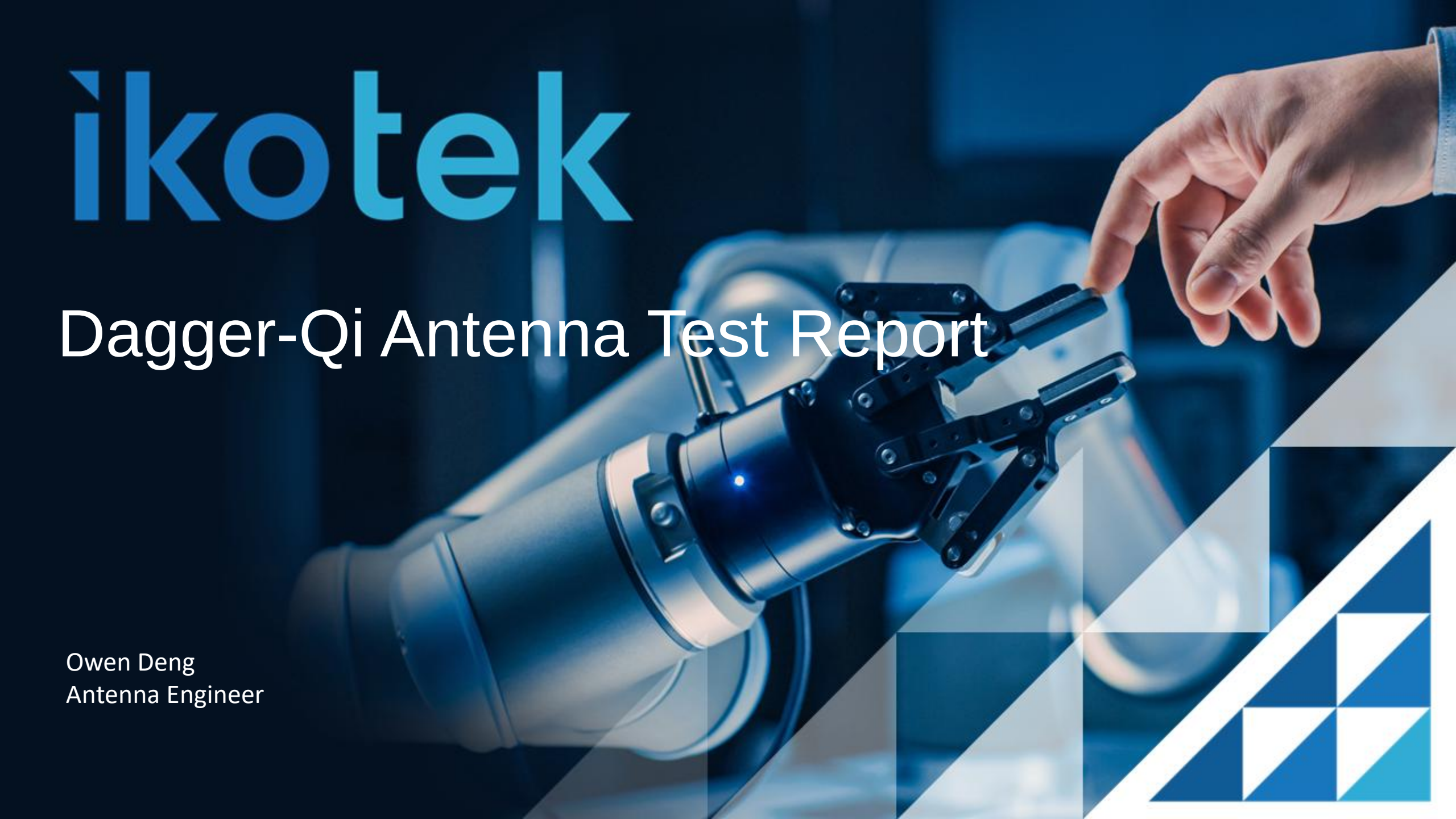




ikotek

Dagger-Qi Antenna Test Report

Owen Deng
Antenna Engineer

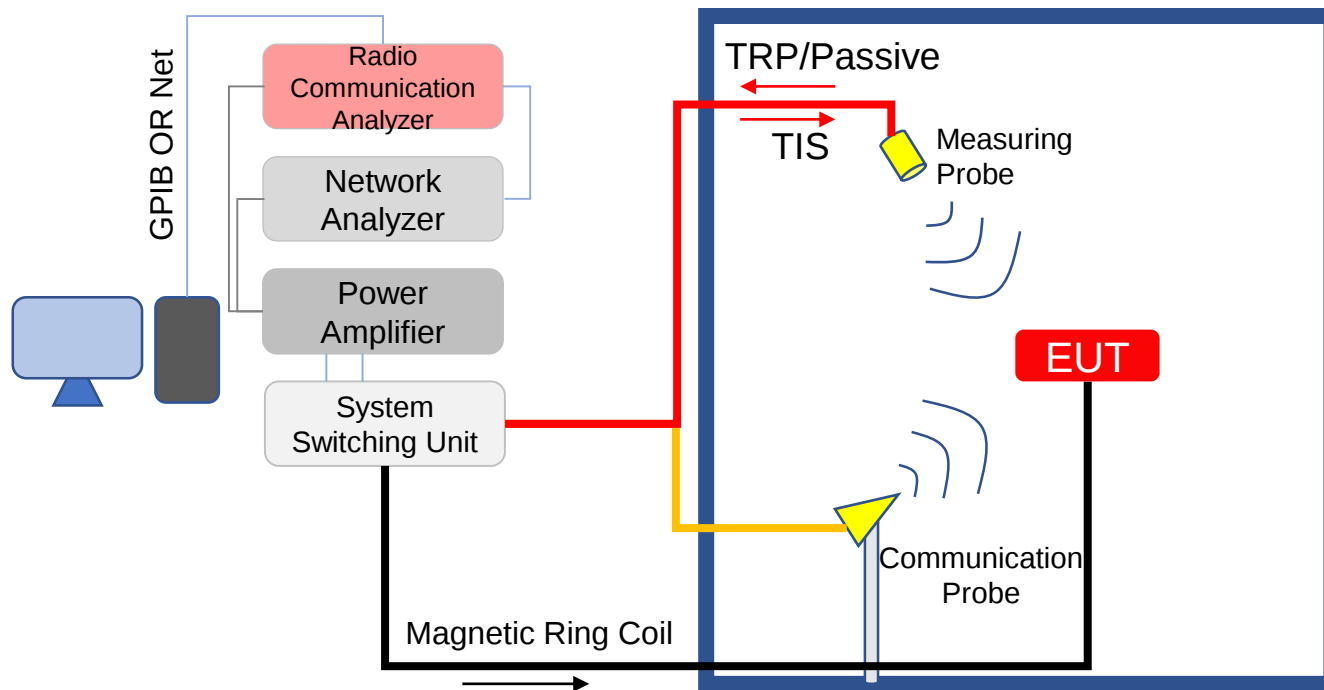
Project Overview



- Project Name: QDM095
- Device Dimensions: 118*91.5*20 mm
- Mainboard Dimensions 87.5*35 mm
- Antenna Number: 3
- Antenna Network Type & Frequency Band:
 - BT*1: 2400-2500MHz
 - LTE*1: 698-960MHz & 1710-2170 MHz
 - GNSS: 1575.42 MHz
- Module No: BG95-M1
- Requirement:
 - certification: Verizon & ATT & T-M

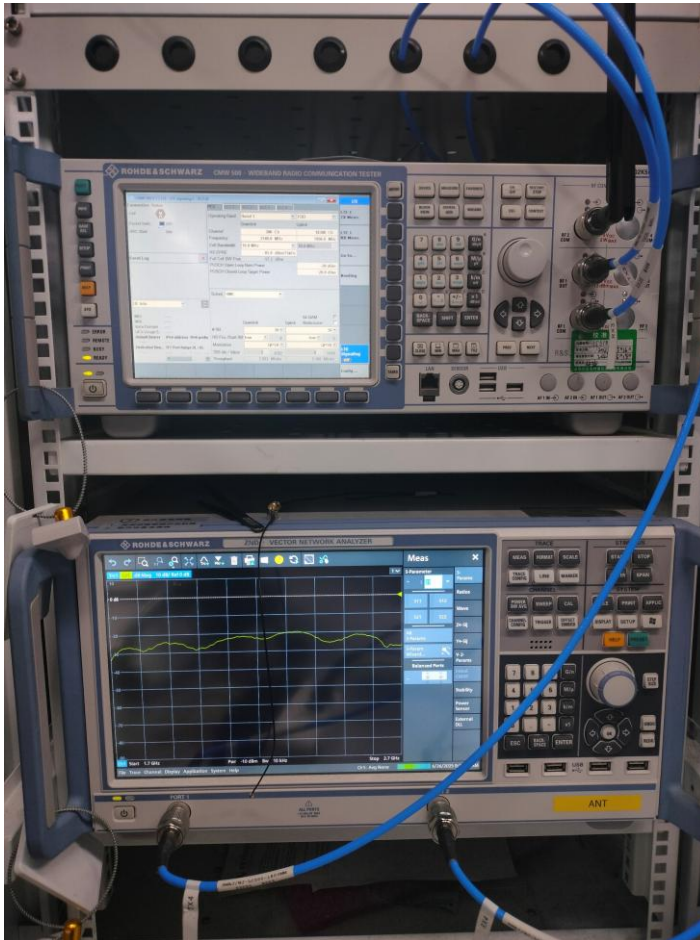
Antenna Test

- Chamber Coordinate System FS-S-1(SI2206)



Antenna Test

- Chamber Coordinate System FS-S-1(SI2206)

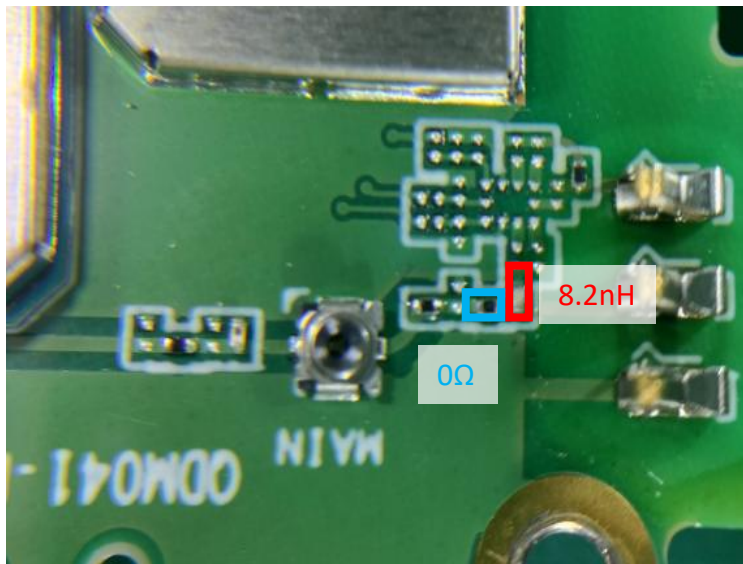


Antenna Data



Band	Tx-Peak Gain(dBi)	Band	Tx-Peak Gain(dBi)
B1	2.85	BT	5.01
B2	2.74		
B3	1.84		
B4	1.65		
B5	0.42		
B8	-3.38		
B12	3.12		
B13	2.26		
B20	0.11		
B28	3.19		
B66	1.84		

Antenna Data



QDM095
(Y0REB0MC5AA-X5-2)

Freq(MHz)	Gain(dBi)	Effi(dB)	Effi(%)	Freq(MHz)	Gain(dBi)	Effi(dB)	Effi(%)	Freq(MHz)	Gain(dBi)	Effi(dB)	Effi(%)
700	2.27	-2.8	52.48	1700	0.05	-4.59	34.74	2300	0.72	-5.17	30.41
710	2.93	-2.3	58.82	1710	0.57	-4.36	36.61	2310	0.92	-5.21	30.16
720	3.12	-2	63.07	1720	0.94	-3.96	40.15	2320	1.06	-4.71	33.84
730	3.19	-1.92	64.22	1730	1.24	-3.74	42.29	2330	0.81	-4.82	32.94
740	3.18	-2.01	62.99	1740	1.35	-3.59	43.73	2340	0.78	-4.83	32.92
750	2.92	-2.19	60.41	1750	1.44	-3.46	45.11	2350	0.72	-4.81	33.05
760	2.9	-2.55	55.61	1760	1.65	-3.3	46.73	2360	0.41	-4.99	31.7
770	2.86	-2.96	50.59	1770	1.79	-3.24	47.42	2370	0.33	-5.12	30.74
780	2.26	-3.32	46.55	1780	1.84	-3.17	48.2	2380	0.36	-5.14	30.64
790	2.09	-3.56	44.01	1790	1.77	-3.17	48.25	2390	0.27	-5.19	30.24
800	1.62	-4.16	38.39	1800	1.74	-3.14	48.48	2400	0.17	-5.38	28.95
810	0.95	-4.87	32.59	1810	1.73	-3.13	48.62	2410	-0.27	-6.02	24.97
820	0.42	-5.37	29.03	1820	1.8	-3.05	49.57	2420	-0.37	-6.14	24.33
830	0.11	-5.61	27.49	1830	1.96	-3.03	49.77	2430	-0.67	-6.29	23.48
840	-0.89	-6.39	22.95	1840	2.31	-2.97	50.48	2440	-1.14	-6.35	23.18
850	-1.44	-6.83	20.75	1850	2.36	-2.9	51.34	2450	-0.97	-6.22	23.88
860	-1.97	-7.21	19	1860	2.38	-2.9	51.25	2460	-0.97	-6.17	24.13
870	-2.62	-7.56	17.55	1870	2.44	-2.91	51.14	2470	-1.09	-6.18	24.09
880	-3.38	-7.96	16.01	1880	2.61	-2.84	51.98	2480	-1.25	-6.18	24.11
890	-4.13	-8.33	14.68	1890	2.65	-2.84	52.02	2490	-1.19	-6.02	25.02
900	-4.87	-8.81	13.14	1900	2.47	-2.81	52.33	2500	-1.12	-5.82	26.18
910	-5.67	-9.32	11.7	1910	2.74	-2.67	54.04	2510	-1.06	-5.76	26.54
920	-5.98	-9.68	10.76	1920	2.85	-2.64	54.45	2520	-0.92	-5.63	27.32
930	-6.12	-10.11	9.75	1930	2.51	-2.77	52.89	2530	-1.01	-5.65	27.22
940	-6.15	-10.45	9.01	1940	2.51	-2.88	51.53	2540	-1.05	-5.63	27.38
950	-6.31	-10.77	8.37	1950	2.61	-2.91	51.19	2550	-1.22	-5.66	27.17
960	-6.41	-11	7.94	1960	2.47	-3	50.13	2560	-1.29	-5.64	27.26
				1970	2.3	-3.18	48.03	2570	-1.29	-5.64	27.31
				1980	2.31	-3.29	46.84	2580	-1.28	-5.7	26.92
				1990	2.4	-3.39	45.78	2590	-1.23	-5.77	26.5
				2000	2.28	-3.6	43.63	2600	-1.34	-5.93	25.52
				2010	2.11	-3.75	42.15	2610	-1.49	-6.04	24.87
				2020	2.32	-3.73	42.41	2620	-1.42	-6.12	24.44
				2030	2.48	-3.73	42.35	2630	-1.61	-6.24	23.75
				2040	2.31	-3.92	40.53	2640	-1.98	-6.39	22.96
				2050	2.09	-4.08	39.12	2650	-1.86	-6.15	24.26
				2060	1.74	-4.21	37.95	2660	-1.76	-6.11	24.47
				2070	1.32	-4.39	36.43	2670	-1.86	-6.31	23.39
				2080	1.2	-4.43	36.09	2680	-1.86	-6.31	23.39
				2090	1.29	-4.34	36.77	2690	-1.81	-6.3	23.44
				2100	1.45	-4.2	38.06	2700	-0.91	-5.92	25.61
				2110	1.53	-4.26	37.46				
				2120	1.62	-4.37	36.59				
				2130	1.43	-4.37	36.53				
				2140	1.33	-4.39	36.37				
				2150	1.53	-4.35	36.69				
				2160	1.62	-4.35	36.69				
				2170	1.3	-4.47	35.76				

Antenna Data



BT			
Freq(MHz)	Gain(dBi)	Effi(dB)	Effi(%)
2400	4.21	-3.6	43.63
2410	4.1	-4.15	38.43
2420	4.4	-4	39.81
2430	4.2	-4.17	38.26
2440	3.88	-3.87	41.05
2450	4.37	-3.55	44.15
2460	4.74	-3.45	45.22
2470	4.86	-3.49	44.77
2480	4.76	-3.58	43.87
2490	4.98	-3.49	44.8
2500	5.01	-3.51	44.52

Antenna Performance

Band	Verizon	
	TRP	TIS(1.4M)
Cat-M Band 4	16	-100
Cat-M Band 13	15	-97

Band	ATT	
	TRP	TIS(1.4M)
Cat-M Band 2	17	-96
Cat-M Band 4	17	-98
Cat-M Band 12	15	-93

Band	T-Mobile US	
	TRP	TIS(1.4M)
Cat-M Band 2	16.5	-96
Cat-M Band 4	17	-98
Cat-M Band 12	15	-95
Cat-M Band 66	17	-100

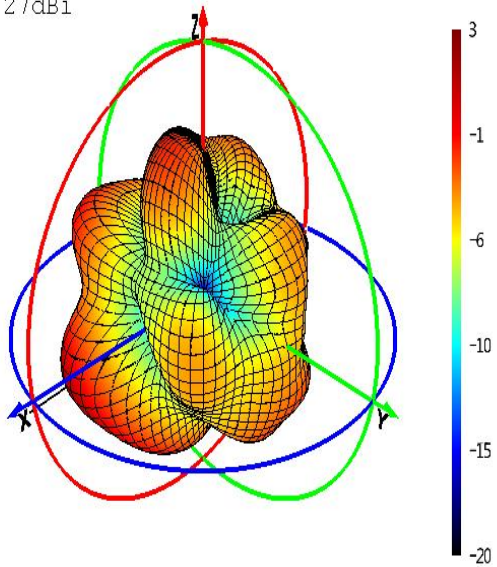
Band	Channel	Frequency	TRP	Channel	Frequency	TIS(10M)
FDD_B2	18650	1855	17.96			
	18900	1880	18.02			
	19150	1905	17.91	1150	1985	-96.98
FDD_B4	20000	1715	18.44			
	20175	1732.5	18.33			
	20350	1750	18.06	2350	2150	-96.28
FDD_B5	20450	829	14.83			
	20525	836.5	14.32			
	20600	844	13.78	2600	889	-91.24
FDD_B12	23060	704	15.78			
	23095	707.5	15.97			
	23130	711	16.09	5130	741	-96.86
FDD_B13	23230	782	16.03	5230	751	-97.29
	132022	1715	18.39			
	132322	1745	18.16			
FDD_B66	132622	1775	18.34			
				67086	2175	-96.87

Antenna Performance

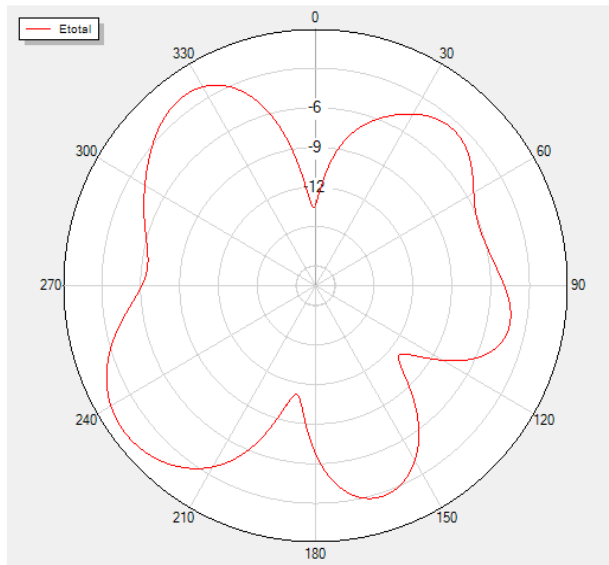


710MHz

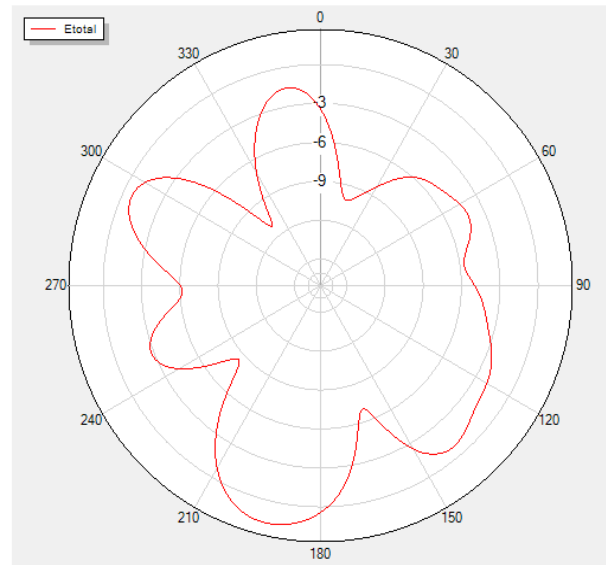
MAX: 2.93dBi
MIN: -20.27dBi



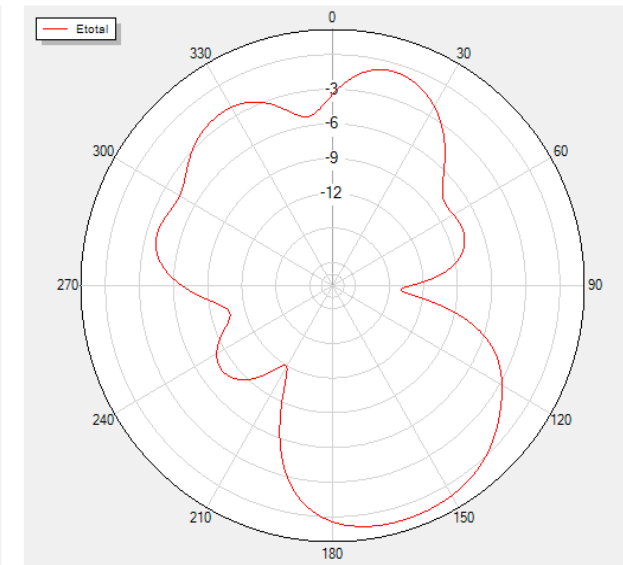
Theta=90 Freq=710MHz



Phi=90 Freq=710MHz



Phi=0 Freq=710MHz

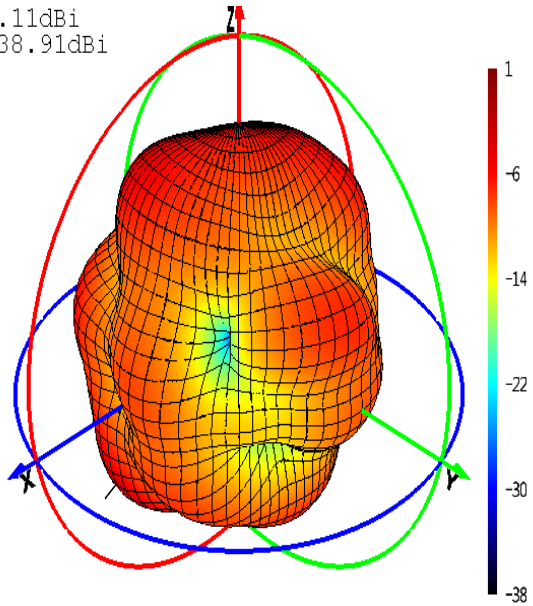


Antenna Performance

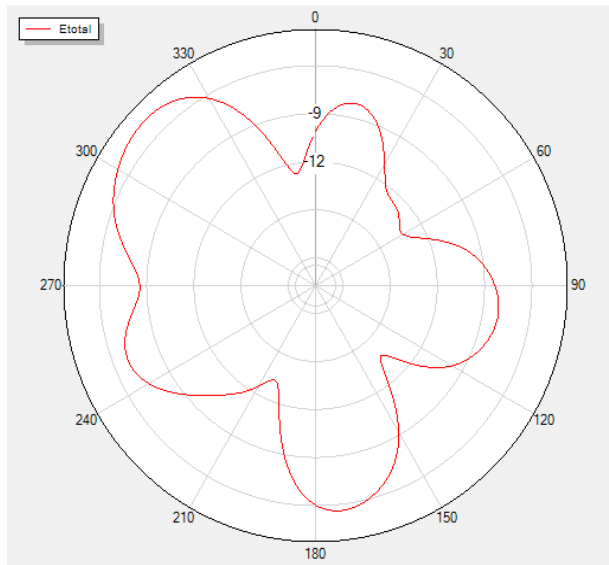


830MHz

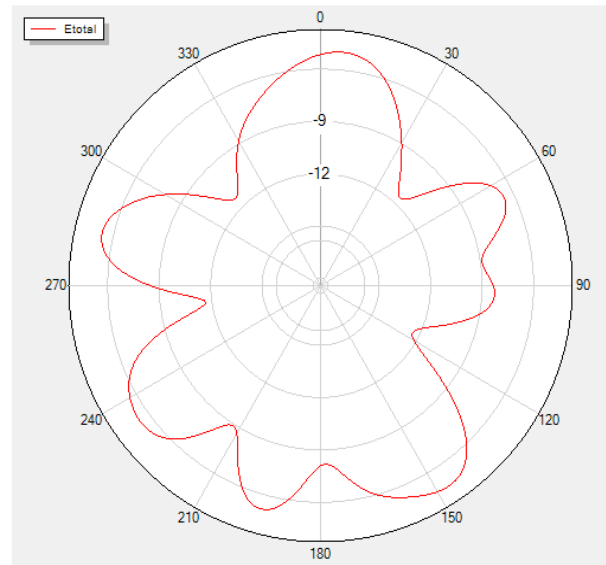
MAX:0.11dBi
MIN:-38.91dBi



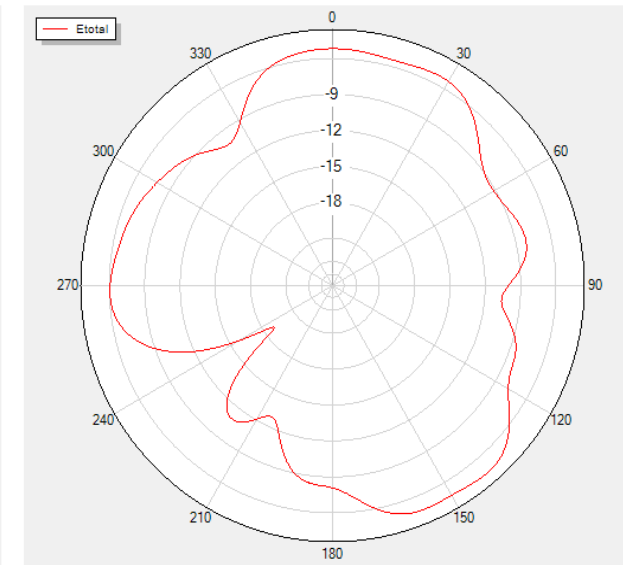
Theta=90 Freq=830MHz



Phi=90 Freq=830MHz



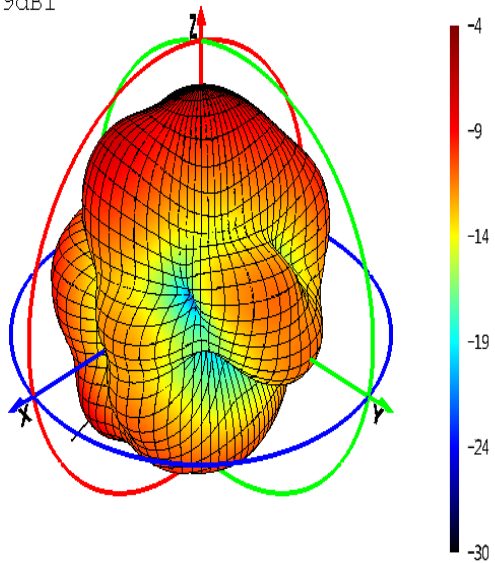
Phi=0 Freq=830MHz



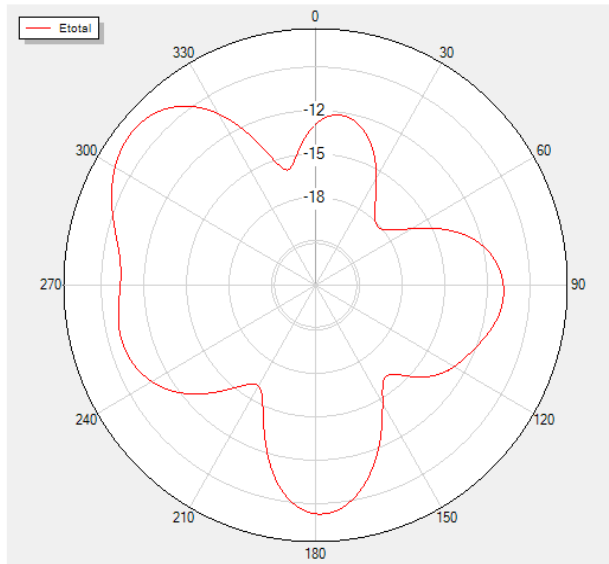
Antenna Performance

900MHz

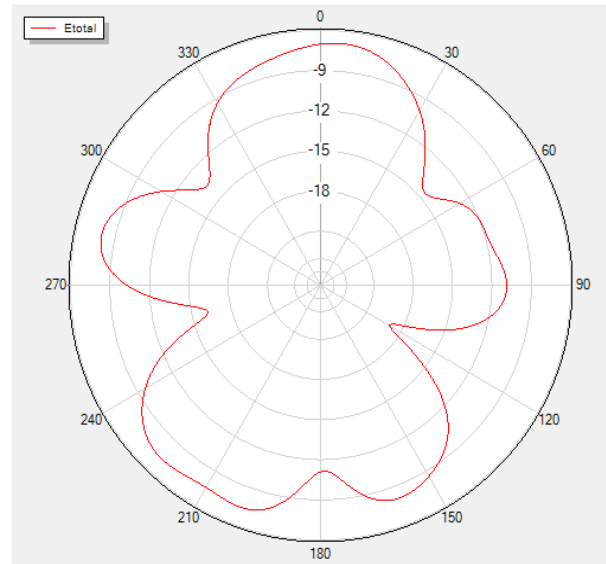
MAX: -4.87dBi
MIN: -30.9dBi



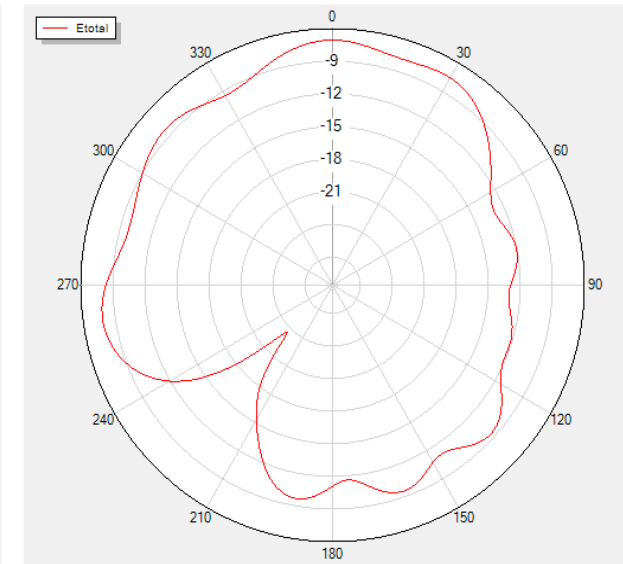
Theta=90 Freq=900MHz



Phi=90 Freq=900MHz



Phi=0 Freq=900MHz

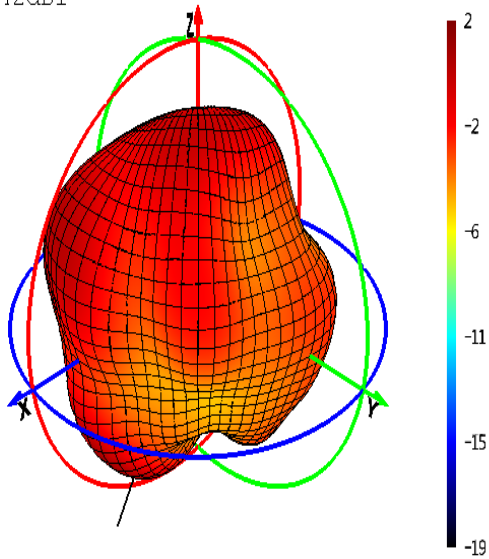


Antenna Performance

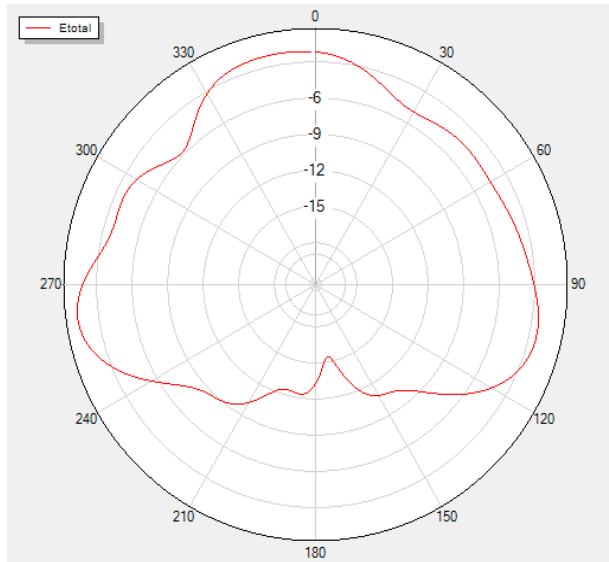


1740MHz

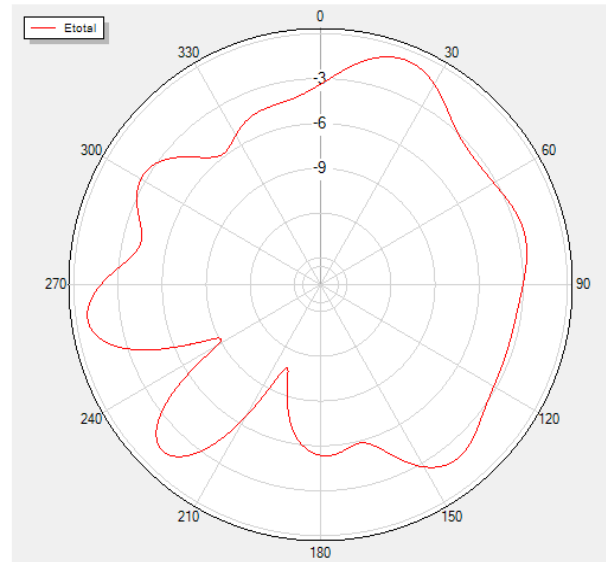
MAX: 1.35dBi
MIN: -20.42dBi



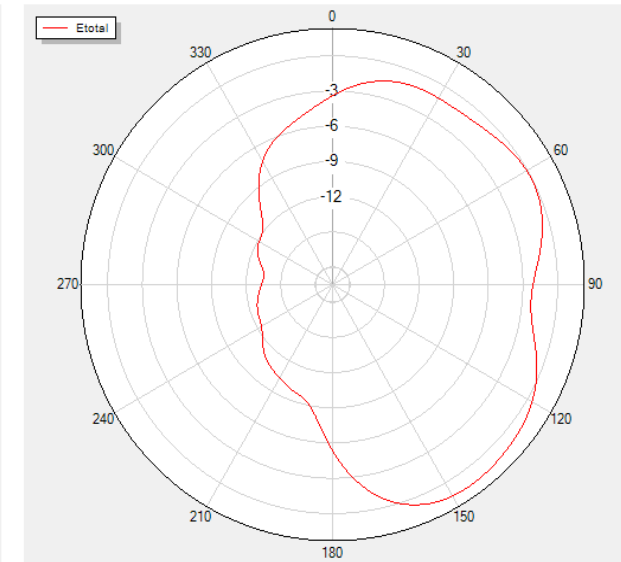
Theta=90 Freq=1740MHz



Phi=90 Freq=1740MHz



Phi=0 Freq=1740MHz

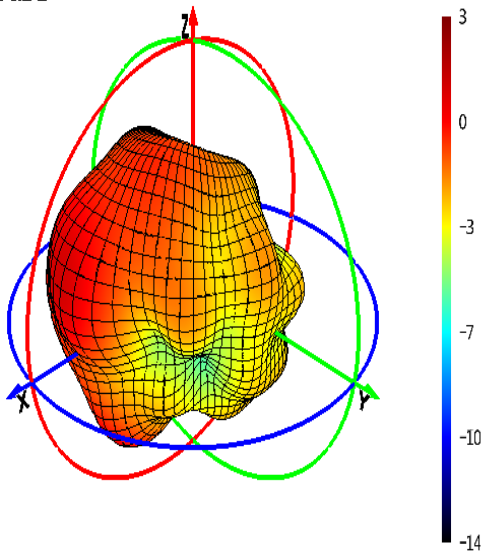


Antenna Performance

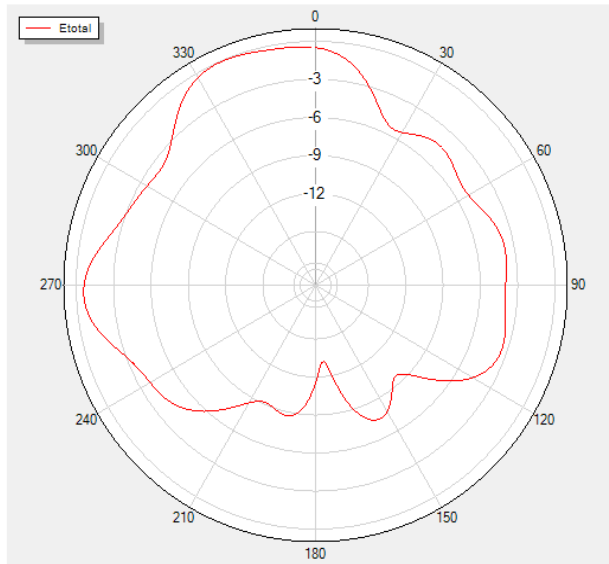


1880MHz

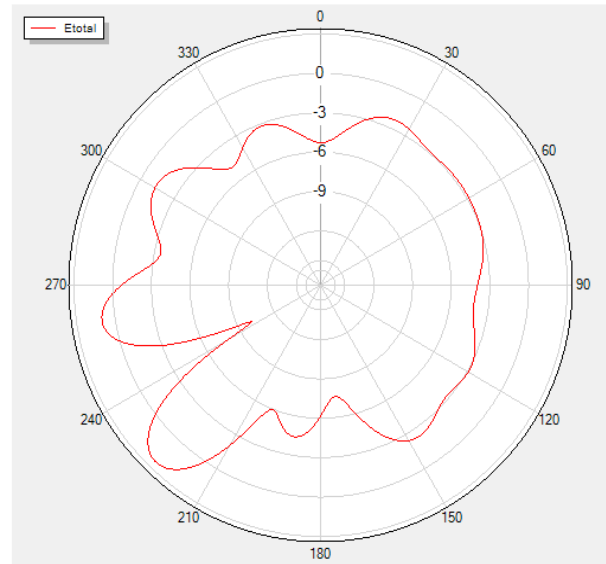
MAX:2.61dBi
MIN:-14.6dBi



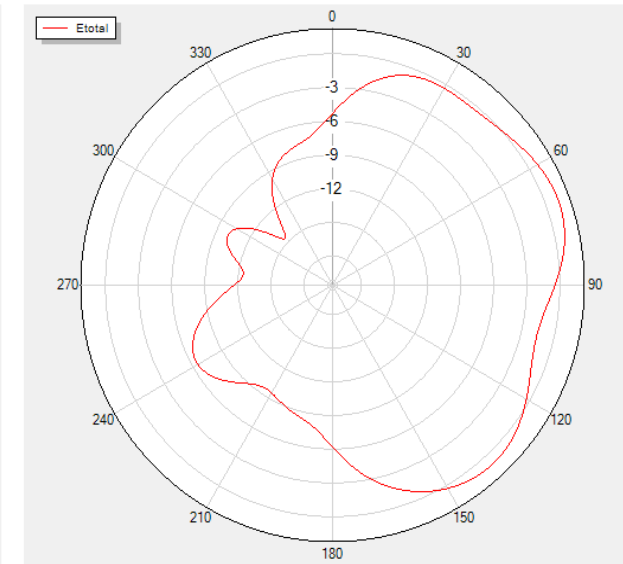
Theta=90 Freq=1880MHz



Phi=90 Freq=1880MHz



Phi=0 Freq=1880MHz

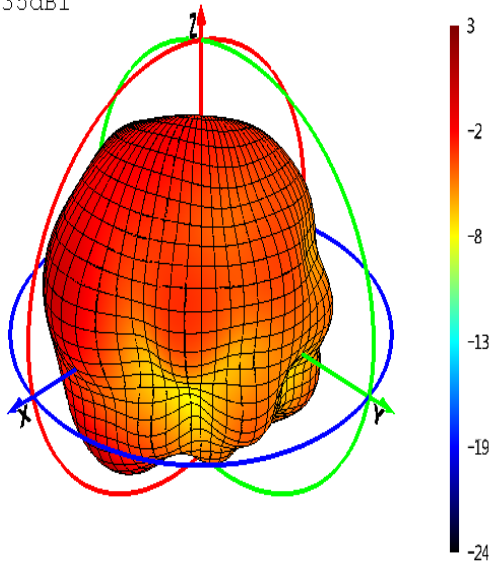


Antenna Performance

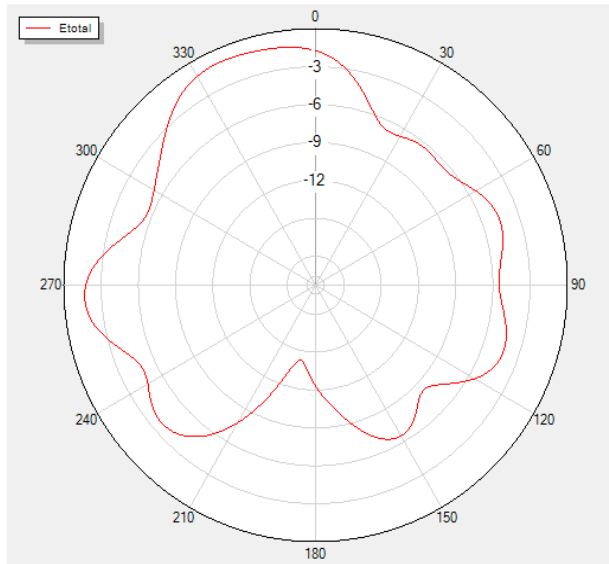


1950MHz

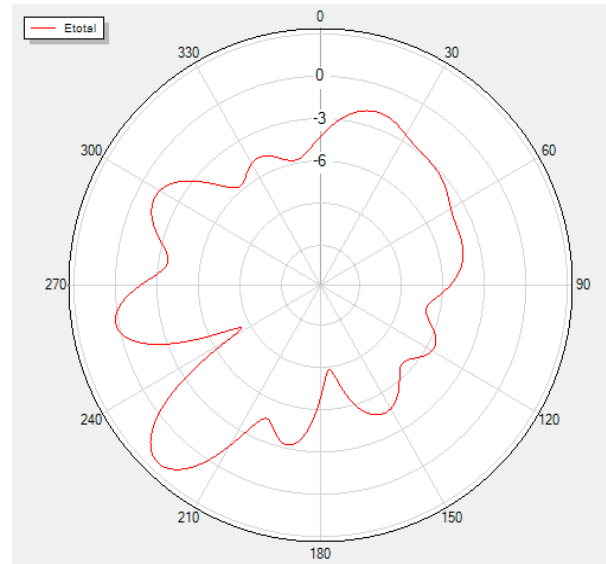
MAX:2.61dBi
MIN:-25.35dBi



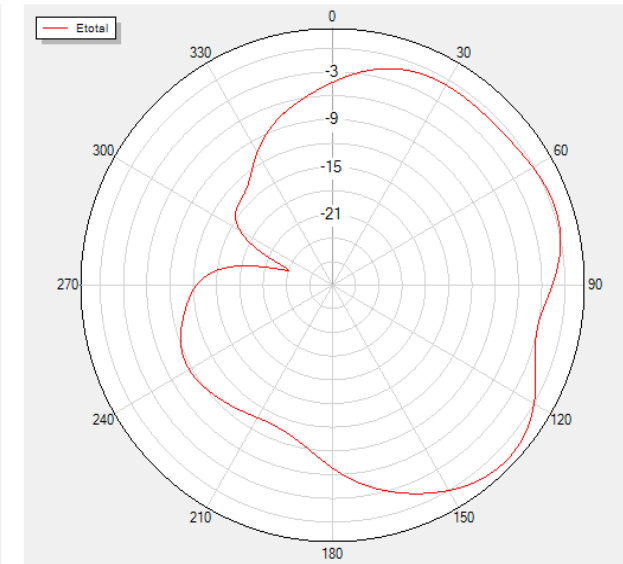
Theta=90 Freq=1950MHz



Phi=90 Freq=1950MHz



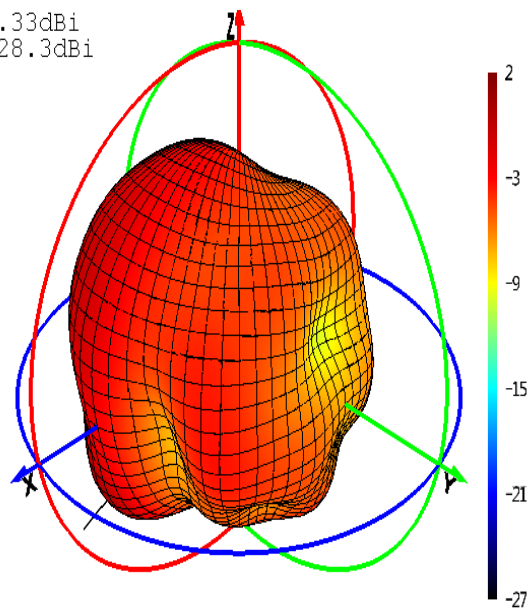
Phi=0 Freq=1950MHz



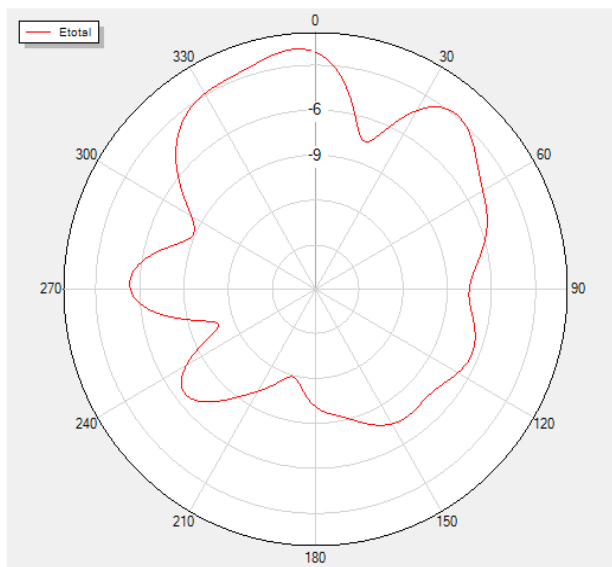
Antenna Performance

2140MHz

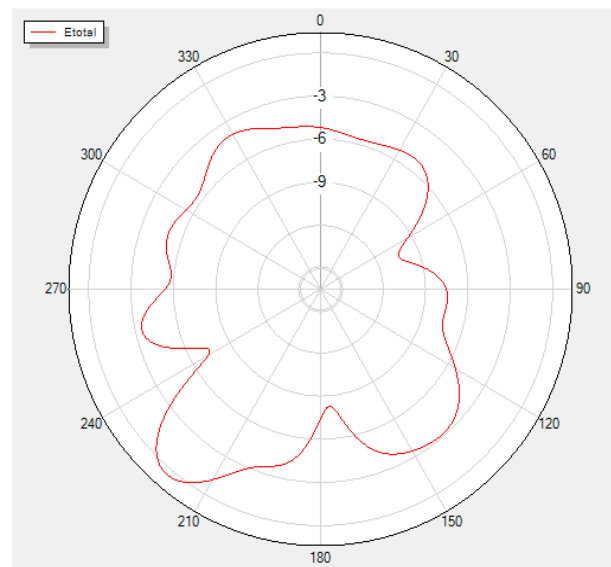
MAX:1.33dBi
MIN:-28.3dBi



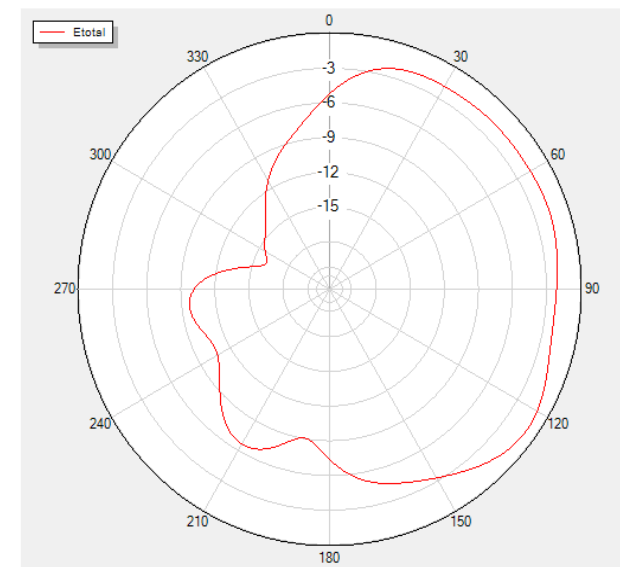
Theta=90 Freq=2140MHz



Phi=90 Freq=2140MHz



Phi=0 Freq=2140MHz

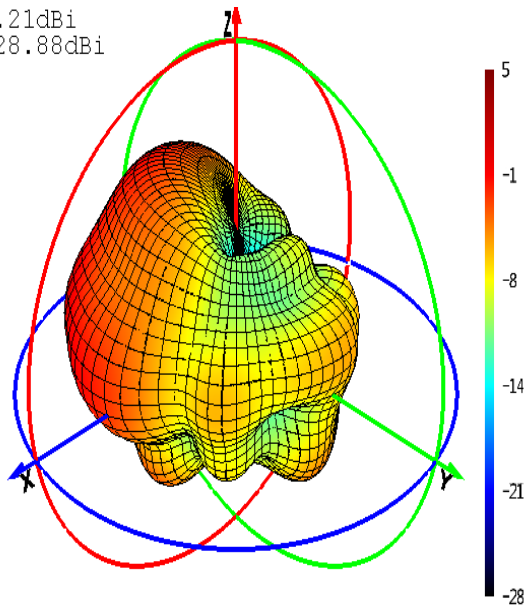


Antenna Performance

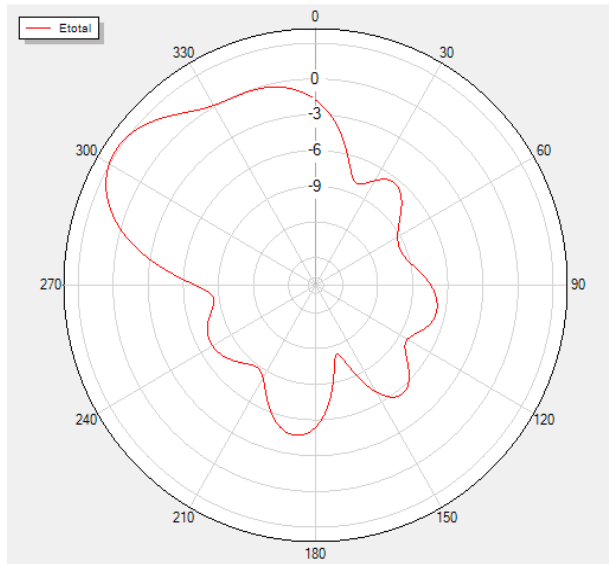


BT-2400MHz

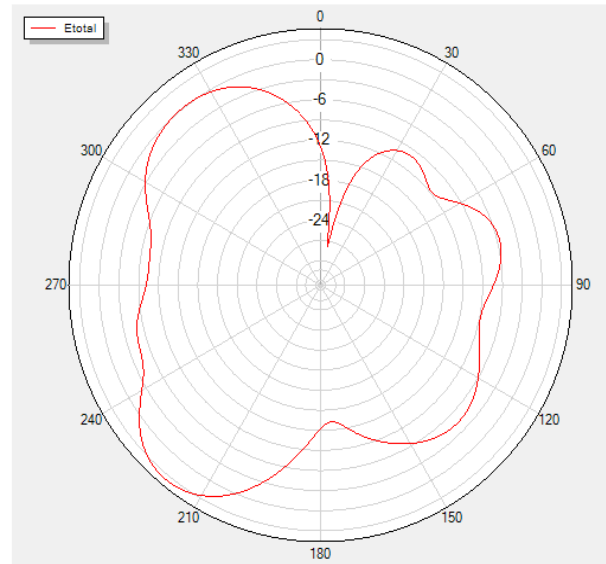
MAX: 4.21dBi
MIN: -28.88dBi



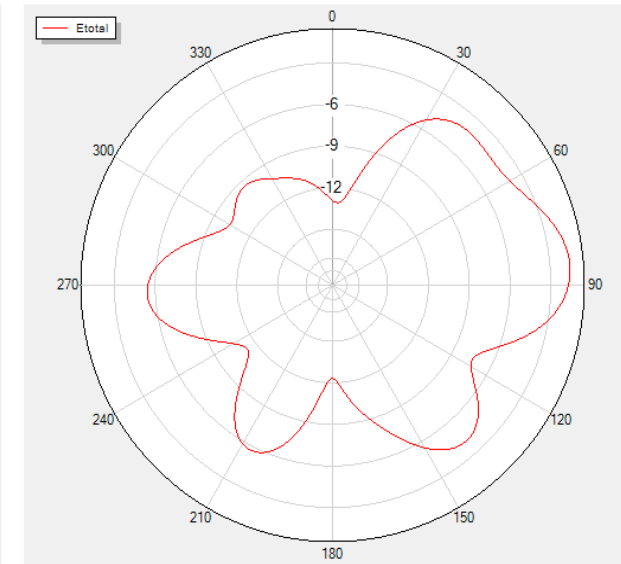
Theta=90 Freq=2400MHz



Phi=90 Freq=2400MHz



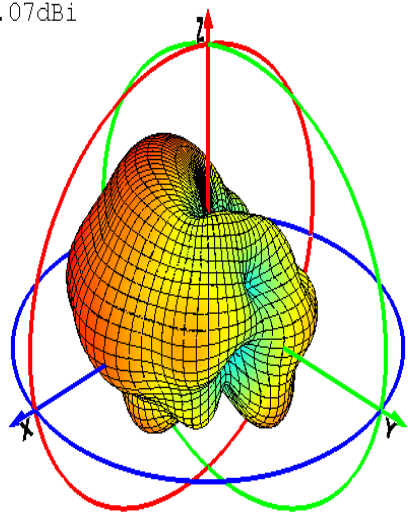
Phi=0 Freq=2400MHz



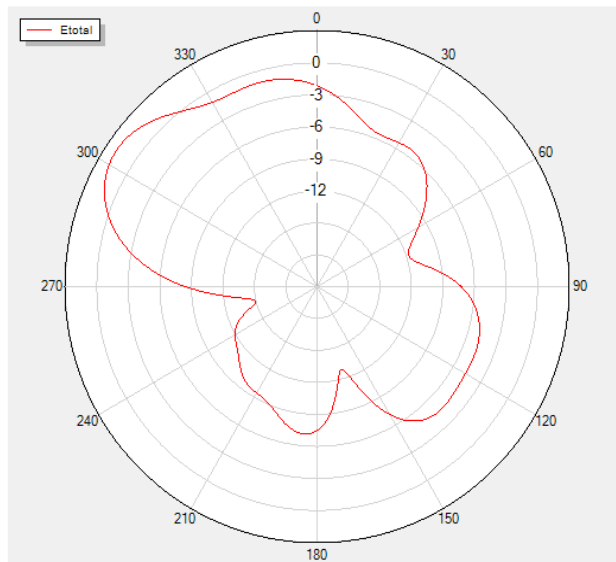
Antenna Performance

BT-2450MHz

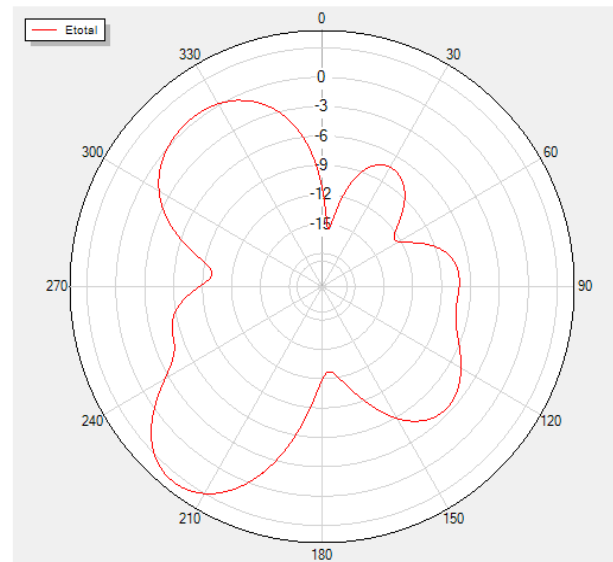
MAX: 4.37dBi
MIN: -24.07dBi



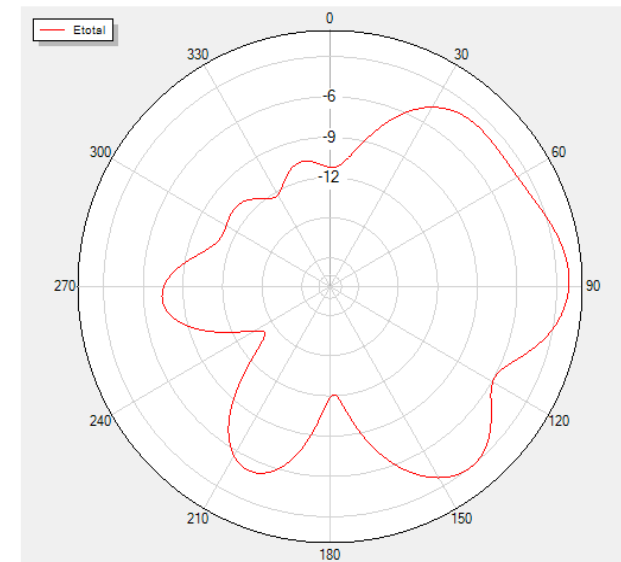
Theta=90 Freq=2450MHz



Phi=90 Freq=2450MHz



Phi=0 Freq=2450MHz

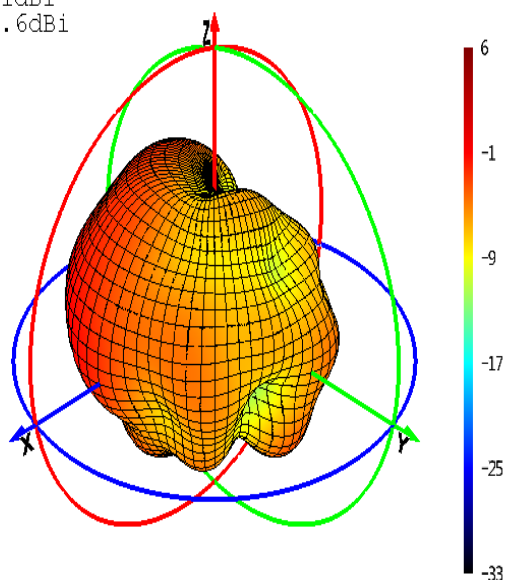


Antenna Performance

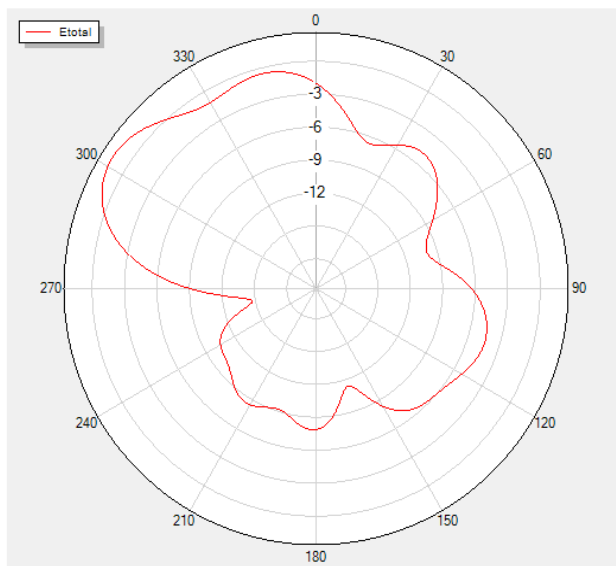


BT-2500MHz

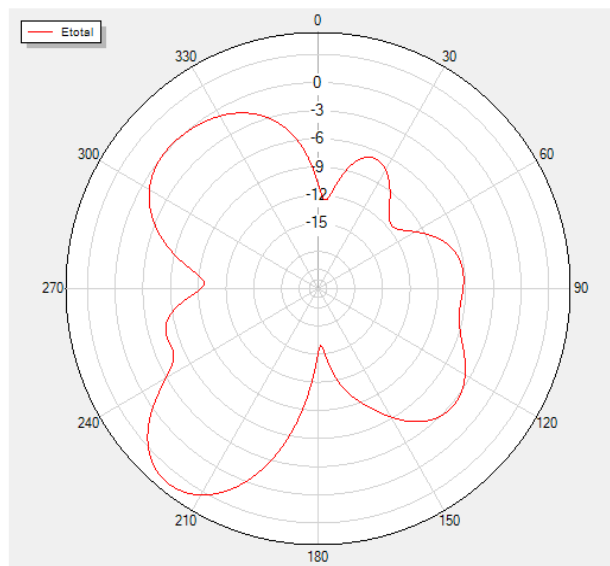
MAX: 5.01dBi
MIN: -34.6dBi



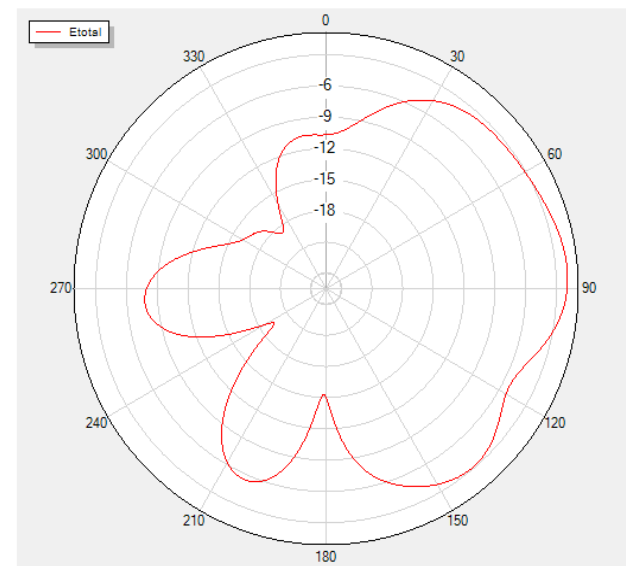
Theta=90 Freq=2500MHz



Phi=90 Freq=2500MHz



Phi=0 Freq=2500MHz



Conclusion



➤ Antenna Performance

According to the result of debugging, the LTE Antenna performance is as follows.

- From the Active result:
 1. The performance of TRP meets the ATT, VZW, and T-M certifications.
 2. In theory, the performance of TIS converted into 1.4M bandwidth, can meet the certifications.



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Thank You