



ShenZhen Huaxinwei communication technology
Co.,Ltd.

Antenna test report

Customer Name: FreeYond

Project Name: M5

Designer: Zhang Jun

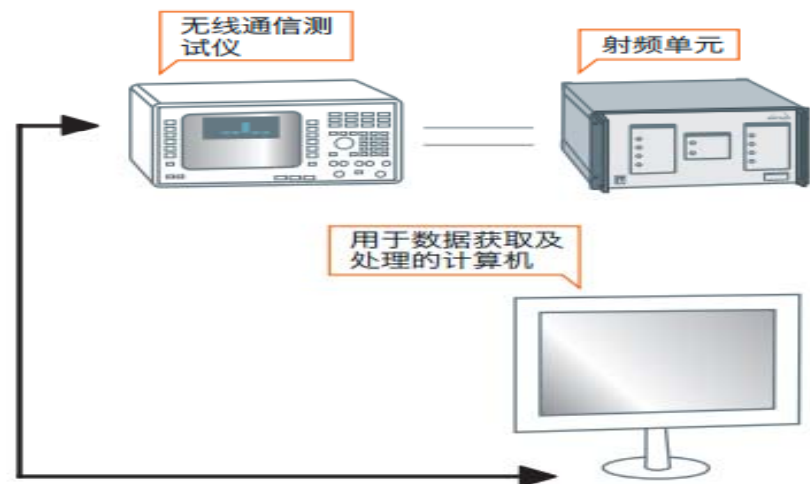
Date: 2022/09/14



The customer name		FreeYond	Project Name	M5
NO.	project	Detailed above		
1	spectrum	GSM850/900/1800/1900+WCDMA-B1/2/4/5/8+LTE-B2/4/5/7/66+GPS/WIFI/BT		
2	Project type	The mobile phone		
3	Antenna space area			
4	Feed point type			
5	The sensitivity			
6	Type of antenna	PIFA		
7	The length of the PCB board			
8	note	Debugging prototype		
RF				

1、Test system and test equipment

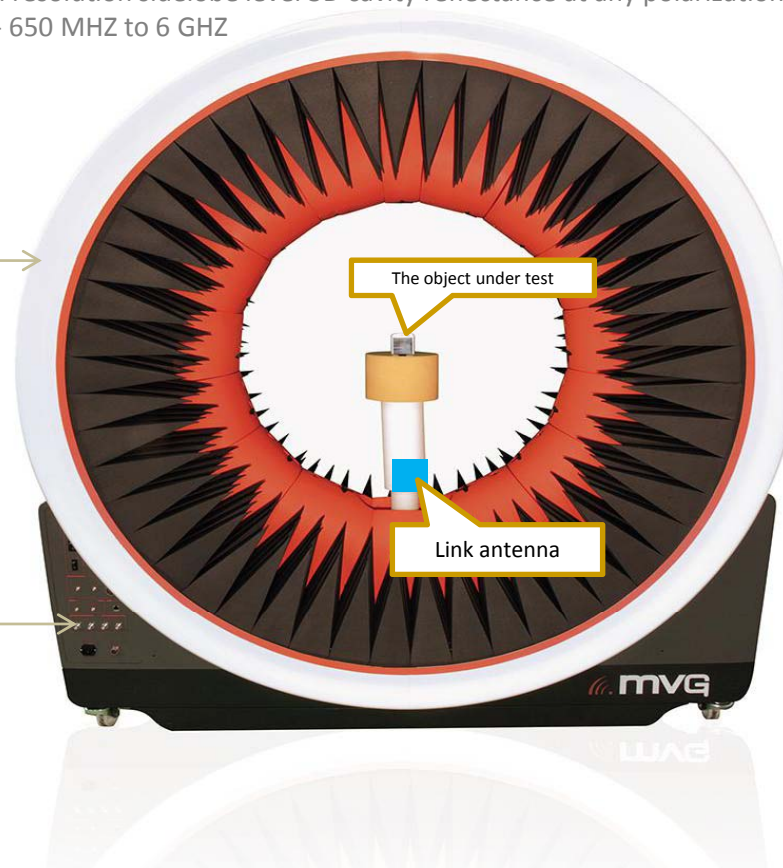
System Brand: MVG(SATIMO) measurement features: gain • pattern beamwidth cross polarization resolution sidelobe level 3D cavity reflectance at any polarization cavity reflectance (line or arc) antenna efficiency TRP, TIS, EIRP and EIS. Frequency band: StarLab 6 GHZ - 650 MHZ to 6 GHZ



TIS预计测量时间 (一个信道每隔30° 取样)

灵敏度算法 \ 标准	GSM GPRS EDGE	CDMA 1 x RTT 1 x EvDO	WCDMA HSDPA LTE FDD/TDD	Wi-Fi 802.11 a/b/g/n	CTIA 批准方法
RSSI模式+线性化+TIS补偿	8 min		10 min		是
EIS模式+TIS补偿		5 min		5 min	是 ²
快速CDMA		8 min			No
EIRP模式+TIS补偿				10 min	No

1、根据RTC
2、根据协议

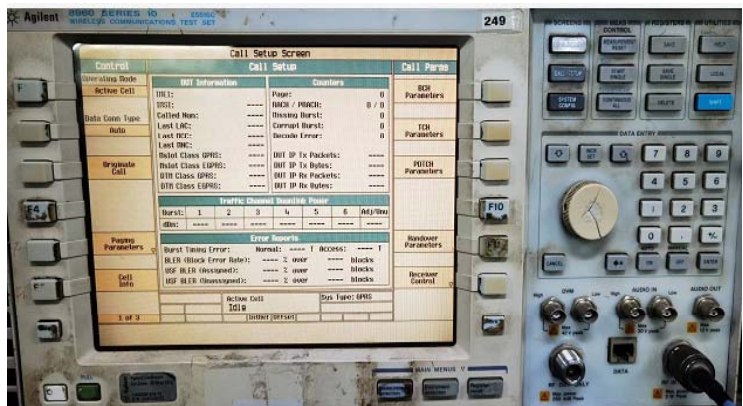


TIS 3D方位切割强度图

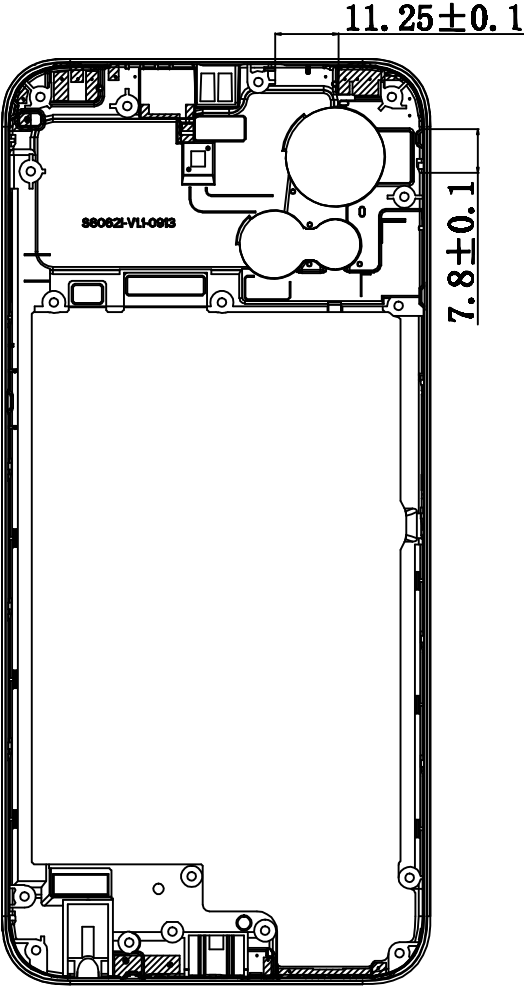
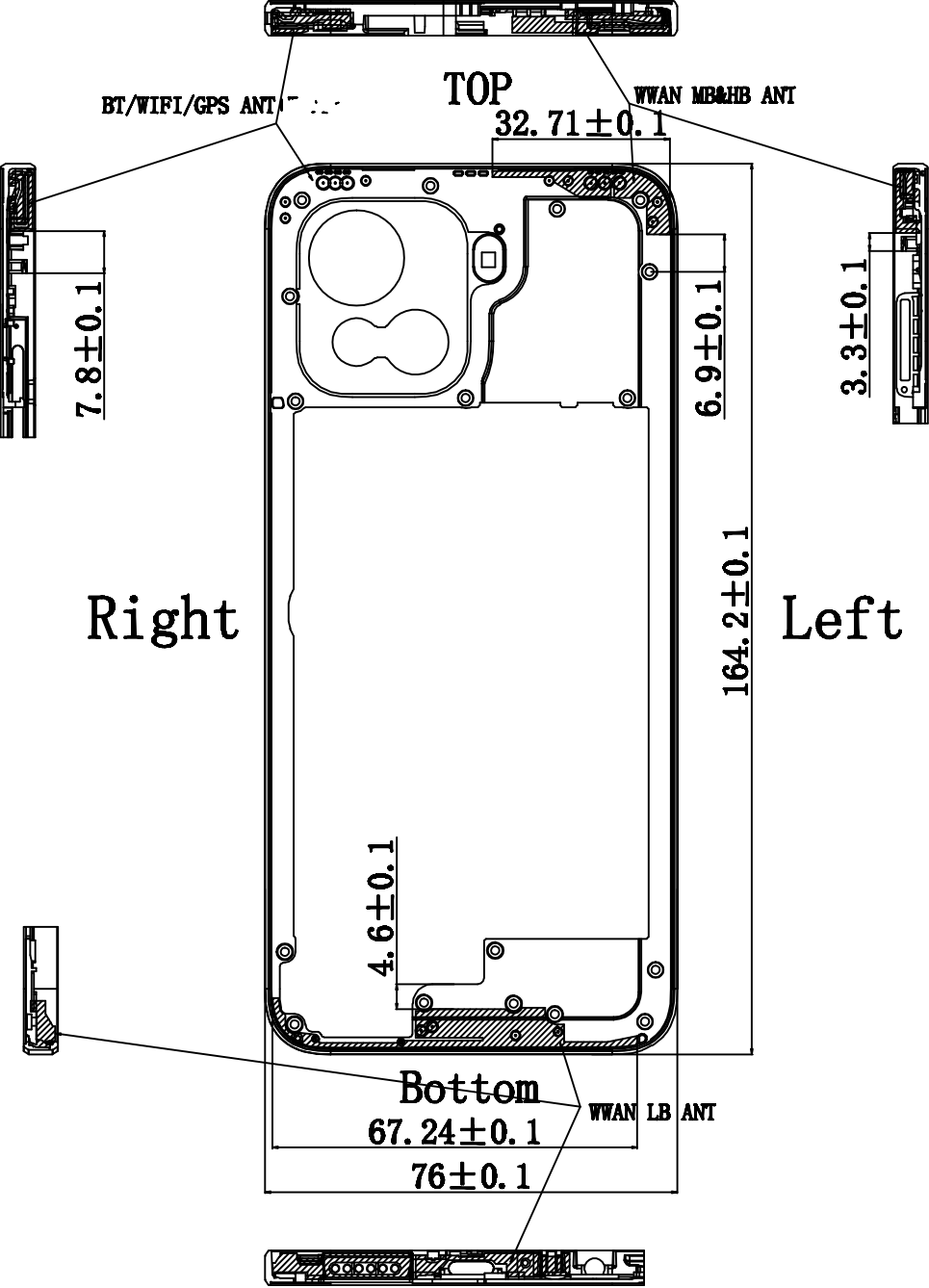


TRP 3D方位切割强度图

Test Equipment



Antenna position:mm



Efficient (main antenna)

Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHS (%)	Max (dB)	Min (dB)
810	12.54	-9.02	-5.83	-7.98	4.796	7.741	-5.83	-18.9
820	15.81	-8.01	-4.89	-7.04	6.176	9.633	-4.89	-22.3
830	22.41	-6.5	-3.37	-5.52	9.024	13.385	-3.37	-23.28
840	27.15	-5.66	-2.38	-4.53	11.054	16.096	-2.38	-16.87
850	30.44	-5.17	-1.77	-3.92	12.457	17.978	-1.77	-17.76
860	27.07	-5.67	-2.16	-4.31	10.771	16.303	-2.16	-15.81
870	26.77	-5.72	-2.69	-4.84	12.367	14.405	-2.69	-17.29
880	23.22	-6.34	-3.18	-5.33	11.326	11.89	-3.18	-19.24
890	27.61	-5.59	-2.51	-4.66	13.305	14.308	-2.51	-17.52
900	28.57	-5.44	-2.37	-4.52	13.29	15.278	-2.37	-16.45
910	28.41	-5.46	-2.46	-4.61	13.112	15.302	-2.46	-16.72
920	25.66	-5.91	-2.73	-4.88	11.712	13.947	-2.73	-17.2
930	22.57	-6.46	-3.36	-5.51	10.464	12.108	-3.36	-18.81
940	18.51	-7.33	-3.63	-5.78	8.688	9.822	-3.63	-20.49
950	16.07	-7.94	-3.86	-6.01	7.571	8.499	-3.86	-21.22
960	12.48	-9.04	-4.62	-6.77	5.676	6.805	-4.62	-23.35
970	11.5	-9.39	-5.97	-8.12	5.45	6.053	-5.97	-19.12
980	9.96	-10.02	-5.65	-7.8	4.057	5.9	-5.65	-26.31

Efficient (main antenna)

Passive Test For 1700-2250								
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHS (%)	Max (dB)	Min (dB)
1700	33.89	-4.7	0.41	-1.74	10.822	23.067	0.41	-14.17
1710	34.17	-4.66	0.21	-1.94	11.265	22.901	0.21	-14.57
1720	35.08	-4.55	0.29	-1.86	12.134	22.947	0.29	-14.35
1730	35.57	-4.49	0.12	-2.03	12.513	23.058	0.12	-15.58
1740	35.21	-4.53	0.1	-2.05	12.699	22.51	0.1	-16.16
1750	36.37	-4.39	0.26	-1.89	13.076	23.298	0.26	-16.1
1760	38.61	-4.13	0.47	-1.68	14.003	24.607	0.47	-15.54
1770	36.81	-4.34	0.52	-1.63	13.356	23.45	0.52	-14.48
1780	35.96	-4.44	0.29	-1.86	13.102	22.862	0.29	-13.41
1790	34.95	-4.57	0.29	-1.86	12.71	22.239	0.29	-12.25
1800	35.01	-4.56	0.2	-1.95	12.735	22.279	0.2	-11.27
1810	64.94	-1.87	3.71	1.56	37.681	27.257	3.71	-12.39
1820	35.35	-4.52	0.15	-2	12.783	22.57	0.15	-9.88
1830	34.41	-4.63	0.11	-2.04	12.404	22.009	0.11	-10.53
1840	35.65	-4.48	0.41	-1.74	12.625	23.028	0.41	-10.77
1850	33.47	-4.75	0.11	-2.04	11.819	21.651	0.11	-11.06
1860	34.4	-4.63	0.51	-1.64	11.798	22.606	0.51	-11.38
1870	31.33	-5.04	0.02	-2.13	10.69	20.644	0.02	-11.03
1880	30.7	-5.13	-0.01	-2.16	10.191	20.507	-0.01	-11.7
1890	29.7	-5.27	-0.15	-2.3	9.651	20.049	-0.15	-12.08
1900	31.39	-5.03	0.15	-2	9.944	21.443	0.15	-11.86
1910	29.03	-5.37	-0.09	-2.24	8.981	20.047	-0.09	-12.36
1920	29.27	-5.34	0	-2.15	8.852	20.414	0	-12.95
1930	26.79	-5.72	-0.27	-2.42	8.113	18.674	-0.27	-13.28
1940	26.45	-5.78	-0.25	-2.4	7.978	18.475	-0.25	-14.64
1950	55.64	-2.55	4.52	2.37	21.39	34.251	4.52	-15.36
1960	23.98	-6.2	-0.74	-2.89	7.323	16.656	-0.74	-16.77
1970	22.49	-6.48	-1.08	-3.23	6.973	15.517	-1.08	-15.85
1980	22.9	-6.4	-1.18	-3.33	7.157	15.746	-1.18	-15.48
1990	23.59	-6.27	-1.16	-3.31	7.452	16.138	-1.16	-16.42
2000	24.39	-6.13	-0.94	-3.09	7.805	16.586	-0.94	-16.13
2010	24.63	-6.09	-0.88	-3.03	7.992	16.638	-0.88	-17.15
2020	24.14	-6.17	-1.04	-3.19	8.16	15.981	-1.04	-16.33
2030	45.87	-3.39	3.38	1.23	19.17	26.697	3.38	-17.36
2040	21.58	-6.66	-1.95	-4.1	8.076	13.506	-1.95	-15.45

Efficient (main antenna)

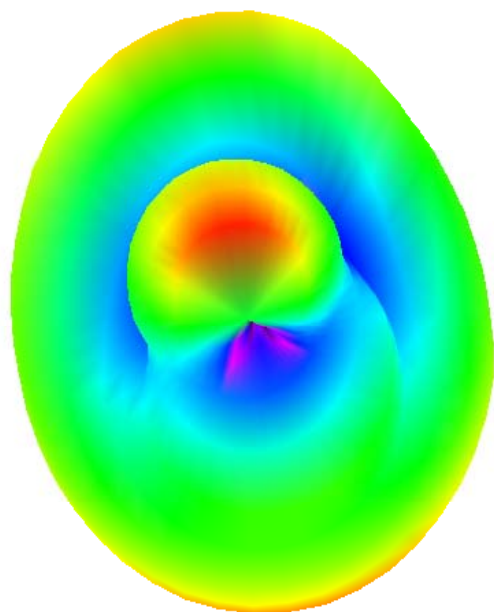
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHS (%)	Max (dB)	Min (dB)
2000	37.26	-4.29	0.73	-1.42	10.186	27.069	0.73	-24.61
2010	37.38	-4.27	0.86	-1.29	10.183	27.198	0.86	-29.34
2020	36.18	-4.42	0.73	-1.42	9.789	26.391	0.73	-29.74
2030	34.38	-4.64	0.43	-1.72	9.292	25.089	0.43	-27.34
2040	30.77	-5.12	-0.18	-2.33	8.298	22.469	-0.18	-24.7
2050	30.29	-5.19	-0.3	-2.45	8.073	22.222	-0.3	-22.73
2060	29.7	-5.27	-0.36	-2.51	7.857	21.843	-0.36	-20.29
2070	28.42	-5.46	-0.66	-2.81	7.53	20.887	-0.66	-19.89
2080	27.86	-5.55	-0.78	-2.93	7.441	20.421	-0.78	-19.6
2090	27.32	-5.64	-0.65	-2.8	7.387	19.93	-0.65	-20.28
2100	27.18	-5.66	-0.64	-2.79	7.428	19.753	-0.64	-19.53
2110	25.81	-5.88	-0.71	-2.86	7.11	18.697	-0.71	-19.26
2120	25.33	-5.96	-0.8	-2.95	7.038	18.295	-0.8	-19.58
2130	23.77	-6.24	-0.81	-2.96	6.61	17.161	-0.81	-20.25
2140	22.76	-6.43	-1.13	-3.28	6.412	16.344	-1.13	-20.97
2150	21.74	-6.63	-1.18	-3.33	6.137	15.6	-1.18	-21.95
2160	21.04	-6.77	-1.35	-3.5	6.007	15.029	-1.35	-21.11
2170	19.74	-7.05	-1.66	-3.81	5.654	14.082	-1.66	-19.56
2180	19.01	-7.21	-1.71	-3.86	5.468	13.538	-1.71	-18.09

Efficient (main antenna)

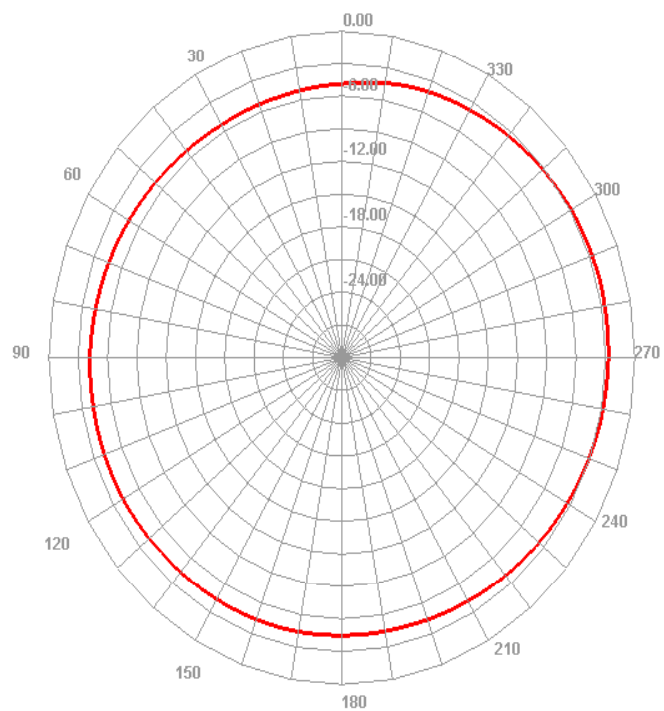
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHS (%)	Max (dB)	Min (dB)
2500	24.92	-6.03	-2.09	-4.24	8.239	16.683	-2.09	-19.52
2510	24.06	-6.19	-2.32	-4.47	7.741	16.32	-2.32	-18.99
2520	24.86	-6.04	-1.78	-3.93	7.844	17.017	-1.78	-17.73
2530	27.5	-5.61	-1.25	-3.4	8.602	18.902	-1.25	-16.31
2540	27.87	-5.55	-1.11	-3.26	8.825	19.04	-1.11	-15.53
2550	25.63	-5.91	-2.14	-4.29	14.047	11.584	-2.14	-17.92
2560	30.67	-5.13	-0.68	-2.83	10.114	20.559	-0.68	-14.21
2570	32.2	-4.92	-0.72	-2.87	10.981	21.216	-0.72	-14.09

Efficient (Band 5)

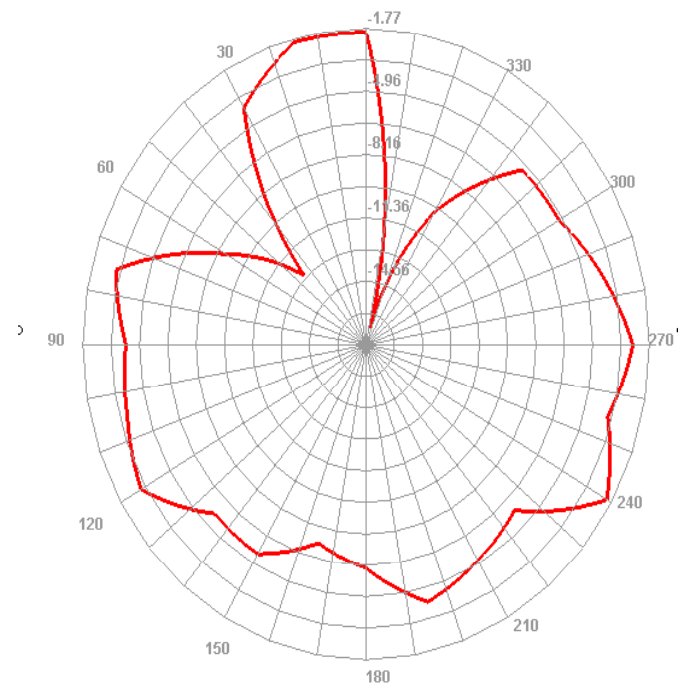
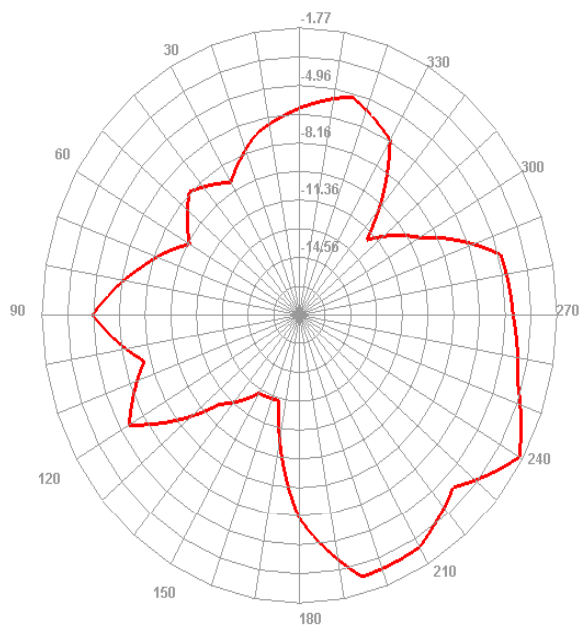
850.000MHz



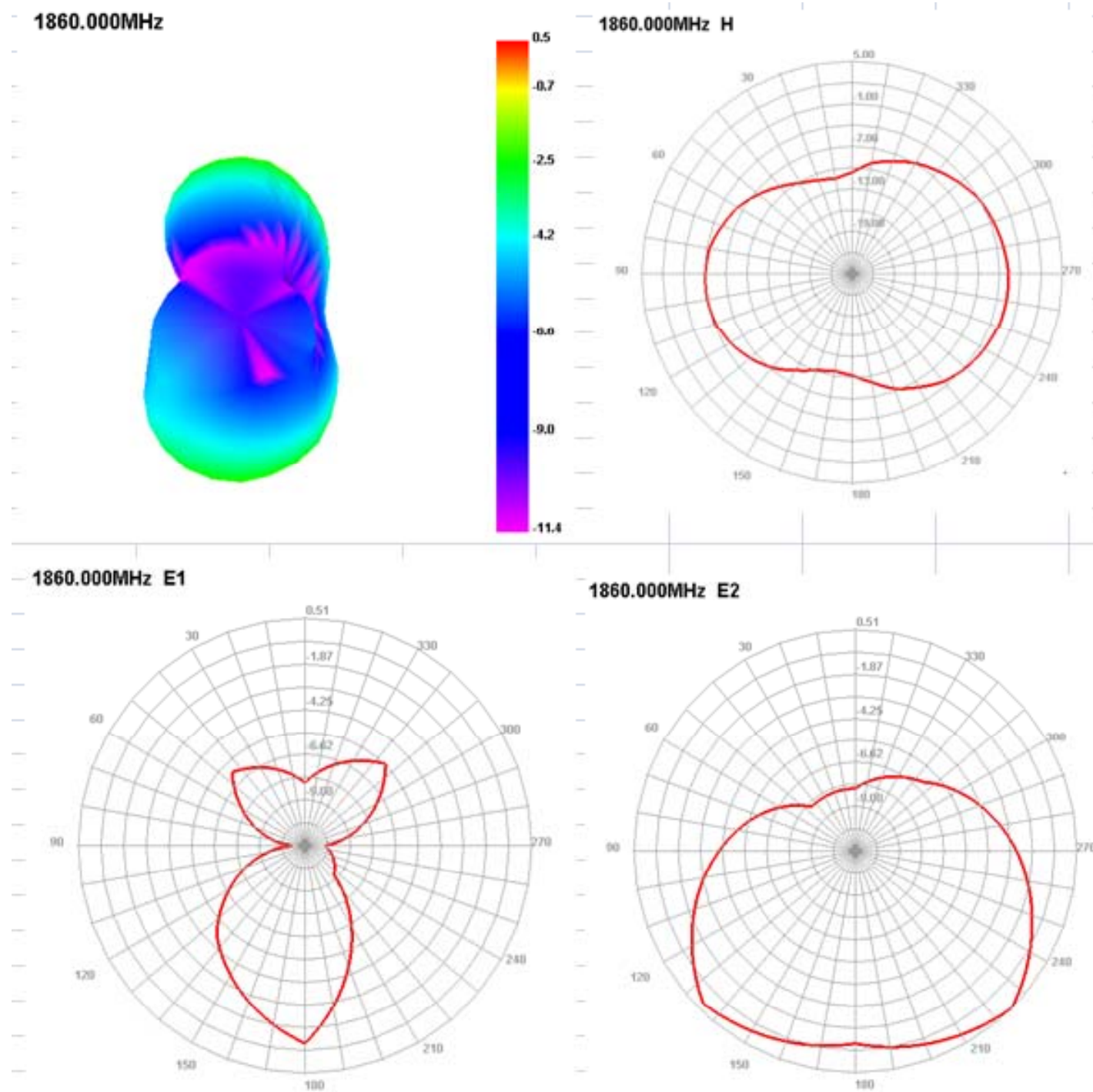
850.000MHz H



850.000MHz E1

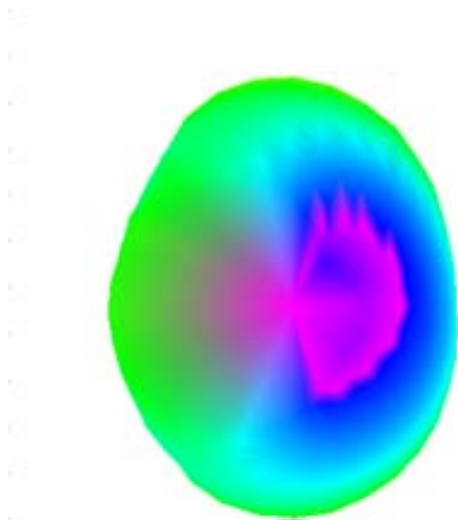


Efficient (Band 2)

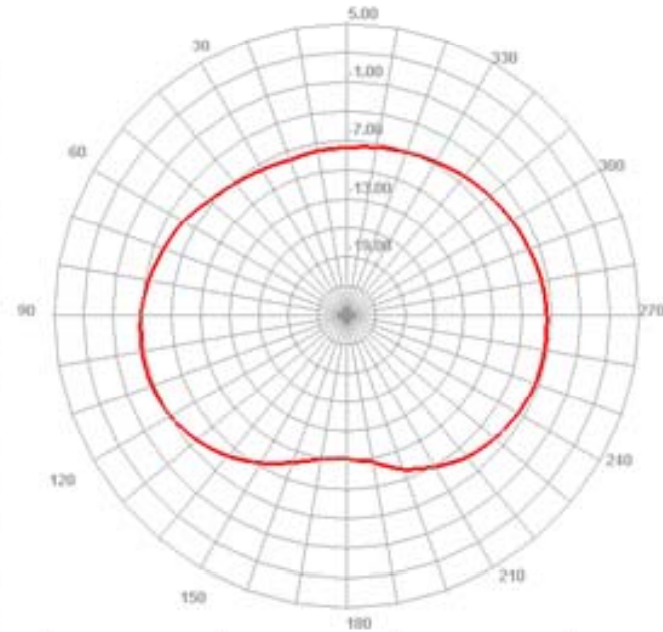


Efficient (Band 4)

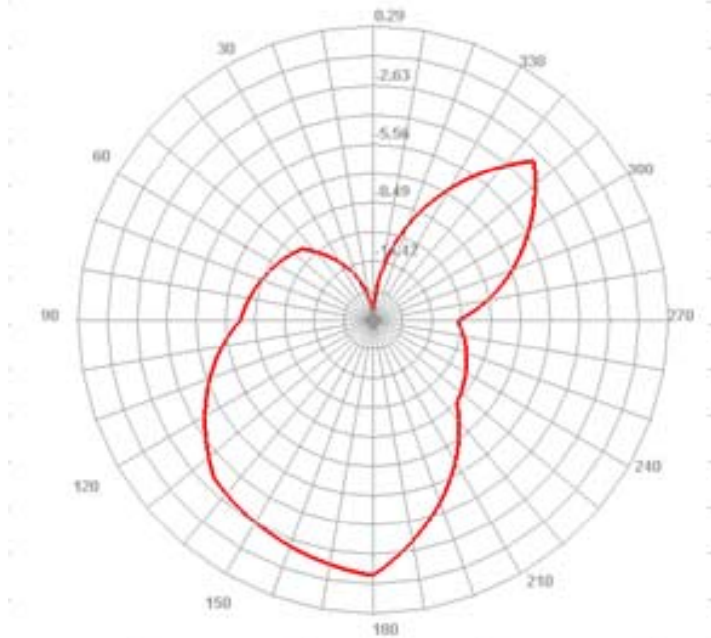
1720.000MHz



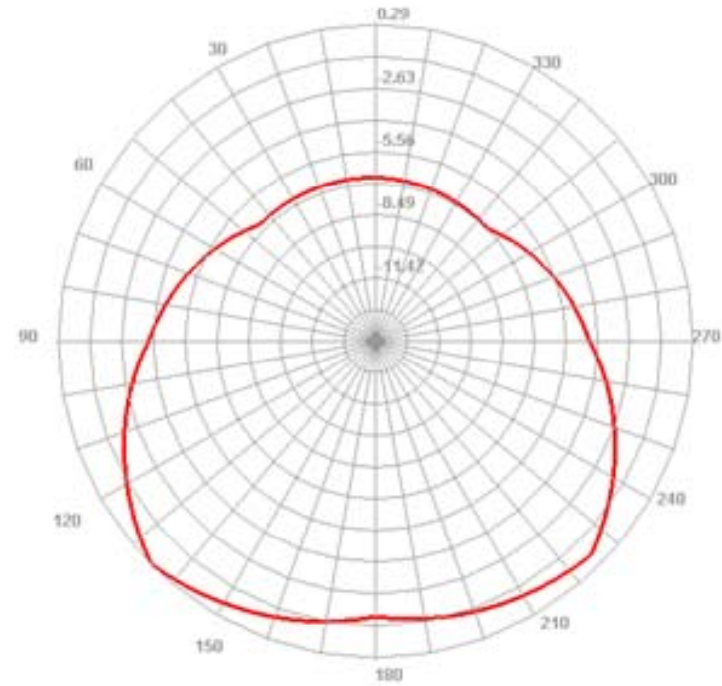
1720.000MHz H



1720.000MHz E1

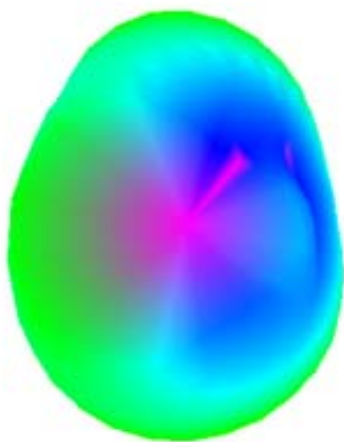


1720.000MHz E2

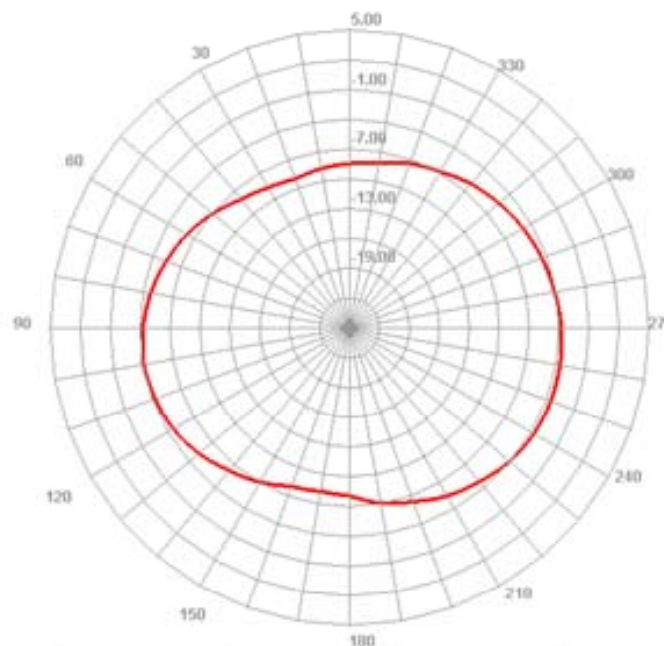


Efficient (Band 66)

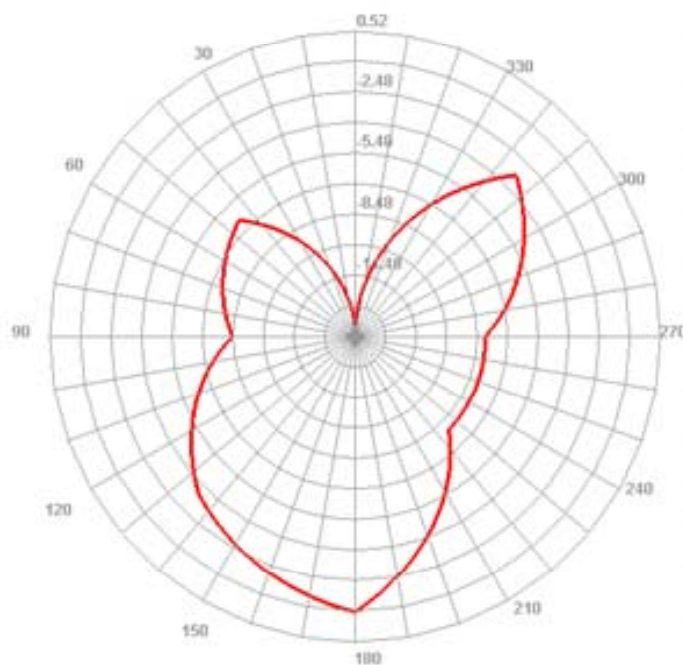
1770.000MHz



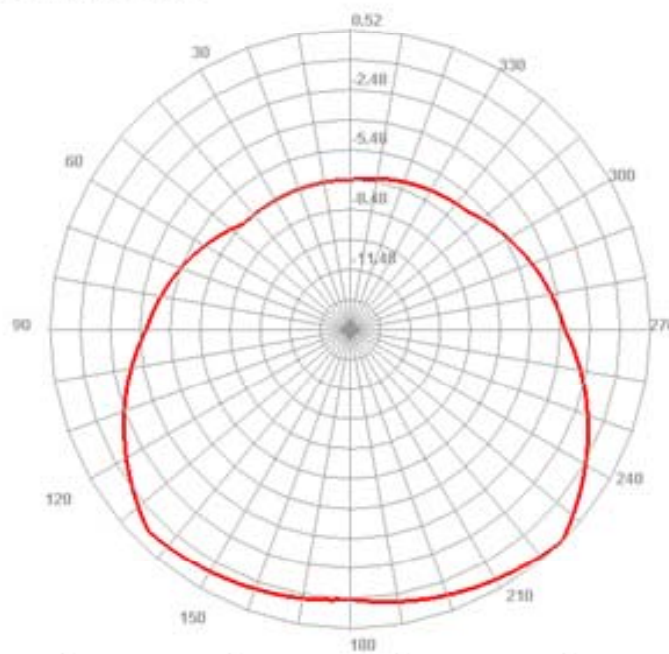
1770.000MHz H



1770.000MHz E1

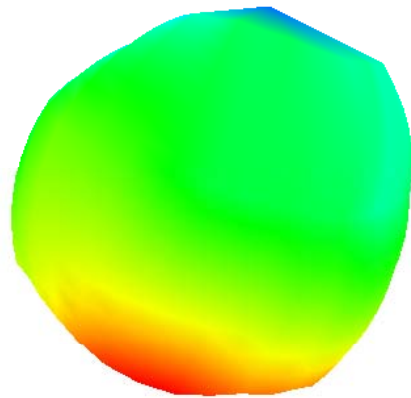


1770.000MHz E2

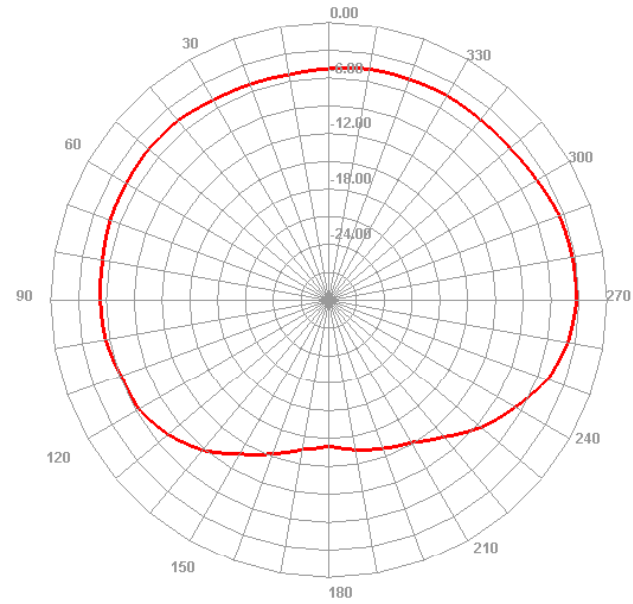


Efficient (Band 7)

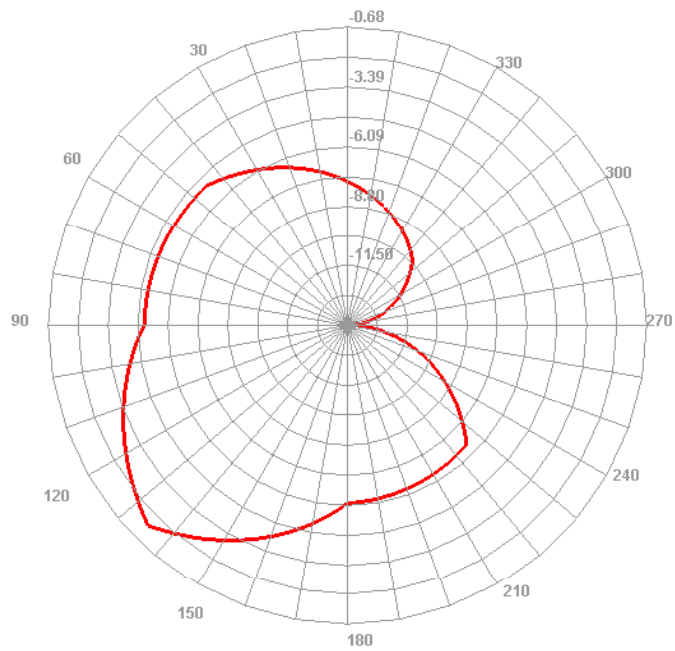
2560.000MHz



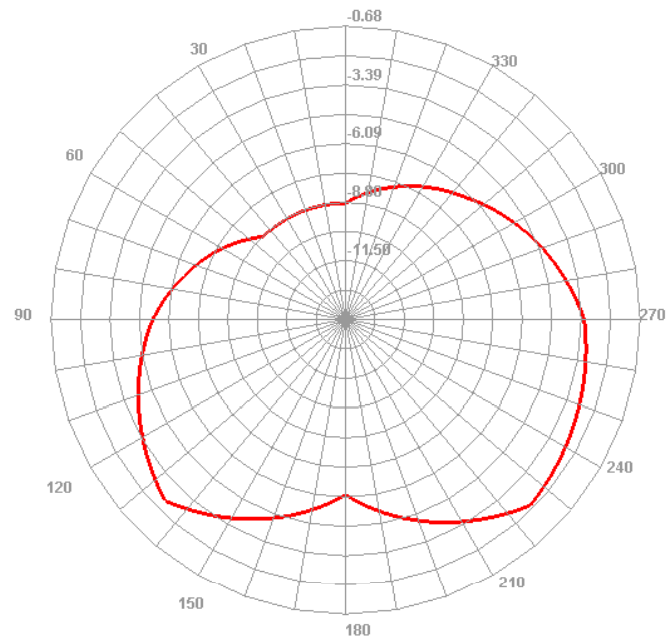
2560.000MHz H



2560.000MHz E1



2560.000MHz E2



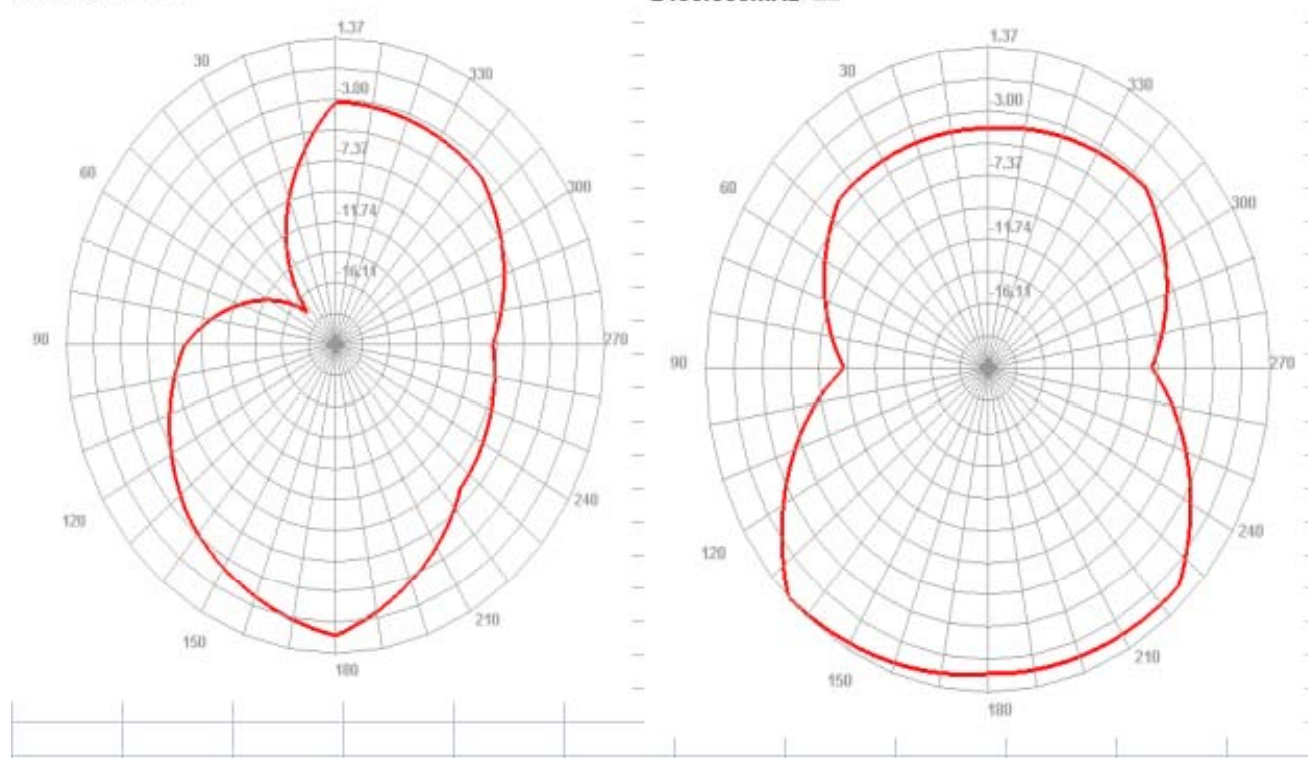
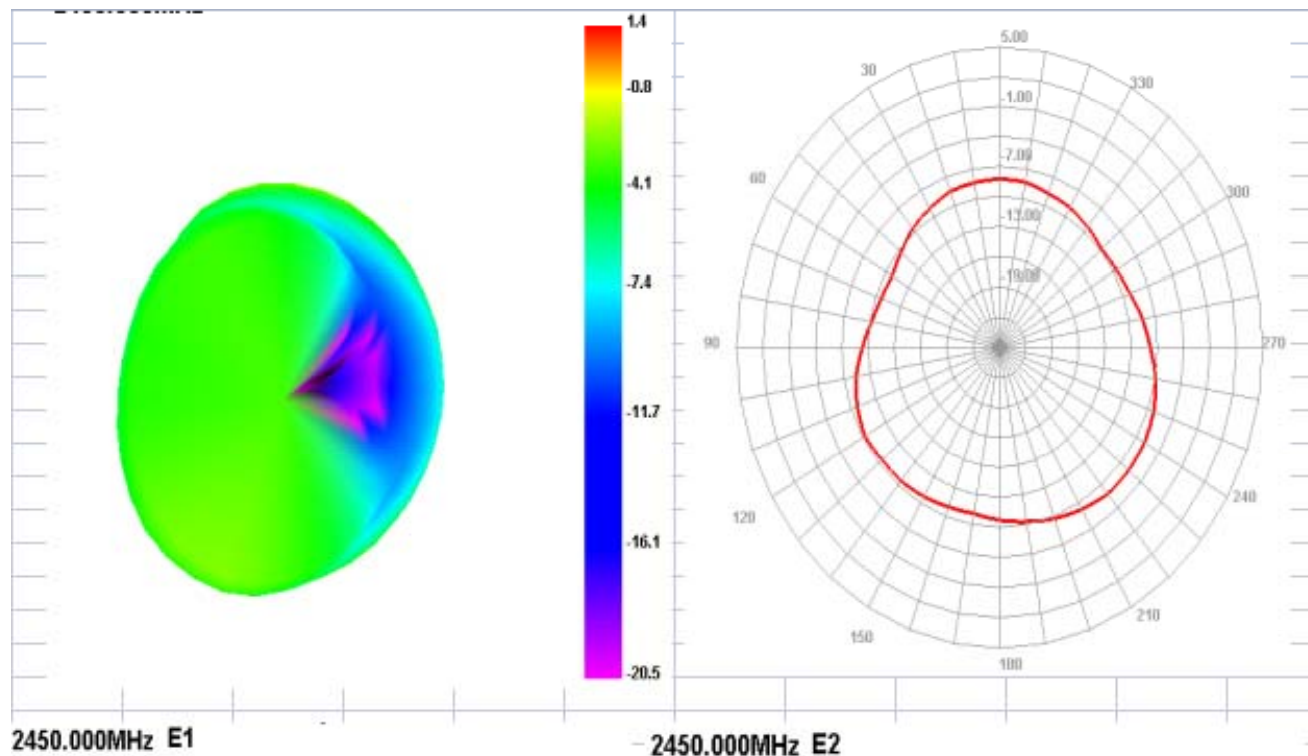
Efficient (2. 4G-WiFi /BT)

Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHIS (%)	Max (dB)	Min (dB)
2400	33. 97	-4. 69	0. 8	-1. 35	12. 311	21. 659	0. 8	-20. 95
2410	34. 69	-4. 6	0. 92	-1. 23	12. 556	22. 13	0. 92	-20. 46
2420	35. 2	-4. 53	0. 99	-1. 16	12. 61	22. 592	0. 99	-19. 77
2430	35. 22	-4. 53	1. 05	-1. 1	12. 391	22. 832	1. 05	-19. 55
2440	35. 94	-4. 44	1. 18	-0. 97	12. 375	23. 561	1. 18	-19. 25
2450	36. 47	-4. 38	1. 42	-0. 73	12. 273	24. 195	1. 42	-18. 81
2460	35. 84	-4. 46	1. 43	-0. 72	11. 698	24. 145	1. 43	-19. 11
2470	36. 14	-4. 42	1. 52	-0. 63	11. 393	24. 749	1. 52	-18. 48
2480	35. 74	-4. 47	1. 48	-0. 67	10. 918	24. 82	1. 48	-18. 57
2490	34. 51	-4. 62	1. 44	-0. 71	10. 242	24. 267	1. 44	-18. 45
2500	35. 07	-4. 55	1. 6	-0. 55	10. 14	24. 929	1. 6	-18. 24
2510	35	-4. 56	1. 59	-0. 56	9. 899	25. 105	1. 59	-17. 46

Efficient (5G-WIFI)

Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHS (%)	Max (dB)	Min (dB)
5000	38.89	-4.1	1.61	-0.54	18.642	20.25	1.61	-18.75
5050	40.58	-3.92	3.07	0.92	15.625	24.957	3.07	-19.24
5100	41.41	-3.83	3.32	1.17	17.932	23.48	3.32	-18.38
5150	42.21	-3.75	3.53	1.38	16.889	25.32	3.53	-15.9
5200	40.14	-3.96	3.51	1.36	15.385	24.753	3.51	-17.14
5250	38.77	-4.12	1.59	-0.56	19.209	19.559	1.59	-19.01
5300	36.22	-4.41	1.73	-0.42	15.736	20.488	1.73	-17.68
5350	33.86	-4.7	2.12	-0.03	13.065	20.791	2.12	-21.24
5400	31.65	-5	1	-1.15	12.687	18.964	1	-22.09
5450	35.2	-4.53	1.22	-0.93	15.319	19.885	1.22	-21.29
5500	38.49	-4.15	3.19	1.04	15.013	23.476	3.19	-19.75
5550	41.96	-3.77	2.85	0.7	18.194	23.766	2.85	-21.79
5600	39.68	-4.01	2.99	0.84	16.679	23.002	2.99	-16.12
5650	35.49	-4.5	2.18	0.03	13.699	21.795	2.18	-19.96
5700	38.86	-4.11	2.21	0.06	17.034	21.824	2.21	-19.35
5750	40.08	-3.97	3.52	1.37	16.904	23.177	3.52	-19.35
5800	38.51	-4.14	3.05	0.9	16.228	22.277	3.05	-16.49
5825	33.83	-4.6	2.42	-0.07	13.005	20.795	2.11	-21.22

Efficient (2.4GWIFI/BT)



Efficient (5G-WIFI)

