Well Green Technology Co., Ltd

No. 20, Alley51 ,Lane 118,ShuangLian Sec.2,Mintzu Rd.,
PingJen City, TaoYuan Hsien, Taiwan, R.O.C
TEL: (03)420-6428 FAX: (03) 420-6418

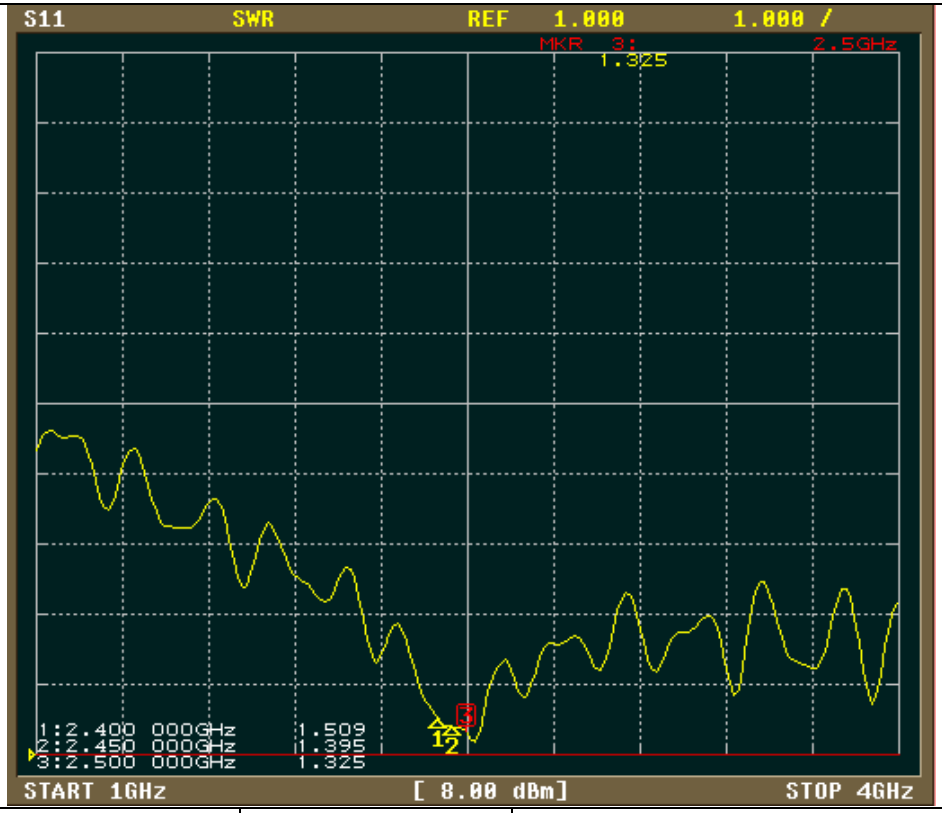
TWINHEAD F10DA
Antenna Test Report

Data 3/22/05

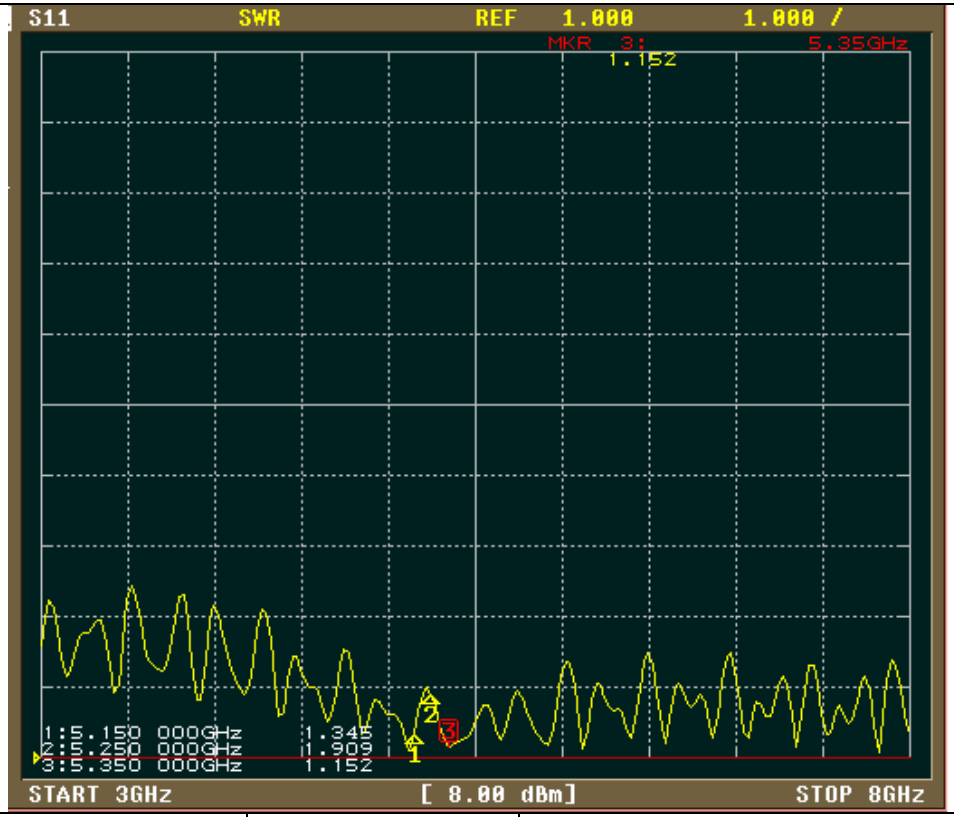
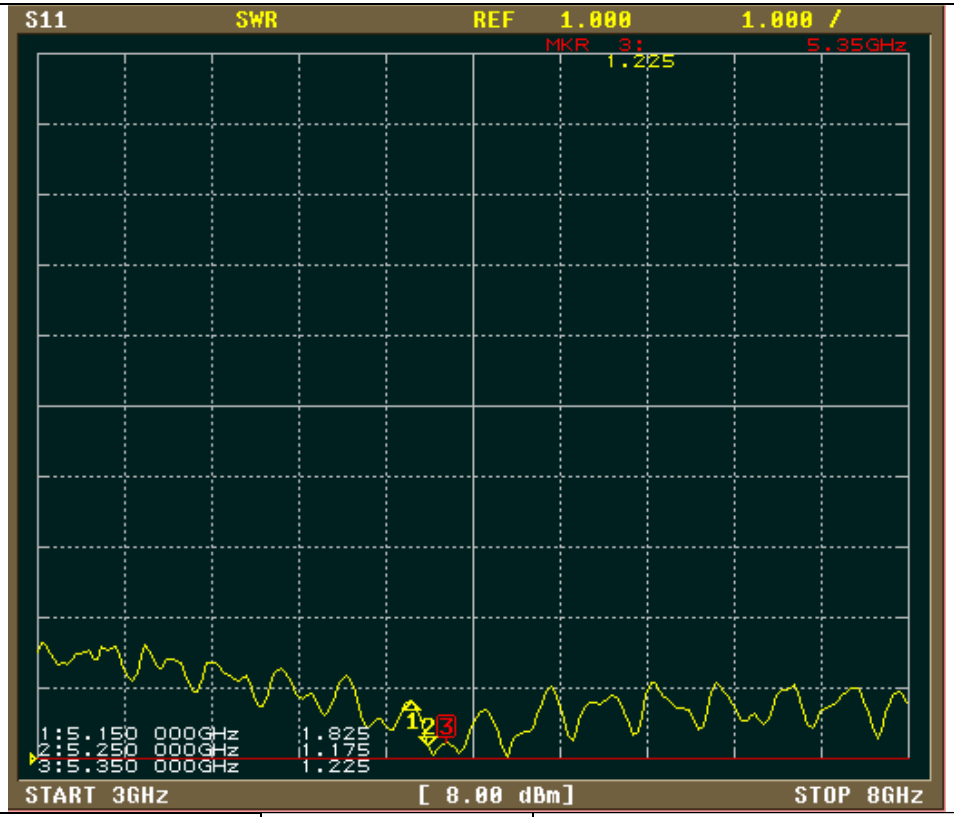
RD Manager	Supervisor	RD engineer	Sales engineer
David	Johnson	Tim	Jerry

4. Voltage Standing Wave Ratio (VSWR)

4.1 VSWR 2.4 GHz ~ 2.5 GHz

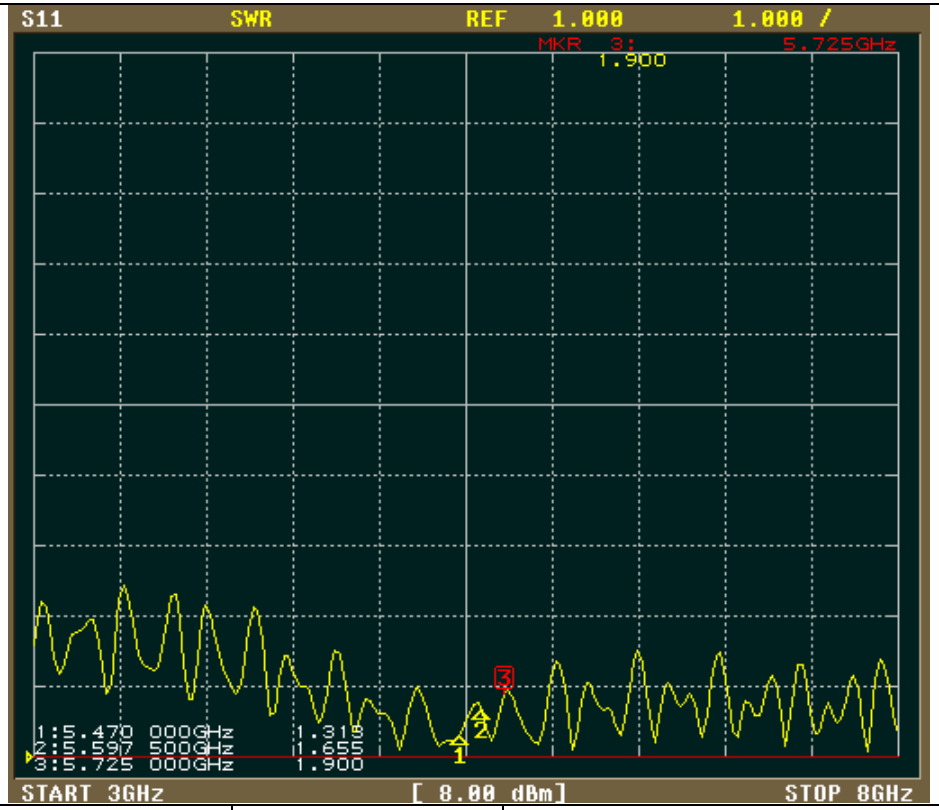
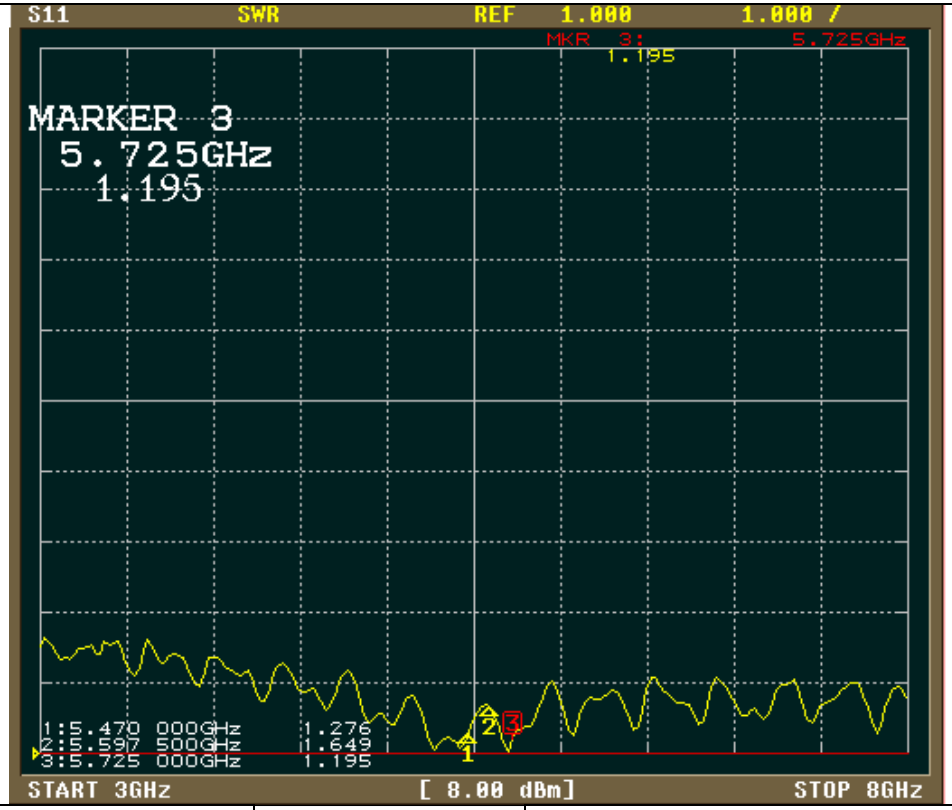
Antenna 1					Antenna 2				
									
Center freq. @MHz	Bandwidth @MHz	VSWR			Center freq. @MHz	Bandwidth @MHz	VSWR		
		2.4GHz	2.45GHz	2.5GHz			2.4GHz	2.45GHz	2.5GHz
2450		1.50	1.39	1.32	2450		1.68	1.21	1.51

4.2 VSWR 5.15 GHz ~ 5.35 GHz

Antenna 1	Antenna 2
	

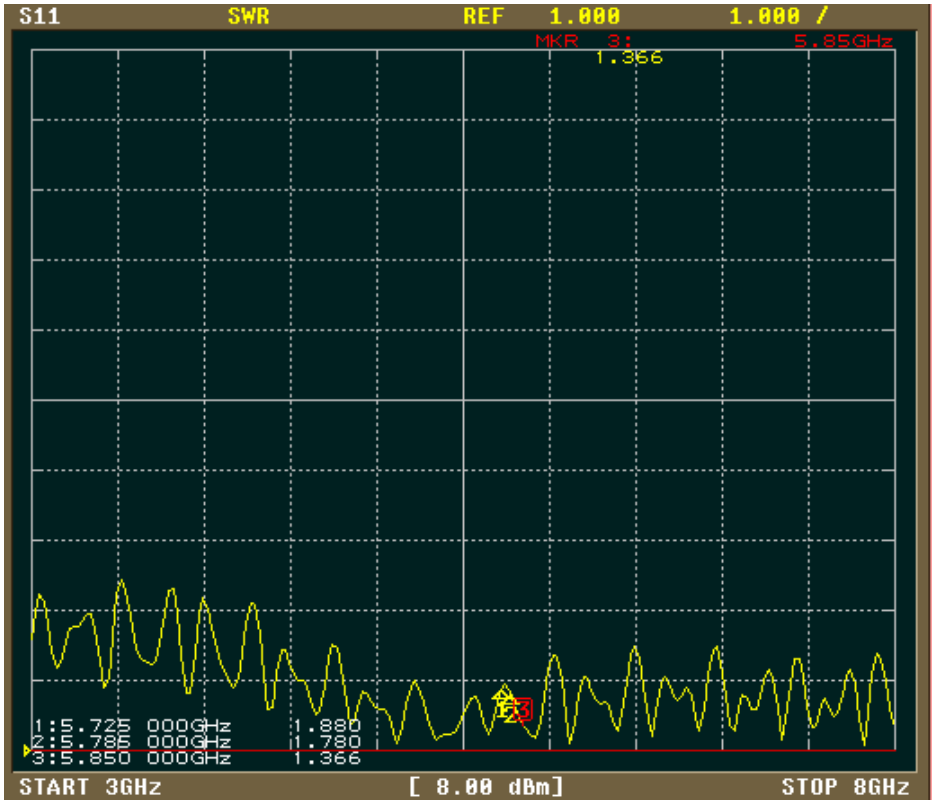
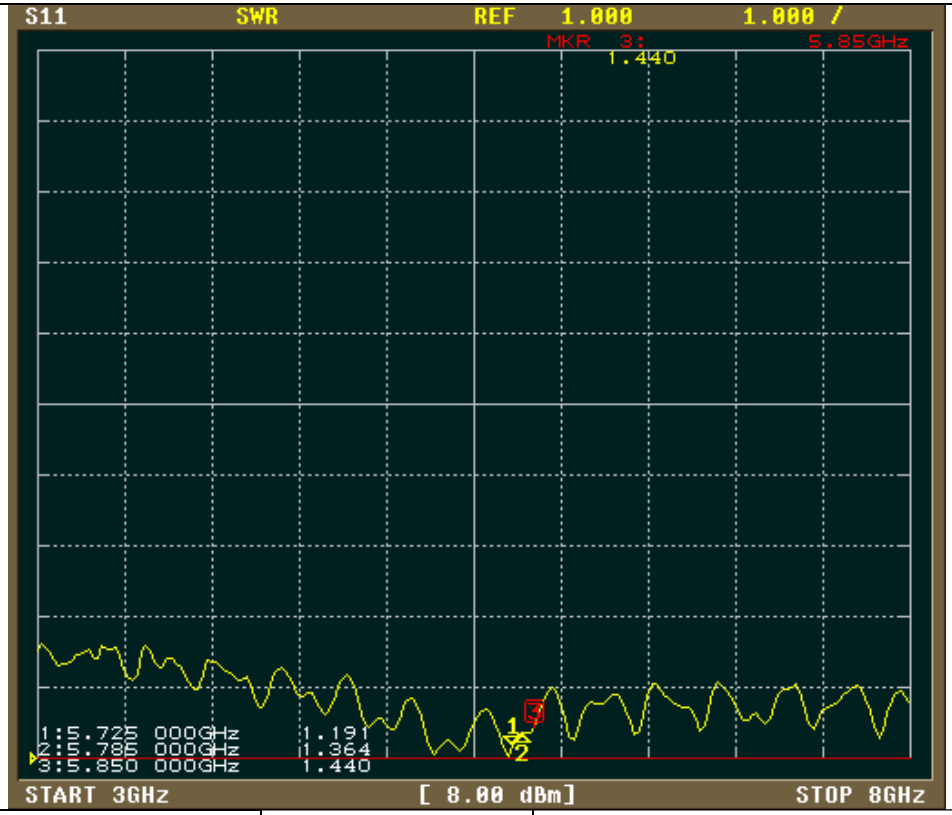
Center freq. @MHz	Bandwidth @MHz	VSWR			Center freq. @MHz	Bandwidth @MHz	VSWR		
		5.15GHz	5.25GHz	5.35GHz			5.15GHz	5.25GHz	5.35GHz
5250		1.34	1.90	1.15	5250		1.82	1.17	1.22

4.3 VSWR 5.47 GHz ~ 5.725 GHz

Antenna 1	Antenna 2
	

Center freq. @MHz	Bandwidth @MHz	VSWR			Center freq. @MHz	Bandwidth @MHz	VSWR		
		5.47GHz	5.5975GHz	5.725GHz			5.47GHz	5.5975GHz	5.725GHz
5597		1.31	1.65	1.90	5597		1.27	1.64	1.19

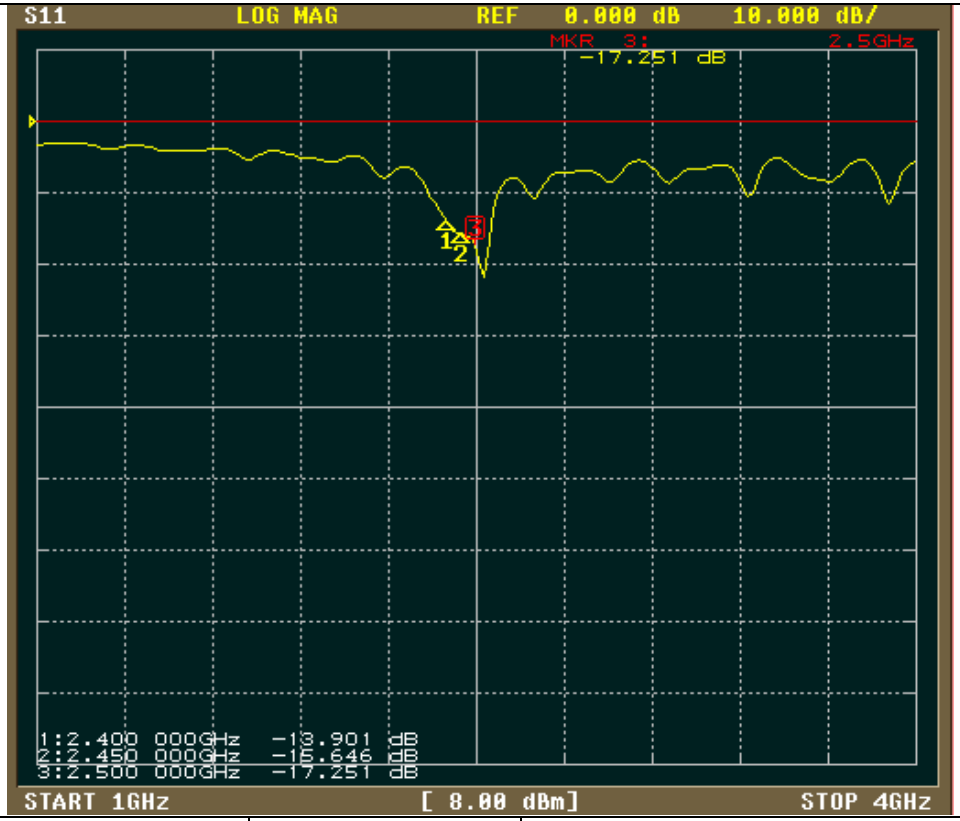
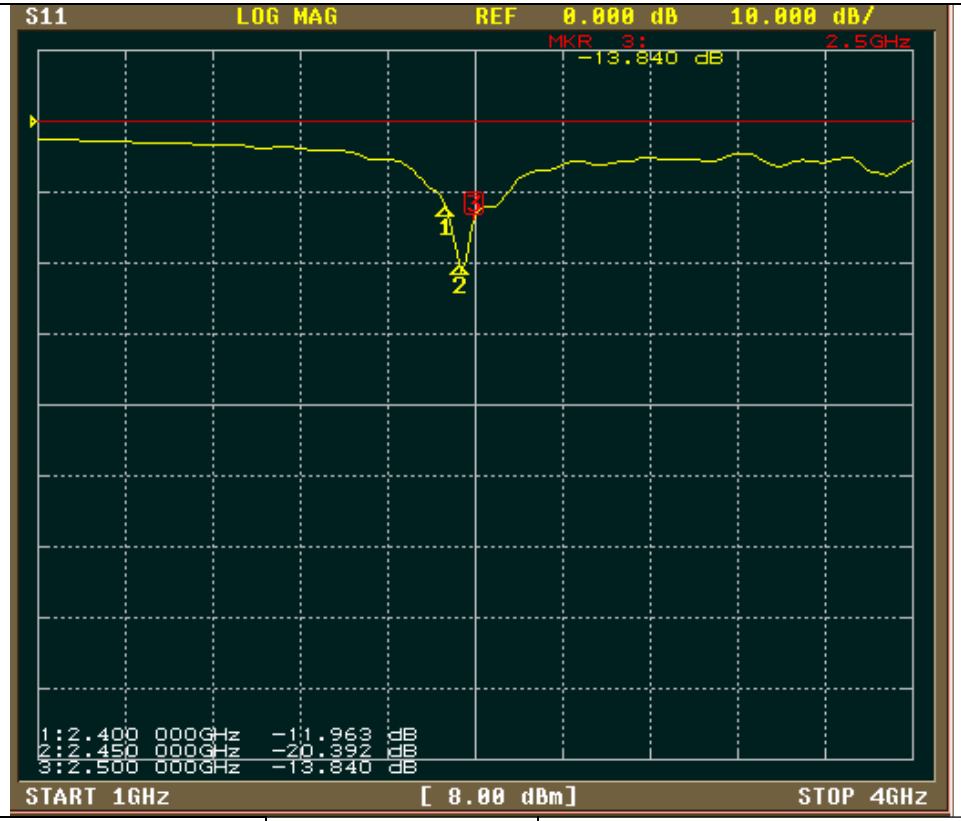
4.4 VSWR 5.725 GHz ~ 5.85 GHz

Antenna 1	Antenna 2
	

Center freq. @MHz	Bandwidth @MHz	VSWR			Center freq. @MHz	Bandwidth @MHz	VSWR		
		5.725GHz	5.785GHz	5.85GHz			5.725GHz	5.785GHz	5.85GHz
5785		1.88	1.78	1.36	5785		1.19	1.36	1.44

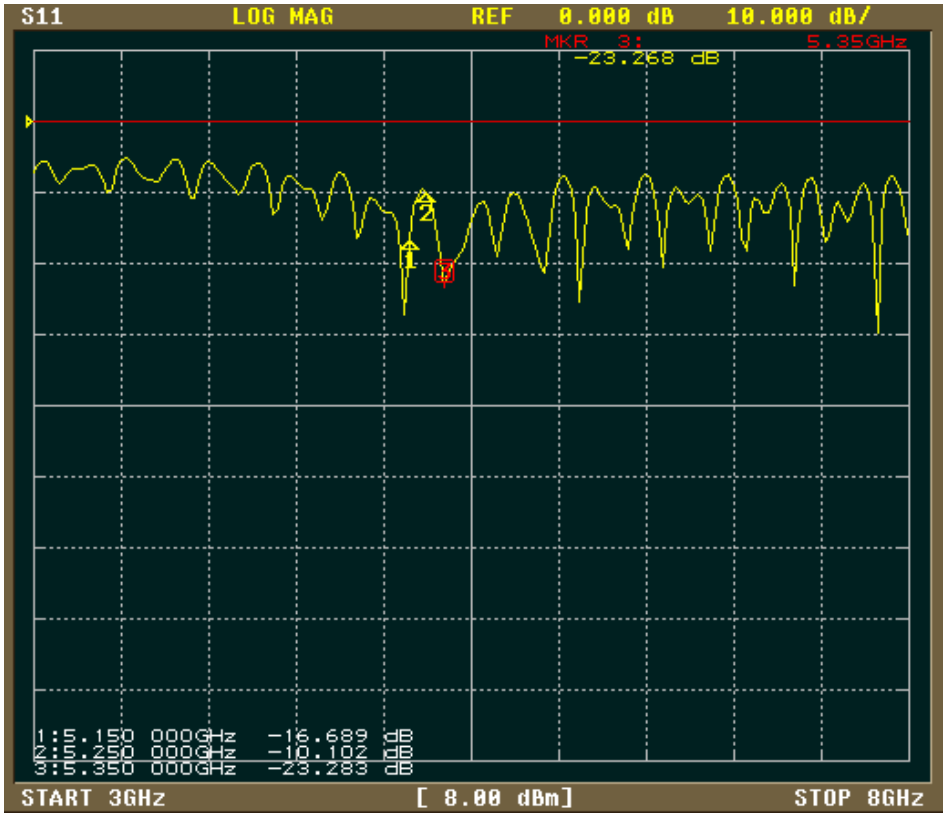
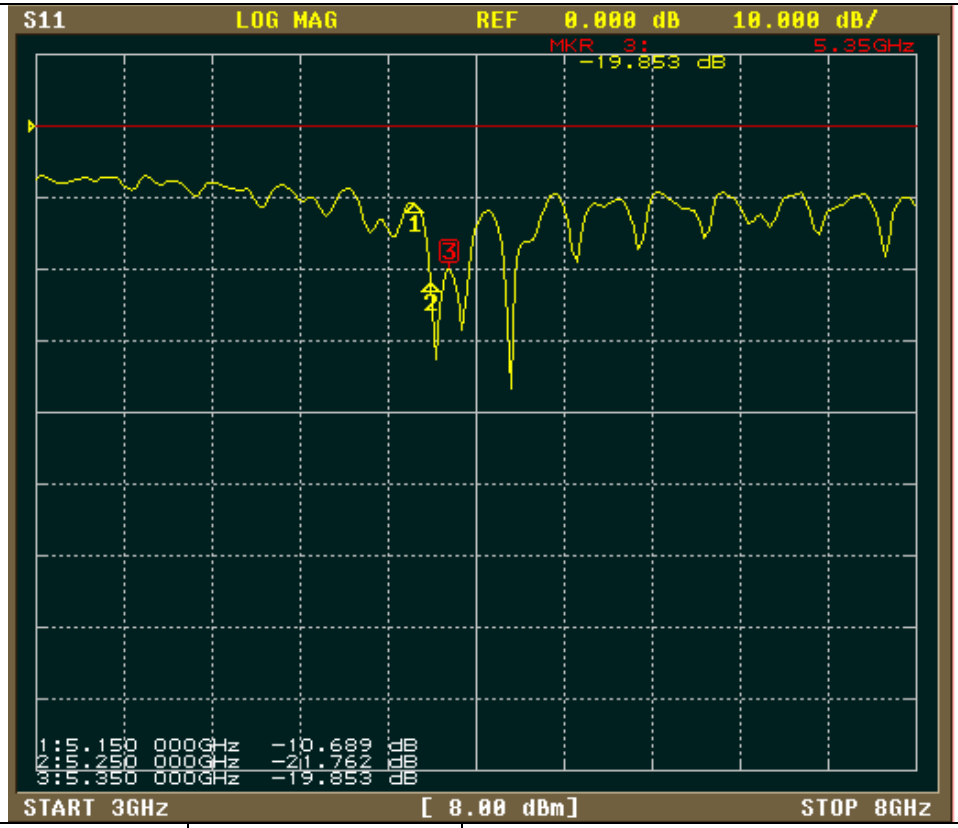
5. Return Loss

5.1 Return Loss 2.4GHz ~ 2.5GHz

Antenna 1	Antenna 2
	

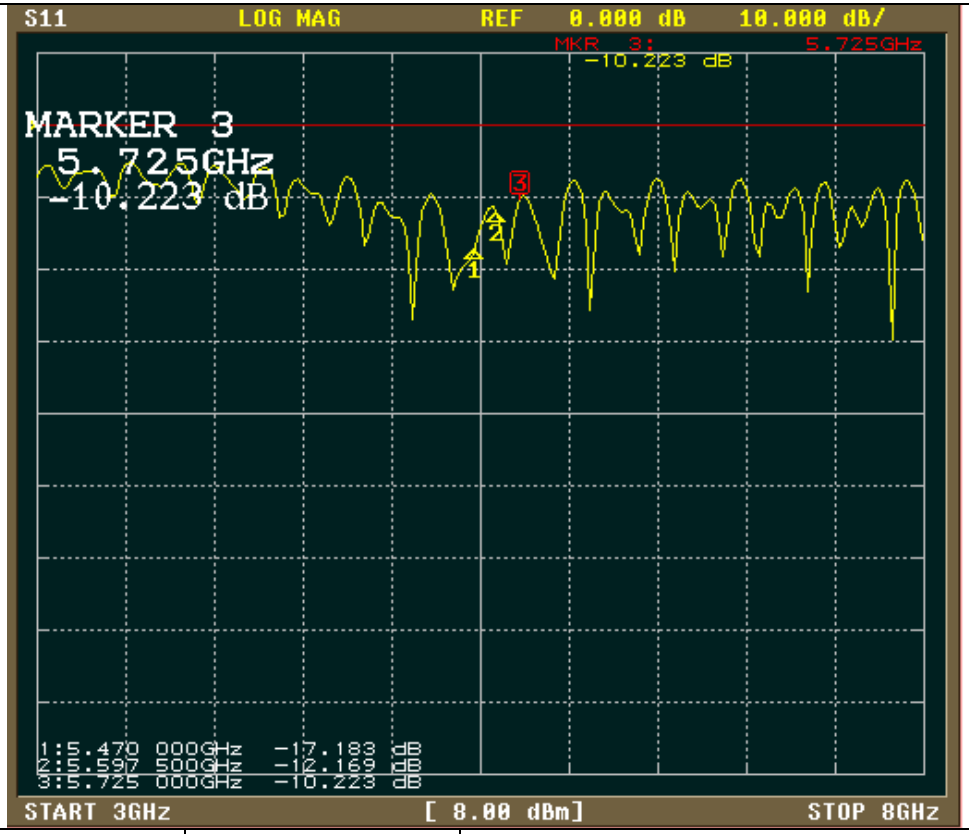
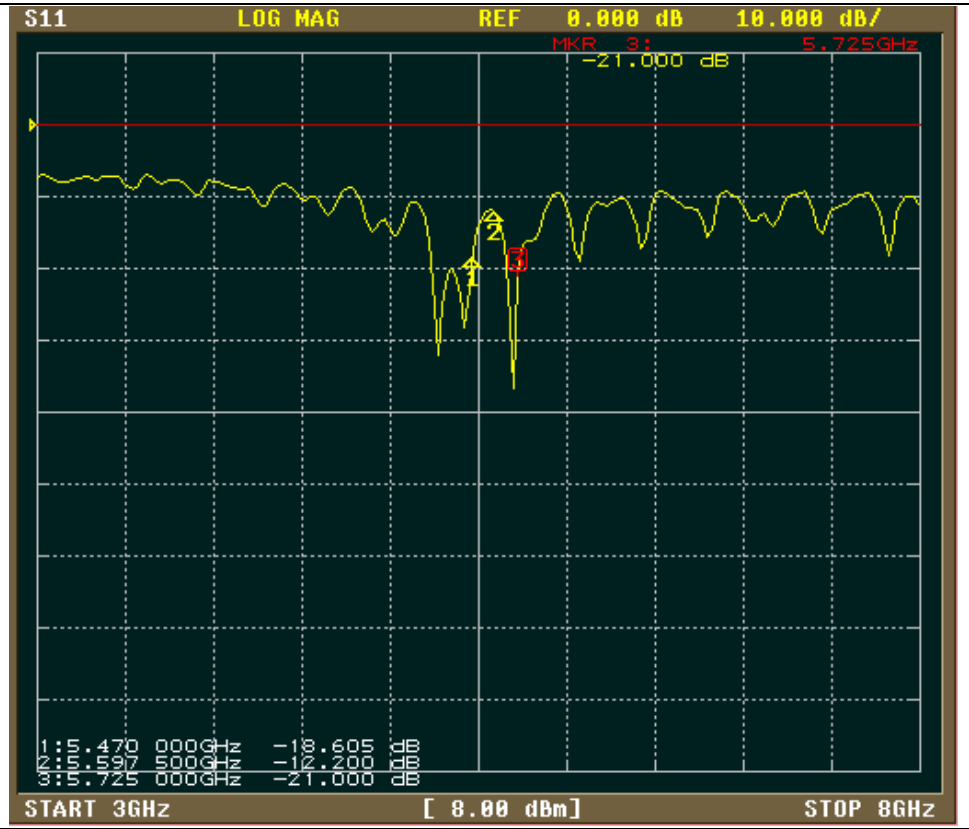
Center freq. @MHz	Bandwidth @MHz	Return Loss			Center freq. @MHz	Bandwidth @MHz	Return Loss		
		2.4GHz	2.45GHz	2.5GHz			2.4GHz	2.45GHz	2.5GHz
2450		-13.90	-15.64	-17.25	2450		-11.96	-20.39	-13.84

5.2 Return Loss 5.15GHz ~ 5.35GHz

Antenna 1	Antenna 2
	

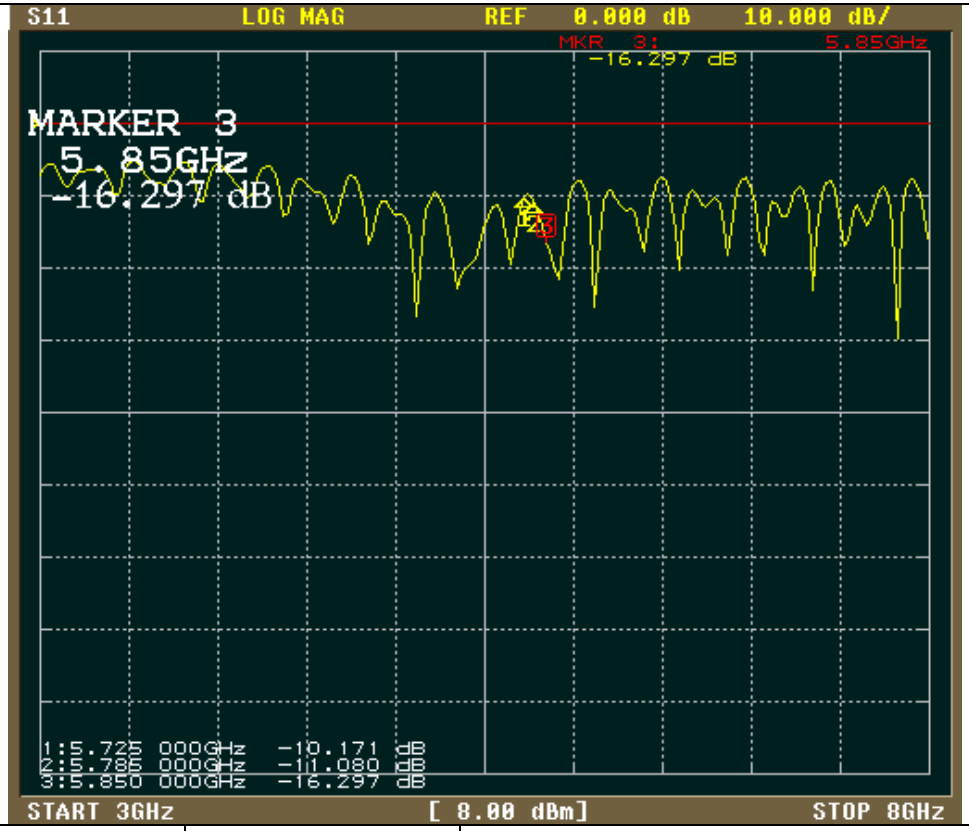
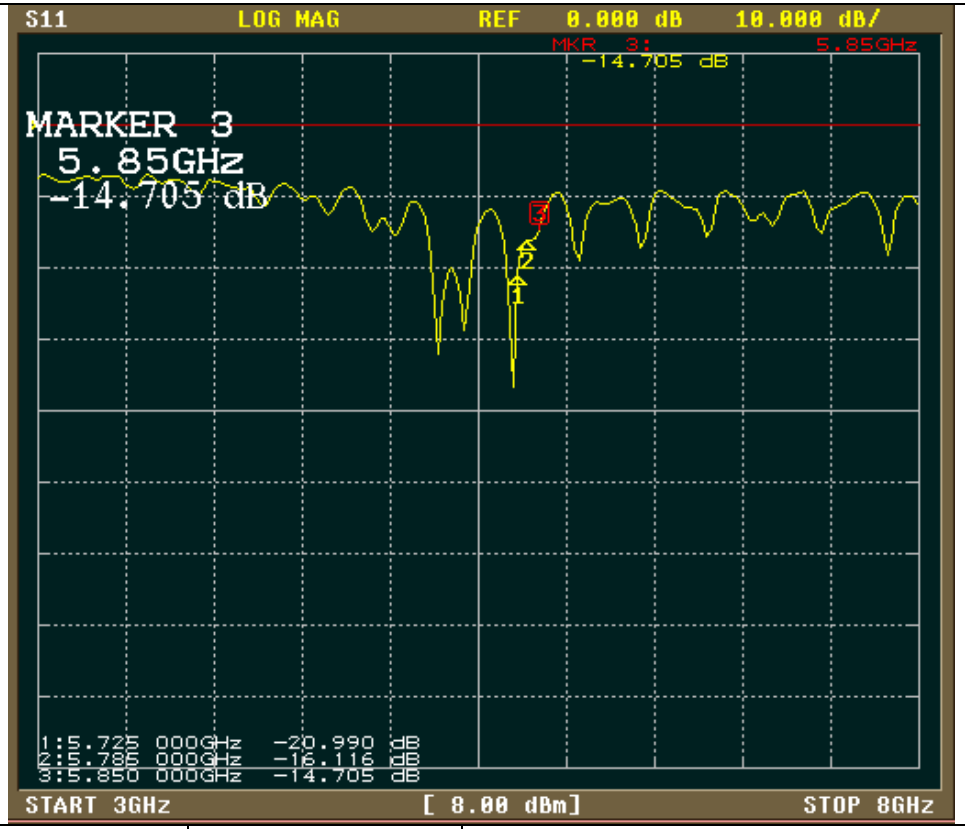
Center freq. @MHz	Bandwidth @MHz	Return Loss			Center freq. @MHz	Bandwidth @MHz	Return Loss		
		5.15GHz	5.25GHz	5.35GHz			5.15GHz	5.25GHz	5.35GHz
5250		-16.68	-10.10	-23.28	5250		-10.68	-21.76	-19.85

5.3 Return Loss 5.47GHz ~ 5.725GHz

Antenna 1	Antenna 2
	

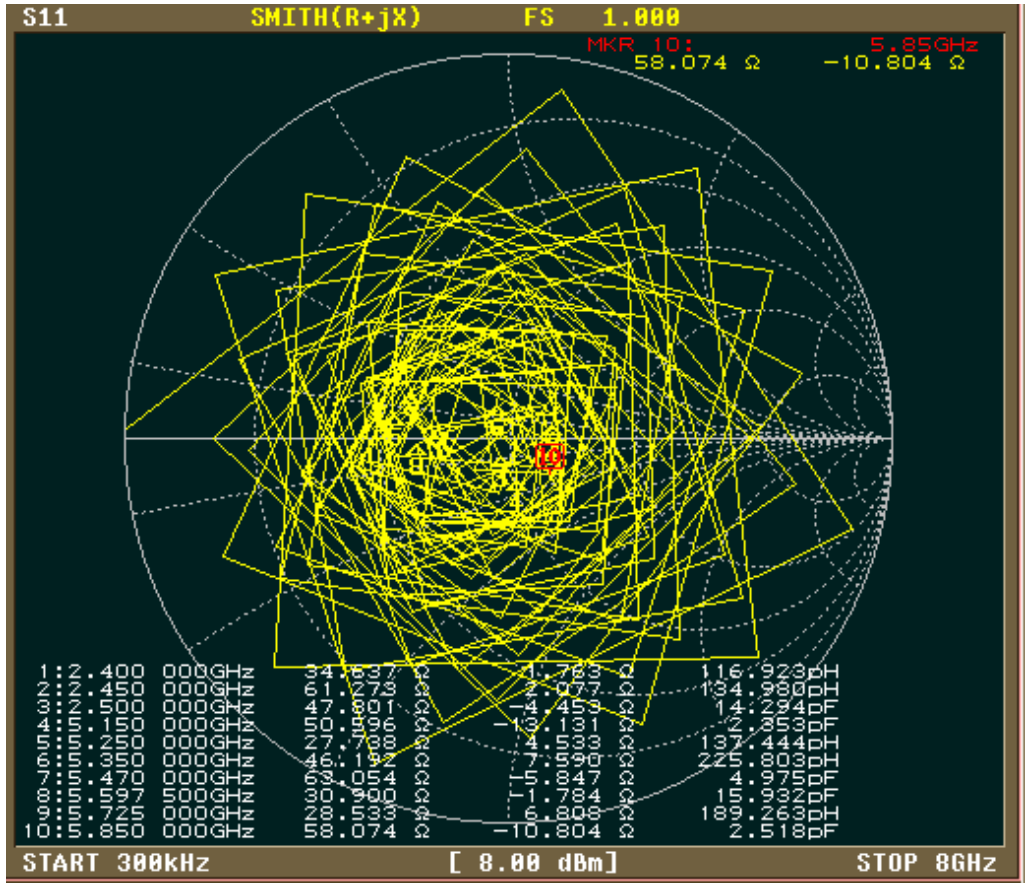
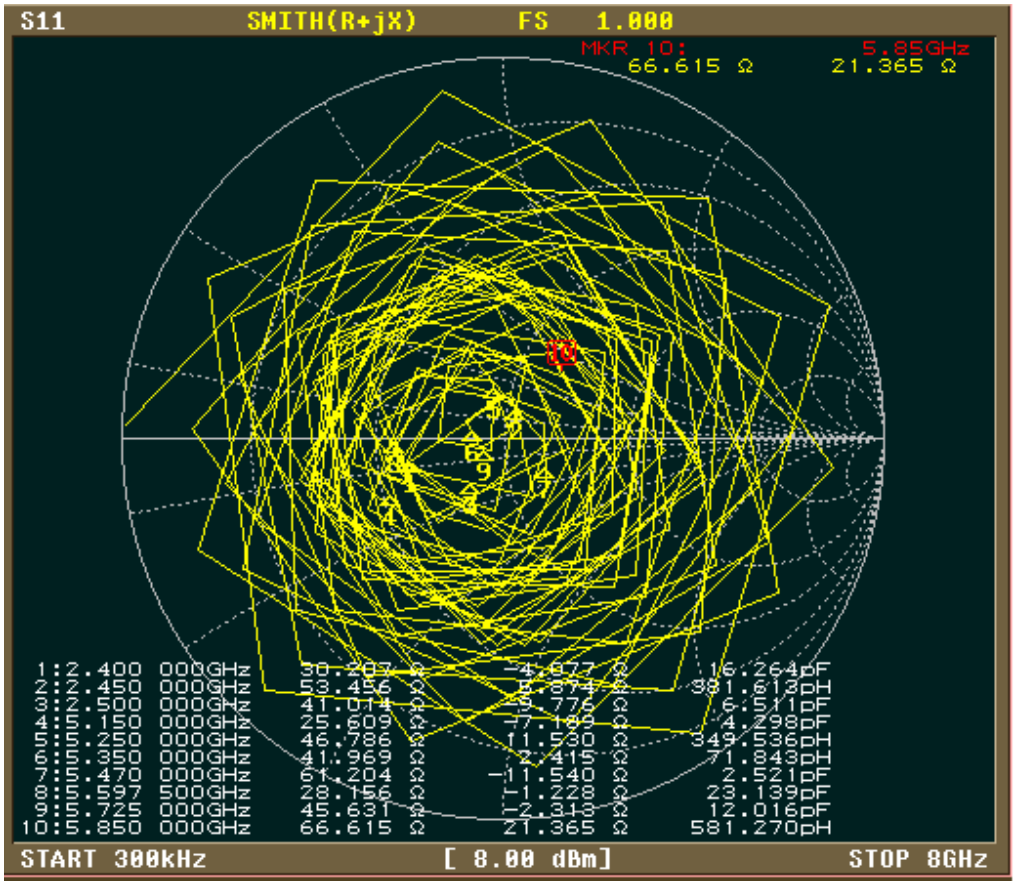
Center freq. @MHz	Bandwidth @MHz	Return Loss			Center freq. @MHz	Bandwidth @MHz	Return Loss		
		5.47GHz	5.5975GHz	5.725GHz			5.47GHz	5.5975GHz	5.725GHz
5597		-17.18	-12.16	-10.22	5597		-18.60	-12.20	-21.00

5.4 Return Loss 5.725GHz ~ 5.85GHz

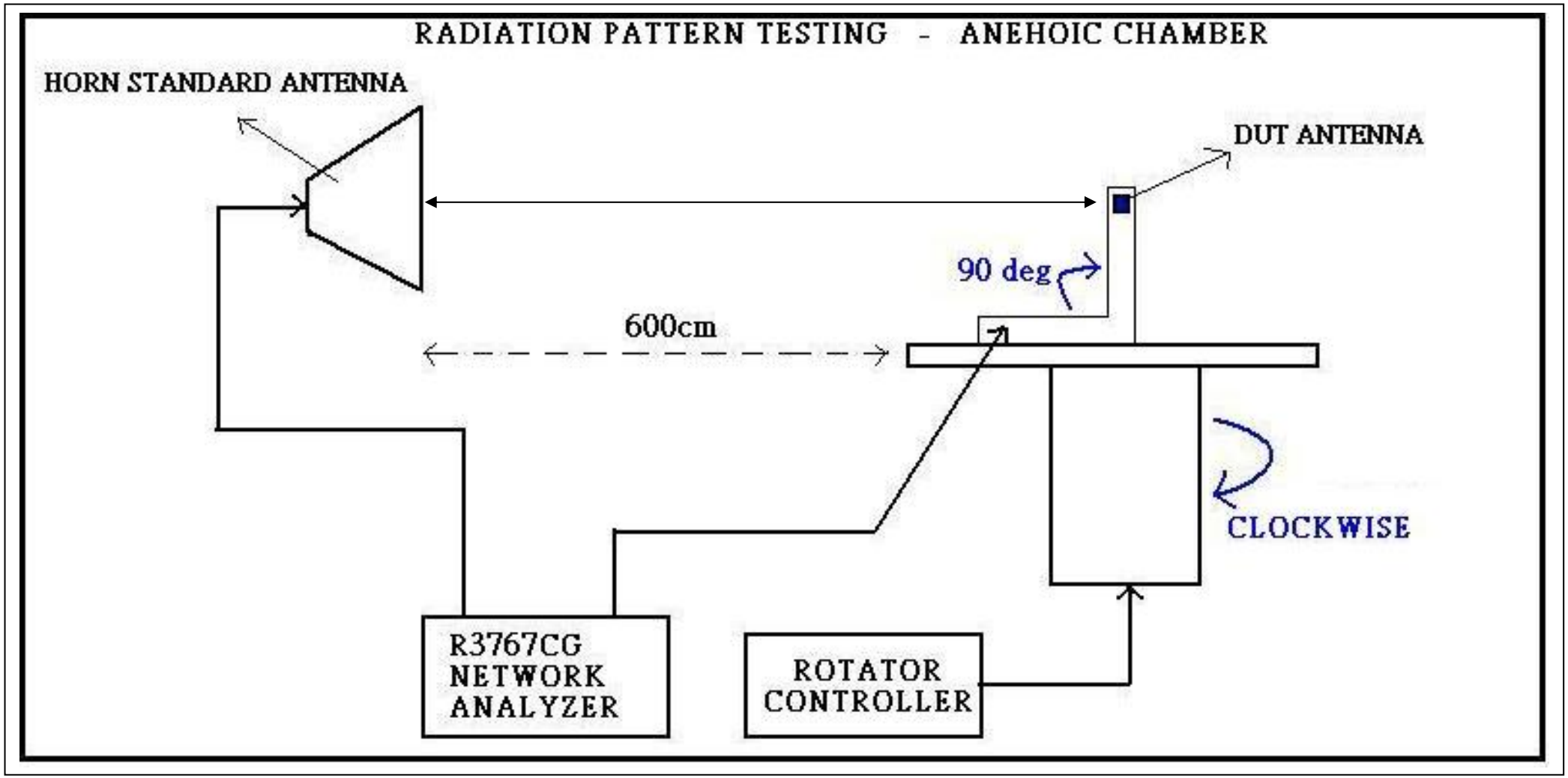
Antenna 1	Antenna 2
	

Center freq. @MHz	Bandwidth @MHz	Return Loss			Center freq. @MHz	Bandwidth @MHz	Return Loss		
		5.725GHz	5.785GHz	5.85GHz			5.725GHz	5.785GHz	5.85GHz
5785		-10.17	-11.08	-16.29	5785		-20.99	-16.11	-14.70

6. Smith Chart

Antenna 1	Antenna 2
	

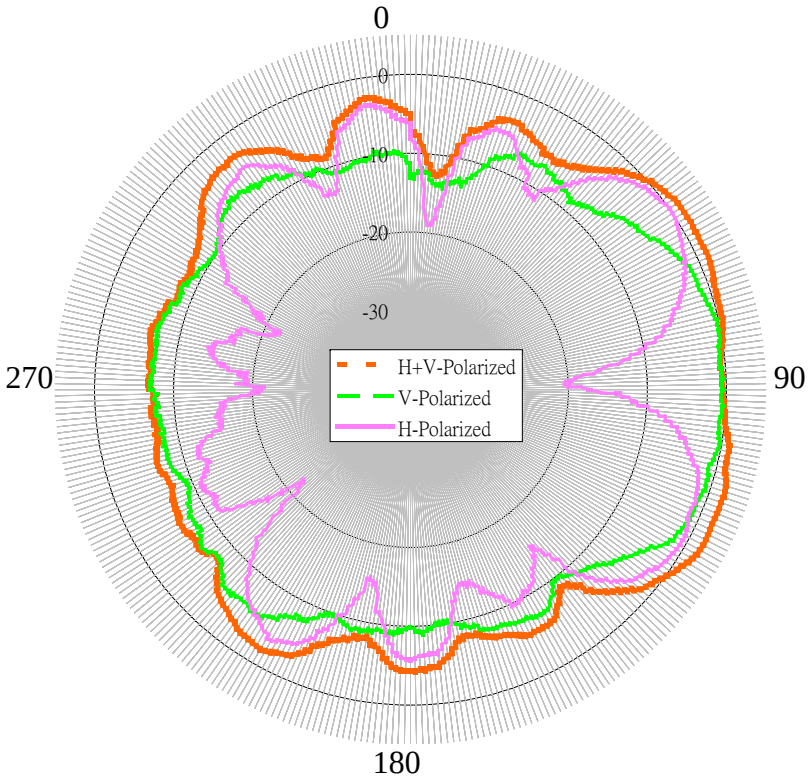
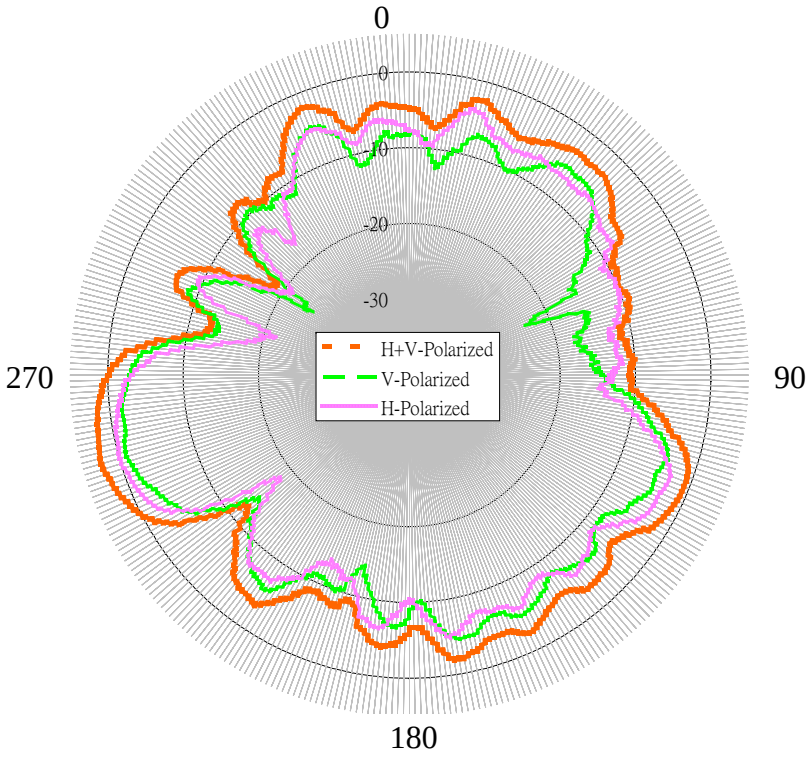
7. Antenna Radiation Pattern Testing Set Up



The radiation pattern and antenna gain shall be tested in an anechoic chamber. The anechoic chamber must be lined with absorptive materials. The measurements shall be made at the connector end of the cable for antenna assembly. The antennas must be installed in a fully populated platform to include a complete display and display plastics.

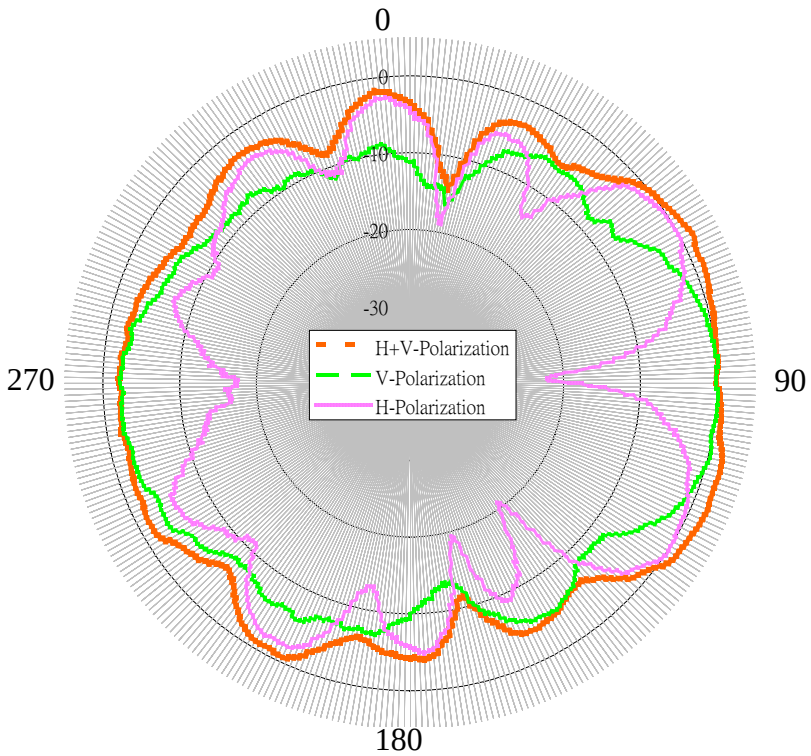
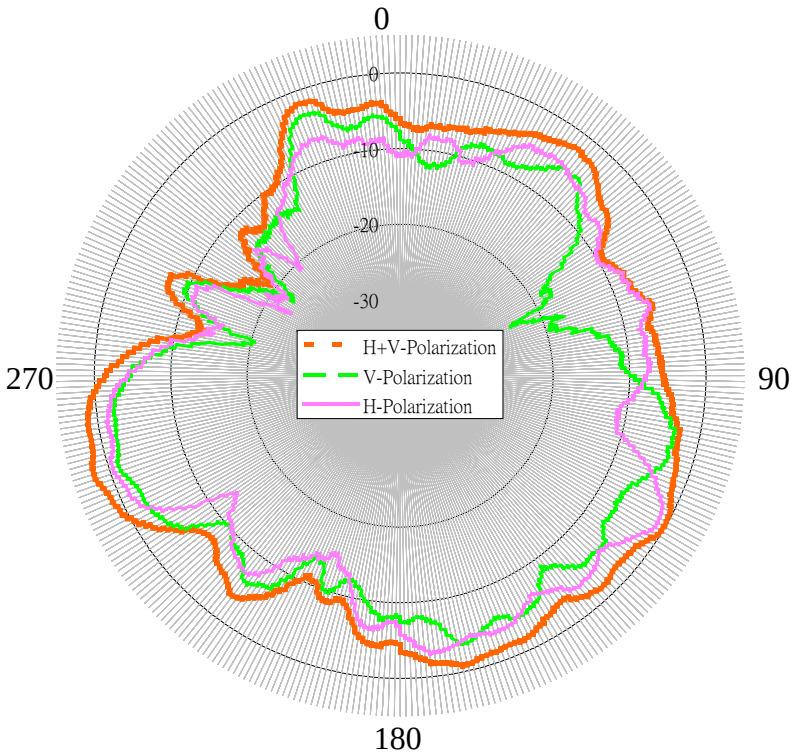
8. Radiation Pattern of XY Plane Testing Result

8.1 2.4 GHz

Antenna 1	Antenna 2
	

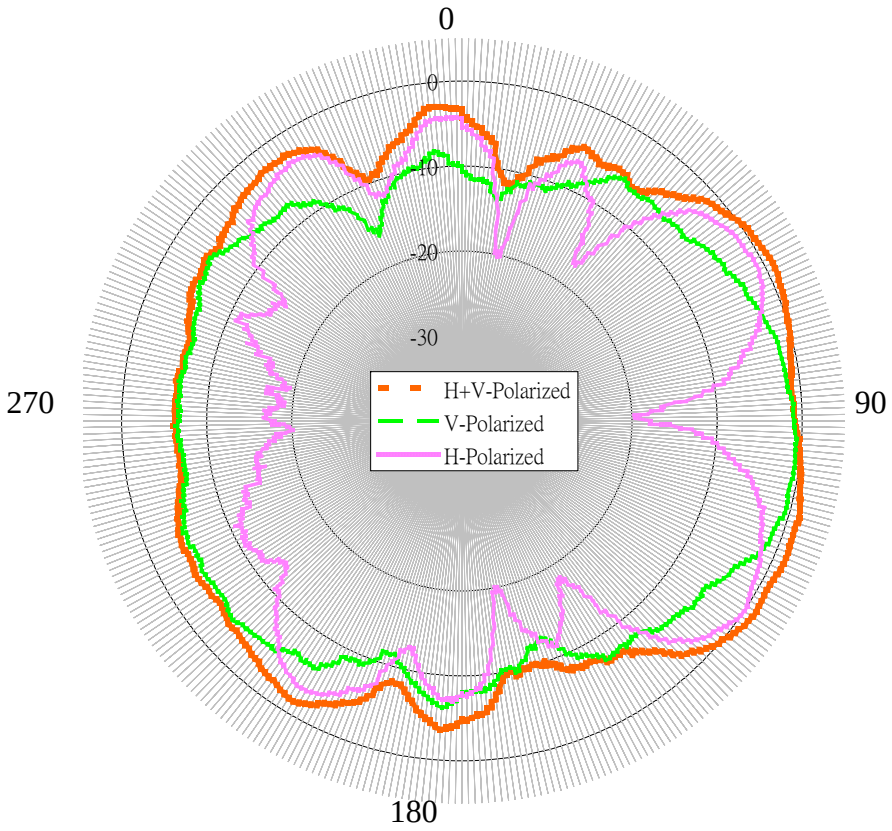
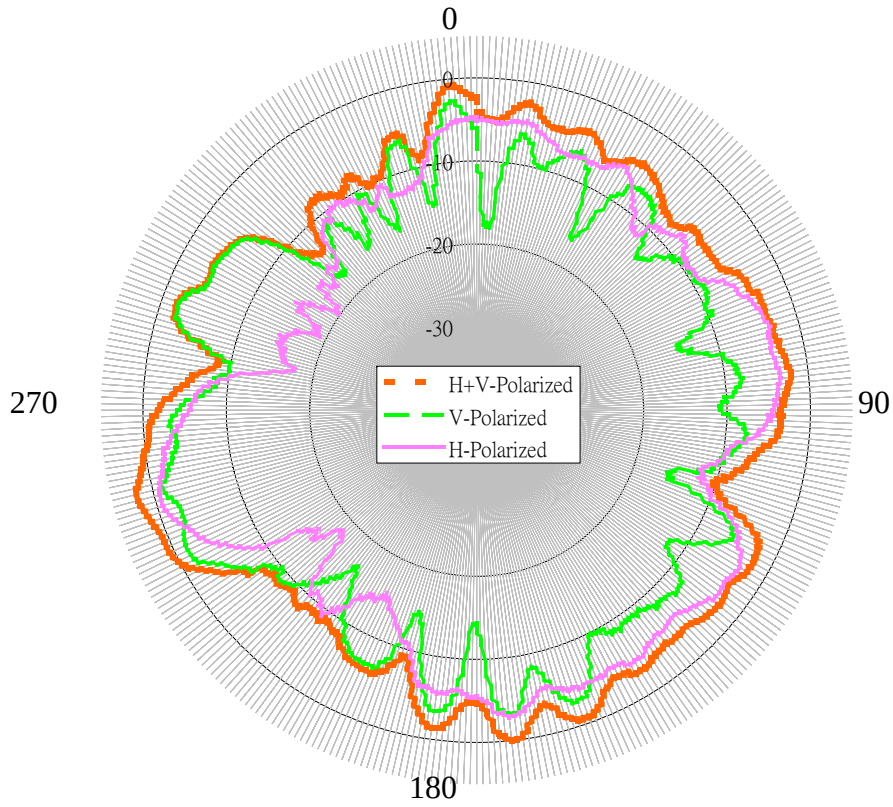
Horn Antenna Polarization	Gain of XY Plane (Azimuth)		Horn Antenna Polarization	Gain of XY Plane (Azimuth)	
V	Peak	-0.17	V	Peak	-0.92
	Average	-5.66		Average	-7.18
H	Peak	0.06	H	Peak	0.05
	Average	-6.34		Average	-6.71
H + V	Peak	2.01	H + V	Peak	2.57
	Average	-2.98		Average	-3.93
V Gain >= -4 Area	18.57%		V Gain >= -4 Area	8.99%	
V Gain >= -5 Area	20.57%		V Gain >= -5 Area	15.99%	

8.2 2.45 GHz

Antenna 1	Antenna 2
	

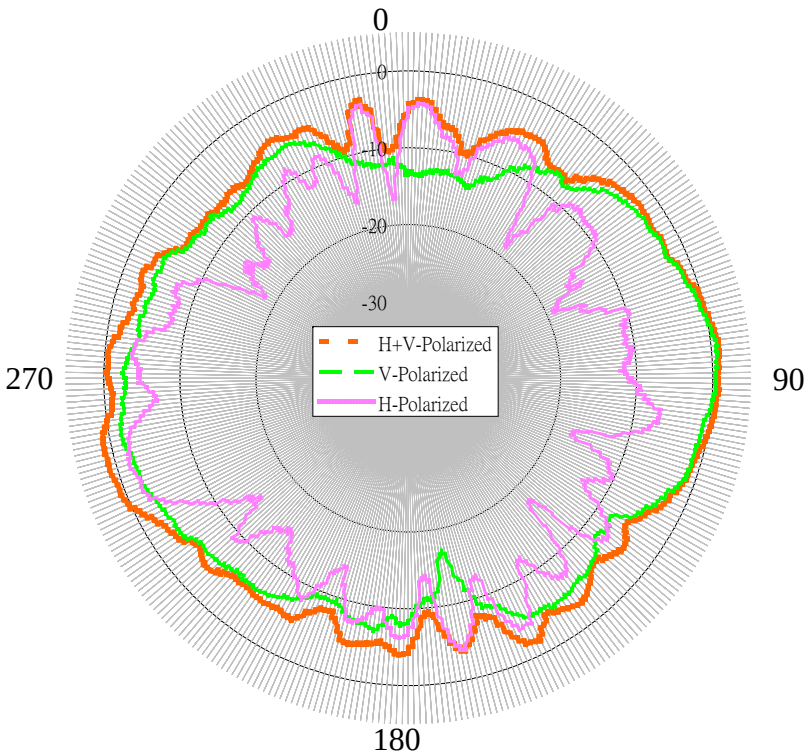
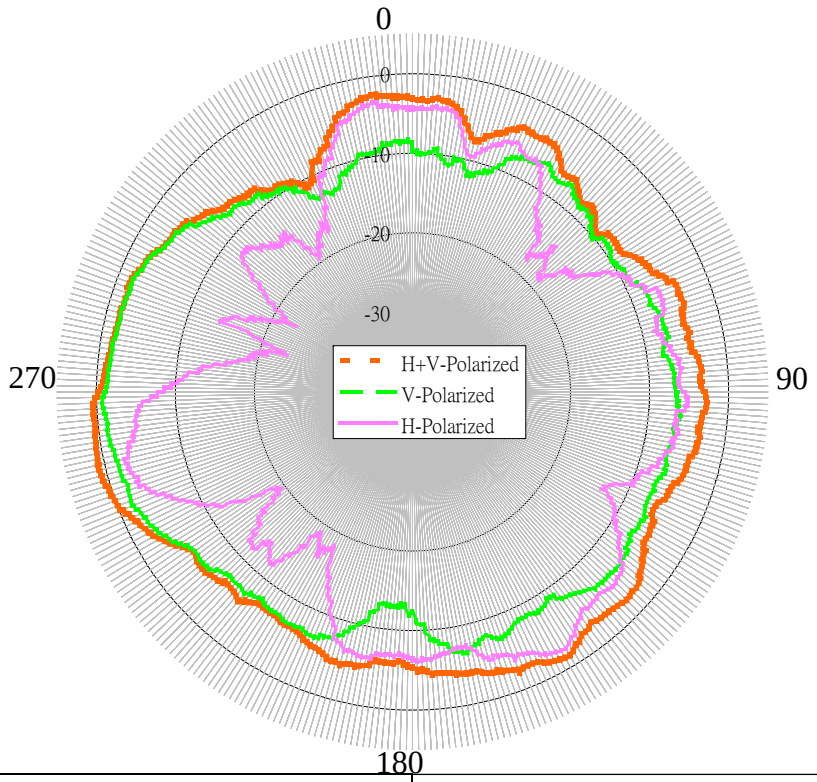
Horn Antenna Polarization	Gain of XY Plane (Azimuth)		Horn Antenna Polarization	Gain of XY Plane (Azimuth)	
V	Peak	0.00	V	Peak	-1.25
	Average	-5.12		Average	-6.94
H	Peak	-0.10	H	Peak	-0.40
	Average	-5.89		Average	-6.33
H + V	Peak	1.82	H + V	Peak	2.15
	Average	-2.48		Average	-3.62
V Gain >= -4 Area	27.56%		V Gain >= -4 Area	13.99%	
V Gain >= -5 Area	31.72%		V Gain >= -5 Area	20.15%	

8.3 2.5 GHz

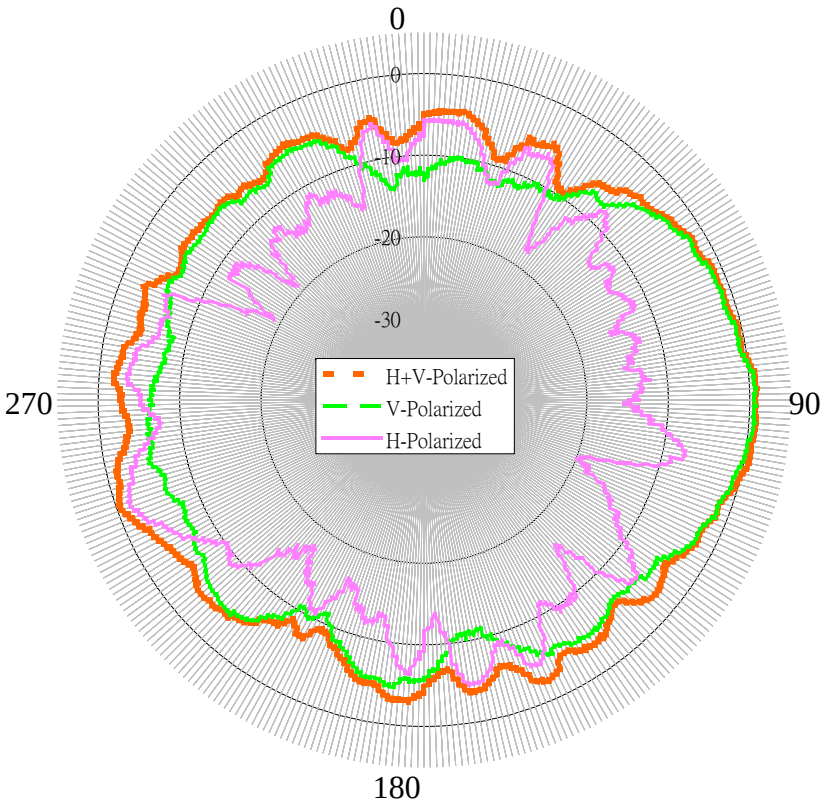
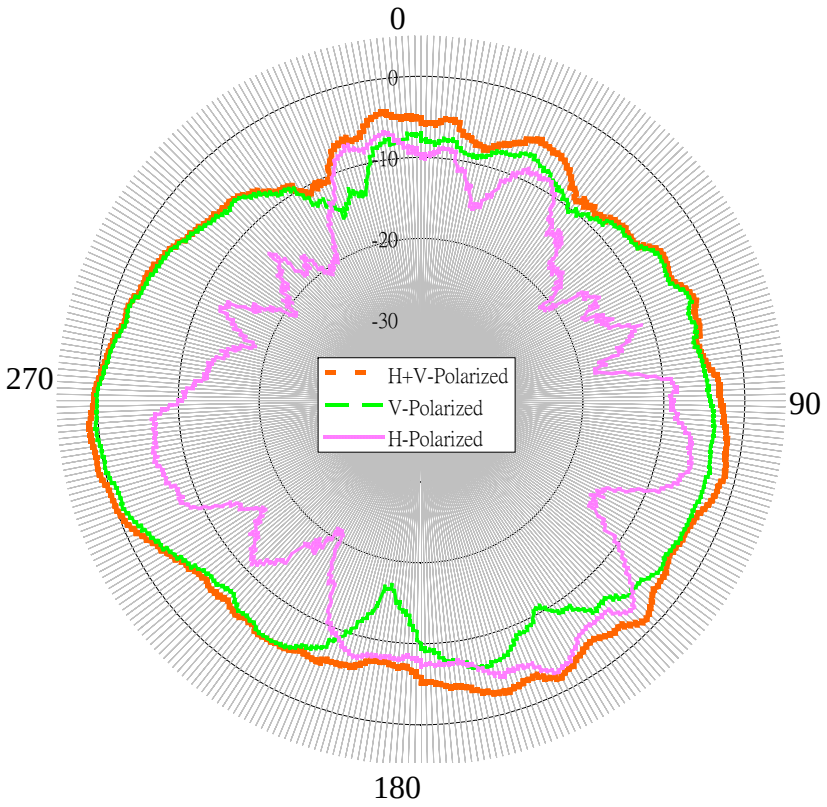
Antenna 1	Antenna 2
	

Horn Antenna Polarization	Gain of XY Plane (Azimuth)		Horn Antenna Polarization	Gain of XY Plane (Azimuth)	
V	Peak	-0.47	V	Peak	-1.06
	Average	-5.62		Average	-6.98
H	Peak	0.11	H	Peak	-0.61
	Average	-6.41		Average	-6.48
H + V	Peak	1.38	H + V	Peak	2.02
	Average	-2.99		Average	-3.71
Gain >= -4 Area	16.40%		Gain >= -4 Area	15.82%	
Gain >= -5 Area	24.56%		Gain >= -5 Area	21.90%	

8.4 5.15 GHz

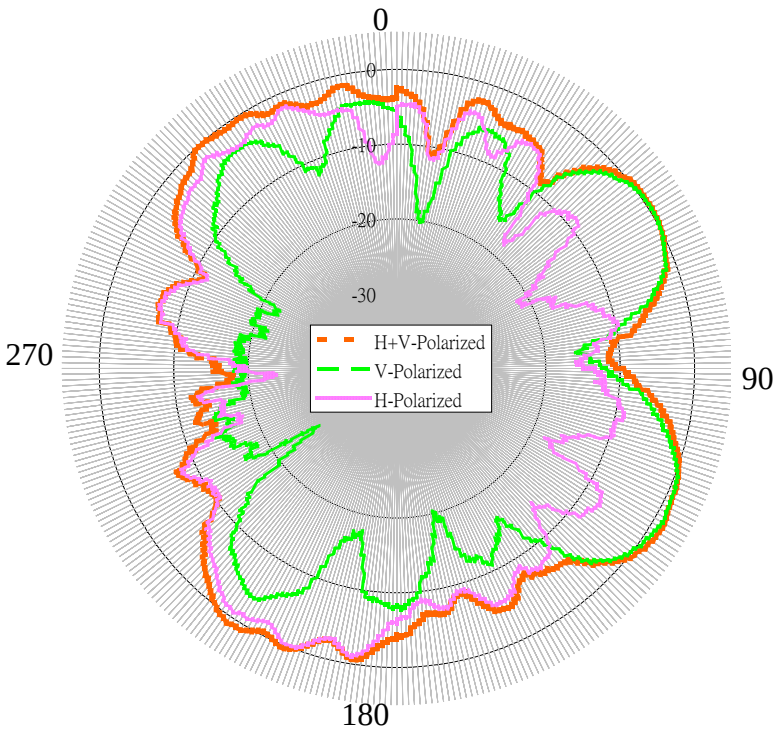
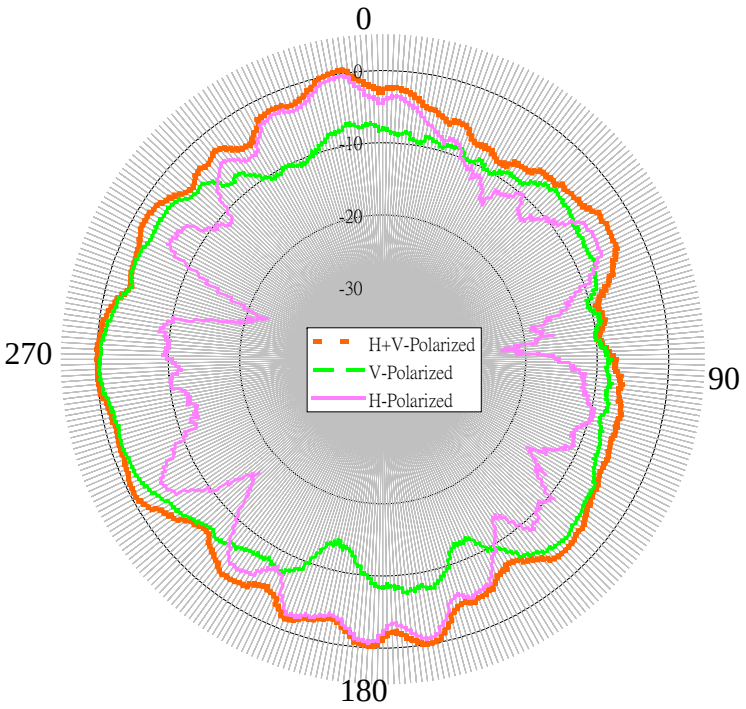
Antenna 1			Antenna 2		
					
Horn Antenna Polarization	**Gain of XY Plane (Azimuth)**		**Horn Antenna Polarization**	**Gain of XY Plane (Azimuth)**	
V	**Peak**	**0.76**	**V**	**Peak**	**-0.63**
	Average	**-4.66**		**Average**	**-6.05**
H	**Peak**	**-1.59**	**H**	**Peak**	**-2.28**
	Average	**-8.25**		**Average**	**-7.60**
H + V	**Peak**	**1.06**	**H + V**	**Peak**	**0.93**
	Average	**-3.09**		**Average**	**-3.75**
Gain >= -4 Area	**30.89%**		**Gain >= -4 Area**	**17.49%**	
Gain >= -5 Area	**40.13%**		**Gain >= -5 Area**	**19.40%**	

8.5 5.25 GHz

Antenna 1	Antenna 2
	

Horn Antenna Polarization	Gain of XY Plane (Azimuth)		Horn Antenna Polarization	Gain of XY Plane (Azimuth)	
V	Peak	0.73	V	Peak	0.39
	Average	-5.02		Average	-5.09
H	Peak	-1.58	H	Peak	-2.43
	Average	-8.69		Average	-9.29
H + V	Peak	0.91	H + V	Peak	1.13
	Average	-3.47		Average	-3.69
Gain >= -4 Area	19.57%		Gain >= -4 Area	26.14%	
Gain >= -5 Area	24.98%		Gain >= -5 Area	35.72%	

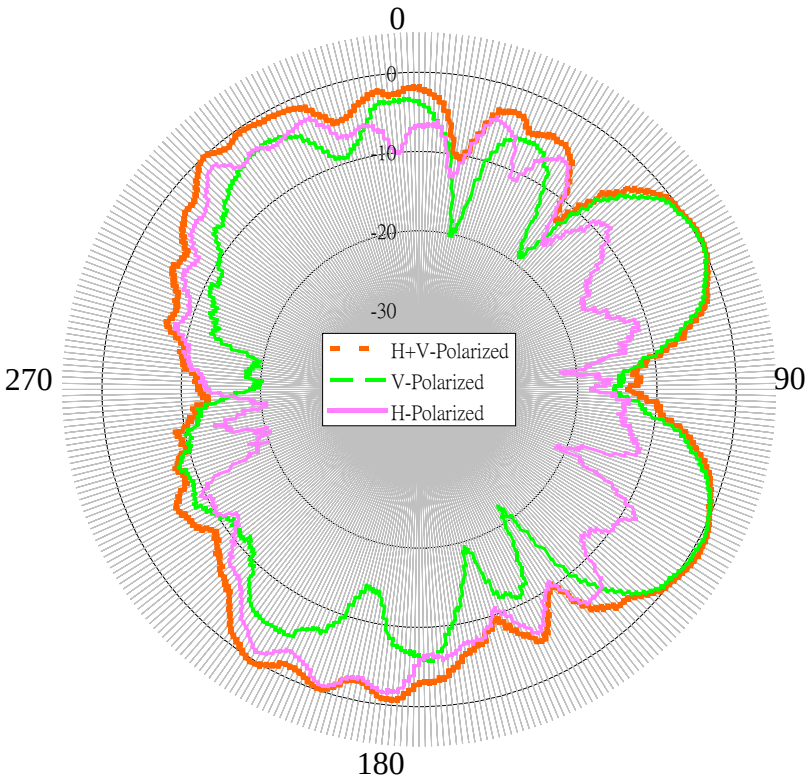
8.6 5.35 GHz

Antenna 1	Antenna 2
	

Horn Antenna Polarization	Gain of XY Plane (Azimuth)		Horn Antenna Polarization	Gain of XY Plane (Azimuth)	
V	Peak	1.21	V	Peak	-0.36
	Average	-5.78		Average	-5.90
H	Peak	-0.14	H	Peak	-0.34
	Average	-6.36		Average	-6.54
H + V	Peak	1.58	H + V	Peak	0.49
	Average	-3.05		Average	-3.19
Gain >= -4 Area	20.82%		Gain >= -4 Area	19.73%	
Gain >= -5 Area	28.06%		Gain >= -5 Area	24.90%	

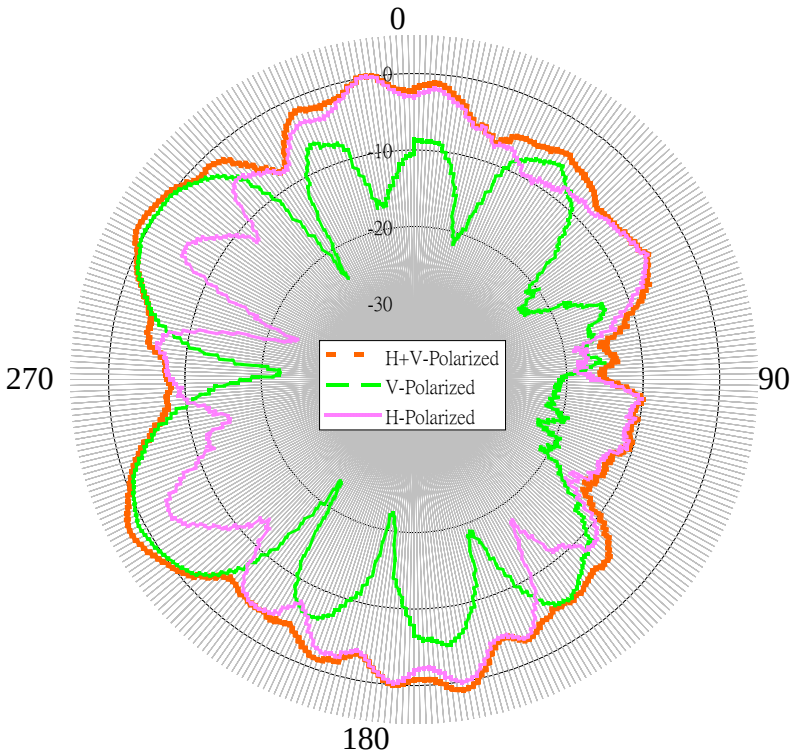
8.7 5.47 GHz

Antenna 1



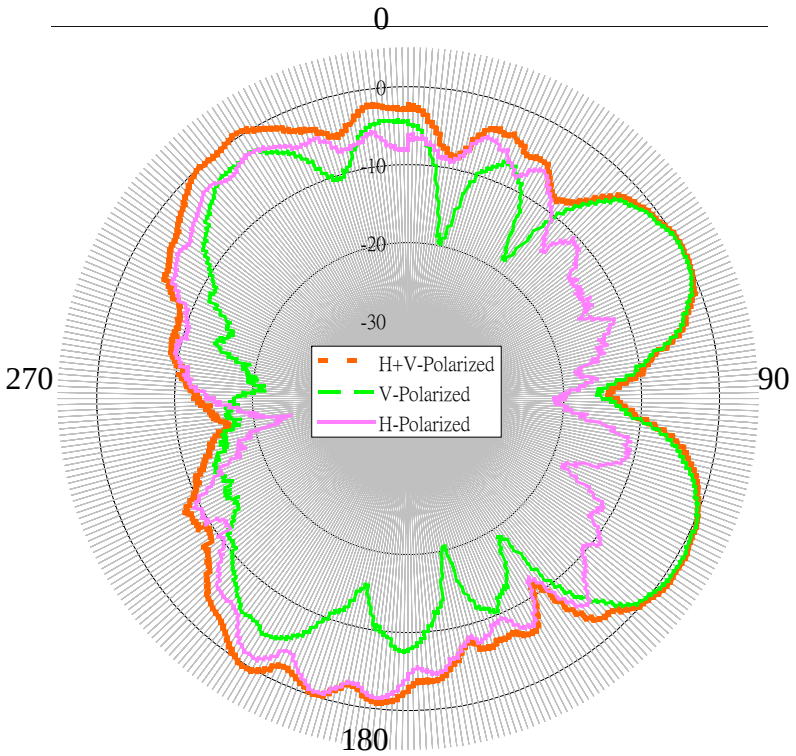
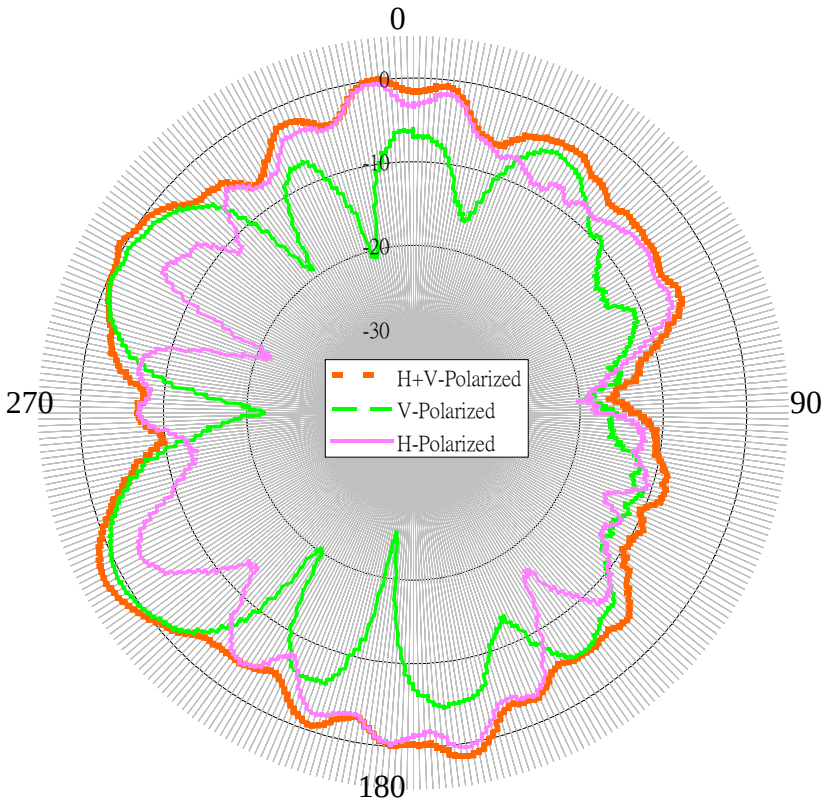
Horn Antenna Polarization	Gain of XY Plane (Azimuth)	
V	Peak	0.59
	Average	-5.77
H	Peak	-0.65
	Average	-6.97
H + V	Peak	0.98
	Average	-3.21
Gain >= -4 Area	21.57%	
Gain >= -5 Area	28.39%	

Antenna 2



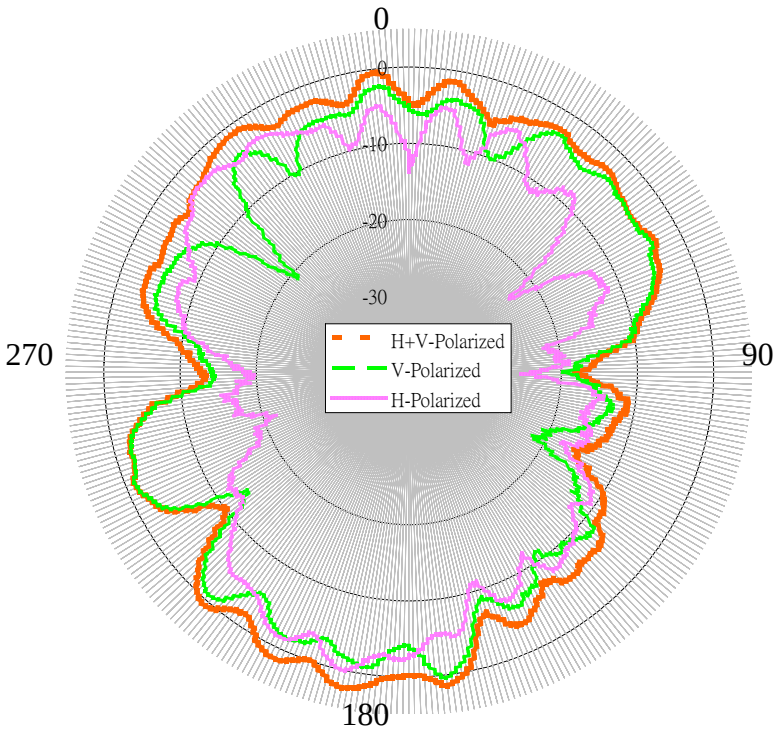
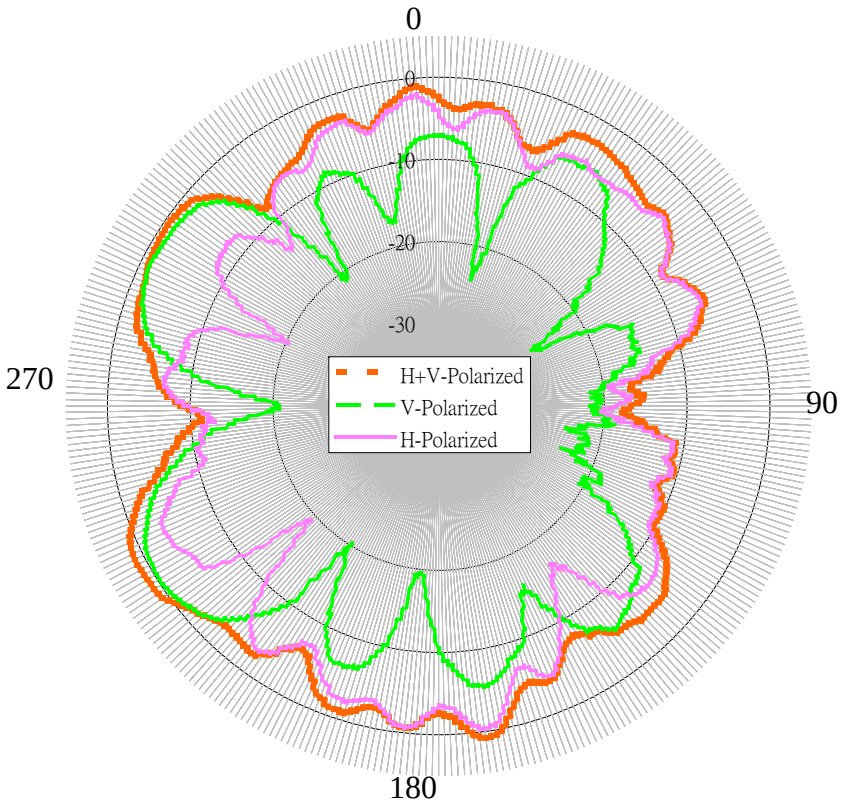
Horn Antenna Polarization	Gain of XY Plane (Azimuth)	
V	Peak	0.85
	Average	-6.43
H	Peak	0.18
	Average	-5.89
H + V	Peak	2.1
	Average	-3.14
Gain >= -4 Area	17.49%	
Gain >= -5 Area	19.98%	

8.8 5.5975 GHz

Antenna 1	Antenna 2
	

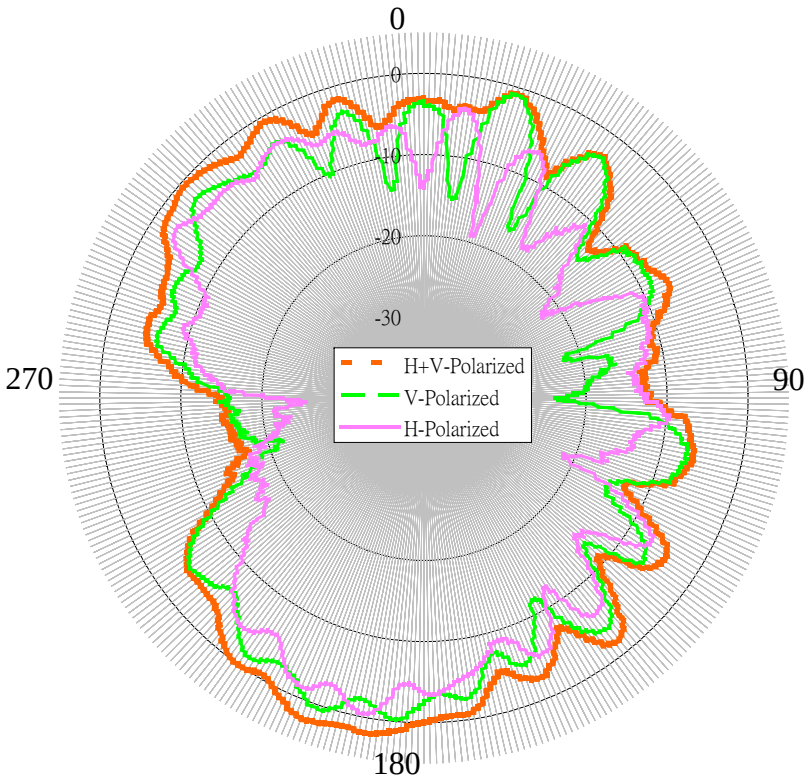
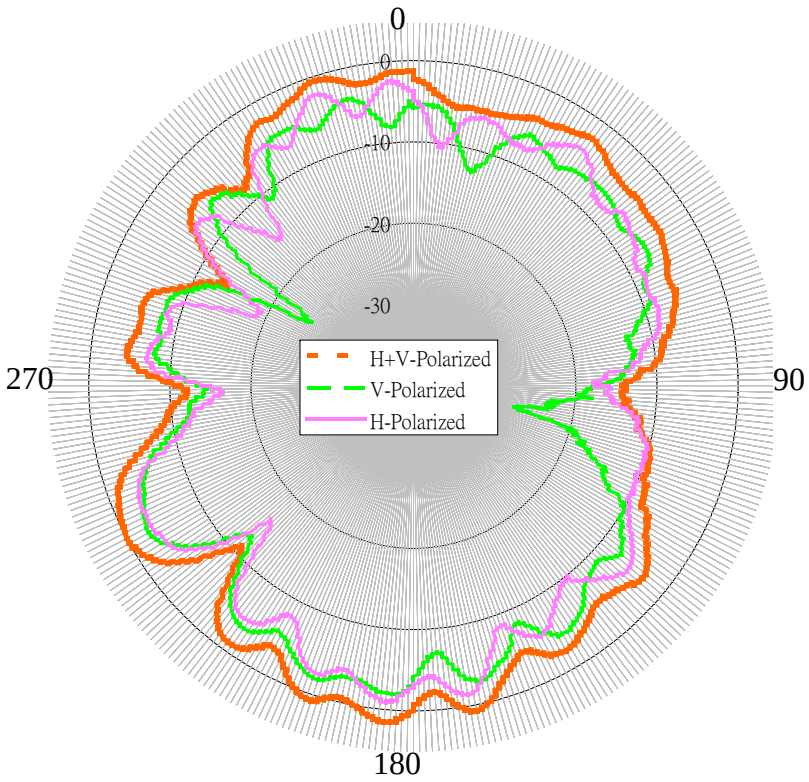
Horn Antenna Polarization	Gain of XY Plane (Azimuth)		Horn Antenna Polarization	Gain of XY Plane (Azimuth)	
V	Peak	0.84	V	Peak	0.65
	Average	-5.69		Average	-6.26
H	Peak	-0.43	H	Peak	0.50
	Average	-6.82		Average	-5.80
H + V	Peak	1.06	H + V	Peak	2.13
	Average	-3.21		Average	-3.02
Gain >= -4 Area	22.06%		Gain >= -4 Area	16.82%	
Gain >= -5 Area	29.14%		Gain >= -5 Area	22.56%	

8.9 5.725 GHz

Antenna 1	Antenna 2
	

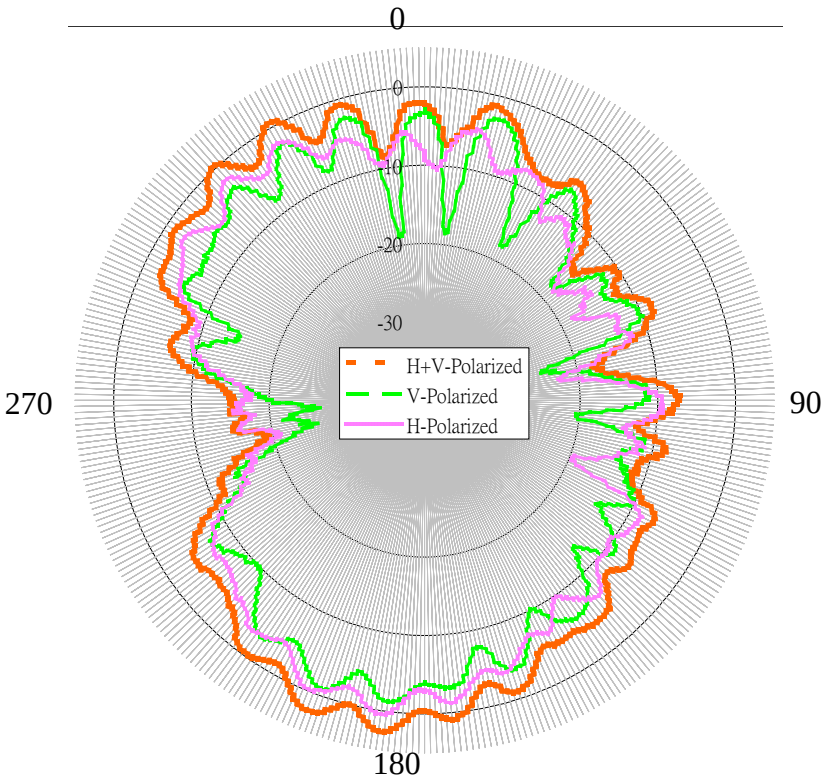
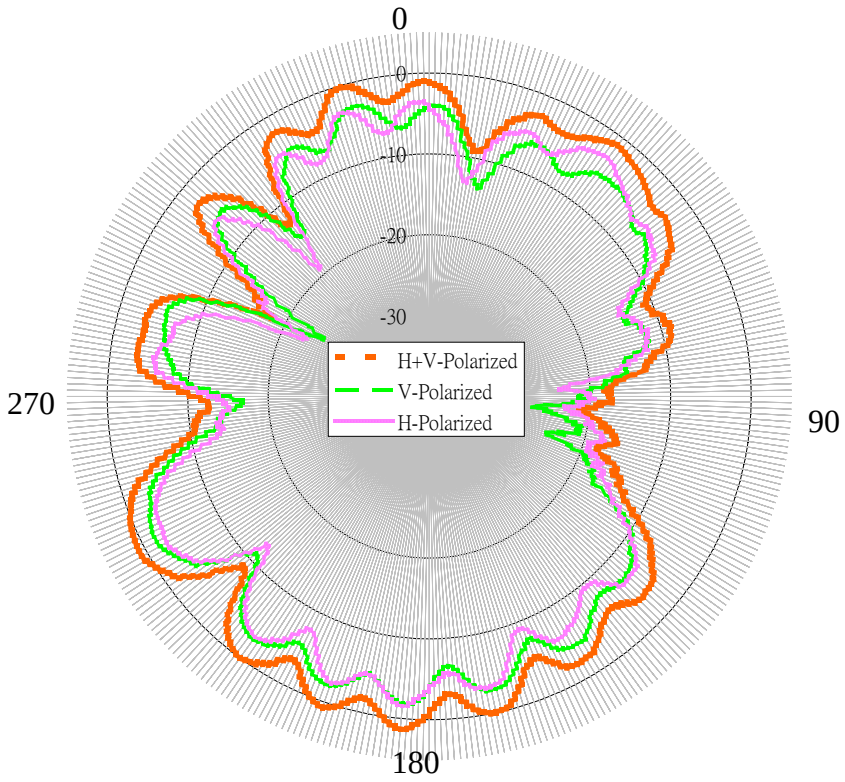
Horn Antenna Polarization	Gain of XY Plane (Azimuth)		Horn Antenna Polarization	Gain of XY Plane (Azimuth)	
V	Peak	0.36	V	Peak	-0.18
	Average	-5.36		Average	-7.07
H	Peak	0.02	H	Peak	-0.36
	Average	-7.23		Average	-6.20
H + V	Peak	2.34	H + V	Peak	1.23
	Average	-3.18		Average	-3.60
Gain >= -4 Area	26.39%		Gain >= -4 Area	16.15%	
Gain >= -5 Area	40.39%		Gain >= -5 Area	17.82%	

8.10 5.785 GHz

Antenna 1	Antenna 2
	

Horn Antenna Polarization	Gain of XY Plane (Azimuth)		Horn Antenna Polarization	Gain of XY Plane (Azimuth)	
V	Peak	0.54	V	Peak	-1.93
	Average	-5.83		Average	-6.73
H	Peak	0.34	H	Peak	-0.89
	Average	-7.42		Average	-6.40
H + V	Peak	2.36	H + V	Peak	1.56
	Average	-3.54		Average	-3.55
Gain >= -4 Area	23.23%		Gain >= -4 Area	13.91%	
Gain >= -5 Area	32.14%		Gain >= -5 Area	23.06%	

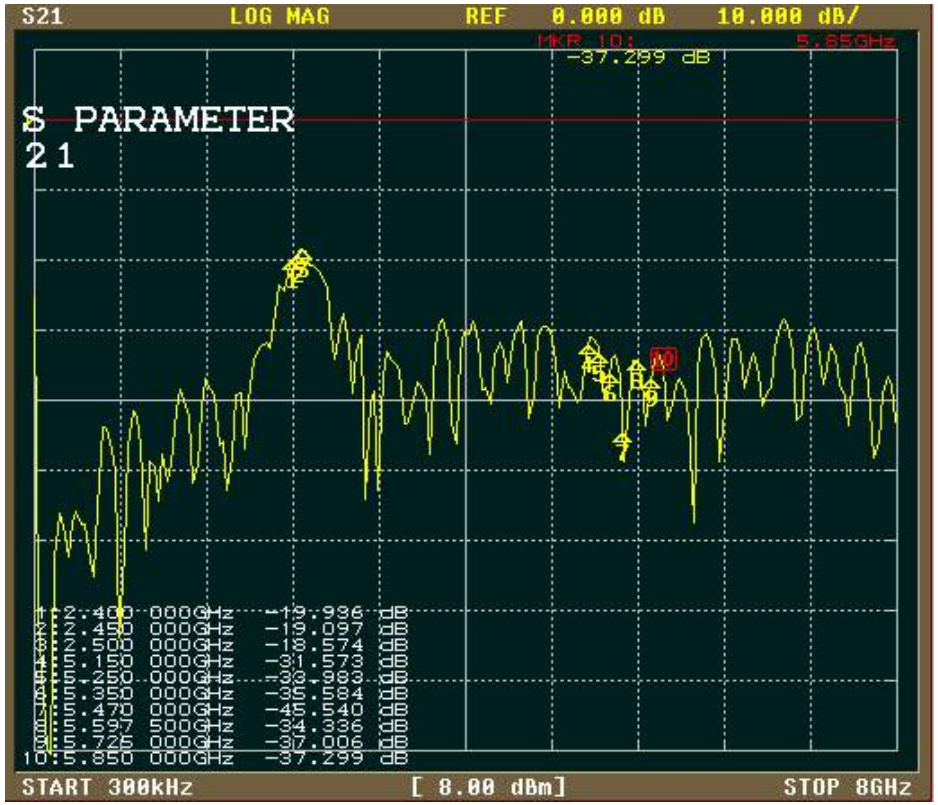
8.11 5.85 GHz

Antenna 1	Antenna 2
	

Horn Antenna Polarization	Gain of XY Plane (Azimuth)		Horn Antenna Polarization	Gain of XY Plane (Azimuth)	
V	Peak	-0.85	V	Peak	-1.63
	Average	-7.16		Average	-6.41
H	Peak	0.45	H	Peak	-1.51
	Average	-6.34		Average	-6.69
H + V	Peak	2.68	H + V	Peak	1.29
	Average	-3.72		Average	-3.53
Gain >= -4 Area	17.65%		Gain >= -4 Area	17.32%	
Gain >= -5 Area	23.98%		Gain >= -5 Area	26.73%	

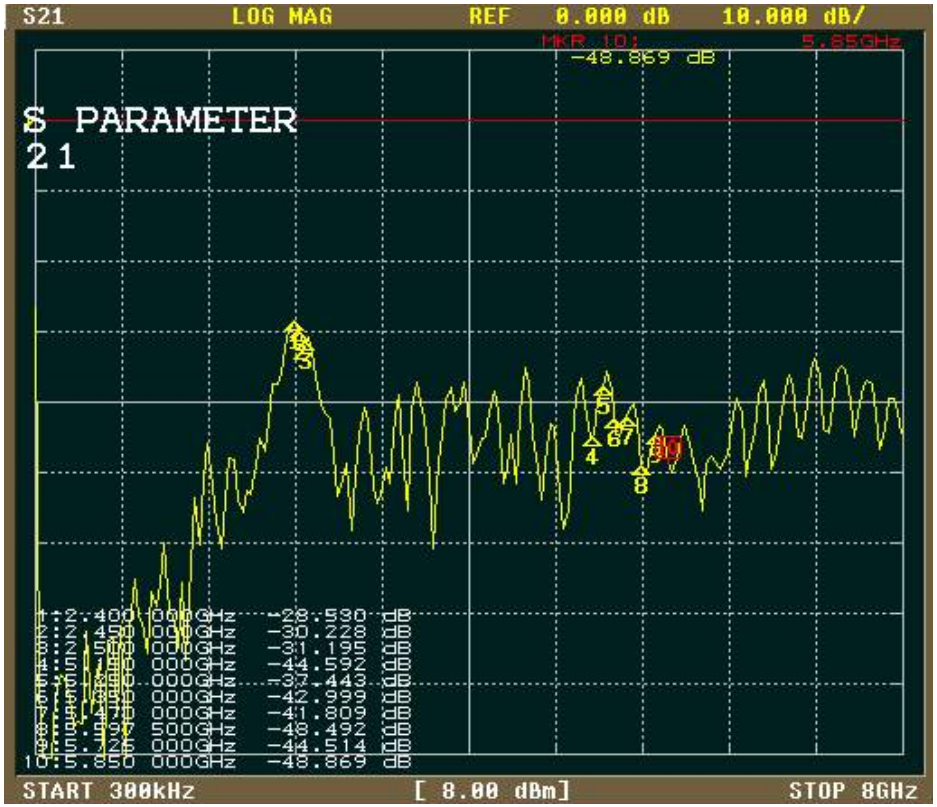
9.1 Isolation test result

R→L



R→B

L→B


S21
LOG MAG
REF 0.000 dB
10.000 dB/
MKR 10:
5.85GHz
-48.869 dB
S PARAMETER
2 1
10:5.850 000GHz -48.869 dB
START 300kHz
[8.00 dBm]
STOP 8GHz