



深圳市星源创科技有限公司

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天线测试报告

Antenna Test Report

TC: 英众/Yingzhong

MN: DNN215-140H-XD

RF: 戴进平/jinpingdai

MD: 黄清清/qingqinghuang

MP: 19918388579

Date: 2022. 11. 10

REV :V1. 0

测试信息 Test information

WIFI ANT Test information

Frequency

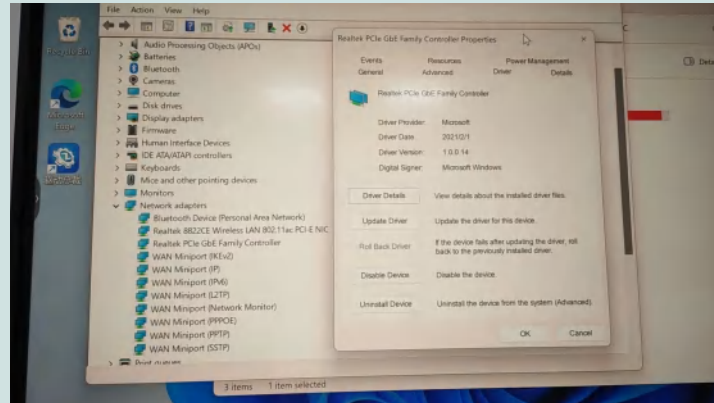
2. 4G (2402~2483) Mhz

5G (5150~5850) Mhz

Module
information



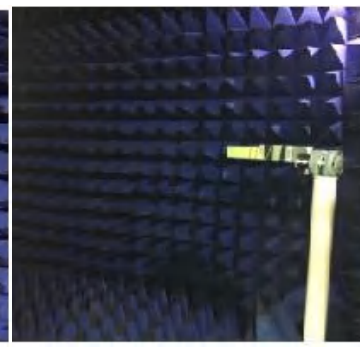
Driver version
information



测试环境

Test environment

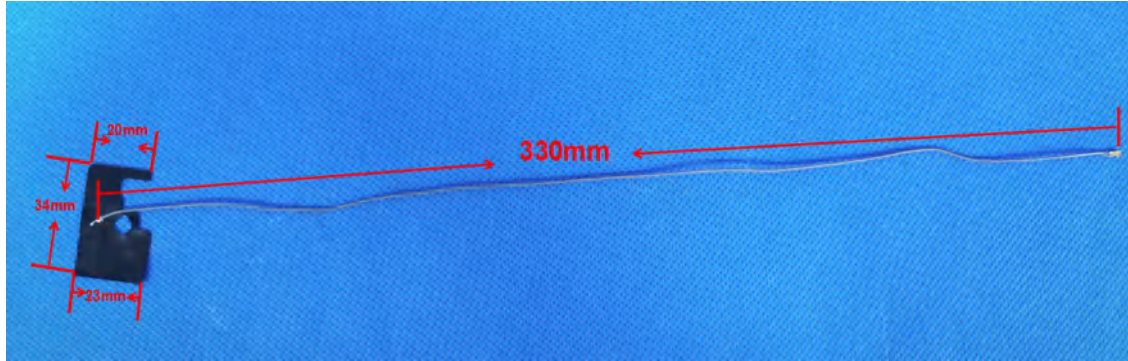
	测试项目/Test project	测试设备/Test equipment
S参数 (S-parameter)	1. 电压驻波比 (VSWR) 2. 回波损耗 (Rrtun Loss)	网络分析仪: Agilent8753ES
2. 有源测试 (Active)	1. 发射功率 (TRP) 2. 接收灵敏度 (TIS) 3. 屏灭/屏亮	1. 暗室: 5*3*3m (3D) Chamber 2. 综测仪: Agilent8960 CMW500
3. 无源测试 (Passive)	1. 天线增益 (Gain) 2. 天线效率 (Efficiency)	1. 暗室: 5*3*3m (3D) Chamber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



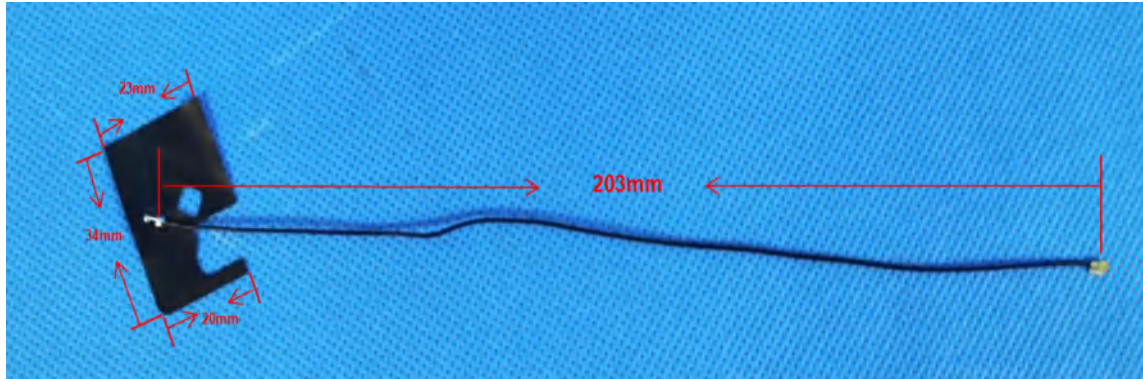
天线尺寸

Antenna S size

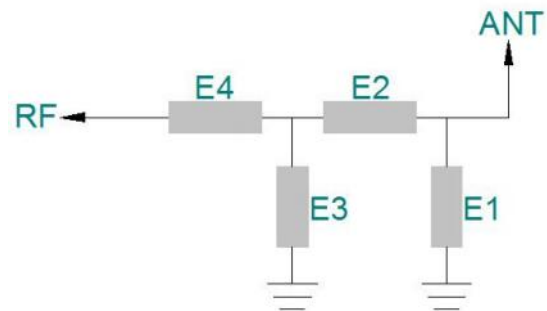
ANT1



ANT2



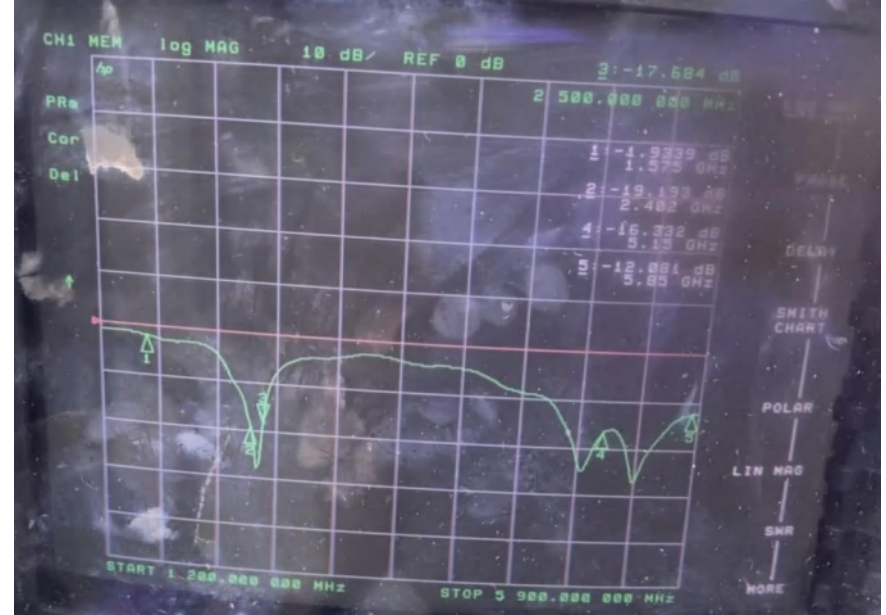
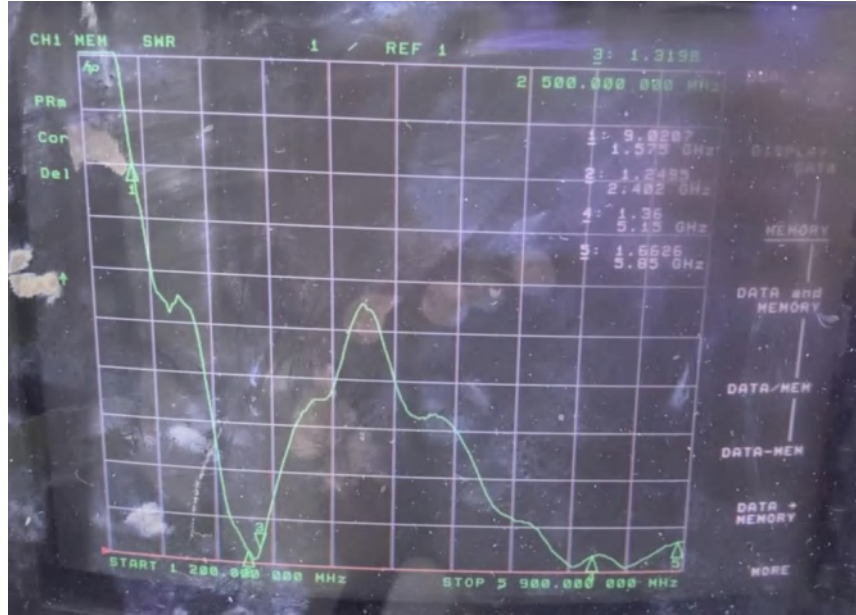
匹配电路 Matching circuit



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

无源测试数据 Passive test data

ANT2 S11-VSWR&Return Loss



Frequency (MHZ)	2400	2450	2483	5150
VSWR	1.24	1.31	1.36	1.66
Return Loss (DB)	-19.19	-17.68	-16.33	-12.06

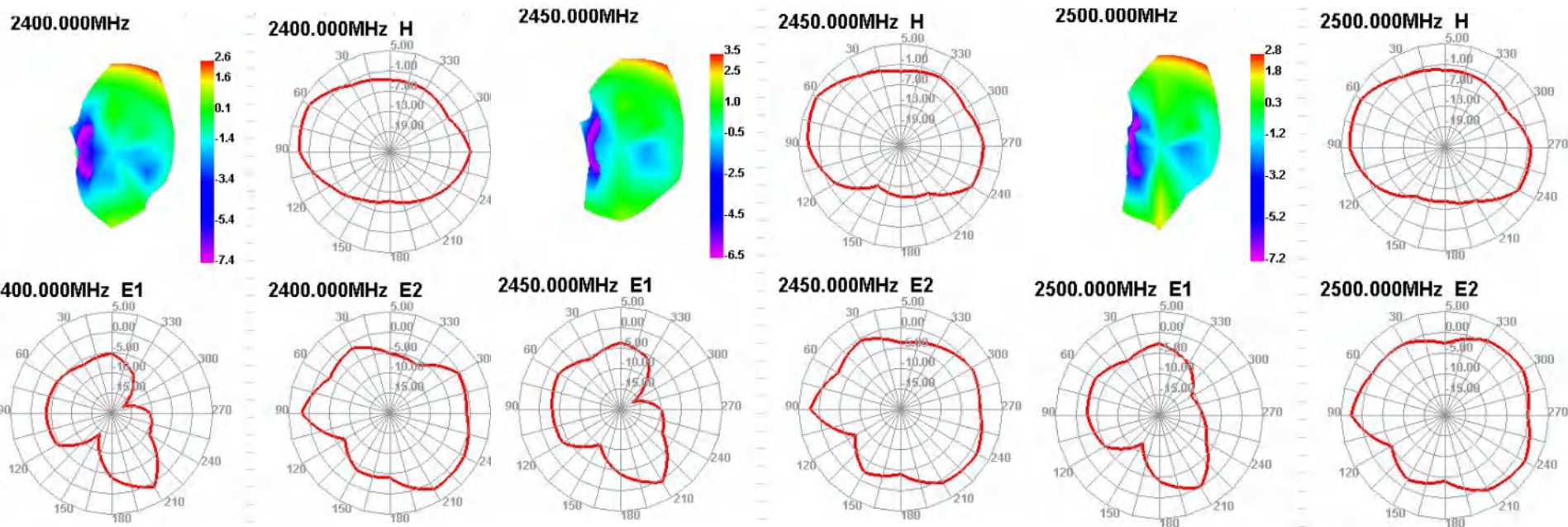
无源测试数据
Passive test data

ANT2 GAIN&Efficiency-WIFI2.4G/BT

Passive Test For WIFI2.4								
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHIS (%)	Max (dB)	Min (dB)
2400	46.42	-3.33	2.64	0.49	19.243	27.18	2.64	-16.88
2410	47.87	-3.2	2.86	0.71	20.007	27.86	2.86	-15.05
2420	48.47	-3.15	3.02	0.87	20.582	27.89	3.02	-14.4
2430	48.47	-3.14	3.05	0.9	20.91	27.564	3.05	-14.67
2440	51.82	-2.86	3.3	1.15	22.874	28.942	3.3	-15.59
2450	55.15	-2.58	3.51	1.36	25.016	30.133	3.51	-16.47
2460	54.55	-2.63	3.41	1.26	25.293	29.255	3.41	-16.02
2470	55.73	-2.54	3.41	1.26	26.356	29.378	3.41	-14.35
2480	59.24	-2.27	3.42	1.27	28.368	30.873	3.42	-13.48
2490	60.79	-2.16	3.27	1.12	29.366	31.428	3.27	-12.26
2500	58.63	-2.32	2.8	0.65	28.661	29.964	2.8	-12.2

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

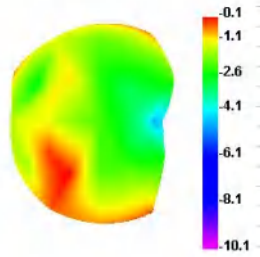
ANT1 GAIN&Efficiency-WIFI 5G

Passive Test For WIFI5G								
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	URI5 (%)	URI5 (%)	Max (dB)	Min (dB)
5150	41.71	-3.8	-0.07	-2.22	25.09	16.623	-0.07	-19.39
5170	40.77	-3.9	0.12	-2.03	24.498	16.27	0.12	-19.38
5190	39.62	-4.02	0.24	-1.91	24.001	15.619	0.24	-18.62
5210	42.55	-3.71	0.78	-1.37	25.891	16.66	0.78	-17.72
5230	42	-3.77	0.78	-1.37	25.399	16.603	0.78	-18.85
5250	42.8	-3.69	0.84	-1.31	25.795	17.004	0.84	-20.38
5270	42.78	-3.69	1.02	-1.13	25.852	16.923	1.02	-20.48
5290	44.36	-3.53	1.18	-0.97	26.795	17.564	1.18	-18.86
5310	42.04	-3.76	0.97	-1.18	25.171	16.866	0.97	-18.38
5330	42.82	-3.68	1.09	-1.06	25.6	17.222	1.09	-17.92
5350	43.9	-3.58	1.27	-0.88	26.334	17.57	1.27	-18.55
5370	42.31	-3.74	0.95	-1.2	25.588	16.72	0.95	-17.54
5390	37.45	-4.27	0.18	-1.97	22.859	14.589	0.18	-16.97
5410	45.95	-3.38	0.93	-1.22	28.586	17.368	0.93	-16.71
5430	40.56	-3.92	0.22	-1.93	25.523	15.036	0.22	-17.39
5450	45.87	-3.38	0.62	-1.53	29.168	16.703	0.62	-15.85
5470	43.28	-3.64	0.54	-1.61	27.859	15.422	0.54	-17.27
5490	46.8	-3.3	0.8	-1.35	30.342	16.461	0.8	-19.21
5510	49.31	-3.07	0.66	-1.49	32.198	17.11	0.66	-17.32
5530	52.45	-2.8	0.84	-1.31	34.419	18.03	0.84	-17.62
5550	56.33	-2.49	1.26	-0.89	37.054	19.275	1.26	-15.06
5570	54.27	-2.65	1.03	-1.12	35.781	18.491	1.03	-16.61
5590	59.15	-2.28	1.17	-0.98	39.155	19.99	1.17	-16.21
5610	55.34	-2.57	0.99	-1.16	36.885	18.451	0.99	-15.15
5630	61.44	-2.12	1.48	-0.67	41.14	20.304	1.48	-16.34
5650	55.78	-2.54	1	-1.15	37.165	18.614	1	-14.34
5670	60.59	-2.18	1.59	-0.56	40.444	20.143	1.59	-15.46
5690	58.55	-2.32	1.41	-0.74	39.415	19.138	1.41	-15.65
5710	58.05	-2.36	1.56	-0.59	39.306	18.748	1.56	-14.68
5730	64	-1.94	2.12	-0.03	43.353	20.65	2.12	-14.3
5750	58.42	-2.33	1.63	-0.52	39.615	18.802	1.63	-15
5770	63.36	-1.98	2.28	0.13	43.403	19.955	2.28	-14.83
5790	58.03	-2.36	2.09	-0.06	40.139	17.893	2.09	-15.47
5810	63.14	-2	2.38	0.23	43.683	19.459	2.38	-15.48
5830	62.09	-2.07	2.42	0.27	42.857	19.231	2.42	-15.56
5850	66.86	-1.75	2.79	0.64	46.243	20.615	2.79	-15

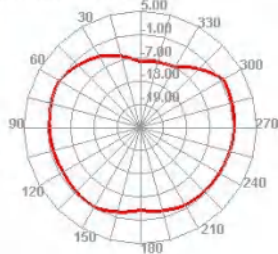
无源测试数据
Passive test data

ANT1 Direction of figure(5G)

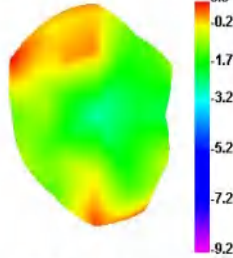
5150.000MHz



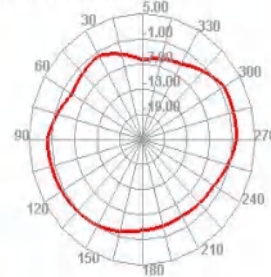
5150.000MHz H



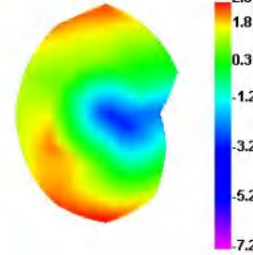
5490.000MHz



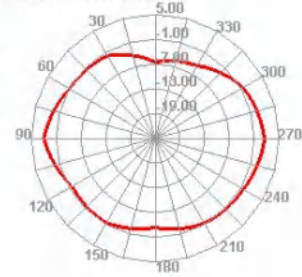
5490.000MHz H



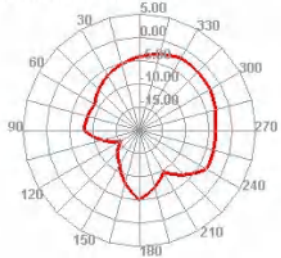
5850.000MHz



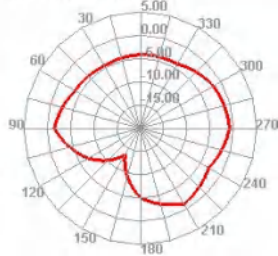
5850.000MHz H



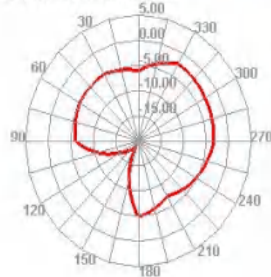
5150.000MHz E1



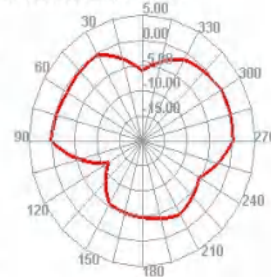
5150.000MHz E2



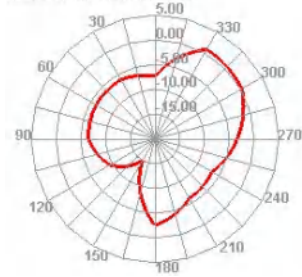
5490.000MHz E1



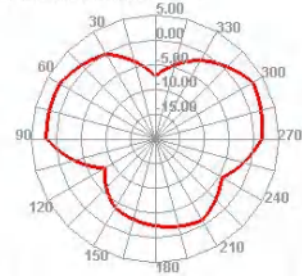
5490.000MHz E2



5850.000MHz E1



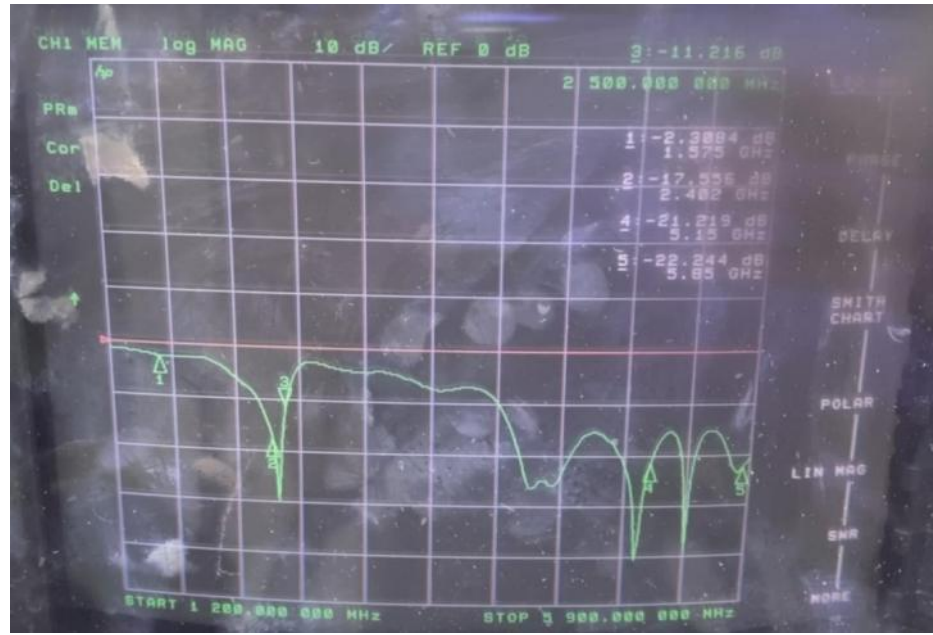
5850.000MHz E2



无源测试数据

Passive test data

ANT2 S11-VSWR&Return Loss



Frequency (MHZ)	2400	2450	2483	5150
VSWR	1.31	1.79	1.19	1.16
Return Loss (DB)	-17.55	-11.21	-21.21	-22.24

无源测试数据
Passive test data

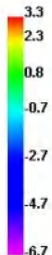
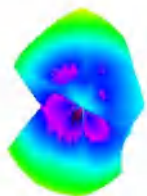
ANT2 GAIN&Efficiency-WIFI2.4G/BT

Passive Test For WIFI2.4								
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHS (%)	Max (dB)	Min (dB)
2400	42.15	-3.75	3.29	1.14	12.047	30.101	3.29	-19.73
2410	43.41	-3.62	3.5	1.35	12.601	30.811	3.5	-19.5
2420	44.17	-3.55	3.54	1.39	13.076	31.09	3.54	-17.6
2430	44.38	-3.53	3.5	1.35	13.361	31.018	3.5	-17.38
2440	47.37	-3.24	3.67	1.52	14.629	32.743	3.67	-17.47
2450	49.56	-3.05	3.65	1.5	15.714	33.847	3.65	-18.51
2460	48.84	-3.11	3.41	1.26	15.729	33.111	3.41	-17.41
2470	50.14	-3	3.41	1.26	16.33	33.805	3.41	-17.26
2480	52.98	-2.76	3.53	1.38	17.448	35.528	3.53	-16.95
2490	52.84	-2.77	3.5	1.35	17.381	35.456	3.5	-17.61
2500	49.41	-3.06	3.28	1.13	16.3	33.11	3.28	-18.82

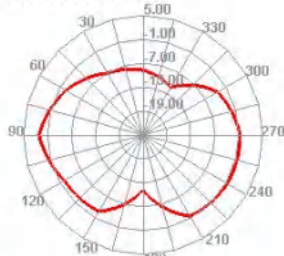
无源测试数据
Passive test data

ANT2 Direction of figure(2.4/BT)

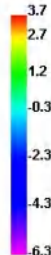
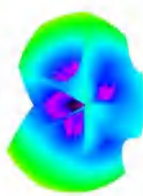
2400.000MHz



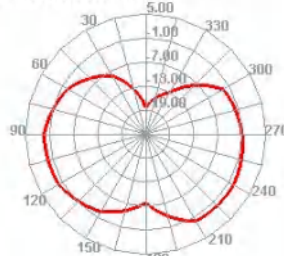
2400.000MHz H



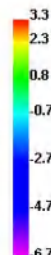
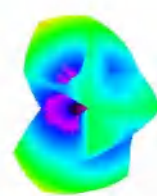
2450.000MHz



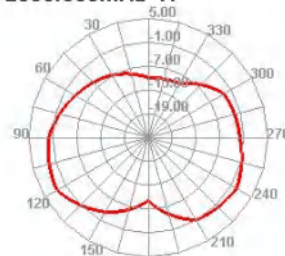
2450.000MHz H



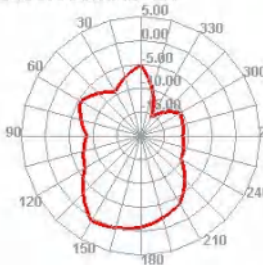
2500.000MHz



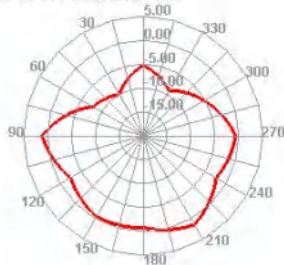
2500.000MHz H



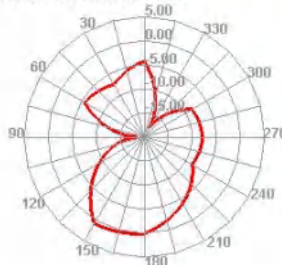
2400.000MHz E1



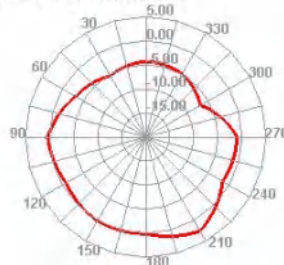
2400.000MHz E2



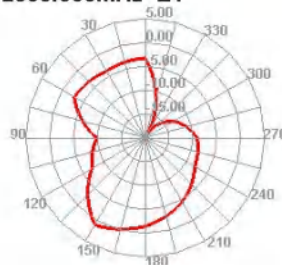
2450.000MHz E1



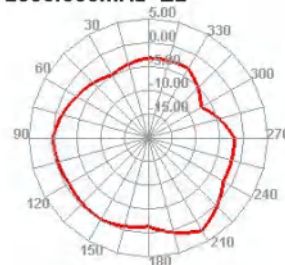
2450.000MHz E2



2500.000MHz E1



2500.000MHz E2



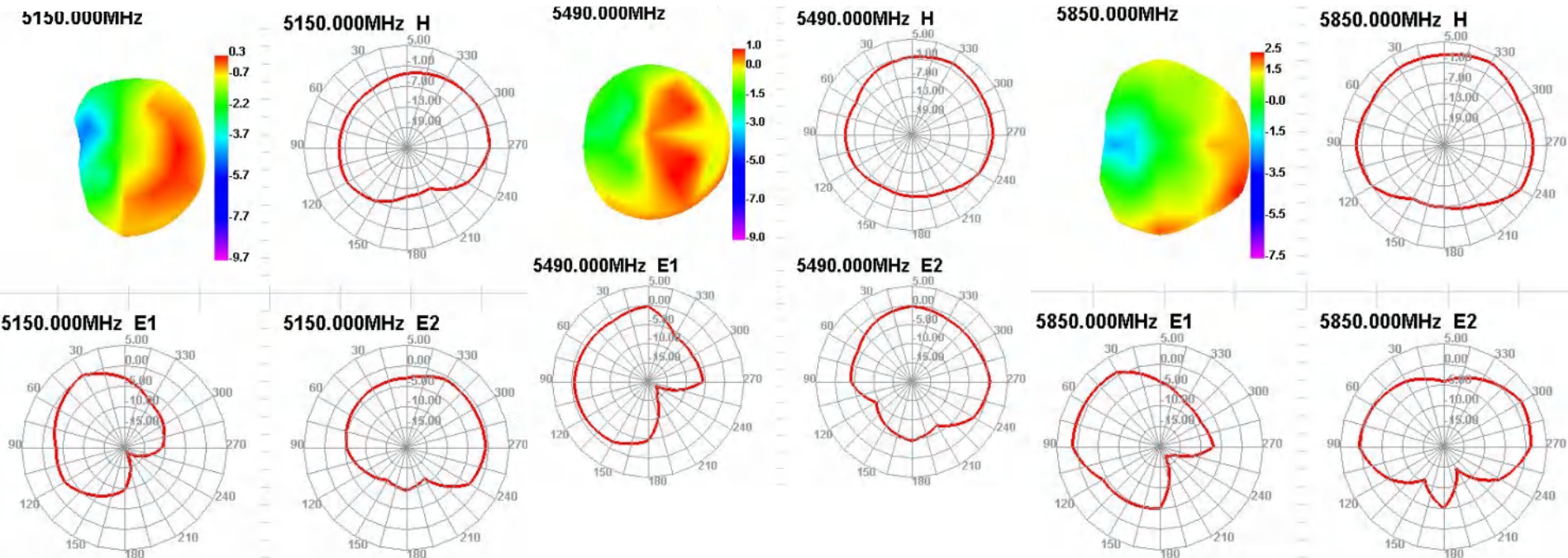
无源测试数据 Passive test data

ANT1 GAIN&Efficiency-WIFI 5G

Passive Test For WIFI5G								
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dEd)	DHIS (%)	DHIS (%)	Max (dB)	Min (dB)
5150	35.95	-4.44	0.32	-1.83	24.028	11.918	0.32	-19.08
5170	37.39	-4.27	0.27	-1.88	24.842	12.545	0.27	-21.92
5190	35.53	-4.49	0.04	-2.11	23.287	12.238	0.04	-24.11
5210	37.91	-4.21	0.2	-1.95	24.662	13.244	0.2	-19.42
5230	36.84	-4.34	-0.16	-2.31	23.884	12.953	-0.16	-19.17
5250	39.7	-4.01	0.12	-2.03	25.692	14.011	0.12	-21.53
5270	41.08	-3.86	0.37	-1.78	26.128	14.956	0.37	-22.74
5290	42.99	-3.67	0.49	-1.66	27.086	15.901	0.49	-17.92
5310	41.33	-3.84	0.57	-1.58	26.055	15.279	0.57	-21.34
5330	43.98	-3.57	0.97	-1.18	27.781	16.198	0.97	-19.49
5350	46.84	-3.29	1.13	-1.02	29.44	17.4	1.13	-17.76
5370	46.59	-3.32	1.02	-1.13	28.945	17.643	1.02	-18.97
5390	42.17	-3.75	0.45	-1.7	26.225	15.945	0.45	-23.76
5410	51.11	-2.91	1.06	-1.09	31.873	19.239	1.06	-22.21
5430	45.21	-3.45	0.55	-1.6	28.416	16.797	0.55	-19.65
5450	50.12	-3	0.95	-1.2	31.383	18.736	0.95	-18.55
5470	46.43	-3.33	0.64	-1.51	28.702	17.727	0.64	-20.71
5490	48.77	-3.12	1.04	-1.11	30.02	18.751	1.04	-24.06
5510	49.95	-3.02	1.59	-0.56	30.907	19.038	1.59	-21.93
5530	52.38	-2.81	1.71	-0.44	32.242	20.14	1.71	-24.21
5550	55.2	-2.58	1.93	-0.22	33.974	21.23	1.93	-22.7
5570	52.75	-2.78	1.67	-0.48	32.602	20.151	1.67	-21.37
5590	58.09	-2.36	2.28	0.13	36.308	21.782	2.28	-26.75
5610	54.16	-2.66	1.86	-0.29	34.4	19.756	1.86	-24.39
5630	60.03	-2.22	2.24	0.09	38.327	21.703	2.24	-21.69
5650	55.05	-2.59	1.84	-0.31	35.417	19.635	1.84	-19.48
5670	59.53	-2.25	2.16	0.01	38.481	21.053	2.16	-22.98
5690	58.73	-2.31	2.17	0.02	38.326	20.408	2.17	-30.72
5710	55.74	-2.54	1.93	-0.22	36.563	19.179	1.93	-25.58
5730	62.01	-2.08	2.47	0.32	40.634	21.372	2.47	-21.68
5750	54.9	-2.6	1.89	-0.26	35.883	19.012	1.89	-23.54
5770	60.24	-2.2	2.33	0.18	39.421	20.822	2.33	-25.36
5790	53.14	-2.75	1.91	-0.24	34.89	18.253	1.91	-24.76
5810	57.27	-2.42	2.39	0.24	37.629	19.643	2.39	-22.14
5830	55.51	-2.56	2.16	0.01	36.333	19.173	2.16	-23.22
5850	61.72	-2.1	2.48	0.33	40.199	21.521	2.48	-20.86

无源测试数据
Passive test data

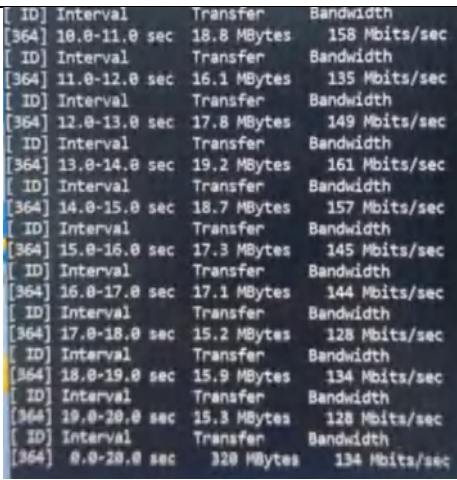
ANT1 Direction of figure(5G)



有源测试数据
Active test data

802.11b	Frequency	TRP		TIS	
	2412	CH1 11Mbps	11.06	CH1 11Mbps	-79.41
	2437	CH6 11Mbps	12.06	CH6 11Mbps	-79.19
	2467	CH11 11Mbps	11.38	CH11 11Mbps	-78.66
802.11a		TRP		TIS	
	5180	CH36 6Mbps	10.92	CH36 54Mbps	-69.79
	5300	CH60 6Mbps	11.63	CH60 54Mbps	-67.98
	5805	CH161 6Mbps	11.06	CH161 54Mbps	-69.69

吞吐量测试 Throughput test

2.4G wifi 吞吐量测试				
上行	134M		下行	217M
图片			图片	
备注				

吞吐量测试 Throughput test

5G wifi 天吐量测试							
上行		465M		下行		532M	
图片	Interval	Transfer	Bandwidth	图片	9.0-10.0 sec	61.2 MBytes	513 Mbits/sec
	11.0-12.0 sec	55.9 MBytes	469 Mbits/sec		Interval	Transfer	Bandwidth
	Interval	Transfer	Bandwidth		10.0-11.0 sec	64.4 MBytes	540 Mbits/sec
	12.0-13.0 sec	55.4 MBytes	465 Mbits/sec		Interval	Transfer	Bandwidth
	Interval	Transfer	Bandwidth		11.0-12.0 sec	63.2 MBytes	530 Mbits/sec
	13.0-14.0 sec	54.6 MBytes	458 Mbits/sec		Interval	Transfer	Bandwidth
	Interval	Transfer	Bandwidth		12.0-13.0 sec	63.5 MBytes	533 Mbits/sec
	14.0-15.0 sec	54.8 MBytes	459 Mbits/sec		Interval	Transfer	Bandwidth
	Interval	Transfer	Bandwidth		13.0-14.0 sec	64.7 MBytes	543 Mbits/sec
	15.0-16.0 sec	54.0 MBytes	453 Mbits/sec		Interval	Transfer	Bandwidth
	Interval	Transfer	Bandwidth		14.0-15.0 sec	63.6 MBytes	533 Mbits/sec
	16.0-17.0 sec	55.8 MBytes	468 Mbits/sec		Interval	Transfer	Bandwidth
	Interval	Transfer	Bandwidth		15.0-16.0 sec	65.9 MBytes	553 Mbits/sec
	17.0-18.0 sec	58.1 MBytes	487 Mbits/sec		Interval	Transfer	Bandwidth
	Interval	Transfer	Bandwidth		16.0-17.0 sec	64.9 MBytes	544 Mbits/sec
18.0-19.0 sec	54.6 MBytes	458 Mbits/sec	Interval	Transfer	Bandwidth		
Interval	Transfer	Bandwidth	17.0-18.0 sec	64.2 MBytes	538 Mbits/sec		
19.0-20.0 sec	55.2 MBytes	463 Mbits/sec	Interval	Transfer	Bandwidth		
Interval	Transfer	Bandwidth	18.0-19.0 sec	65.8 MBytes	552 Mbits/sec		
0.0-20.0 sec	1.08 GBytes	465 Mbits/sec	Interval	Transfer	Bandwidth		
				19.0-20.0 sec	65.6 MBytes	550 Mbits/sec	
				Interval	Transfer	Bandwidth	
				0.0-20.0 sec	1.24 GBytes	532 Mbits/sec	
备注							



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：15/m

结果：播放音乐流畅，无杂音。

Test environment: Open space (channel)

Testing tool: Bluetooth speaker

Test distance: 15 meters

Result: The music plays smoothly without any noise.