

Zhejiang Haitong communications  
electronic Limited by Share Ltd.

(Shenzhen R&D)

Customer: TCL Communication Ltd.

Project name: T608DL

Product name: T608DL - cellular &wifi antenna

Material: FPC

Date: 2022.10.31

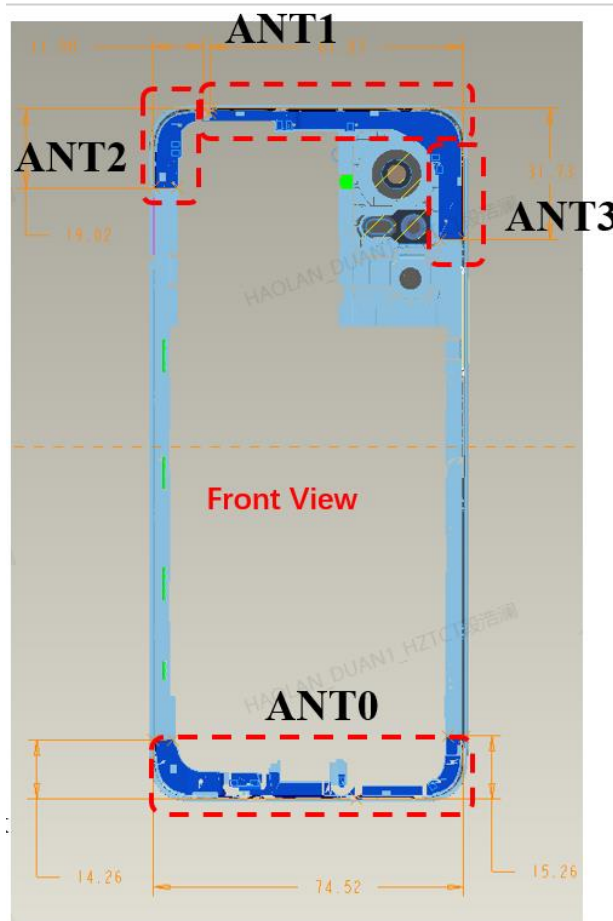
1: chamber room introduction and testing scope



Our company has a number of OTA test darkrooms, ranging from 400MHz to 8.5ghz, which can provide passive test and active test (including OTA overall 2G,3G,4G,5GFR test, WiFi multi-mode test, GPS active test, Bluetooth active test, which can provide antenna gain and efficiency. 2D orientation and apple chart analysis and upper and lower hemisphere efficiency values, mutual disturbance correlation coefficient test items

## WIFI a/b/g/n/ac

### 2: Antenna Location:



Antenna	Type	Description
ANT 0	FPC	GSM850 TX+MHB TRX+LB DRX
ANT 1	FPC	LB TRX+GSM850 PRX +MHB DRX
ANT 2	FPC	GPS+2.4 WIFI +BT
ANT 3	FPC	5G WIFI

	Model name	Type	Manufacturer	Production address
ANT 0	SONATA-MAIN-HT-V2	FPC	HT	1St floor, Phoenix Tower, 15 Science and Technology North First Road, Shenzhen, Guangdong Province
ANT 1	SONATA-DIV-HT-V2	FPC	HT	
ANT 2	SONATA-3IN1-HT-V2	FPC	HT	
ANT 3	SONATA-DIV-HT-V2	FPC	HT	

HT: Zhejiang Haitong communications electronic Limited by Share Ltd.

### 3: Test Equipment list

Type of Equipment	Model number/Version	Manufacturer	Calibration due date
Software	GTS 3.0.3.1	GTS	NA
Network Analyzer	ZVB 8	R&S	2022/8/12

### 4: Test result

Antenna placement:

ANTO_600M			
Frequency (MHz)	AVG Gain	efficiency (%)	Peak Gain
600	-13.10	4.90	-11.51
610	-12.31	5.88	-10.34
620	-11.48	7.11	-9.19
630	-10.73	8.46	-8.29
640	-10.08	9.81	-7.58
650	-9.96	10.08	-7.26
660	-10.48	8.95	-7.73
670	-11.28	7.45	-8.73
680	-12.20	6.02	-9.99
690	-13.04	4.97	-10.59
700	-13.73	4.23	-11.44
AVG	-11.67	7.08	-9.33

ANTO_700M			
Frequency (MHz)	AVG Gain	efficiency (%)	Peak Gain
700	-10.18	9.59	-7.68
710	-9.68	10.77	-6.86
720	-9.29	11.78	-6.25

730	-9.19	12.05	-5.99
740	-9.51	11.19	-6.45
750	-10.09	9.79	-7.23
760	-10.66	8.59	-8.14
770	-11.04	7.87	-8.83
780	-11.62	6.89	-10.02
790	-12.19	6.04	-11.18
800	-12.69	5.38	-12.19
ANTO_800M			
Frequency (MHz)	AVG Gain	efficiency (%)	Peak Gain
800	-11.02	7.91	-10.35
810	-10.82	8.28	-9.75
820	-10.57	8.76	-9.16
830	-10.30	9.34	-8.65
840	-9.79	10.49	-7.72
850	-9.27	11.82	-6.77
860	-8.86	13.01	-6.05
870	-8.80	13.18	-6.03
880	-8.97	12.68	-6.35
890	-9.38	11.54	-7.22
900	-9.88	10.27	-8.30
AVG	-9.79	10.66	-7.85

ANTO_1700M			
Frequency (MHz)	AVG Gain	efficiency (%)	Peak Gain
1700	-3.93	40.5	-1.37
1730	-4.55	35.07	0.32
1750	-4.71	33.77	0.11
1770	-4.77	33.31	0.17
1790	-4.75	33.50	0.60
1810	-4.93	32.15	0.31
1830	-4.82	33.00	0.14
1850	-4.82	32.95	0.48
1870	-4.91	32.27	0.52
1890	-4.93	32.12	0.16
AVG	-4.34	30.28	0.24

ANTO_1900M			
Frequency (MHz)	AVG Gain	efficiency (%)	Peak Gain
1910	-4.99	31.72	0.39
1930	-5.21	30.10	0.77
1950	-5.17	30.39	1.03
1970	-5.34	29.26	0.42
1990	-5.32	29.40	0.20
2010	-5.42	28.69	0.46
2030	-5.60	27.57	0.23
2050	-5.79	26.34	0.00
2070	-6.06	24.78	0.07
2090	-6.23	23.84	-0.32
AVG	-5.01	25.64	0.30

ANTO_2000M			
Frequency (MHz)	AVG Gain	efficiency (%)	Peak Gain
2110	-6.22	23.88	-0.36
2130	-6.28	23.58	-0.14
2150	-6.10	24.54	0.27
2170	-5.98	25.25	0.53
2190	-5.70	26.91	0.98
2210	-5.68	27.05	1.24
2230	-5.65	27.20	1.23
2250	-5.69	26.95	0.78
2270	-5.89	25.78	0.20
2290	-6.09	24.60	-0.09
AVG	-5.39	23.25	0.42

ANTO_2500M			
Frequency (MHz)	AVG Gain	efficiency (%)	Peak Gain
2490	-6.97	20.11	-0.46
2510	-6.72	21.30	-0.69
2530	-6.41	22.84	-0.66
2550	-6.21	23.95	-0.51
2570	-5.94	25.49	-0.42
2590	-5.60	27.53	-0.62
2610	-5.43	28.64	-0.90
2630	-5.54	27.94	-1.67
2650	-5.51	28.14	-2.00
2670	-5.47	28.38	-2.11
2690	-5.65	27.23	-2.03
AVG	-5.95	25.60	-1.10

ANT1_600M			
Frequency (MHz)	AVG Gain	efficiency (%)	Peak Gain
600	-10.69	8.54	-9.37
610	-10.11	9.74	-8.52
620	-9.52	11.18	-7.49
630	-8.78	13.23	-6.25
640	-8.02	15.79	-5.12
650	-7.42	18.11	-4.12
660	-7.10	19.51	-3.67
670	-7.01	19.90	-4.01
680	-7.14	19.31	-4.30
690	-7.48	17.86	-4.41
700	-7.92	16.14	-4.81
AVG	-8.29	15.39	-5.64

ANT1_700M			
Frequency (MHz)	AVG Gain	efficiency (%)	Peak Gain
700	-7.76	8.98	-4.34
710	-7.46	9.98	-3.88
720	-7.35	11.21	-3.62
730	-7.37	12.56	-3.87
740	-7.56	14.32	-4.20
750	-7.83	16.22	-4.44
760	-8.22	17.71	-4.89
770	-8.65	18.78	-5.42
780	-9.22	19.25	-6.20
790	-9.92	18.48	-7.17
800	-10.56	17.17	-8.12
AVG	-8.36	14.97	-5.10



ANT1_780M			
Frequency (MHz)	AVG Gain	efficiency (%)	Peak Gain
700	-10.47	8.98	-8.04
710	-10.01	9.98	-7.39
720	-9.50	11.21	-6.75
730	-9.01	12.56	-6.20
740	-8.44	14.32	-5.18
750	-7.90	16.22	-4.39
760	-7.52	17.71	-3.95
770	-7.26	18.78	-3.58
780	-7.16	19.25	-3.45
790	-7.33	18.48	-3.72
800	-7.65	17.17	-4.14
AVG	-8.39	14.97	-5.16

ANT1_800M			
Frequency (MHz)	AVG Gain	efficiency (%)	Peak Gain
800	-9.15	12.15	-6.00
810	-8.77	13.28	-5.37
820	-8.35	14.61	-4.81
830	-7.99	15.89	-4.38
840	-7.87	16.34	-3.97
850	-7.88	16.28	-3.69
860	-7.93	16.10	-3.54
870	-8.17	15.23	-3.71
880	-8.58	13.86	-4.28
890	-8.97	12.69	-4.83
900	-9.37	11.56	-5.44
AVG	-8.46	14.36	-4.55

ANTI_1900M			
Frequency (MHz)	AVG Gain	efficiency (%)	Peak Gain
1890	-4.86	35.66	-0.04
1910	-4.72	36.70	-0.17
1930	-4.99	34.69	-0.19
1950	-5.02	34.45	-0.07
1970	-5.23	32.97	-0.35
1990	-5.43	31.61	-0.65
2010	-5.30	32.48	-0.58
2030	-5.34	32.21	-0.65
2050	-5.24	32.92	-0.69
2070	-5.09	33.98	-0.54
2090	-5.08	34.03	-0.65
AVG	-5.12	33.79	-0.42

ANTI_2000M			
Frequency (MHz)	AVG Gain	efficiency (%)	Peak Gain
2110	-5.29	32.55	-1.06
2130	-5.40	31.86	-1.39
2150	-5.49	31.23	-1.46
2170	-5.57	30.75	-2.12
2190	-5.55	30.88	-2.57
2210	-5.46	31.46	-2.76
2230	-5.51	31.11	-2.31
2250	-5.83	29.12	-1.74
2270	-6.43	25.75	-2.08
2290	-7.10	22.52	-2.79
2310	-7.56	20.52	-3.38
AVG	-5.93	28.89	-2.15

ANTI_2500M			
Frequency (MHz)	AVG Gain	efficiency (%)	Peak Gain
2490	-7.09	22.55	-2.03
2510	-7.00	22.95	-1.94
2530	-6.85	23.67	-1.58
2550	-6.78	23.99	-1.51
2570	-6.41	25.87	-1.38
2590	-5.90	28.70	-0.90
2610	-5.63	30.35	-0.53
2630	-5.66	30.17	-0.57
2650	-5.52	31.03	-0.34
2670	-5.45	31.51	-0.31
2690	-5.12	33.76	-0.16
AVG	-6.13	27.69	-1.02

ANT3_5000M			
Frequency (MHz)	AVG Gain	efficiency (%)	Peak Gain
5100	-5.05	31.29	1.40
5120	-4.85	32.77	1.64
5140	-4.69	33.93	2.32
5160	-4.40	36.30	2.38
5180	-4.99	31.71	1.94
5200	-4.47	35.73	2.98
5220	-4.21	37.90	2.71
5240	-4.64	34.32	2.44
5260	-4.82	32.99	1.90
5280	-4.75	33.52	3.03
5300	-4.95	32.00	2.21
5320	-5.16	30.46	1.74
5340	-4.93	32.11	2.61
5360	-4.91	32.28	2.41
5380	-4.92	32.20	2.54
5400	-4.77	33.38	3.04
5420	-4.56	35.00	3.19
5440	-4.39	36.36	2.71
5460	-4.22	37.88	3.15
5480	-3.99	39.94	3.14
5500	-3.98	39.98	3.20
5520	-3.93	40.46	2.49
5540	-4.00	39.77	2.84
5560	-4.01	39.75	2.98

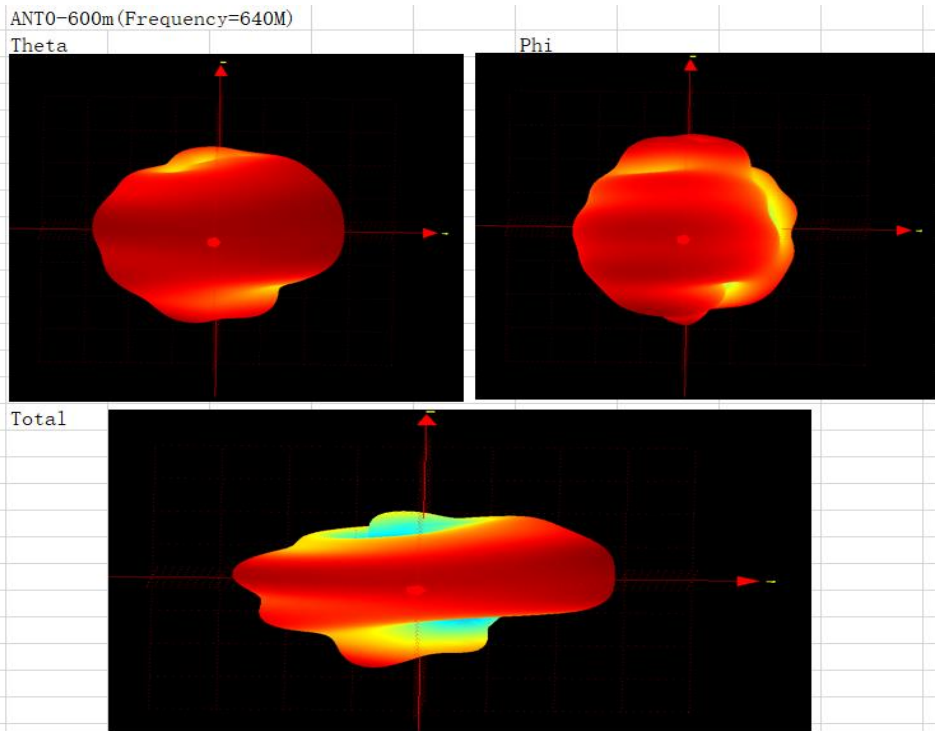
5580	-4.08	39.11	2.44
5600	-4.06	39.30	2.76
5620	-4.02	39.64	2.83
5640	-4.00	39.83	2.85
5660	-3.85	41.22	3.03
5680	-3.84	41.29	3.12
5700	-4.09	38.96	3.06
5720	-4.09	39.00	3.28
5740	-4.22	37.82	3.09
5760	-4.26	37.48	3.54
5780	-4.54	35.16	3.58
5800	-4.55	35.04	3.74
5820	-5.01	31.52	3.56
5840	-5.43	28.61	3.37
5860	-5.75	26.59	3.25
5880	-6.32	23.34	2.89
5900	-6.52	22.30	2.87
AVG	-4.98	32.35	3.29

ANT2_1500M			
Frequency (MHz)	AVG Gain	efficiency (%)	Peak Gain
1550	-4.73	33.65	-0.21
1555	-4.62	34.52	-0.18
1560	-4.51	35.40	-0.03
1565	-4.43	36.06	0.00
1570	-4.36	36.67	0.11
1575	-4.32	36.96	0.09
1580	-4.37	36.57	0.12
1585	-4.36	36.65	0.05
1590	-4.35	36.72	0.18
1595	-4.42	36.12	0.18
1600	-4.42	36.15	0.30
AVG	-4.44	35.95	0.06

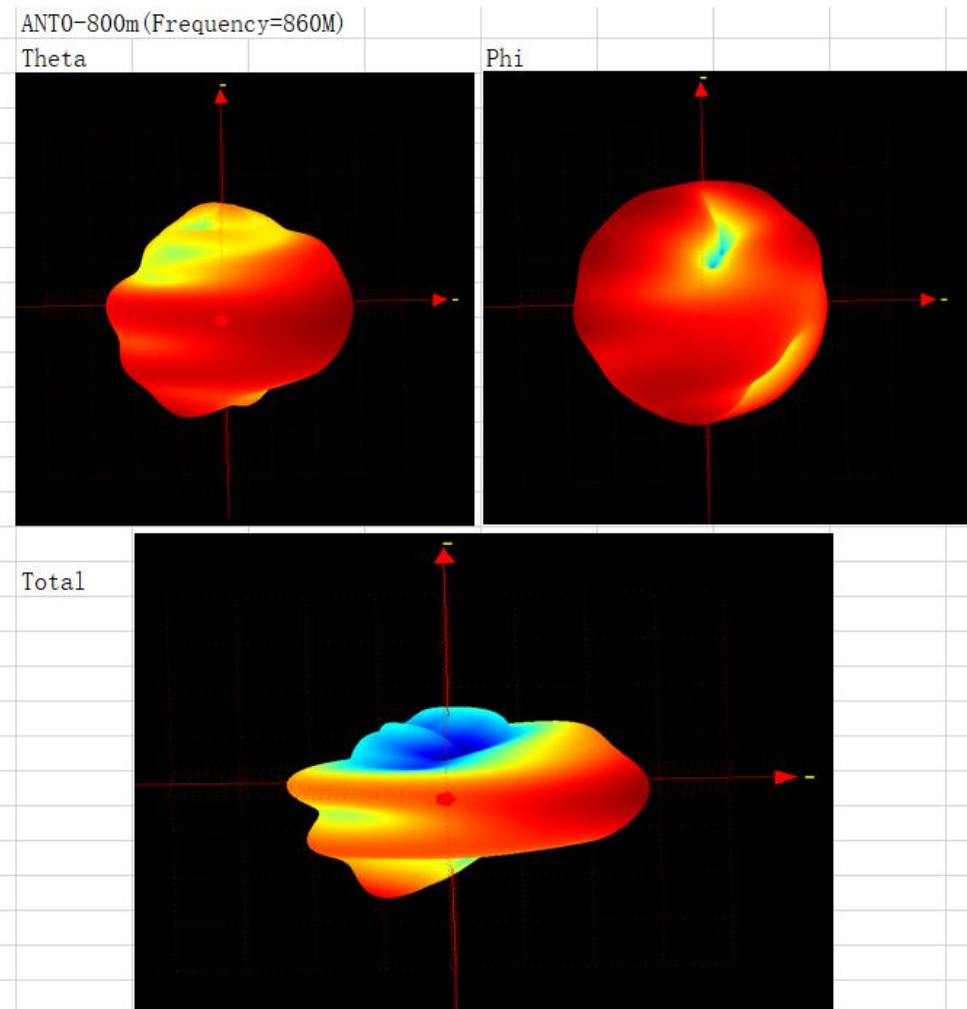
ANT2_2400M			
Frequency (MHz)	AVG Gain	efficiency (%)	Peak Gain
2400	-4.00	39.82	2.63
2410	-3.74	42.29	2.83
2420	-3.49	44.76	3.13
2430	-3.32	46.59	3.38
2440	-3.24	47.39	3.53
2450	-3.20	47.88	3.66
2460	-3.24	47.38	3.53
2470	-3.36	46.16	3.45
2480	-3.47	45.01	3.40
2490	-3.55	44.12	3.38
2500	-3.65	43.12	3.23
AVG	-3.48	44.96	3.29

### 3D Pattern

#### ANT 0\_ 600M (Frequency=640MHz)



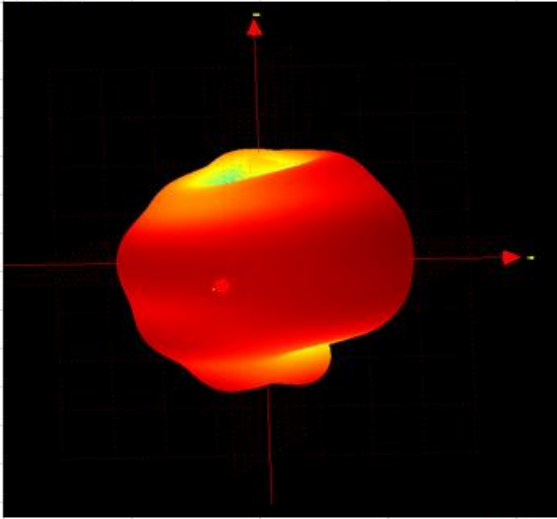
#### ANT 0\_ 800M (Frequency=860MHz)



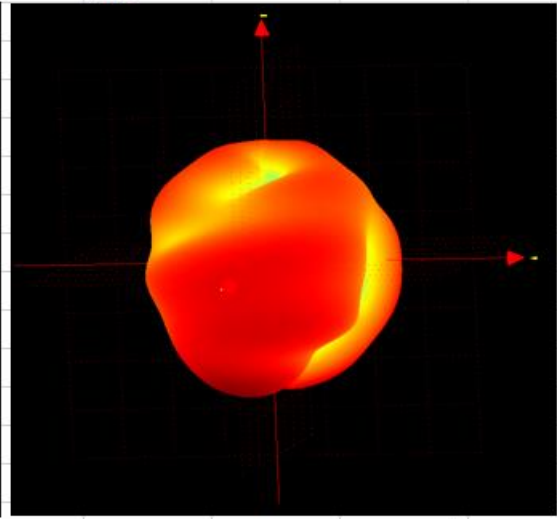
# ANT 0\_ 700M (Frequency=730MHz)

ANT0-700m (Frequency=730M)

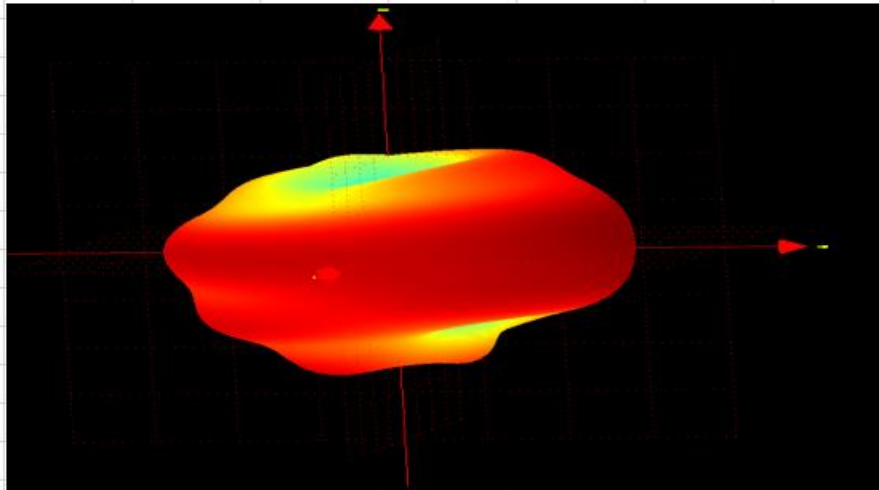
Theta



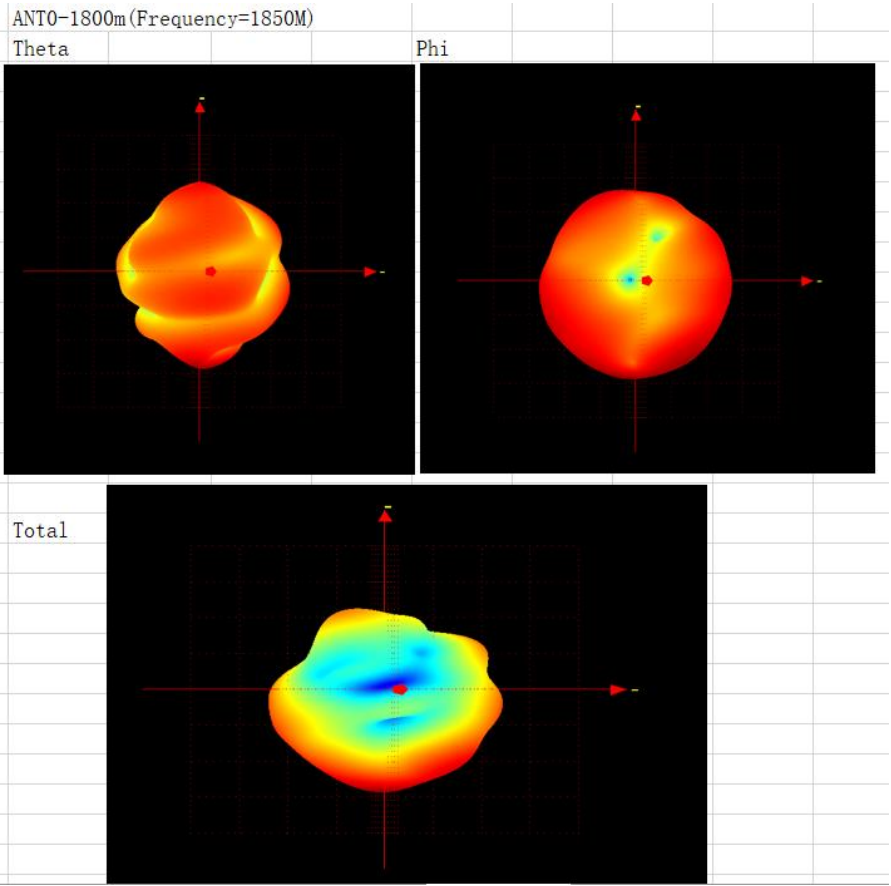
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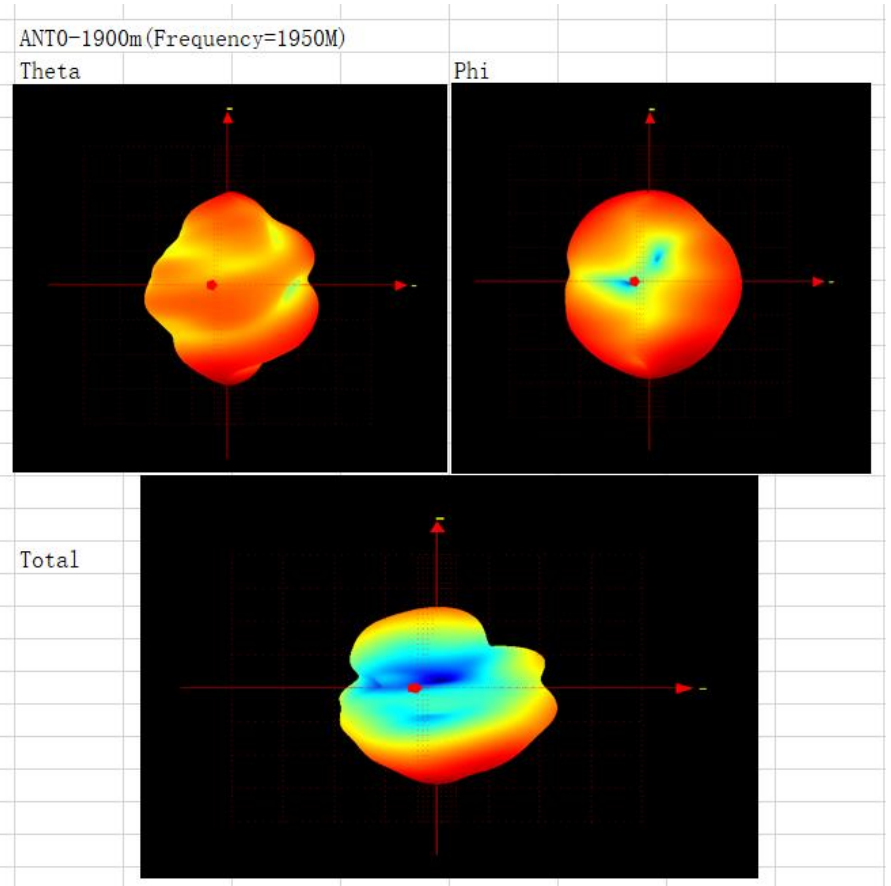
Total



# ANT 0\_ 1700M (Frequency=1850MHz)



# ANT 0\_ 1900M (Frequency=1950MHz)

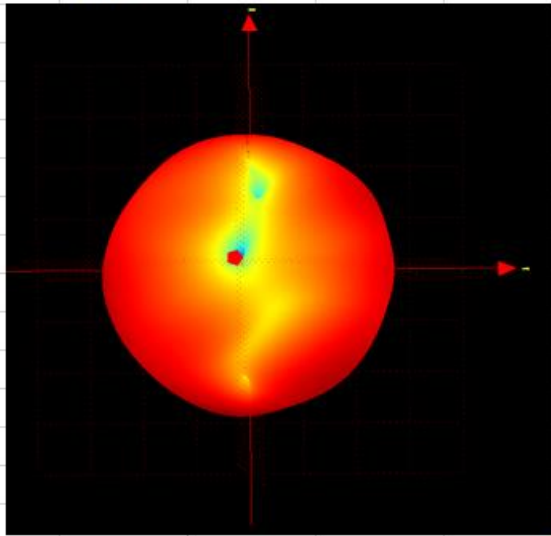




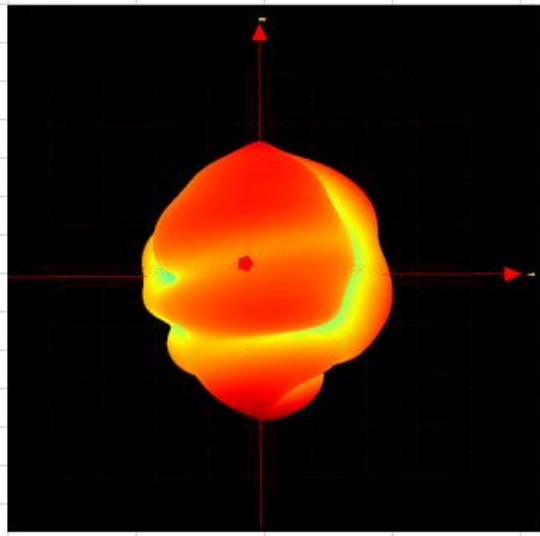
# ANT 0\_ 1700M (Frequency=1750MHz)

ANT0-1700m (Frequency=1750M)

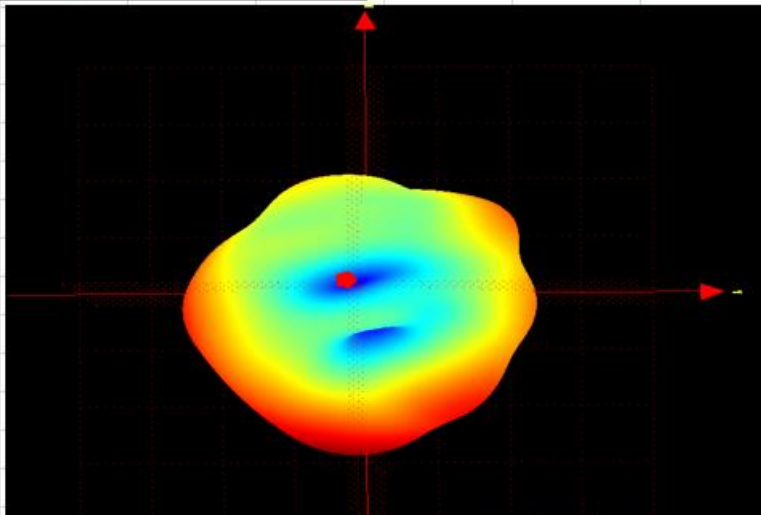
Theta



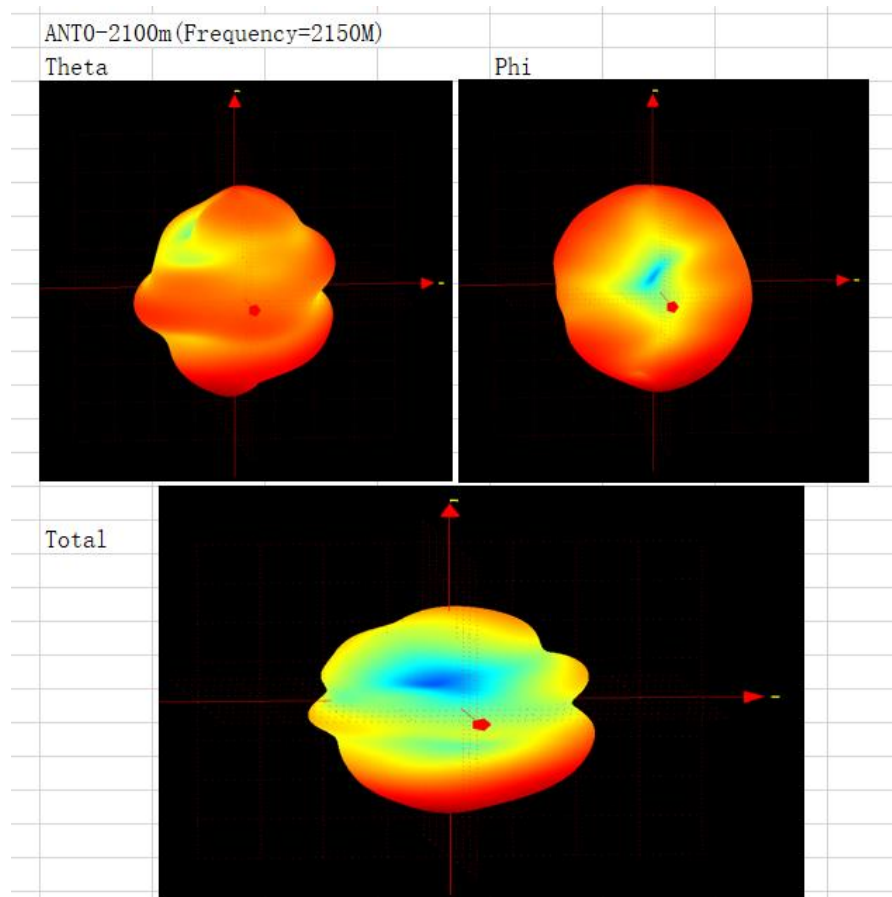
Phi



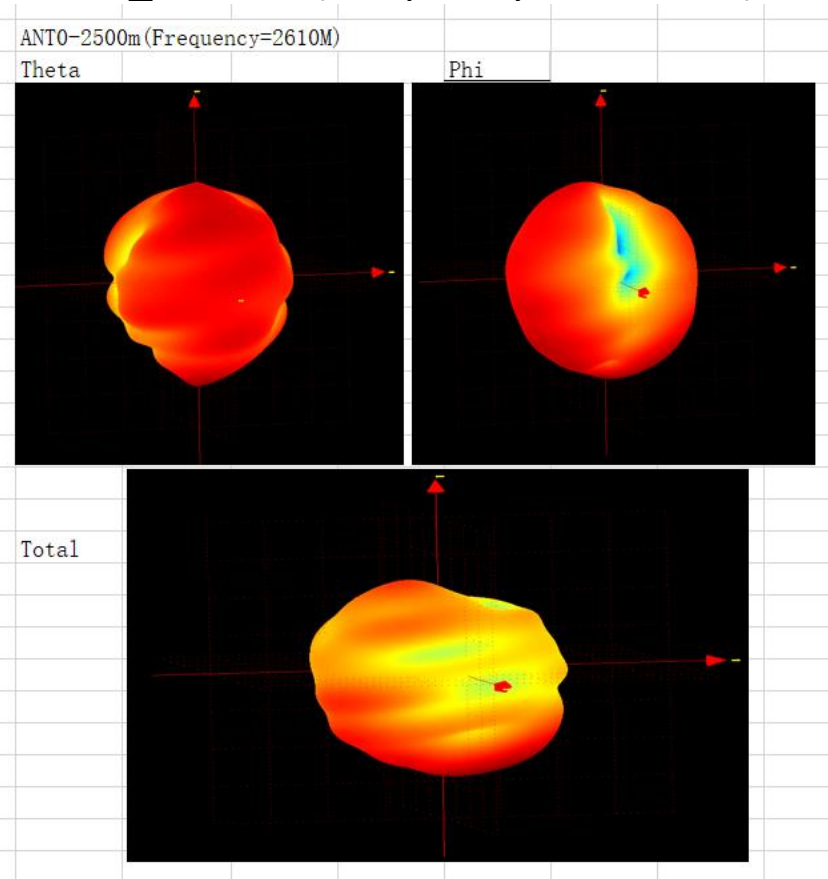
Total



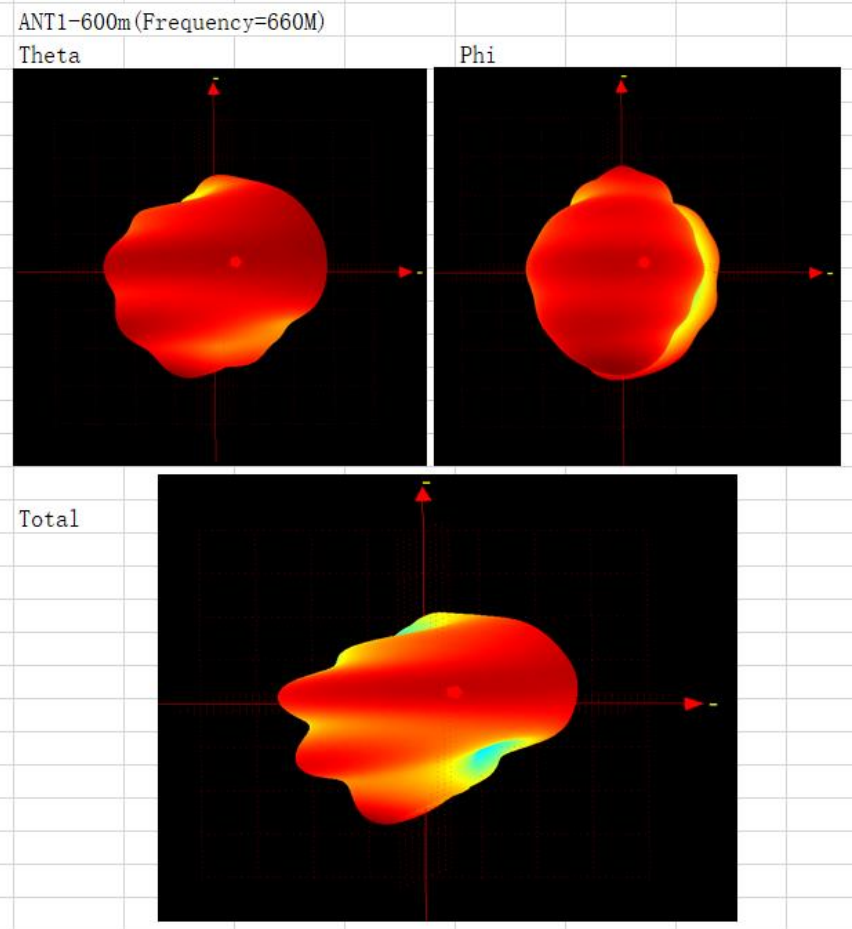
## ANT 0\_ 2000M (Frequency=2150MHz)



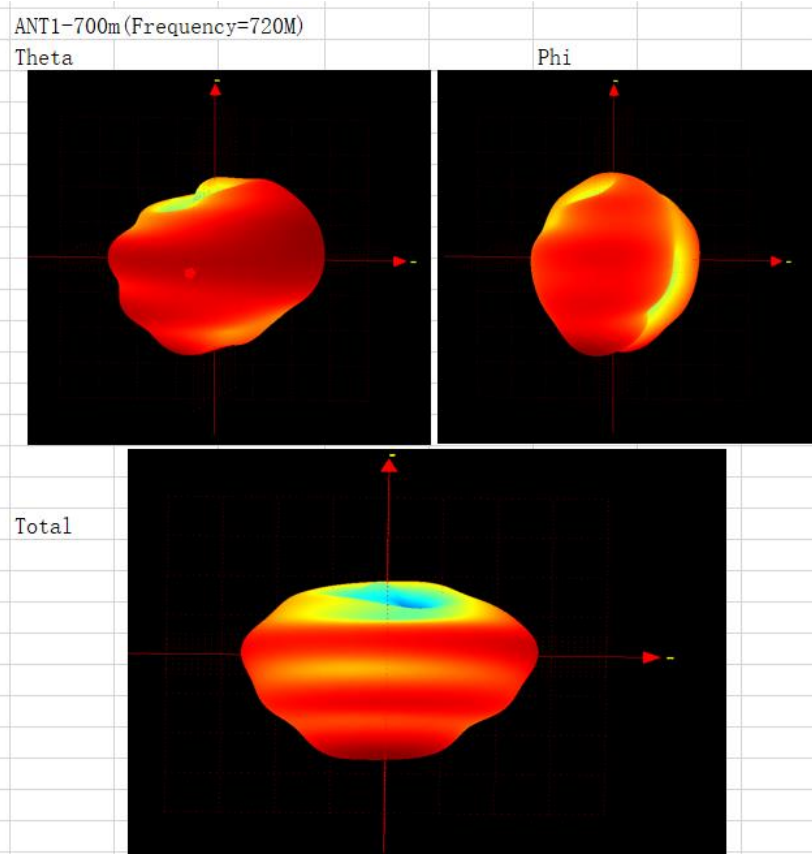
## ANT 0\_ 2500M (Frequency=2610MHz)



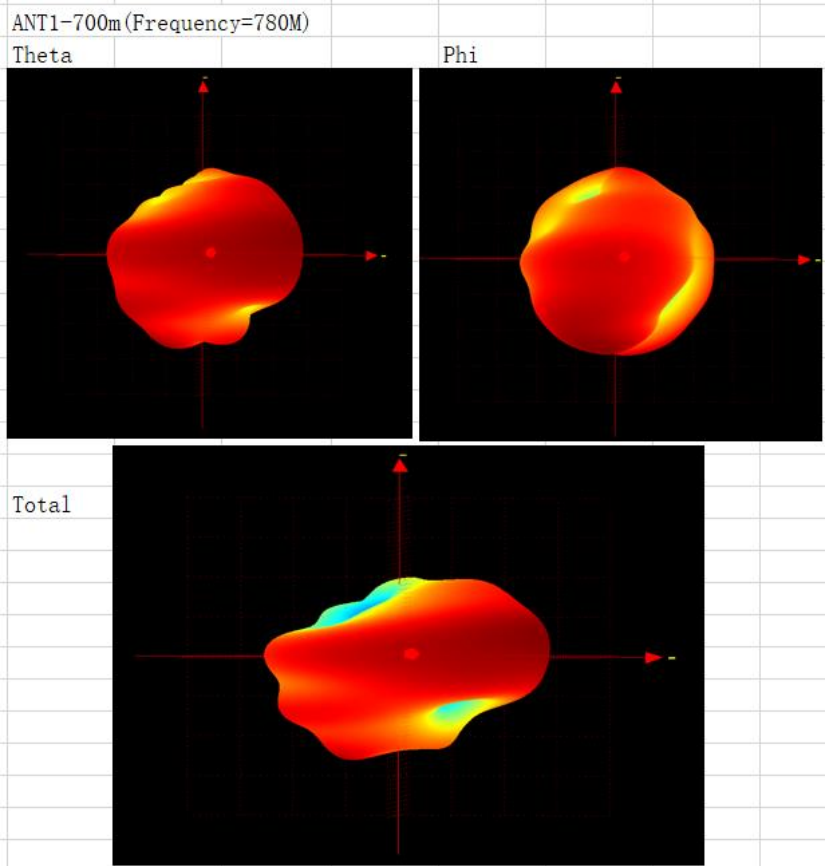
## ANT 1\_ 600M (Frequency=660MHz)



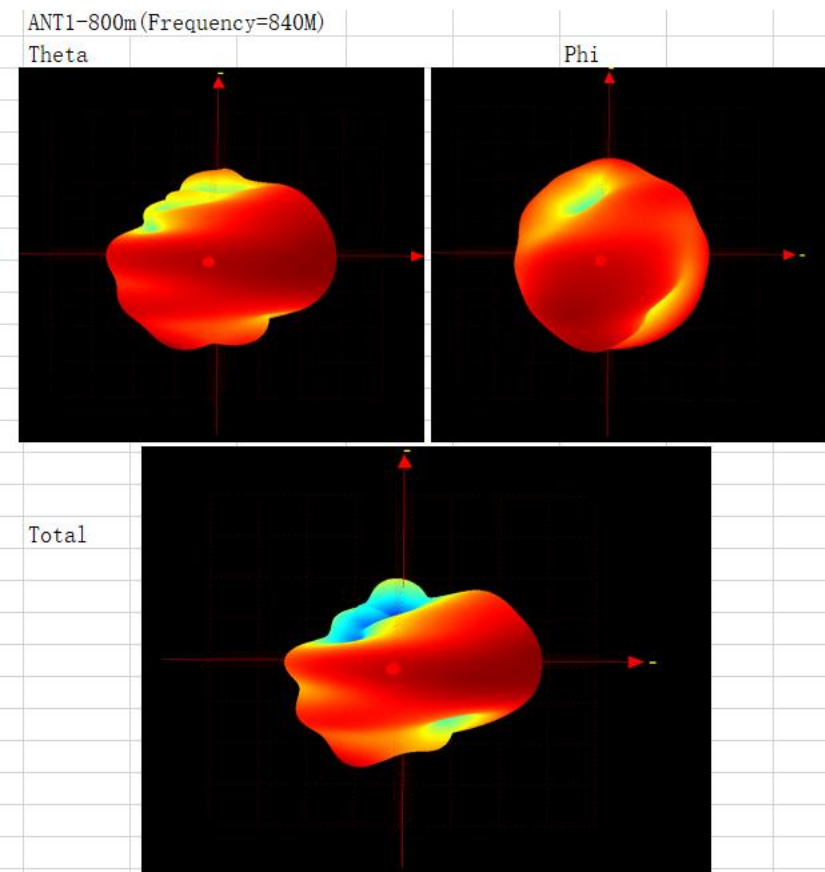
## ANT 1\_ 700M (Frequency=720MHz)



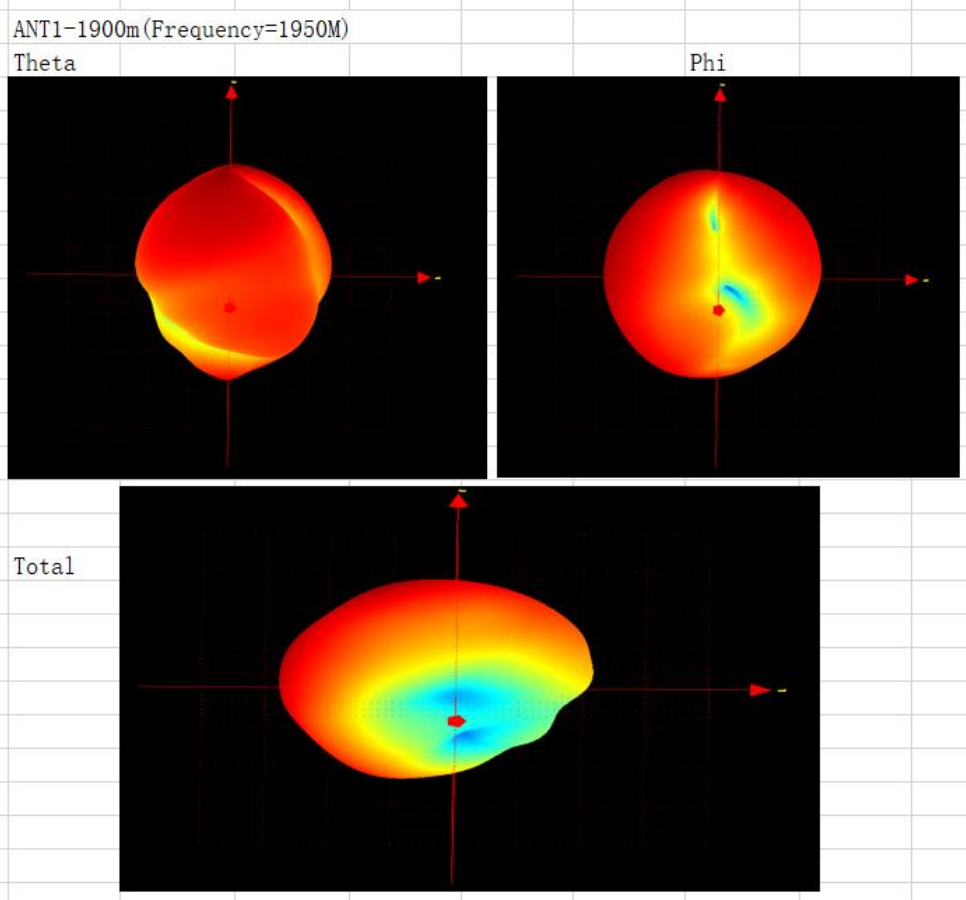
## ANT 1\_ 700M (Frequency=780MHz)



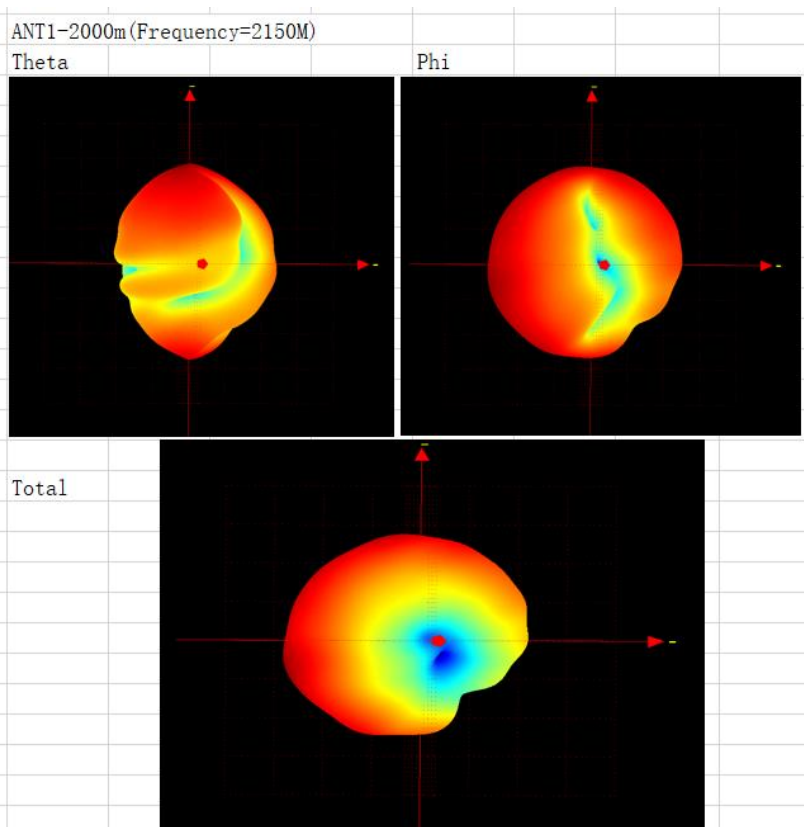
## ANT 1\_ 800M (Frequency=840MHz)



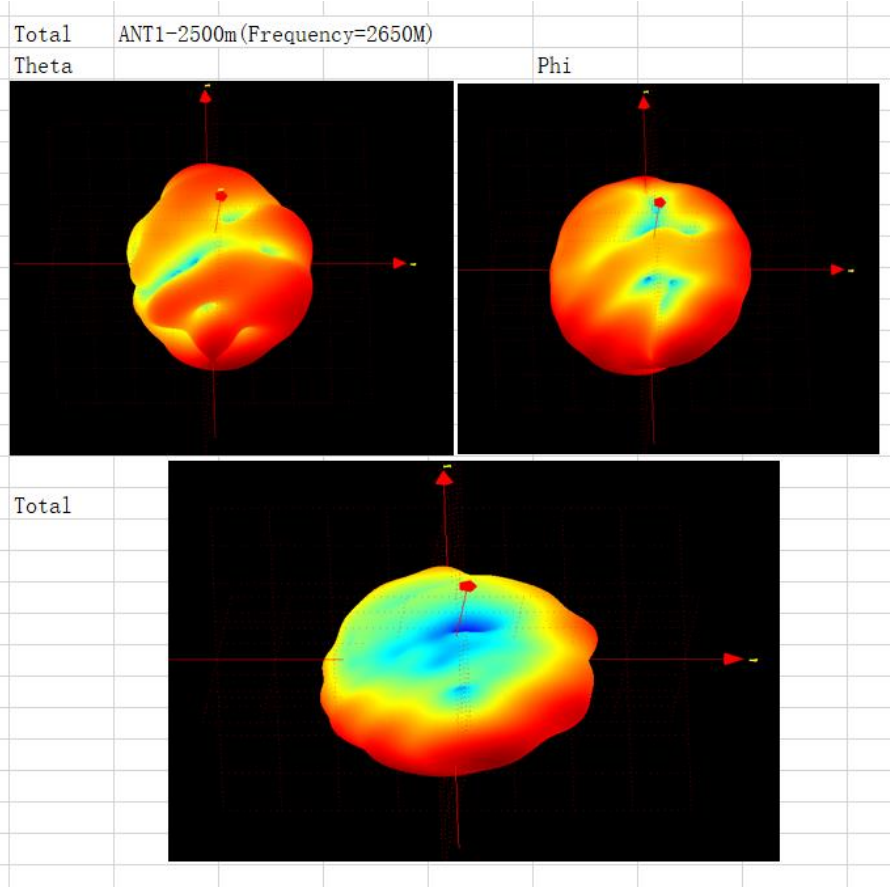
## ANT 1\_ 1900M (Frequency=1950MHz)



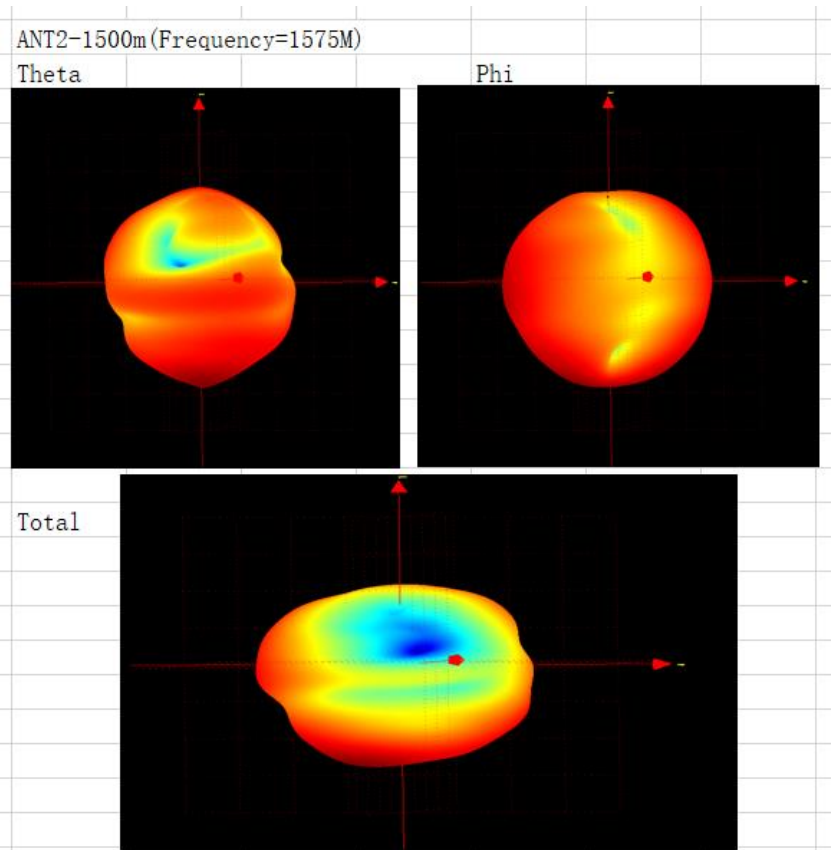
## ANT 1\_ 2000M (Frequency=2150MHz)



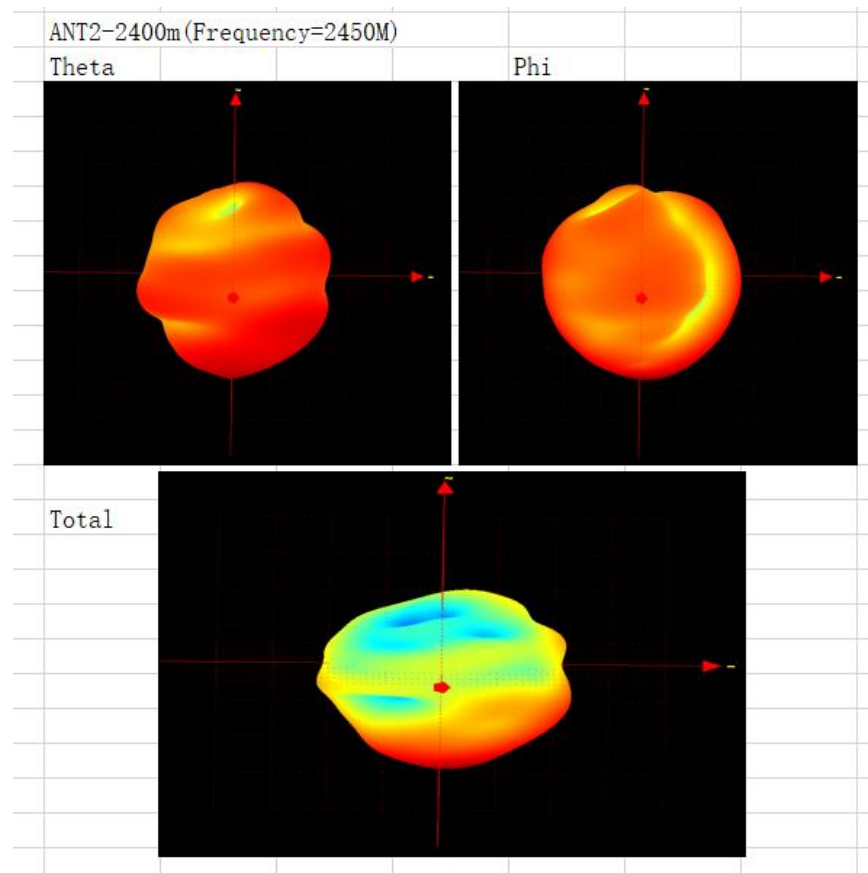
## ANT 1\_ 2500M (Frequency=2650MHz)



## ANT2\_ 1500M (Frequency=1575MHz)



## ANT2\_ 2400M (Frequency=2450MHz)



## ANT 3\_ 5000M (Frequency=5500MHz)

