



Antenna Test Report

TC: YuKe

MN: RA1503

RF: LiuLeiQue

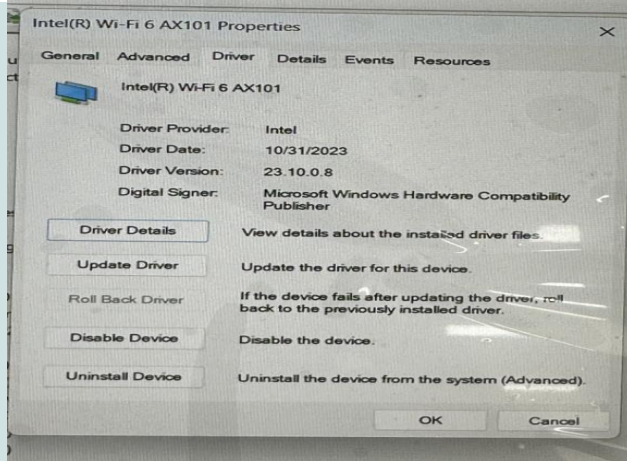
MD: HuangQingqing

MP: 13005478517

Date: 2024. 10. 24

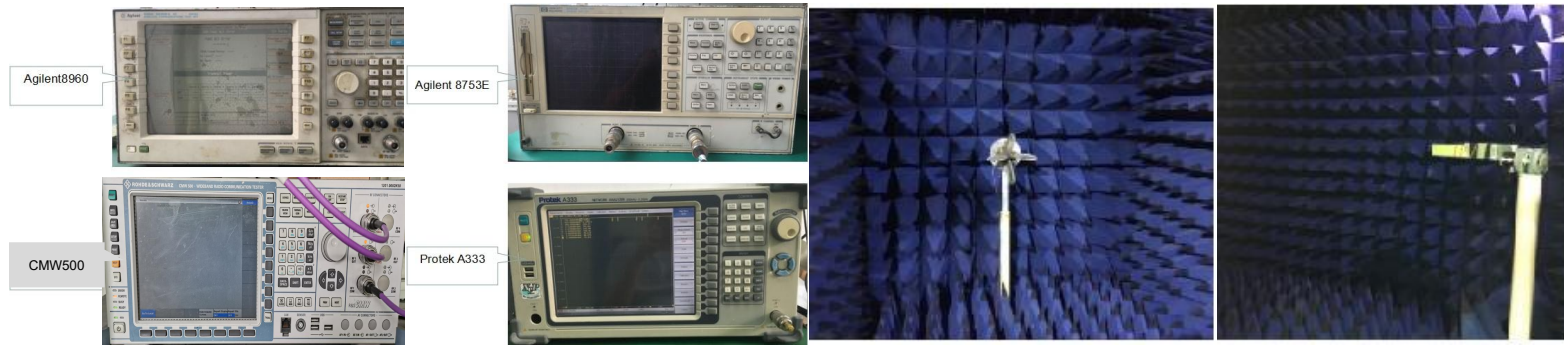
REV :V1. 0

Test information

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

Test environment

	Test items	Test equipment
1. S-parameter	1. VSWR 2. Rrtun Loss	Agilent8753ES
2. Active	1. TRP 2. TIS 3. LCD OFF/ON	1. 5*3*3m (3D) Chamber 2. Agilent8960 CMW500
3. Passive	1. Gain 2. Efficiency	1. 5*3*3m (3D) Chamber 2. Agilent 8753ES

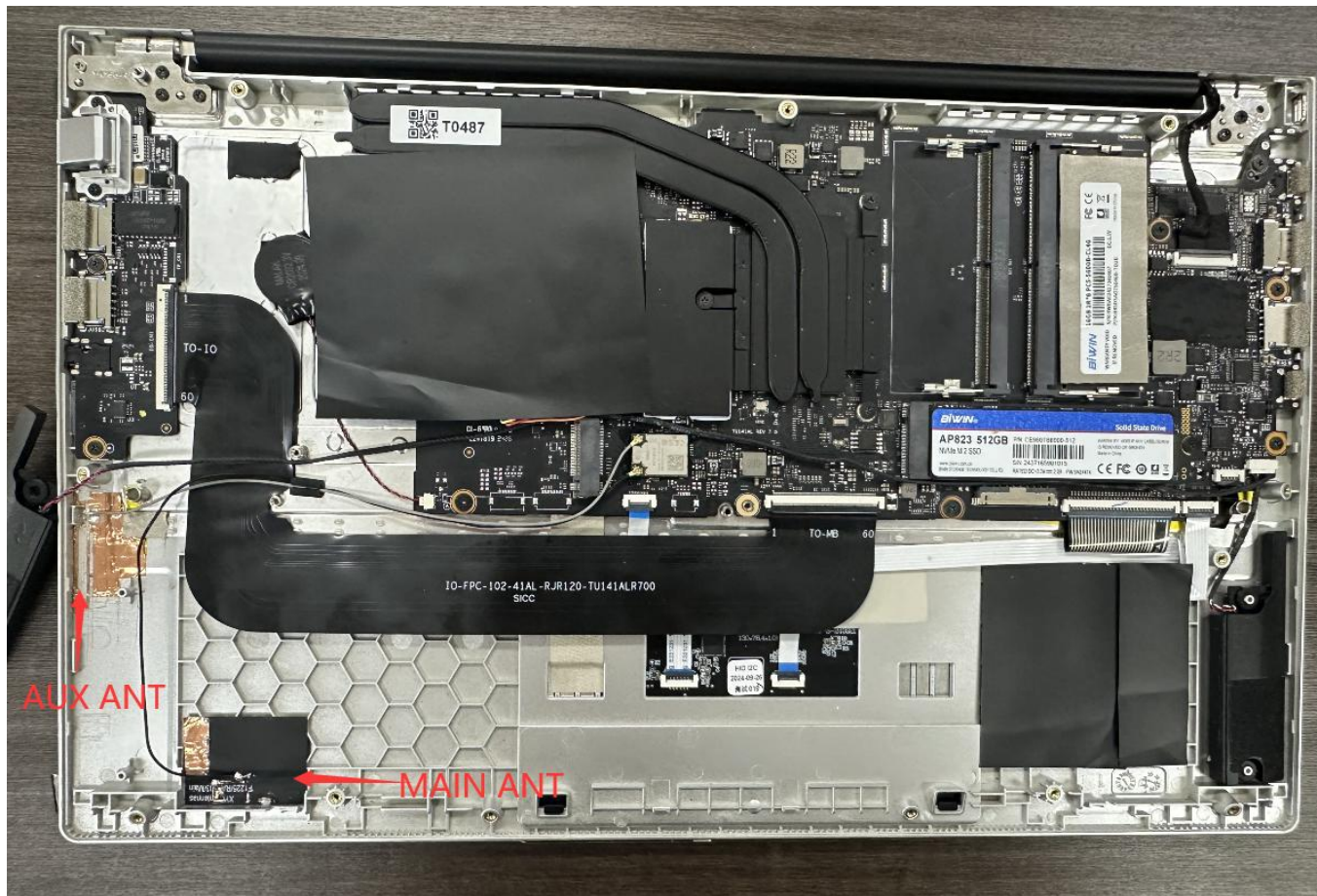




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Antenna position

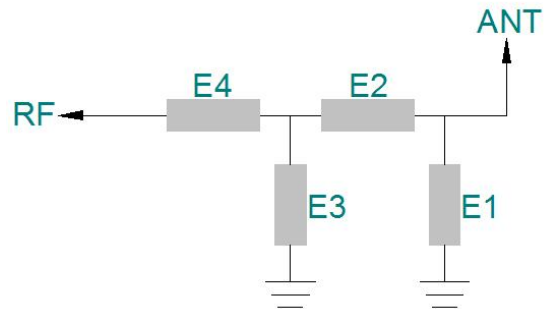




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Matching circuit



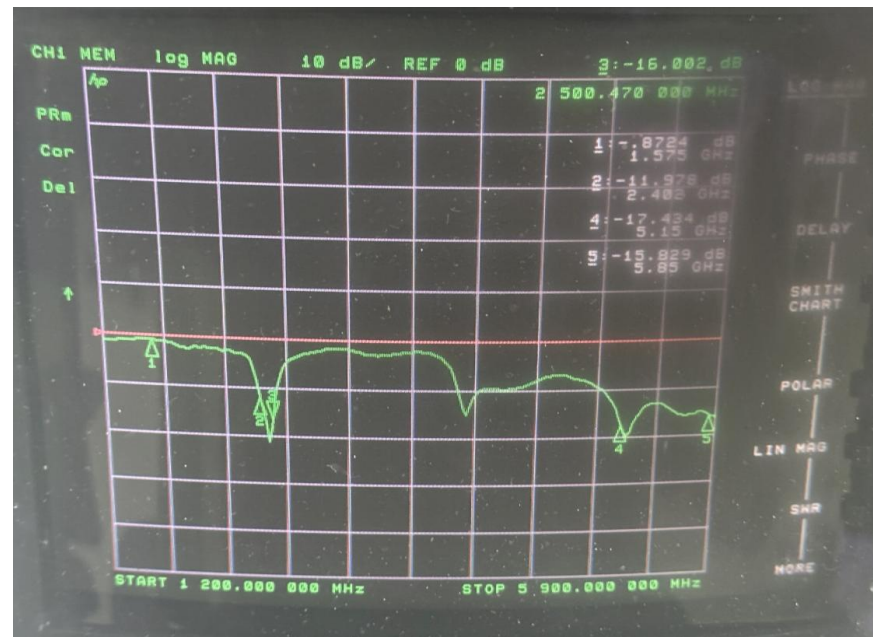
	Capacitors (PF)	Inductance (NH)
E1(0402)		
E2(0402)		
E3(0402)		
E4(0402)		

Matching circuit schematic & Bitmap



Passive test data

ANT1 S11-VSWR&Return Loss



Frequency (MHZ)	2400	2500	5150	5850
VSWR	1.69	1.4	1.31	1.38
Return Loss (DB)	-11.97	-16	-17.43	-15.82



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Passive test data

ANT1 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	24.46	-6.11	1.74	-0.41	13.721	10.742	1.74	-20.76
2410	25.85	-5.87	1.96	-0.19	14.417	11.436	1.96	-20.57
2420	28.8	-5.41	2.22	0.07	15.999	12.804	2.22	-21.01
2430	28.66	-5.43	1.97	-0.18	15.746	12.913	1.97	-22.14
2440	30.35	-5.18	2.1	-0.05	16.508	13.842	2.1	-22.95
2450	32.6	-4.87	2.36	0.21	17.614	14.988	2.36	-23.7
2460	32.89	-4.83	2.41	0.26	17.616	15.269	2.41	-22.32
2470	33.58	-4.74	2.47	0.32	17.926	15.659	2.47	-20.06
2480	33.69	-4.72	2.5	0.35	17.937	15.757	2.5	-19.37
2490	32.74	-4.85	2.39	0.24	17.448	15.295	2.39	-19.35
2500	30.09	-5.22	2.22	0.07	16.097	13.991	2.22	-18.82



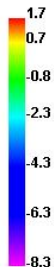
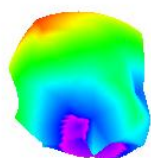
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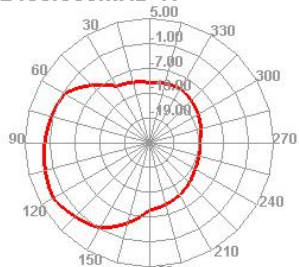
Passive test data

ANT1 Direction of figure(2.4/BT)

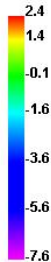
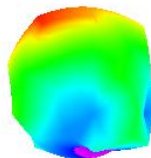
2400.000MHz



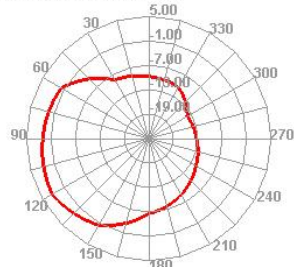
2400.000MHz H



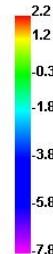
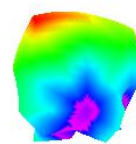
2450.000MHz



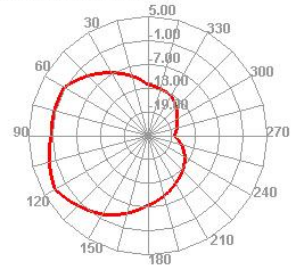
2450.000MHz H



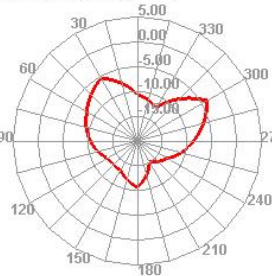
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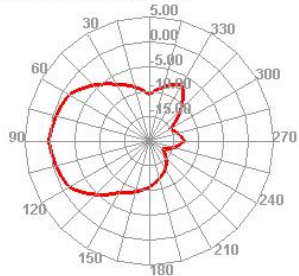
2500.000MHz H



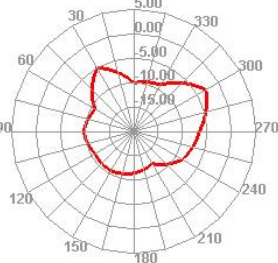
2400.000MHz E1



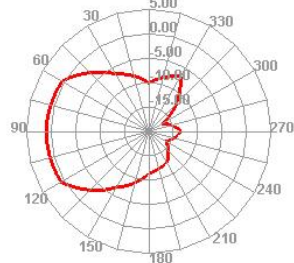
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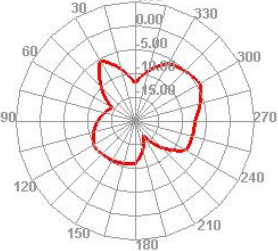
2450.000MHz E1



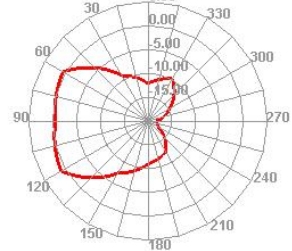
2450.000MHz E2



2500.000MHz E1



2500.000MHz E2





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Passive test data

ANT1 GAIN&Efficiency-WIFI 5G

Passive Test For WIFI5G								
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHS (%)	Max (dB)	Min (dB)
5150	27.58	-5.59	0.98	-1.17	15.121	12.456	0.98	-37.31
5170	26.75	-5.73	0.79	-1.36	14.683	12.066	0.79	-26.29
5190	29.98	-5.23	1.12	-1.03	16.35	13.63	1.12	-22.2
5210	30.79	-5.12	1.09	-1.06	16.541	14.246	1.09	-20.73
5230	30	-5.23	1.16	-0.99	15.927	14.068	1.16	-22.36
5250	34.79	-4.59	1.96	-0.19	18.218	16.572	1.96	-24.74
5270	36.16	-4.42	1.97	-0.18	18.793	17.366	1.97	-22.96
5290	39.79	-4	2.14	-0.01	20.507	19.287	2.14	-21.67
5310	35.5	-4.5	1.54	-0.61	18.226	17.273	1.54	-24.72
5330	35.9	-4.45	1.92	-0.23	18.578	17.321	1.92	-22.73
5350	37.19	-4.3	2.35	0.2	19.277	17.909	2.35	-28.89
5370	34.83	-4.58	2.2	0.05	18.052	16.776	2.2	-23.73
5390	32.26	-4.91	1.8	-0.35	16.754	15.501	1.8	-25.66
5410	36.19	-4.41	2.14	-0.01	18.741	17.453	2.14	-26.09
5430	35.68	-4.48	2.08	-0.07	18.356	17.326	2.08	-27.24
5450	37.29	-4.28	2.69	0.54	19.148	18.139	2.69	-25.28
5470	36.6	-4.36	2.91	0.76	18.923	17.679	2.91	-22.55
5490	35.31	-4.52	2.91	0.76	18.36	16.951	2.91	-28.65
5510	36.76	-4.35	2.91	0.76	19.131	17.626	2.91	-22.63
5530	36.65	-4.36	2.87	0.72	19.138	17.512	2.87	-22.61
5550	38.97	-4.09	3.12	0.97	20.357	18.609	3.12	-20.92
5570	37.02	-4.32	2.83	0.68	19.208	17.812	2.83	-21.94
5590	37.83	-4.22	2.7	0.55	19.421	18.41	2.7	-24.6
5610	34.55	-4.62	1.99	-0.16	17.607	16.941	1.99	-23.69
5630	34.81	-4.58	1.81	-0.34	17.879	16.935	1.81	-22.27
5650	33.17	-4.79	1.48	-0.67	17.157	16.015	1.48	-25.4
5670	36.77	-4.34	2.06	-0.09	19.103	17.671	2.06	-21.1
5690	31.77	-4.98	1.76	-0.39	16.695	15.073	1.76	-21.29
5710	33.98	-4.69	2.43	0.28	18.305	15.679	2.43	-22.02
5730	33.64	-4.73	2.54	0.39	18.405	15.238	2.54	-22.05
5750	30.89	-5.1	2.07	-0.08	17.005	13.884	2.07	-19.93
5770	33	-4.81	2.32	0.17	18.293	14.709	2.32	-23.28
5790	30.78	-5.12	1.88	-0.27	17.225	13.551	1.88	-19.49
5810	33.21	-4.79	2.5	0.35	18.777	14.433	2.5	-19.93
5830	34.6	-4.61	3.02	0.87	19.815	14.786	3.02	-24.59
5850	37.88	-4.22	3.56	1.41	21.764	16.113	3.56	-31.06



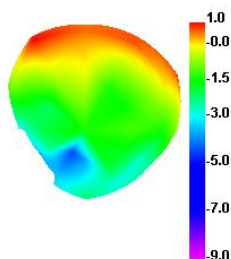
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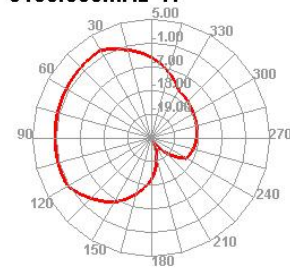
Passive test data

ANT1 Direction of figure(5G)

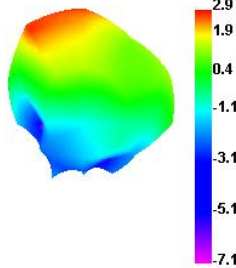
5150.000MHz



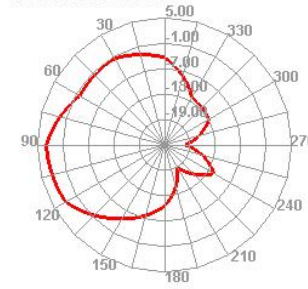
5150.000MHz H



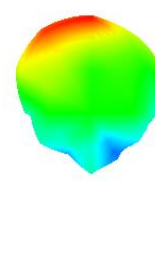
5490.000MHz



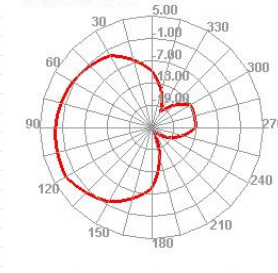
5490.000MHz H



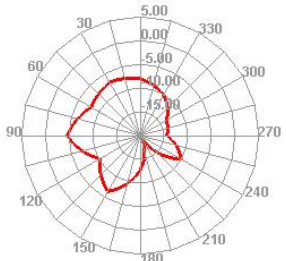
5850.000MHz



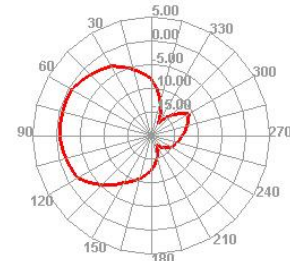
5850.000MHz H



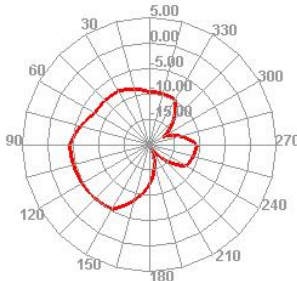
5150.000MHz E1



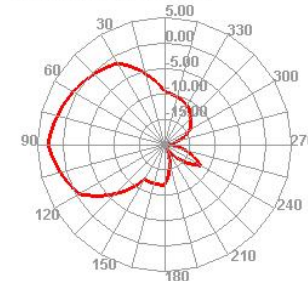
5150.000MHz E2



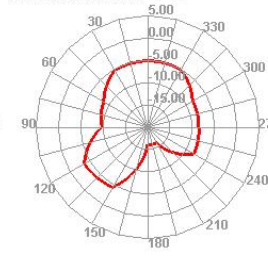
5490.000MHz E1



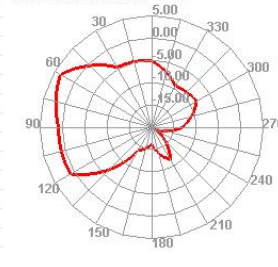
5490.000MHz E2



5850.000MHz E1



5850.000MHz E2



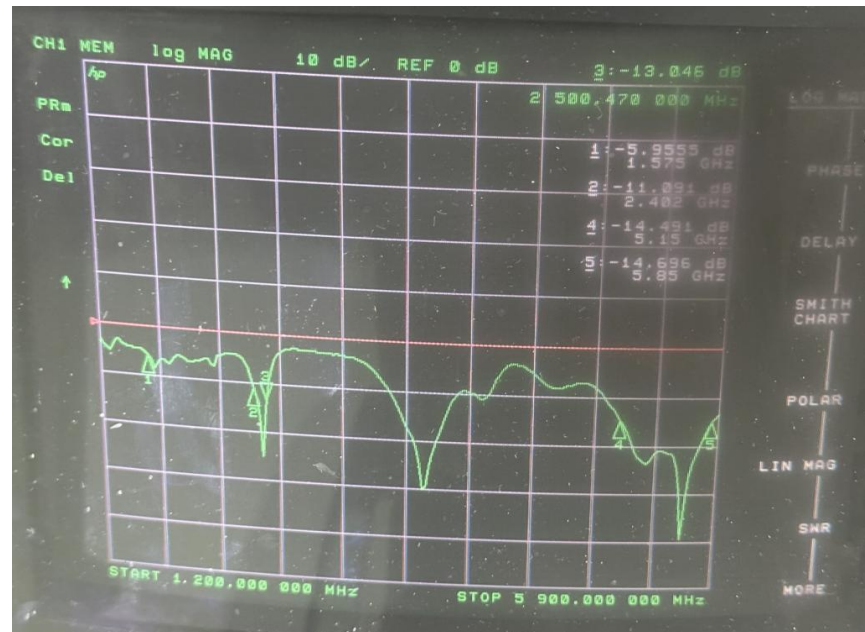


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Passive test data

ANT2 S11-VSWR&Return Loss



Frequency (MHZ)	2400	2500	5150	5850
VSWR	1.77	1.62	1.46	1.45
Return Loss (DB)	-11.09	-13.04	-14.49	-14.69



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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	16.76	-7.76	-1.35	-3.5	8.373	8.384	-1.35	-17.11
2410	16.97	-7.7	-1.39	-3.54	8.237	8.738	-1.39	-16.7
2420	18.76	-7.27	-0.81	-2.96	8.921	9.835	-0.81	-16.38
2430	19.34	-7.14	-0.38	-2.53	9.111	10.224	-0.38	-16.11
2440	21.28	-6.72	0.46	-1.69	10.063	11.221	0.46	-14.96
2450	21.74	-6.63	1.03	-1.12	10.328	11.407	1.03	-17.72
2460	22.42	-6.49	1.64	-0.51	10.648	11.772	1.64	-20.7
2470	23.96	-6.21	2.24	0.09	11.454	12.502	2.24	-22.74
2480	24.14	-6.17	2.38	0.23	11.563	12.579	2.38	-23.23
2490	24.65	-6.08	2.43	0.28	11.843	12.802	2.43	-21.75
2500	22.85	-6.41	1.84	-0.31	10.934	11.914	1.84	-20.54



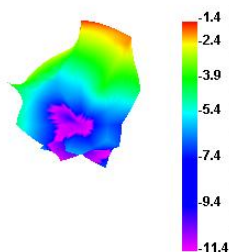
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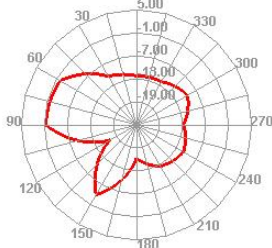
Passive test data

ANT2 Direction of figure(2.4/BT)

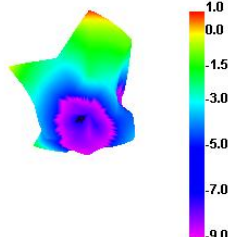
2400.000MHz



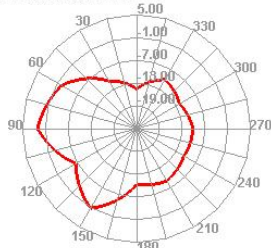
2400.000MHz H



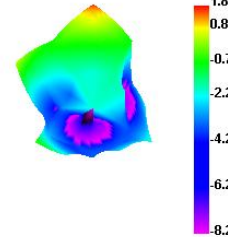
2450.000MHz



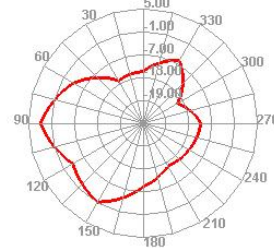
2450.000MHz H



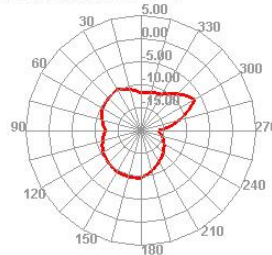
2500.000MHz



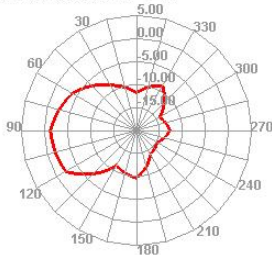
2500.000MHz H



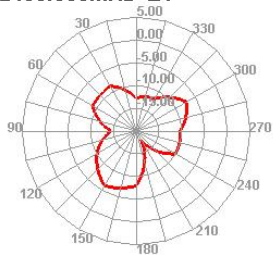
2400.000MHz E1



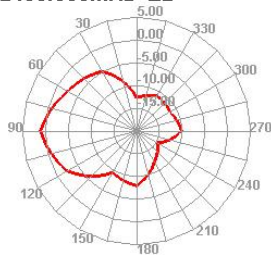
2400.000MHz E2



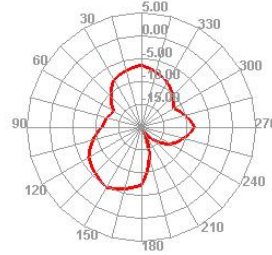
2450.000MHz E1



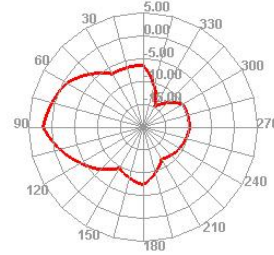
2450.000MHz E2



2500.000MHz E1



2500.000MHz E2





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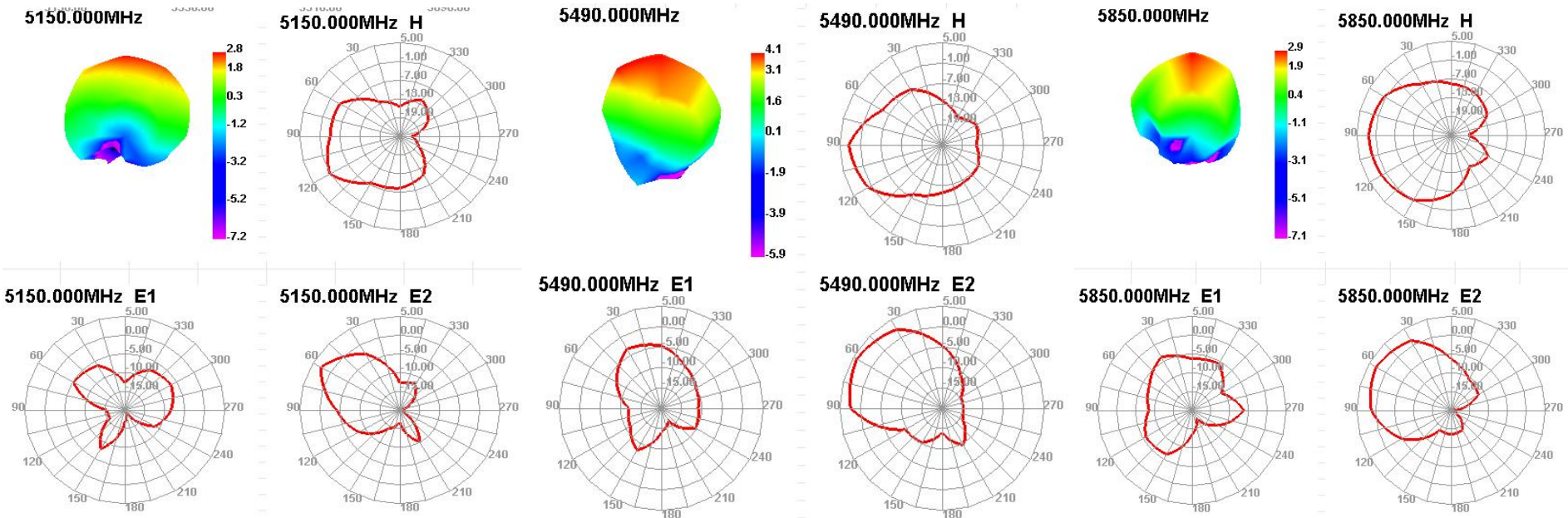
Passive test data

ANT2 GAIN&Efficiency-WIFI 5G

Passive Test For WIFI5G								
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHS (%)	Max (dB)	Min (dB)
5150	22.78	-6.42	2.78	0.63	17.919	4.862	2.78	-26.96
5170	25.07	-6.01	3.4	1.25	19.887	5.183	3.4	-26.65
5190	25.66	-5.91	3.58	1.43	20.659	5.003	3.58	-23.19
5210	30.62	-5.14	4.54	2.39	24.893	5.732	4.54	-22.51
5230	28.51	-5.45	4.32	2.17	23.394	5.115	4.32	-24.33
5250	34.89	-4.57	5.42	3.27	28.945	5.94	5.42	-25.05
5270	32.16	-4.93	5.17	3.02	26.798	5.365	5.17	-25.5
5290	36.05	-4.43	5.55	3.4	29.475	6.577	5.55	-25.06
5310	30.94	-5.09	4.7	2.55	24.71	6.228	4.7	-26.9
5330	32	-4.95	4.52	2.37	25.05	6.951	4.52	-26.6
5350	32.66	-4.86	4.37	2.22	25.251	7.412	4.37	-22.69
5370	32.31	-4.91	4.3	2.15	24.87	7.443	4.3	-24.38
5390	30.89	-5.1	3.9	1.75	23.503	7.388	3.9	-23.74
5410	36.43	-4.39	4.43	2.28	27.626	8.805	4.43	-23.4
5430	35.1	-4.55	4.03	1.88	26.76	8.34	4.03	-24.49
5450	37.54	-4.25	4.29	2.14	28.802	8.739	4.29	-23.12
5470	36.24	-4.41	4.12	1.97	28.035	8.208	4.12	-23.36
5490	35.53	-4.49	4.08	1.93	27.714	7.818	4.08	-25.66
5510	36.72	-4.35	4.23	2.08	28.986	7.73	4.23	-22.81
5530	37.4	-4.27	4.38	2.23	29.818	7.586	4.38	-20.2
5550	40.78	-3.9	4.61	2.46	32.45	8.328	4.61	-18.02
5570	39.32	-4.05	4.03	1.88	30.976	8.342	4.03	-17.66
5590	40.97	-3.87	4.54	2.39	31.652	9.322	4.54	-17.54
5610	38.13	-4.19	4.71	2.56	29.129	8.997	4.71	-18.27
5630	37.71	-4.24	4.85	2.7	28.461	9.244	4.85	-21.13
5650	36.2	-4.41	4.42	2.27	26.84	9.363	4.42	-22.38
5670	37.3	-4.28	4.07	1.92	26.95	10.352	4.07	-25.55
5690	34.14	-4.67	3.23	1.08	23.851	10.293	3.23	-27.49
5710	34.56	-4.61	2.92	0.77	23.748	10.816	2.92	-18.75
5730	35.14	-4.54	2.65	0.5	23.973	11.164	2.65	-17.21
5750	30.46	-5.16	1.53	-0.62	20.548	9.913	1.53	-17.34
5770	31.95	-4.96	1.8	-0.35	21.285	10.66	1.8	-17.86
5790	27.69	-5.58	1.15	-1	18.435	9.259	1.15	-21.71
5810	29.57	-5.29	1.61	-0.54	19.856	9.719	1.61	-22.36
5830	28.85	-5.4	1.89	-0.26	19.503	9.347	1.89	-21.33
5850	32.49	-4.88	2.93	0.78	22.277	10.217	2.93	-20.7

Passive test data

ANT2 Direction of figure(5G)





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Active test data

802.11b	Frequency	TRP		TIS	
	2412	CH1 11Mbps	10.41	CH1 11Mbps	-75.63
	2437	CH6 11Mbps	11.49	CH6 11Mbps	-74.98
	2467	CH11 11Mbps	10.7	CH11 11Mbps	-74.58
802.11a		TRP		TIS	
	5180	CH36 6Mbps	10.45	CH36 54Mbps	-69.93
	5300	CH60 6Mbps	11.66	CH60 54Mbps	-69.65
	5805	CH161 6Mbps	10.94	CH161 54Mbps	-68.68



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Throughput test

2.4G wifi Antenna Throughput test				
upstream	167M		downlink	155M
picture	[ID] Interval Transfer Bandwidth [384] 18.0-19.0 sec 21.1 MBytes 177 Mbits/sec [ID] Interval Transfer Bandwidth [384] 19.0-20.0 sec 19.5 MBytes 164 Mbits/sec [ID] Interval Transfer Bandwidth [384] 20.0-21.0 sec 21.8 MBytes 183 Mbits/sec [ID] Interval Transfer Bandwidth [384] 21.0-22.0 sec 20.6 MBytes 173 Mbits/sec [ID] Interval Transfer Bandwidth [384] 22.0-23.0 sec 21.6 MBytes 181 Mbits/sec [ID] Interval Transfer Bandwidth [384] 23.0-24.0 sec 21.3 MBytes 179 Mbits/sec [ID] Interval Transfer Bandwidth [384] 24.0-25.0 sec 19.2 MBytes 161 Mbits/sec [ID] Interval Transfer Bandwidth [384] 25.0-26.0 sec 20.9 MBytes 176 Mbits/sec [ID] Interval Transfer Bandwidth [384] 26.0-27.0 sec 21.8 MBytes 182 Mbits/sec [ID] Interval Transfer Bandwidth [384] 27.0-28.0 sec 20.3 MBytes 170 Mbits/sec [ID] Interval Transfer Bandwidth [384] 28.0-29.0 sec 20.7 MBytes 174 Mbits/sec [ID] Interval Transfer Bandwidth [384] 29.0-30.0 sec 17.8 MBytes 150 Mbits/sec [ID] Interval Transfer Bandwidth [384] 0.0-30.0 sec 596 MBytes 167 Mbits/sec		picture	[ID] Interval Transfer Bandwidth [272] 17.0-18.0 sec 18.4 MBytes 154 Mbits/sec [ID] Interval Transfer Bandwidth [272] 18.0-19.0 sec 11.1 MBytes 92.9 Mbits/sec [ID] Interval Transfer Bandwidth [272] 19.0-20.0 sec 17.7 MBytes 149 Mbits/sec [ID] Interval Transfer Bandwidth [272] 20.0-21.0 sec 18.7 MBytes 157 Mbits/sec [ID] Interval Transfer Bandwidth [272] 21.0-22.0 sec 18.3 MBytes 153 Mbits/sec [ID] Interval Transfer Bandwidth [272] 22.0-23.0 sec 14.6 MBytes 123 Mbits/sec [ID] Interval Transfer Bandwidth [272] 23.0-24.0 sec 14.7 MBytes 123 Mbits/sec [ID] Interval Transfer Bandwidth [272] 24.0-25.0 sec 18.7 MBytes 157 Mbits/sec [ID] Interval Transfer Bandwidth [272] 25.0-26.0 sec 18.6 MBytes 156 Mbits/sec [ID] Interval Transfer Bandwidth [272] 26.0-27.0 sec 12.4 MBytes 104 Mbits/sec [ID] Interval Transfer Bandwidth [272] 27.0-28.0 sec 17.1 MBytes 144 Mbits/sec [ID] Interval Transfer Bandwidth [272] 28.0-29.0 sec 18.3 MBytes 154 Mbits/sec [ID] Interval Transfer Bandwidth [272] 29.0-30.0 sec 18.7 MBytes 157 Mbits/sec [ID] Interval Transfer Bandwidth [272] 0.0-30.0 sec 555 MBytes 155 Mbits/sec
remarks				



ANTENNA

Throughput test

5G wifi Antenna Throughput test									
upstream		391M			downlink		416M		
picture	[ID]	Interval	Transfer	Bandwidth	picture	[272]	17.0-18.0 sec	49.6 MBytes	416 Mbits/sec
	[384]	18.0-19.0 sec	48.2 MBytes	404 Mbits/sec		[ID]	Interval	Transfer	Bandwidth
	[ID]	Interval	Transfer	Bandwidth		[272]	18.0-19.0 sec	49.4 MBytes	415 Mbits/sec
	[384]	19.0-20.0 sec	47.8 MBytes	401 Mbits/sec		[ID]	Interval	Transfer	Bandwidth
	[ID]	Interval	Transfer	Bandwidth		[272]	19.0-20.0 sec	46.5 MBytes	390 Mbits/sec
	[384]	20.0-21.0 sec	47.9 MBytes	402 Mbits/sec		[ID]	Interval	Transfer	Bandwidth
	[ID]	Interval	Transfer	Bandwidth		[272]	20.0-21.0 sec	44.9 MBytes	376 Mbits/sec
	[384]	21.0-22.0 sec	46.6 MBytes	391 Mbits/sec		[ID]	Interval	Transfer	Bandwidth
	[ID]	Interval	Transfer	Bandwidth		[272]	21.0-22.0 sec	47.5 MBytes	398 Mbits/sec
	[384]	22.0-23.0 sec	48.2 MBytes	405 Mbits/sec		[ID]	Interval	Transfer	Bandwidth
	[ID]	Interval	Transfer	Bandwidth		[272]	22.0-23.0 sec	49.0 MBytes	411 Mbits/sec
	[384]	23.0-24.0 sec	47.4 MBytes	398 Mbits/sec		[ID]	Interval	Transfer	Bandwidth
	[ID]	Interval	Transfer	Bandwidth		[272]	23.0-24.0 sec	48.1 MBytes	403 Mbits/sec
	[384]	24.0-25.0 sec	46.4 MBytes	389 Mbits/sec		[ID]	Interval	Transfer	Bandwidth
	[ID]	Interval	Transfer	Bandwidth		[272]	24.0-25.0 sec	49.3 MBytes	413 Mbits/sec
	[384]	25.0-26.0 sec	48.3 MBytes	405 Mbits/sec		[ID]	Interval	Transfer	Bandwidth
	[ID]	Interval	Transfer	Bandwidth		[272]	25.0-26.0 sec	49.5 MBytes	416 Mbits/sec
[384]	26.0-27.0 sec	46.8 MBytes	393 Mbits/sec	[ID]	Interval	Transfer	Bandwidth		
[ID]	Interval	Transfer	Bandwidth	[272]	26.0-27.0 sec	50.8 MBytes	426 Mbits/sec		
[384]	27.0-28.0 sec	48.0 MBytes	403 Mbits/sec	[ID]	Interval	Transfer	Bandwidth		
[ID]	Interval	Transfer	Bandwidth	[272]	27.0-28.0 sec	51.0 MBytes	428 Mbits/sec		
[384]	28.0-29.0 sec	47.5 MBytes	399 Mbits/sec	[ID]	Interval	Transfer	Bandwidth		
[ID]	Interval	Transfer	Bandwidth	[272]	28.0-29.0 sec	49.0 MBytes	411 Mbits/sec		
[384]	29.0-30.0 sec	47.9 MBytes	402 Mbits/sec	[ID]	Interval	Transfer	Bandwidth		
[ID]	Interval	Transfer	Bandwidth	[272]	29.0-30.0 sec	34.0 MBytes	285 Mbits/sec		
[384]	30.0-30.0 sec	1.37 GBytes	391 Mbits/sec	[ID]	Interval	Transfer	Bandwidth		
[272]	30.0-30.0 sec	1.45 GBytes	415 Mbits/sec						
remarks									

BT Antenna test

Test environment: Open Space(Access)

Test tool: Bluetooth speakers

Test distance: 10m

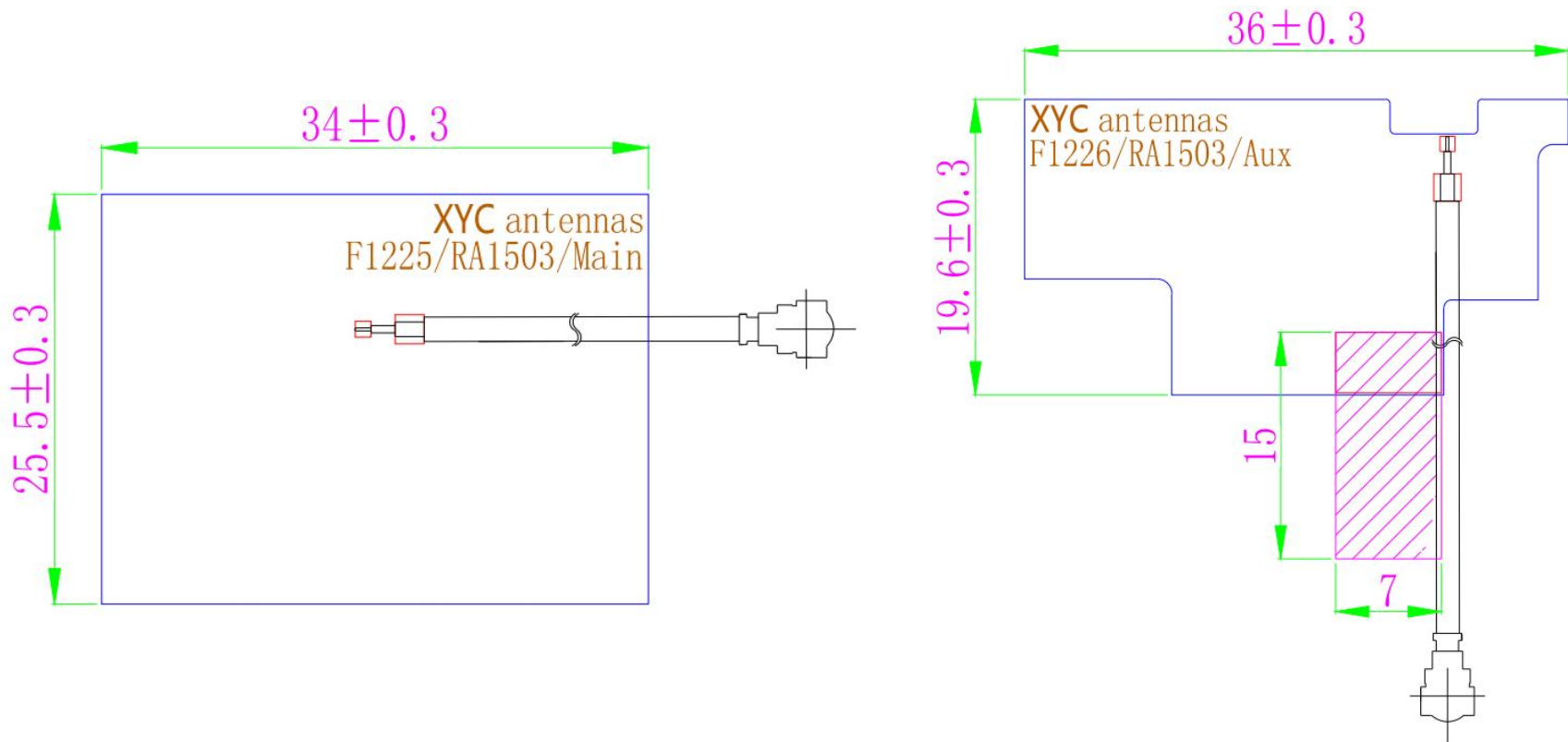
Results: the music played smoothly and
without noise



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Antenna diagram





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Environmental treatment





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Environmental treatment

