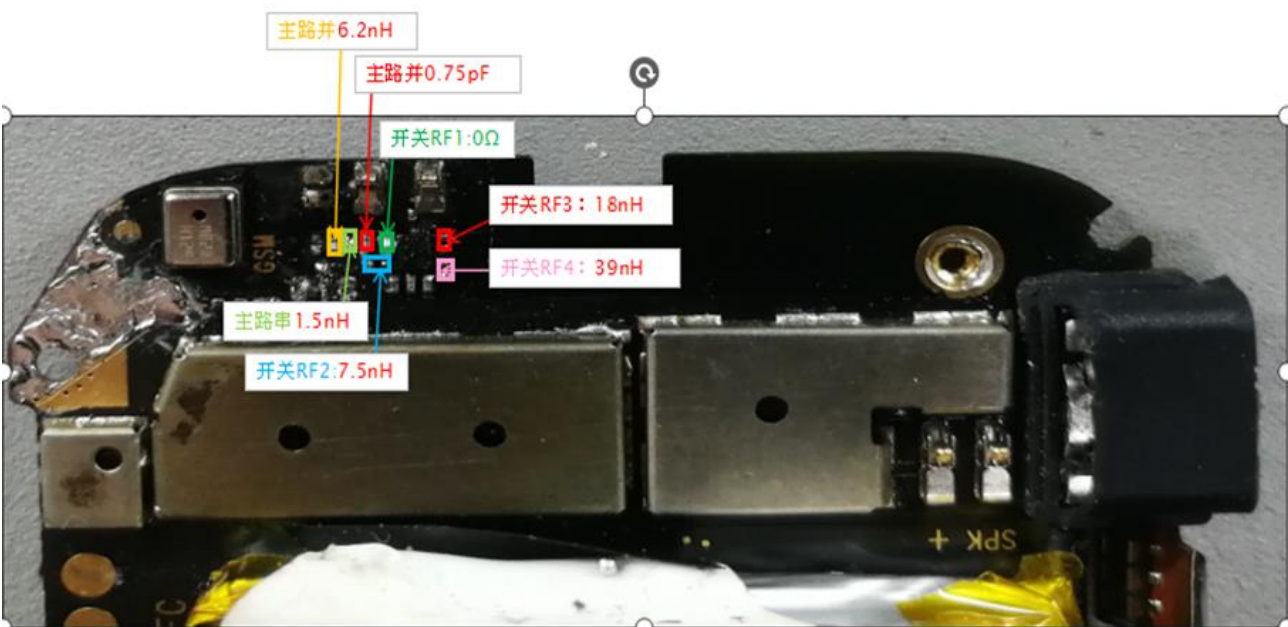


1.Project picture

building-out circuit



主路匹配

Main Antenna matching	
Element	Value
E1 (0201)	0 Ω
E2 (0201)	0. 75pF
E3 (0201)	1. 5nH
E4 (0201)	6. 2nH
E5 (0201)	0 Ω

开关匹配

主天线 Switch 1	RF1	0Ω
	RF2	7. 5NH
	RF3	18NH
	RF4	39NH

开关逻辑

RF1:	GSM900/1800/1900/WCDMA Band1/2/8/TDS-CDMA Band34/39/LTE Band1/2/3/4/7/8/19/25/34/38/39/40/41/66
RF2:	GSM850/WCDMA Band5/LTE Band5/18/20/26
RF3:	LTE Band13
RF4:	LTE Band 12/17/28

Shenzhen Huaxin Micro Communication Technology Co., Ltd.

GSM 四频+WCDMA B1/2/4/5/6/8/+ BC0/BC1

LTEB1/2/3/4/5/7/8/12/13/17/18/19/20/25/26/28A/B/34/38/39/40/41/66+WIFI/BT/GPS

Band	Channel	TRP	TIS	Band	Channel	TRP	TIS
GSM850	128	25.72		GSM900	975	27.22	
	190	26.39			38	27.98	
	251	25.74	-102.34		124	26.43	-102.36
GSM1800	512	26.40		GSM1900	512	26.54	
	698	26.10			661	25.88	
	885	26.41	-103.89		810	26.02	-102.91
WCDMA Band1	9612	17.19		WCDMA Band2	9262	17.53	
	9750	17.12			9400	17.62	
	9888	17.45	-107.25		9538	17.63	-106.34
WCDMA Band4	1312	19.15		WCDMA Band5	4132	15.87	
	1412	19.43			4182	16.90	
	1513	18.30	-107.05		4233	16.89	-105.12
WCDMA Band6	4162	17.15		WCDMA Band8	2712	17.74	
	4175	16.91			2787	18.61	
	4188	16.52	-105.62		2863	18.51	-106.01
BC0	1013	16.18		BC1	25	16.02	
	384	16.34			600	15.97	
	777	16.39	-100.89		1175	15.59	-102.68

LTE Band1	18050	16.48		LTE Band2	18650	17.75	
	18300	16.09			18900	17.45	
	18550	15.97	-92.10		19150	17.19	-93.08
LTE Band3	19250	18.48		LTE Band4	20000	17.99	
	19575	16.36			20175	18.18	
	19900	16.57	-89.62		20350	17.15	-93.04
LTE Band5	20450	14.44		LTE Band7	20800	19.68	
	20525	15.78			21100	19.93	
	20600	15.63	-92.01		21400	18.51	-89.10
LTE Band8	21500	16.19		LTE Band12	23060	9.85	
	21625	17.03			23095	10.03	
	21750	16.55	-90.81		23130	9.98	-88.22
LTE Band13	23230	13.50		LTE Band17	23780	10.26	
	23230	13.47			23790	10.34	
	23230	13.44	-90.13		23800	10.20	-88.34
LTE Band18	23900	15.19		LTE Band19	24050	16.25	
	23925	14.50			24075	15.54	
	23950	15.16	-93.89		24100	15.49	-92.03
LTE Band20	24200	15.67		LTE Band25	26065	17.24	
	24300	15.50			26365	17.19	
	24400	15.59	-89.93		26665	15.42	-95.02
LTE Band26	26740	15.40		LTE B28A	27260	9.36	
	26865	16.14			27360	10.76	
	26990	15.52	-92.01		27460	10.77	-88.06
LTE B28B	27410	10.81		LTE Band34	36200	14.63	
	27510	10.80			36275	14.52	
	27610	10.77	-87.35		36349	14.51	-93.89
LTE Band38	37850	21.63		LTE Band39	38350	17.79	
	38000	21.72			38450	16.02	
	38150	21.20	-90.05		38550	17.09	-88.18
LTE Band40	38750	18.69		LTE Band41	39750	21.16	
	39150	18.21			40620	21.06	
	39550	17.44	-89.82		41490	20.74	-88.76

1、Main antenna efficiency（710-800）（810-980）（1700-1990）（2210-2800）

Freq	Effi	Effi	Gain
(MHz)	(%)	(dB)	(dBi)
700MHz	7%	-11.74	-9.34
710MHz	8%	-11.19	-8.71
720MHz	9%	-10.64	-7.98
730MHz	10%	-10.17	-7.29
740MHz	11%	-9.50	-7.18
750MHz	13%	-8.81	-6.16
760MHz	17%	-7.82	-4.45
770MHz	17%	-7.64	-4.33
780MHz	17%	-7.75	-4.53
790MHz	15%	-8.38	-5.08
800MHz	13%	-8.94	-5.24
820MHz	15%	-8.24	-5.88
830MHz	16%	-7.83	-5.37
840MHz	18%	-7.43	-4.74
850MHz	18%	-7.35	-4.44
860MHz	19%	-7.25	-4.58
870MHz	17%	-7.66	-5.08
880MHz	16%	-8.03	-5.29

Freq	Effi	Effi	Gain
(MHz)	(%)	(dB)	(dBi)
890MHz	17%	-7.70	-4.93
900MHz	13%	-8.73	-6.64
880MHz	12%	-9.23	-8.60
890MHz	14%	-8.66	-7.60
900MHz	14%	-8.45	-5.70
910MHz	21%	-6.70	-3.79
920MHz	22%	-6.54	-4.08
930MHz	25%	-6.07	-2.85
940MHz	23%	-6.31	-2.04
950MHz	17%	-7.67	-4.58
960MHz	17%	-7.80	-4.63
1710MHz	26%	-5.82	-1.39
1730MHz	25%	-6.03	-0.93
1750MHz	23%	-6.32	-1.36
1770MHz	22%	-6.54	-1.42
1790MHz	20%	-7.01	-1.52
1810MHz	20%	-6.91	-1.62

Freq	Effi	Effi	Gain
(MHz)	(%)	(dB)	(dBi)
1870MHz	17%	-7.63	-2.61
1890MHz	16%	-7.88	-2.14
1910MHz	17%	-7.70	-2.85
1930MHz	18%	-7.47	-3.13
1950MHz	18%	-7.44	-2.65
1970MHz	20%	-6.91	-2.37
1990MHz	19%	-7.15	-2.51
2010MHz	21%	-6.85	-2.93
2030MHz	20%	-7.05	-2.85
2050MHz	20%	-6.94	-2.79
2070MHz	21%	-6.78	-2.53
2090MHz	24%	-6.11	-1.76
2100MHz	25%	-5.94	-1.56
2100MHz	26%	-5.93	-1.41
2110MHz	25%	-6.06	-1.92
2130MHz	25%	-5.98	-1.56
2150MHz	25%	-5.95	-1.50
2170MHz	25%	-6.06	-1.25

Freq	Effi	Effi	Gain
(MHz)	(%)	(dB)	(dBi)
2300MHz	32%	-5.00	0.14
2320MHz	32%	-4.89	0.74
2340MHz	37%	-4.37	1.18
2360MHz	38%	-4.18	0.99
2380MHz	40%	-4.02	1.45
2400MHz	41%	-3.88	1.51
2400MHz	41%	-3.88	1.50
2500MHz	45%	-3.48	2.11
2520MHz	51%	-2.95	3.11
2540MHz	49%	-3.11	2.70
2560MHz	44%	-3.52	2.20
2580MHz	43%	-3.64	1.96
2600MHz	43%	-3.64	1.76
2620MHz	43%	-3.70	1.80
2640MHz	46%	-3.36	2.62
2660MHz	48%	-3.15	2.52
2680MHz	45%	-3.51	2.61
2700MHz	43%	-3.67	1.73

Shenzhen Huaxin Micro Communication Technology Co., Ltd.

diversity antenna

Freq	Effi	Effi
(MHz)	(%%)	(dB)
1700MHz	11%	-9.53
1710MHz	11%	-9.55
1730MHz	11%	-9.62
1750MHz	11%	-9.62
1770MHz	11%	-9.63
1790MHz	11%	-9.63
1810MHz	11%	-9.59
1830MHz	11%	-9.44
1850MHz	12%	-9.23
1870MHz	13%	-8.90
1890MHz	15%	-8.23
1910MHz	19%	-7.23
1930MHz	25%	-5.94
1950MHz	27%	-5.76
1970MHz	29%	-5.33

Freq	Effi	Effi
(MHz)	(%%)	(dB)
1990MHz	32%	-5.01
2010MHz	34%	-4.67
2030MHz	33%	-4.81
2050MHz	32%	-4.94
2070MHz	31%	-5.03
2090MHz	34%	-4.66
2110MHz	33%	-4.82
2130MHz	33%	-4.87
2150MHz	32%	-4.92
2170MHz	31%	-5.10
2300MHz	34%	-4.74
2320MHz	34%	-4.74
2340MHz	38%	-4.17
2360MHz	39%	-4.08
2380MHz	40%	-3.96

Freq	Effi	Effi
(MHz)	(%%)	(dB)
2400MHz	41%	-3.91
2500MHz	46%	-3.40
2520MHz	52%	-2.87
2540MHz	50%	-3.00
2560MHz	46%	-3.38
2580MHz	45%	-3.51
2600MHz	46%	-3.41
2620MHz	45%	-3.49
2640MHz	48%	-3.18
2660MHz	50%	-2.98
2680MHz	47%	-3.31
2700MHz	44%	-3.53

GPSantenna

Passive Test For GPS								
Freq	Effi	Effi	Gain	Gain	Max	Min	Attenut	Attenut
(MHz)	(%)	(dB)	(dBi)	(dBd)	(dB)	(dB)	Hor	Ver
1509.09	22%	-6.66	-1.93	-4.08	-1.93	-12.2	43.19	43.27
1513.83	24%	-6.28	-1.79	-3.94	-1.79	-12.15	43.2	43.25
1518.57	28%	-5.56	-0.61	-2.76	-0.61	-12.25	43.22	43.26
1523.32	30%	-5.23	-0.26	-2.41	-0.26	-12.4	43.29	43.37
1528.06	30%	-5.21	-0.69	-2.84	-0.69	-12.4	43.36	43.49
1532.8	31%	-5.11	-0.31	-2.46	-0.31	-12.36	43.3	43.47
1537.55	32%	-4.94	-0.27	-2.42	-0.27	-12.35	43.24	43.44
1542.29	33%	-4.86	-0.08	-2.23	-0.08	-12.38	43.33	43.56
1547.03	33%	-4.85	0.08	-2.07	0.08	-12.34	43.45	43.69
1551.78	32%	-4.95	-0.03	-2.18	-0.03	-12.15	43.49	43.74
1556.52	29%	-5.33	-0.49	-2.64	-0.49	-11.9	43.52	43.78
1561.26	29%	-5.37	-0.36	-2.51	-0.36	-11.75	43.56	43.84
1566.01	27%	-5.68	-0.57	-2.72	-0.57	-11.6	43.59	43.92
1570.75	25%	-5.99	-0.84	-2.99	-0.84	-11.32	43.65	44.02
1575.49	23%	-6.33	-0.88	-3.03	-0.88	-11.06	43.73	44.14
1580.23	23%	-6.31	-0.71	-2.86	-0.71	-10.94	43.77	44.24
1584.98	24%	-6.12	-0.22	-2.37	-0.22	-10.85	43.77	44.32
1589.72	23%	-6.29	-0.30	-2.45	-0.30	-10.62	43.79	44.4
1594.46	22%	-6.50	0.07	-2.08	0.07	-10.48	43.85	44.47
1599.21	20%	-6.91	-0.03	-2.18	-0.03	-10.46	43.91	44.56
1603.95	18%	-7.38	-0.63	-2.78	-0.63	-11.6	43.59	43.92

WIFI (2.4G) antenna

Passive Test For 2000-2500										
Freq	Effi	Effi	Gain	Gain	UHS	DHS	Max	Min	Attenut	Attenut
(MHz)	(%)	(dB)	(dBi)	(dBd)	(%)	(%)	(dB)	(dB)	Hor	Ver
2270	6%	-12.35	-10.38	-12.53	3%	3%	-10.38	-23.42	48.66	49.08
2280	6%	-12.11	-9.32	-11.47	3%	3%	-9.32	-21.85	48.86	49.38
2290	7%	-11.85	-9.16	-11.31	3%	3%	-9.16	-19.34	49.05	49.65
2300	7%	-11.56	-8.60	-10.75	3%	4%	-8.60	-17.35	49.31	49.75
2310	8%	-11.13	-7.25	-9.40	4%	4%	-7.25	-16.35	49.4	49.93
2320	8%	-10.85	-6.72	-8.87	4%	4%	-6.72	-14.82	49.54	49.86
2330	9%	-10.25	-5.22	-7.37	5%	5%	-5.22	-13.48	49.77	50.06
2340	11%	-9.70	-4.17	-6.32	5%	6%	-4.17	-12.8	49.77	50.16
2350	13%	-8.89	-3.70	-5.85	6%	7%	-3.70	-12.13	49.92	50.26
2360	15%	-8.23	-2.07	-4.22	7%	8%	-2.07	-11.98	50.06	50.4
2370	17%	-7.62	-2.59	-4.74	8%	9%	-2.59	-11.88	50.3	50.65
2380	19%	-7.23	-2.21	-4.36	9%	10%	-2.21	-11.46	50.63	50.93
2390	20%	-6.94	-1.39	-3.54	10%	11%	-1.39	-11.52	50.86	51.18
2400	22%	-6.59	-1.10	-3.25	11%	11%	-1.10	-11.84	50.92	51.41
2410	23%	-6.43	-0.87	-3.02	11%	12%	-0.87	-12.03	51	51.47
2420	24%	-6.20	-0.88	-3.03	12%	12%	-0.88	-12.91	50.9	51.29
2430	26%	-5.83	-0.17	-2.32	13%	14%	-0.17	-13.22	50.83	51.23
2440	29%	-5.43	0.35	-1.80	14%	15%	0.35	-12.89	50.85	51.15
2450	30%	-5.24	0.99	-1.16	14%	16%	0.99	-12.5	50.92	51.3
2460	29%	-5.31	0.76	-1.39	14%	15%	0.76	-13.13	50.98	51.43
2470	28%	-5.53	0.46	-1.69	13%	15%	0.46	-13.15	51	51.44
2480	26%	-5.85	0.10	-2.05	12%	14%	0.10	-13.81	50.94	51.41
2490	26%	-5.79	-0.43	-2.58	13%	14%	-0.43	-14.49	50.74	51.15
2500	24%	-6.26	-1.23	-3.38	11%	12%	-1.23	-13.65	50.69	51.02

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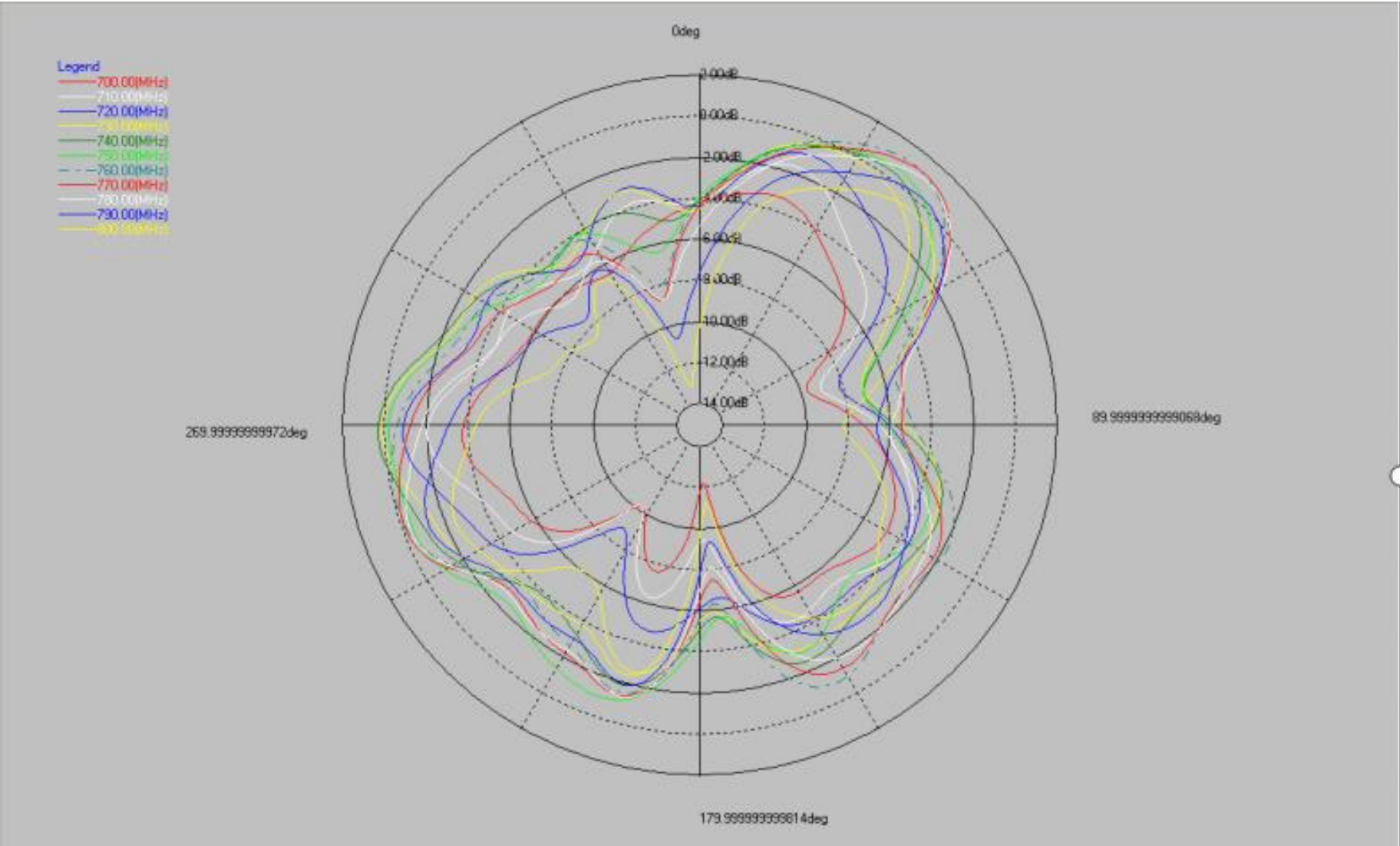
	信道	功率	灵敏度
WiFi	1	12.4	-79.8
	6	13.5	-79.9
	13	11.5	-80.1
GPS	1575.42	SNR	
		42.5	-143.72

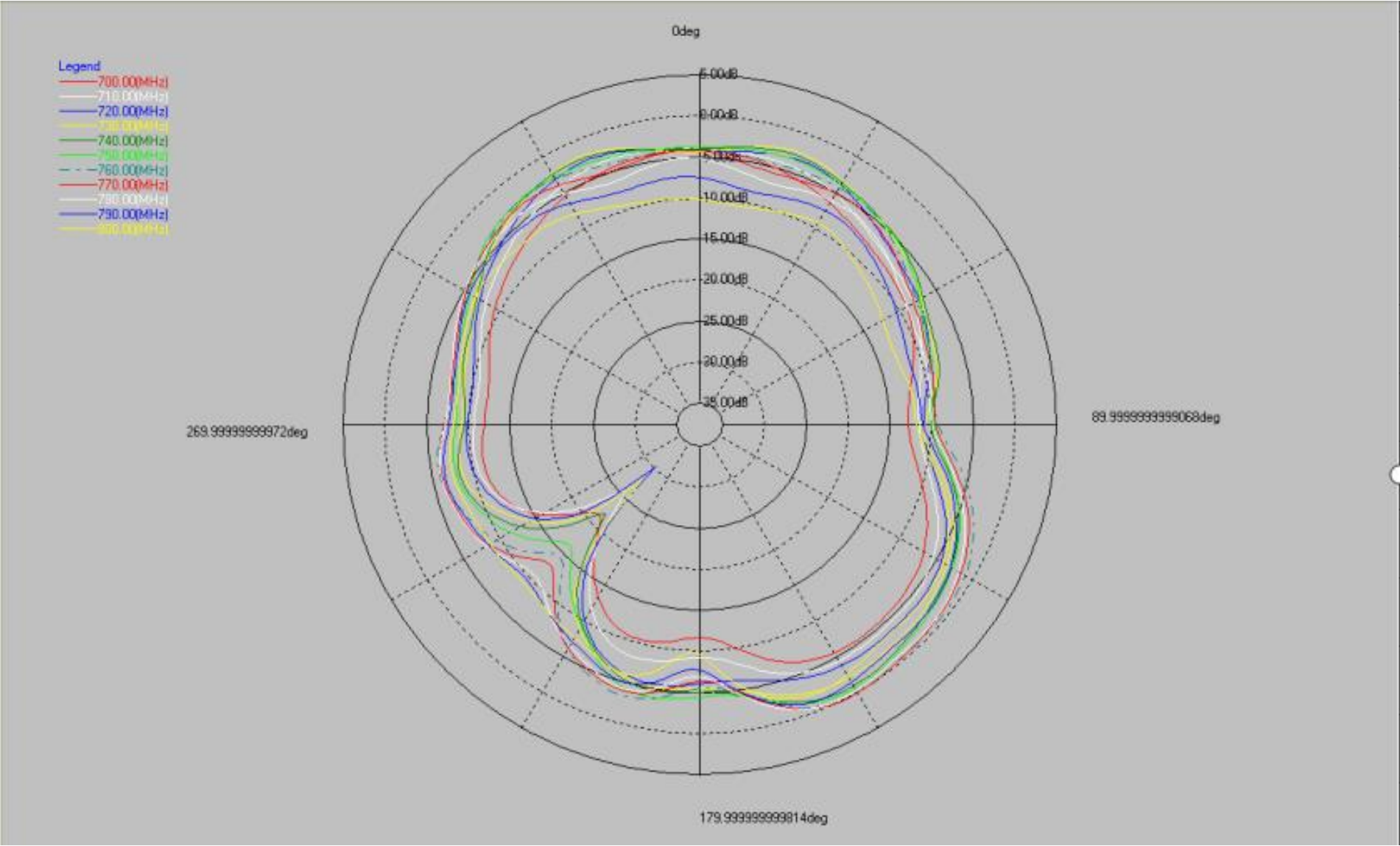
WIFI (5.8G) antenna

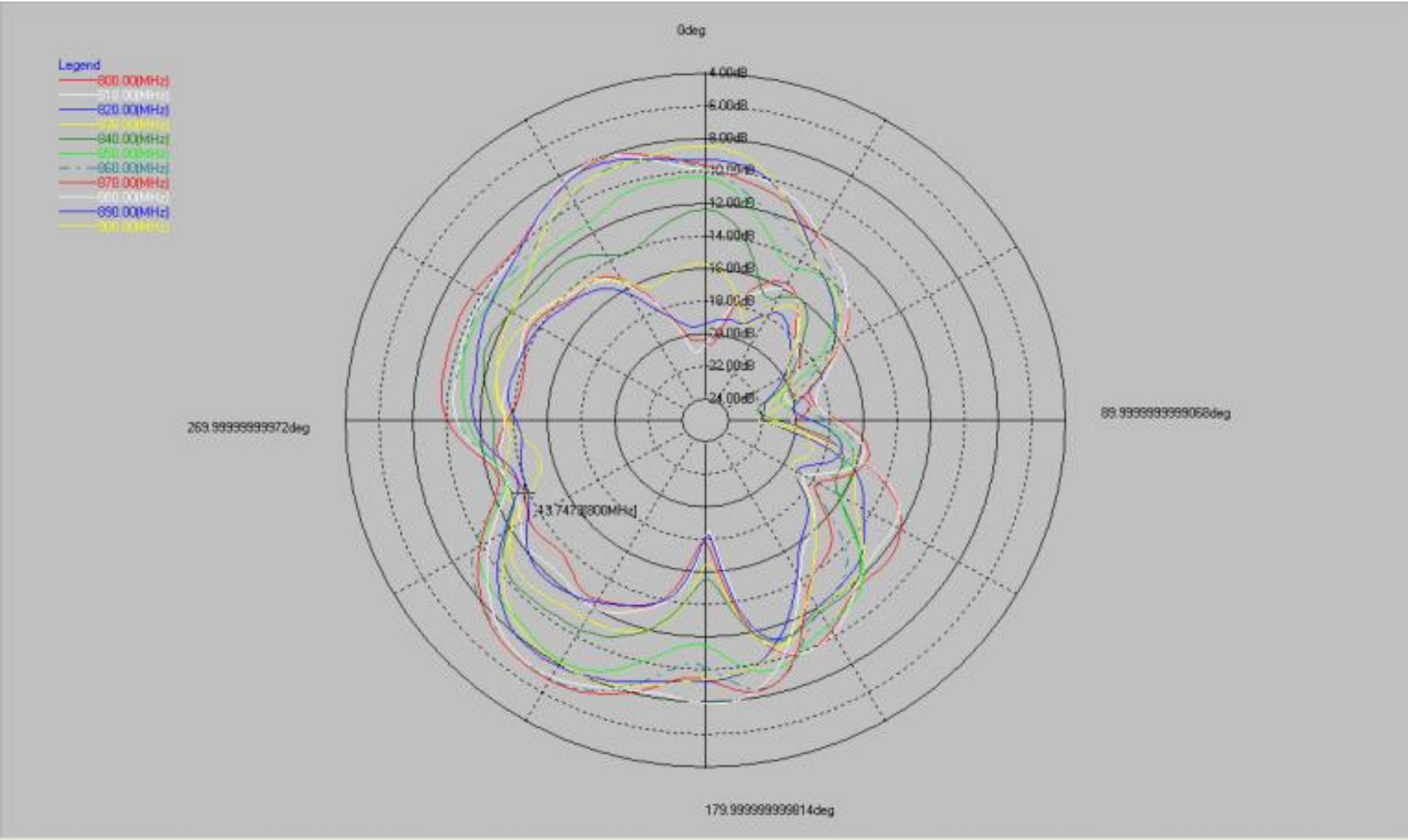
Passive Test For 5100-5800M				
Freq	Effi	Effi	Gain	Gain
(MHz)	(%)	(dB)	(dBi)	(dBd)
5100MHz	18%	-7.38	-0.84	-2.99
5120MHz	18%	-7.36	-0.85	-3.00
5140MHz	18%	-7.33	-1.01	-3.16
5160MHz	19%	-7.19	0.15	-2.00
5180MHz	18%	-7.38	0.53	-1.62
5200MHz	18%	-7.35	-0.31	-2.46
5220MHz	16%	-7.87	-1.02	-3.17
5240MHz	17%	-7.70	-1.09	-3.24
5260MHz	17%	-7.68	-1.06	-3.21
5280MHz	17%	-7.73	-0.46	-2.61
5300MHz	16%	-7.83	-1.41	-3.56
5320MHz	16%	-8.06	-1.84	-3.99
5340MHz	15%	-8.17	-1.68	-3.83
5360MHz	16%	-8.00	-1.32	-3.47

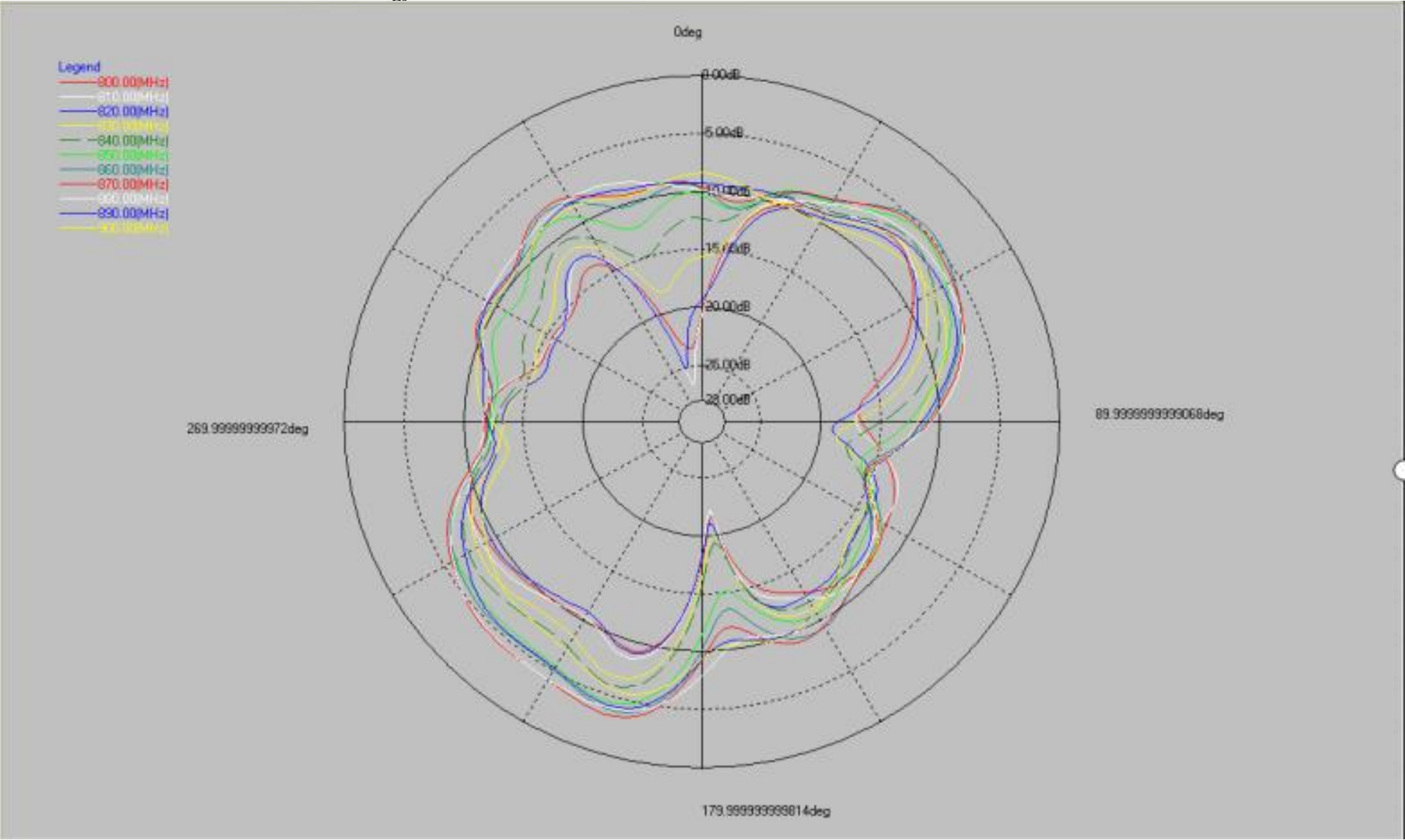
5380MHz	17%	-7.69	-1.80	-3.95
5400MHz	18%	-7.39	-1.37	-3.52
5420MHz	19%	-7.19	0.62	-1.53
5440MHz	20%	-7.04	-0.92	-3.07
5460MHz	22%	-6.55	0.64	-1.51
5480MHz	22%	-6.54	0.34	-1.81
5500MHz	21%	-6.68	-0.43	-2.58
5520MHz	20%	-6.98	0.12	-2.03
5540MHz	22%	-6.67	1.90	-0.25
5560MHz	15%	-8.22	1.24	-0.91
5580MHz	16%	-7.93	0.17	-1.98
5600MHz	17%	-7.77	-0.59	-2.74
5620MHz	18%	-7.40	-0.76	-2.91
5640MHz	21%	-6.85	-0.73	-2.88
5660MHz	23%	-6.43	1.63	-0.52
5680MHz	22%	-6.57	2.34	0.19

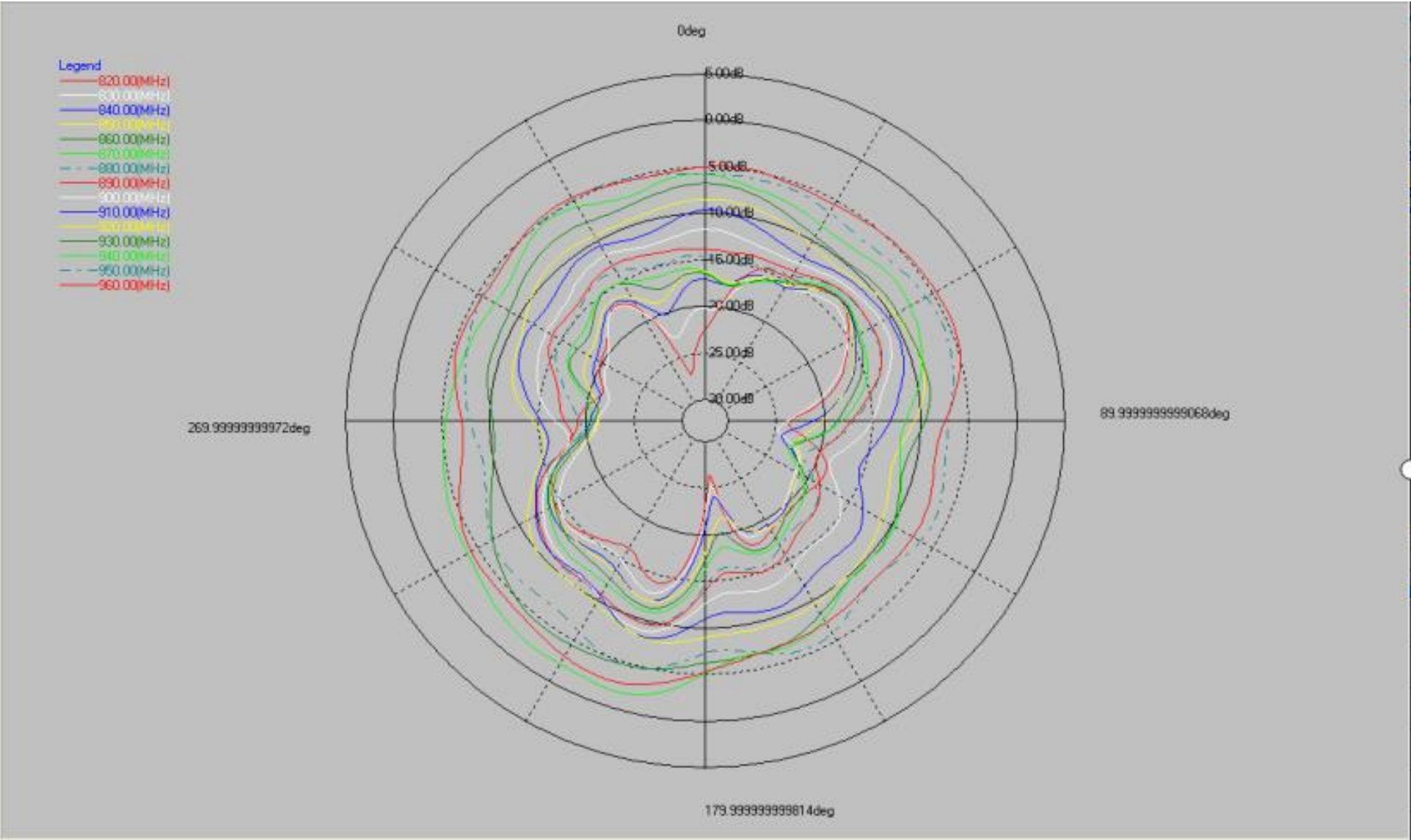
5700MHz	26%	-5.80	0.07	-2.08
5720MHz	29%	-5.38	0.48	-1.67
5740MHz	30%	-5.24	0.10	-2.05
5760MHz	24%	-6.11	1.11	-1.04
5780MHz	31%	-5.05	0.63	-1.52
5800MHz	23%	-6.38	-0.71	-2.86
5820MHz	28%	-5.58	0.83	-1.32
5840MHz	28%	-5.57	0.44	-1.71
5860MHz	31%	-5.04	1.86	-0.29

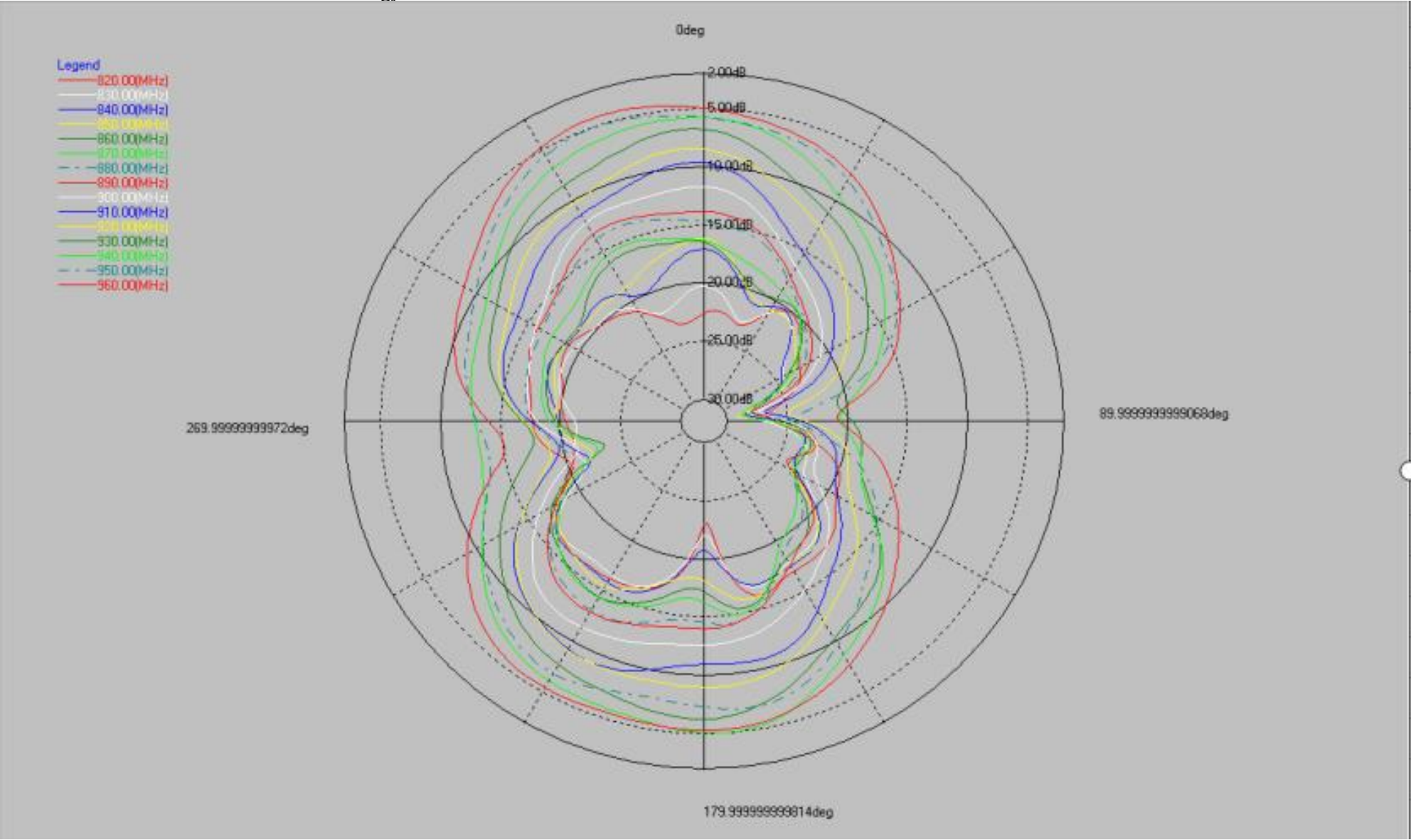


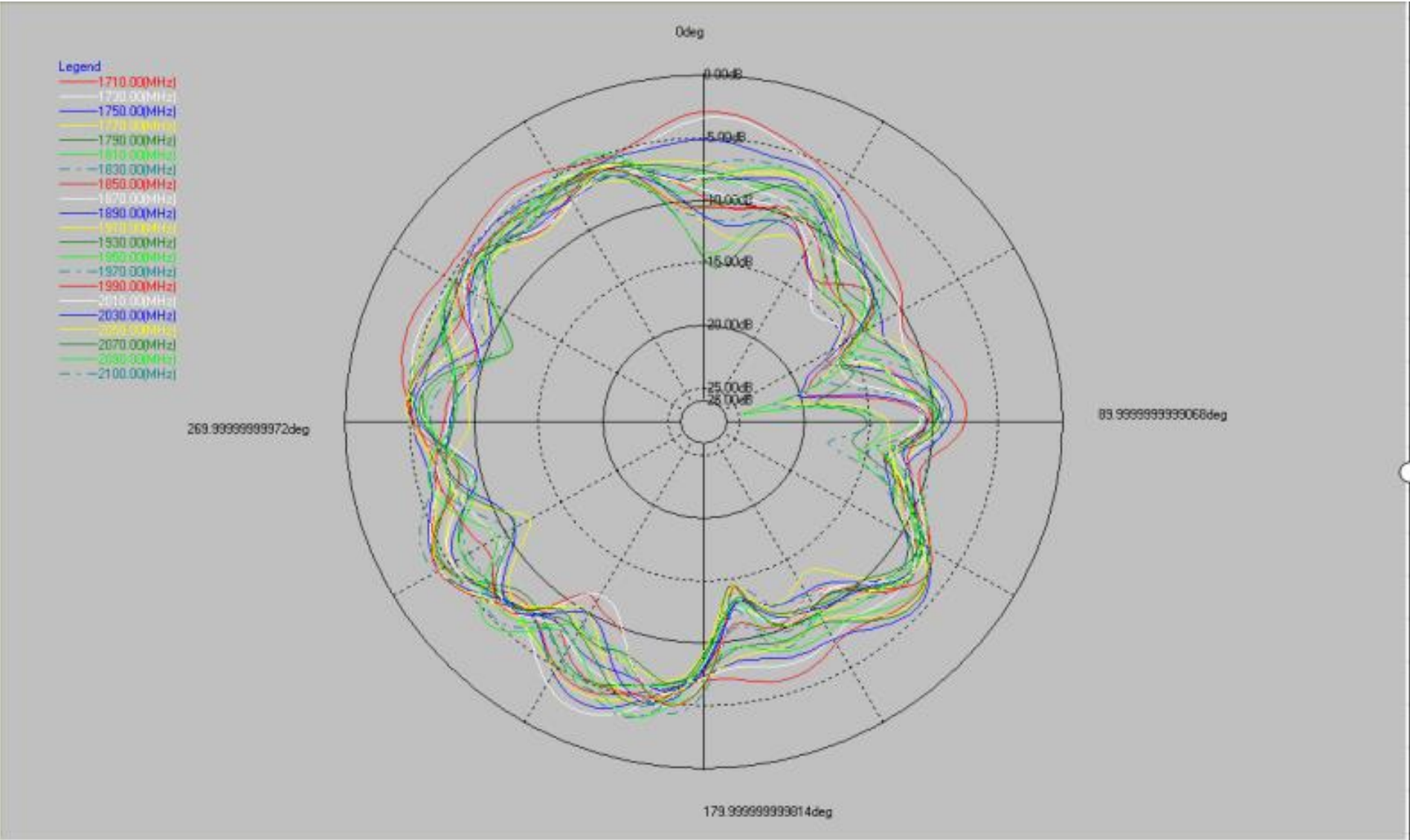


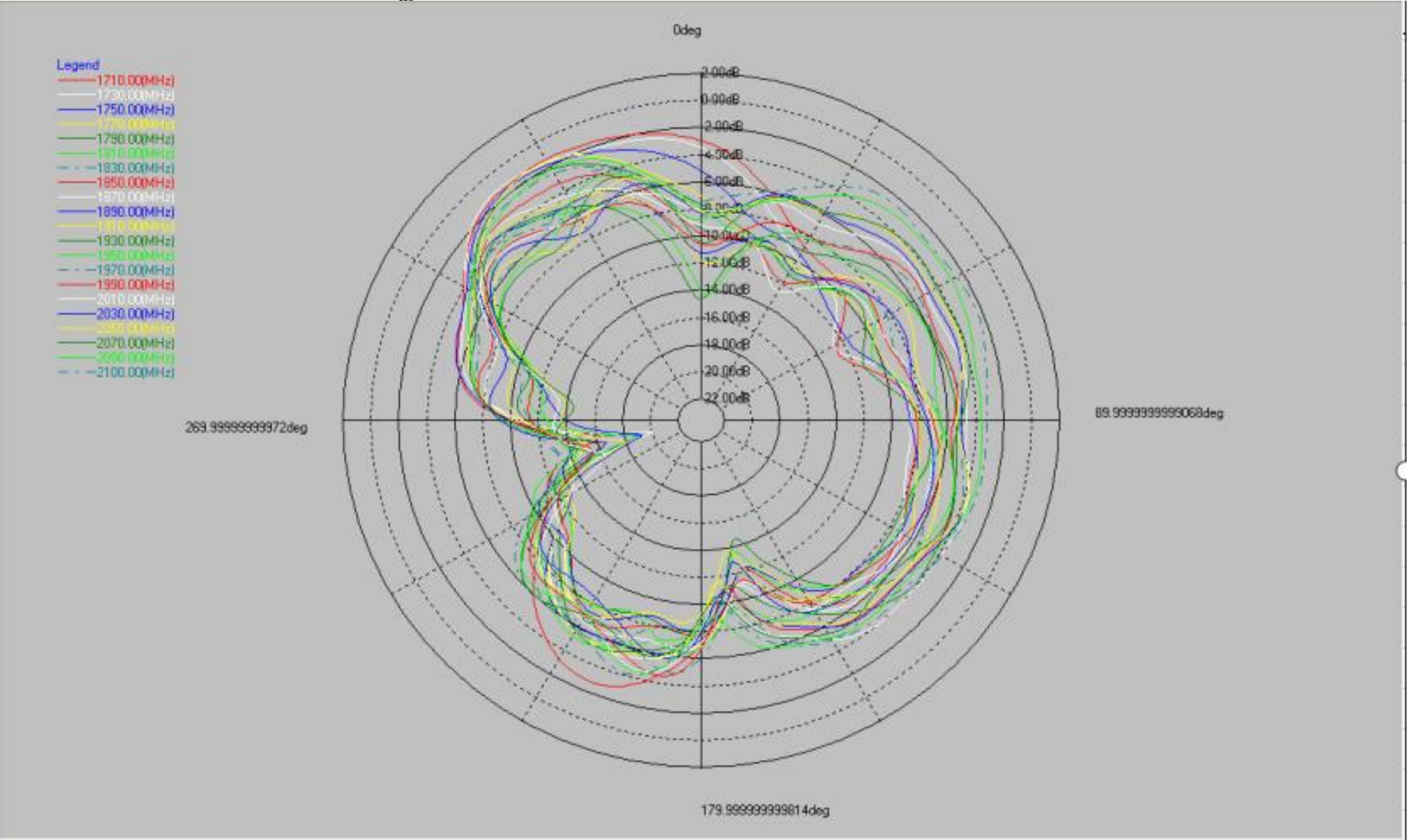


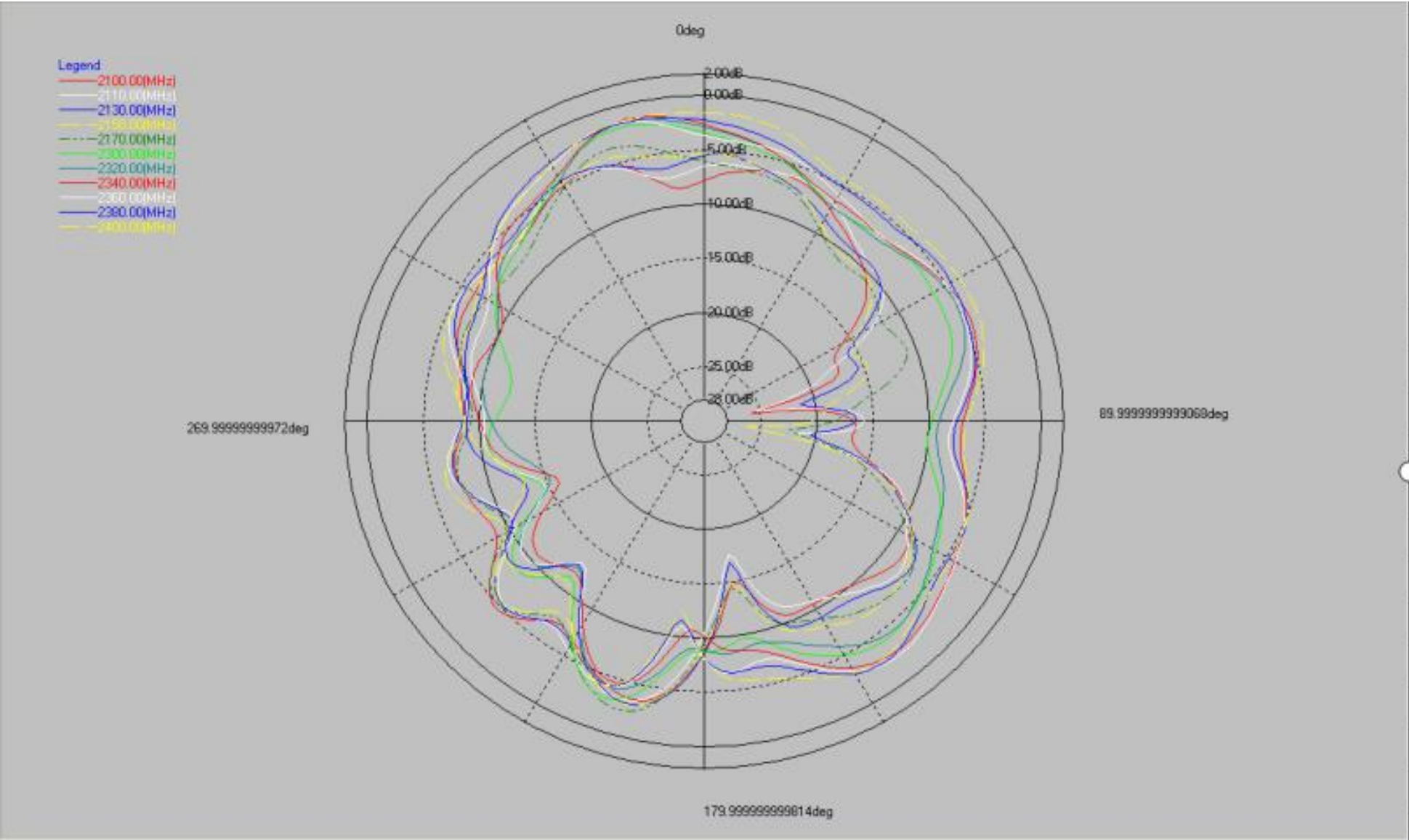


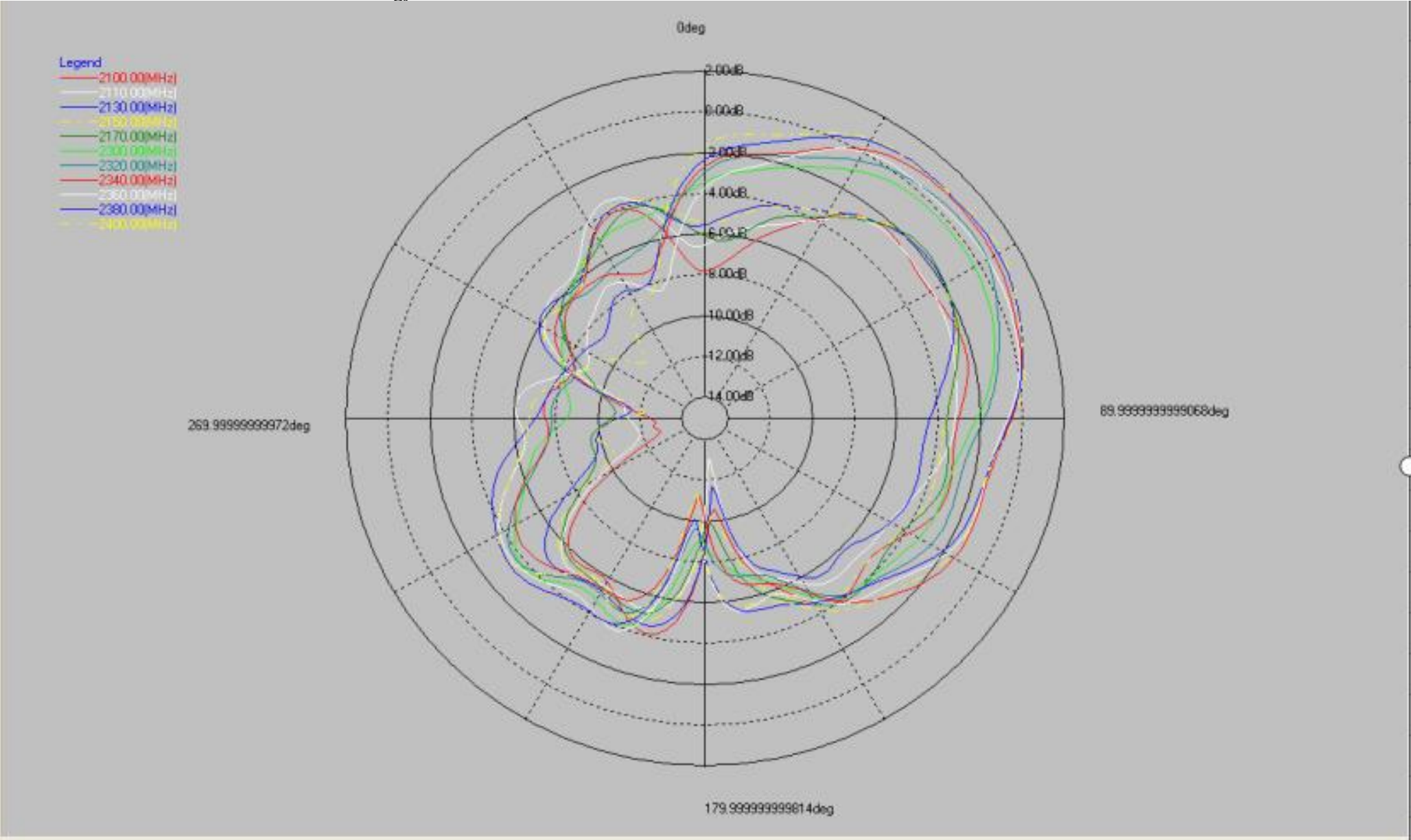


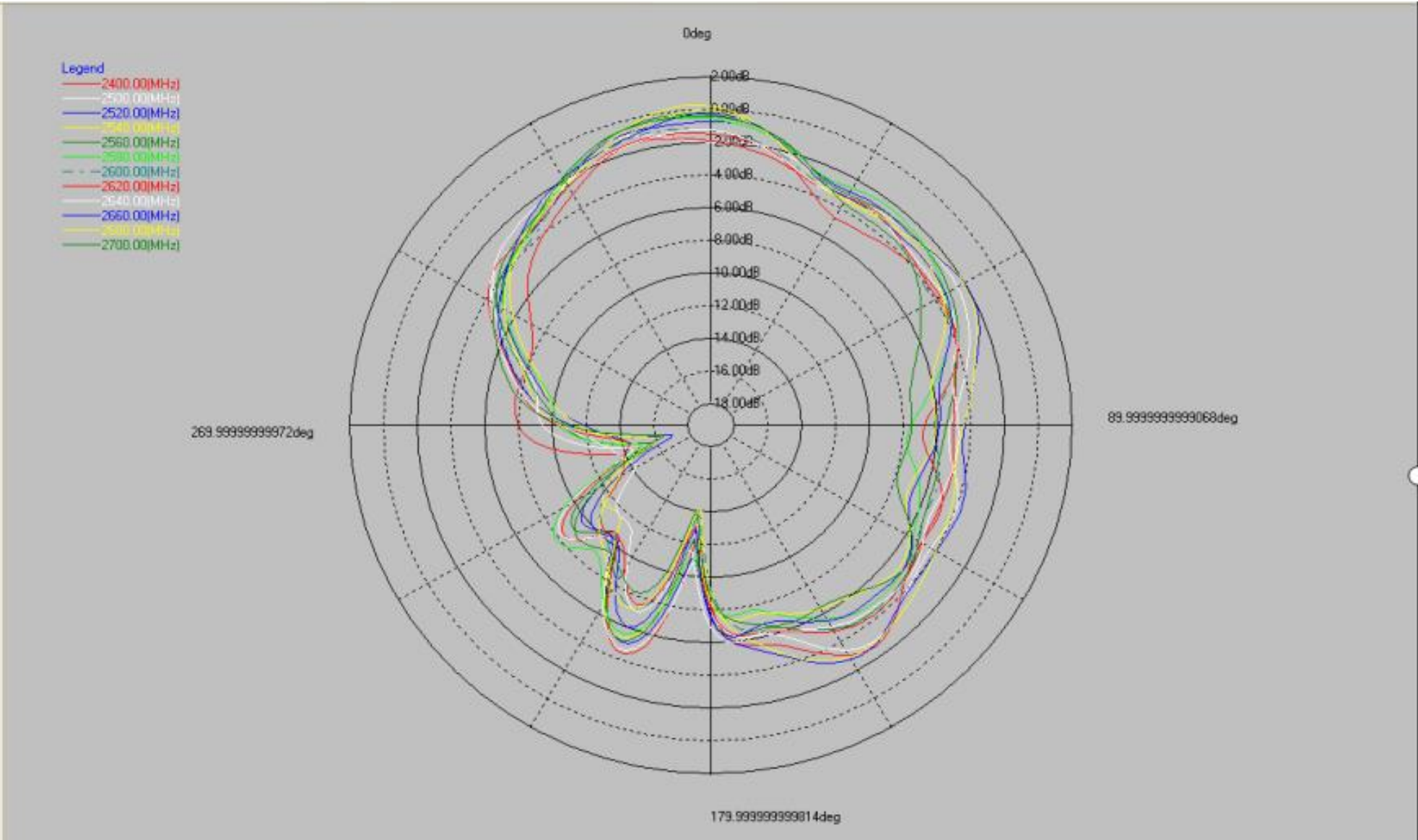


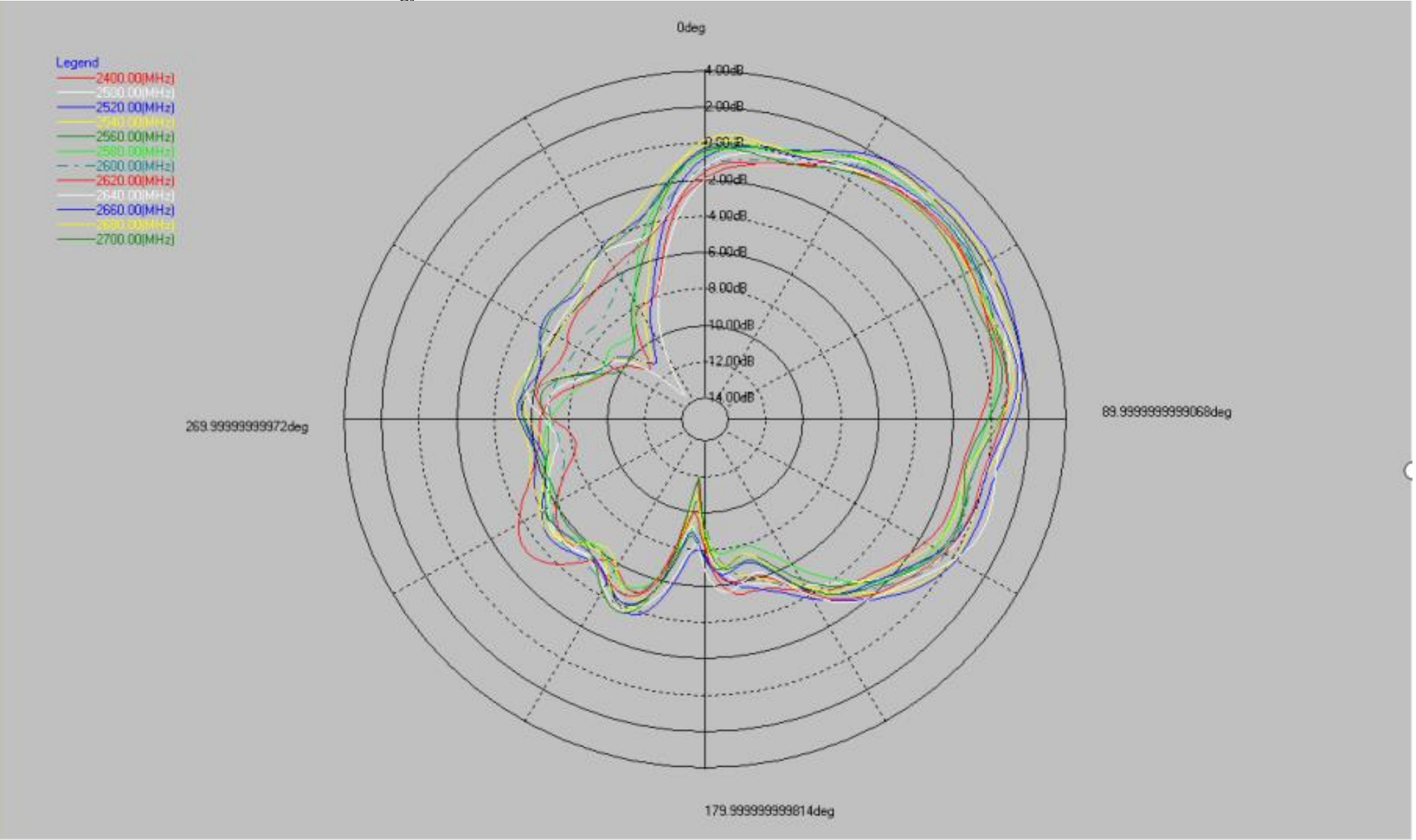






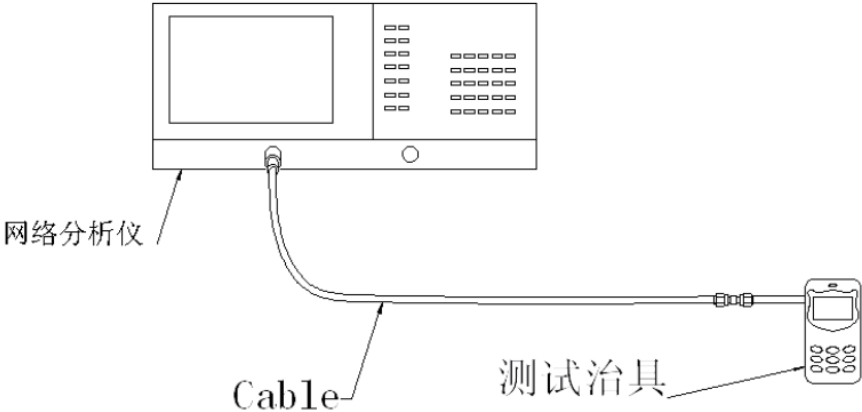






2、S11 testing facility

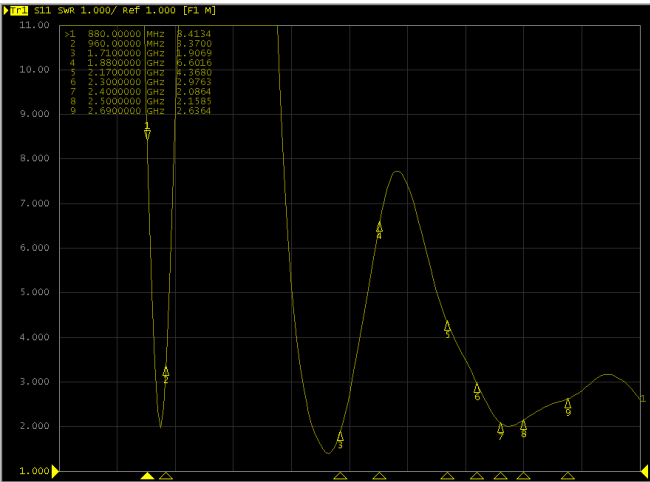
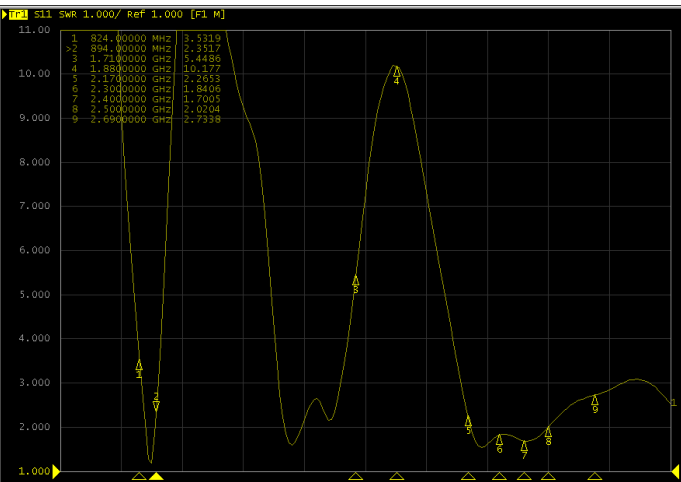
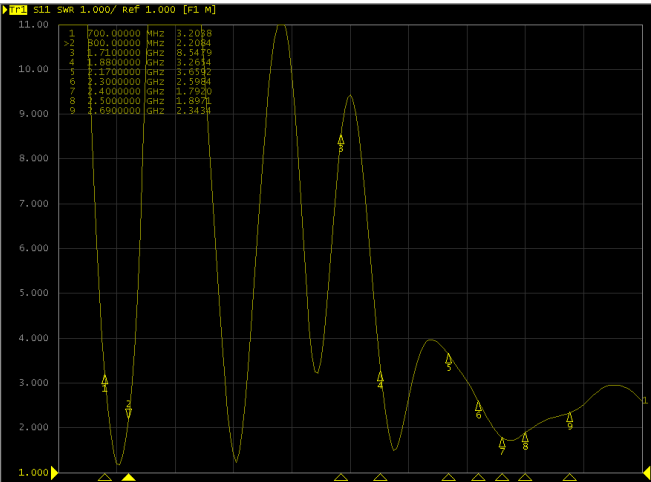
测试设备：Agilent Technologies E5071B



3、S11 test data

主天线

Frequency (MHz)	700	824	960	1710	1880	1990	2. 17	2. 50	2. 69
VSWR	3. 2	3. 53	3. 37	1. 9	6. 6	6. 1	4. 36	2. 15	2. 63

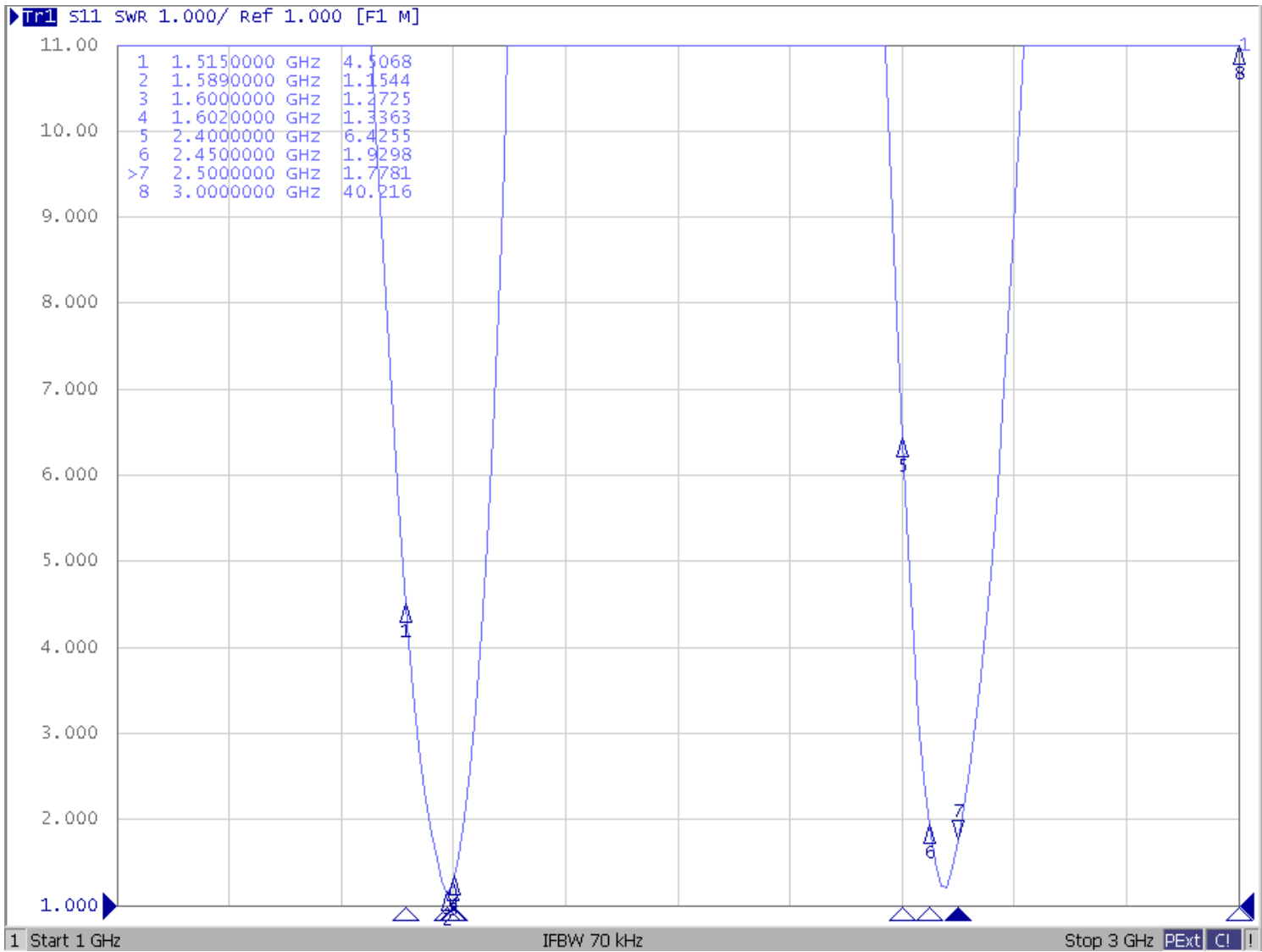


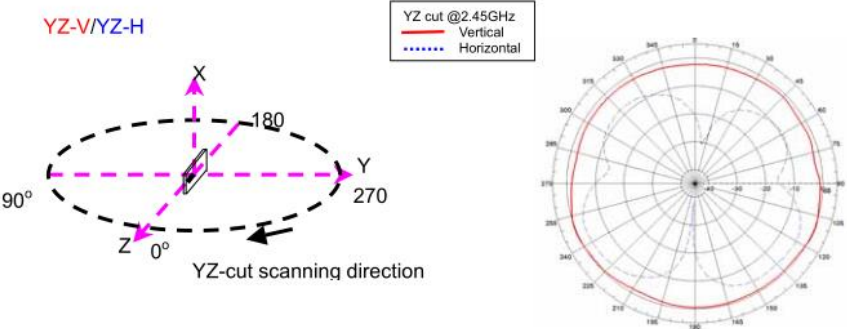
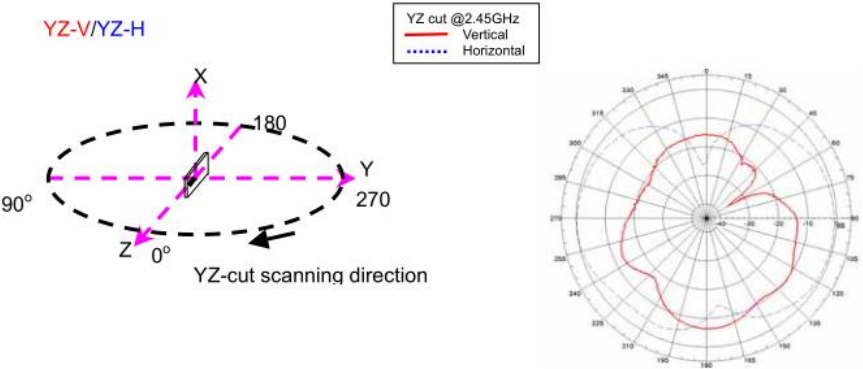
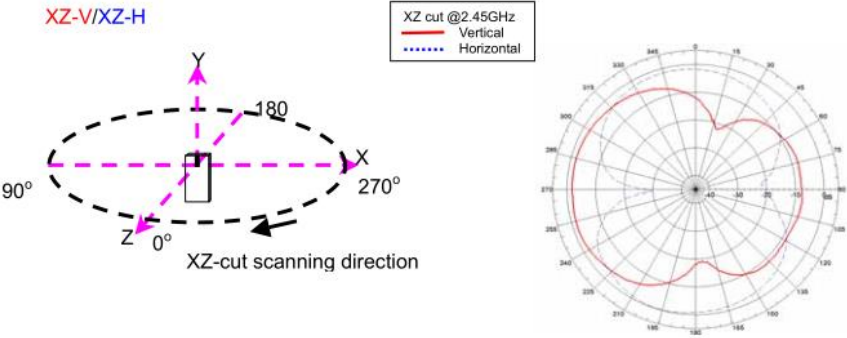
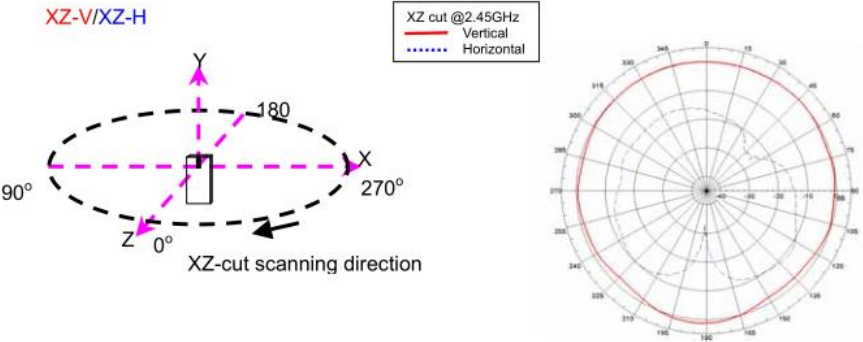
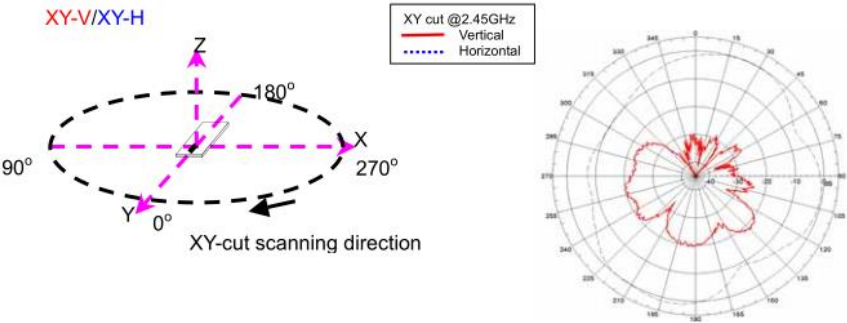
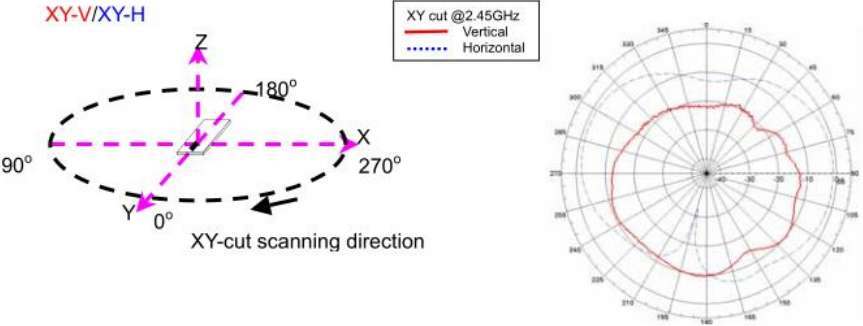
WIFI/BT antenna / antenna active pattern

Frequency (MHz)	2. 4	2. 45	2. 5
VSWR	6. 42	1. 92	1. 77

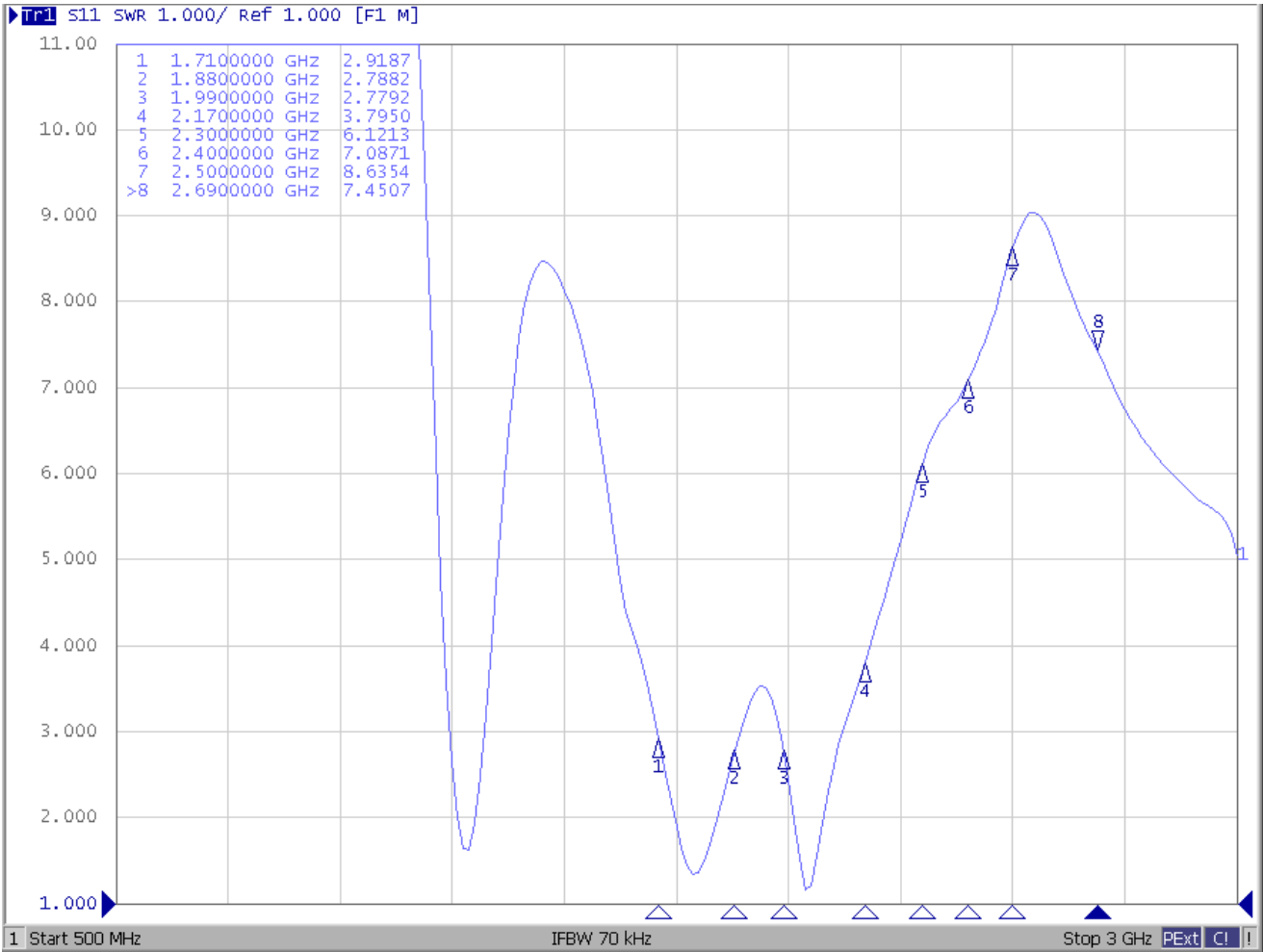
GPS antenna

Frequency (MHz)	1515	1589	1600	1602
VSWR	4. 5	1. 15	1. 27	1. 33



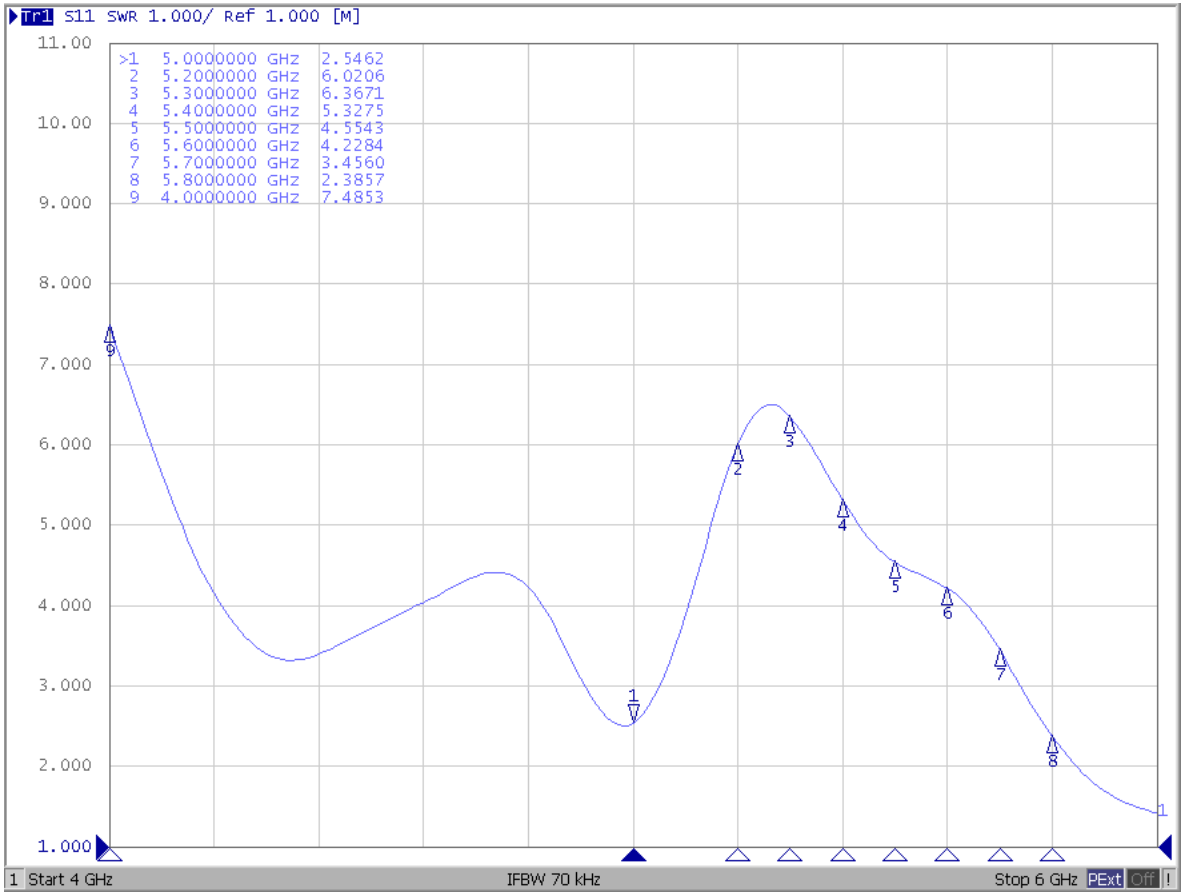


Frequency (MHz)	1700	1900	2300	2400	2500	2600	2700
VSWR	2.91	2.78	6.12	7.08	8.63	8.12	7.45

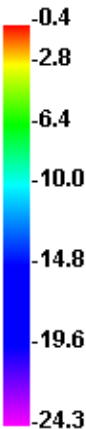
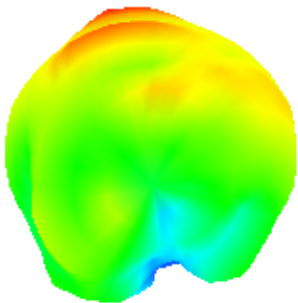


5G WIFI antenna / pattern

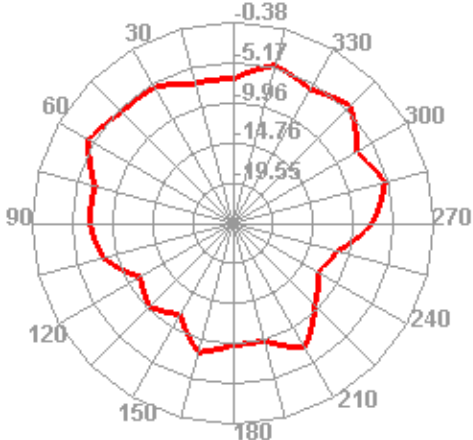
Frequency (GHz)	5.00	5.8
VSWR	2.54	2.38



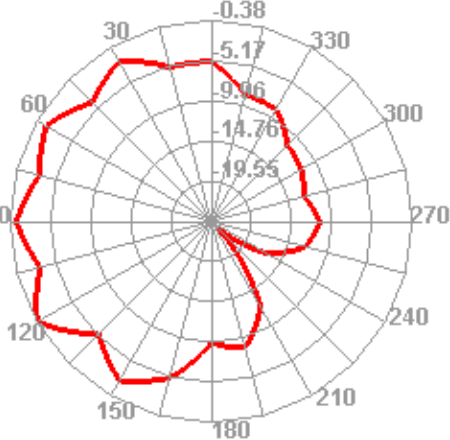
5400.000MHz



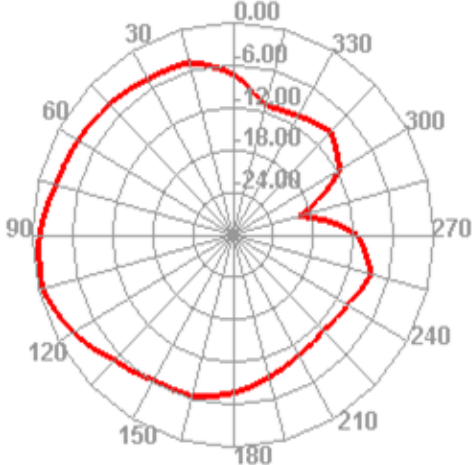
5400.000MHz E1



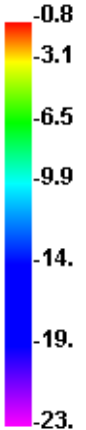
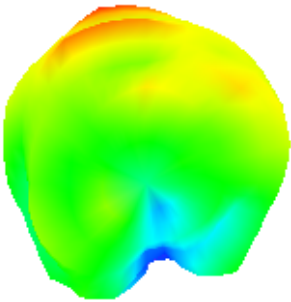
5400.000MHz E2



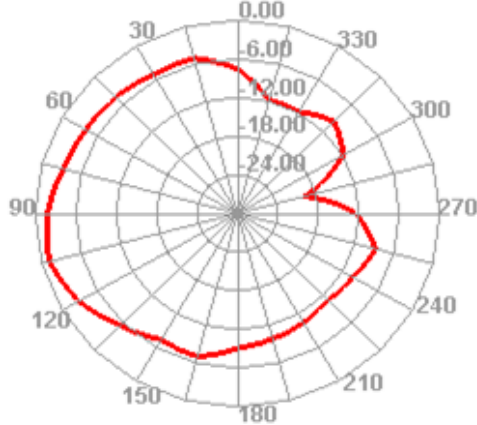
5400.000MHz H



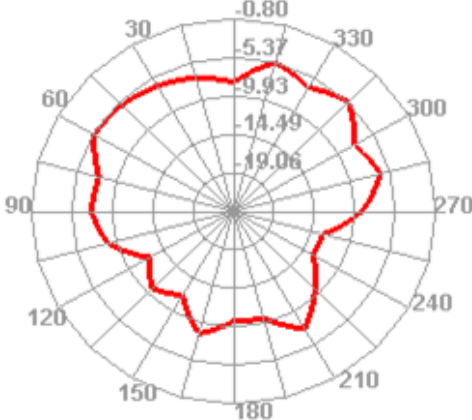
5410.000MHz



5410.000MHz H



5410.000MHz E1



5410.000MHz E2

