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

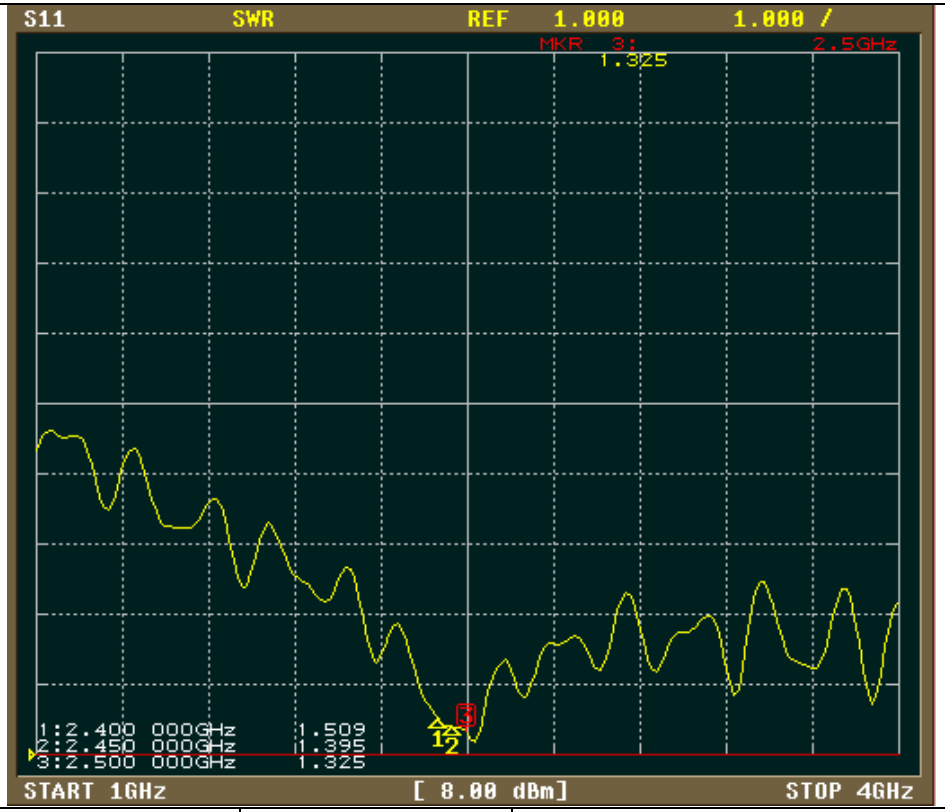
Data 3/22/05

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

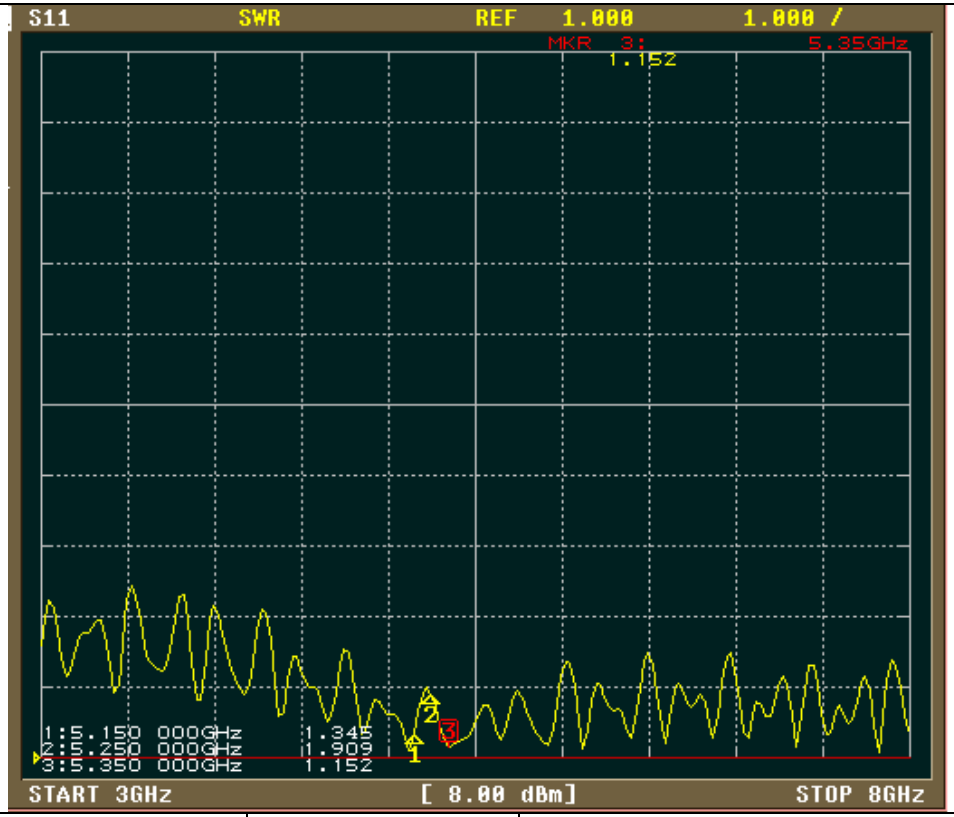
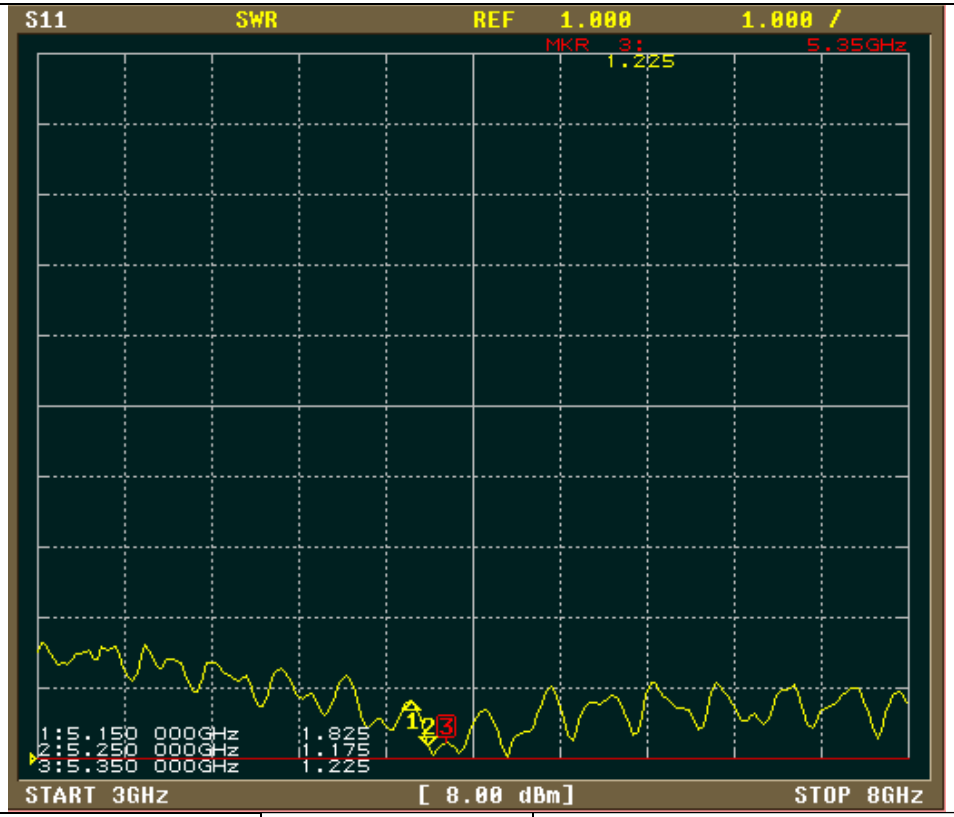


Center freq. @MHz	Bandwidth @MHz	VSWR		
		2.4GHz	2.45GHz	2.5GHz
2450		1.50	1.39	1.32

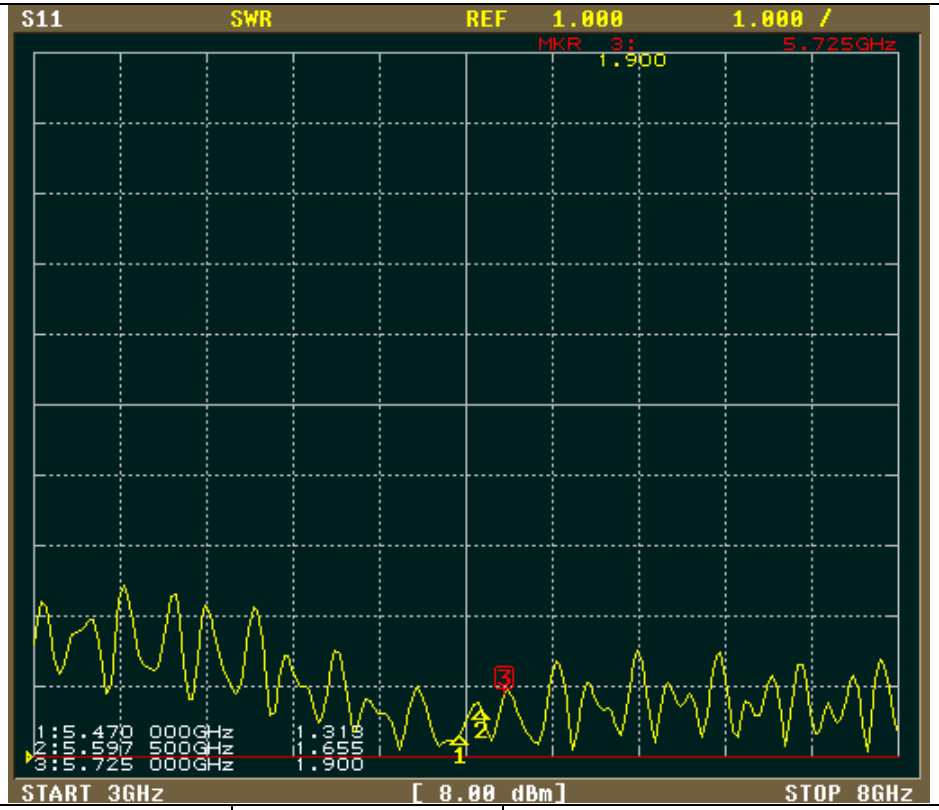
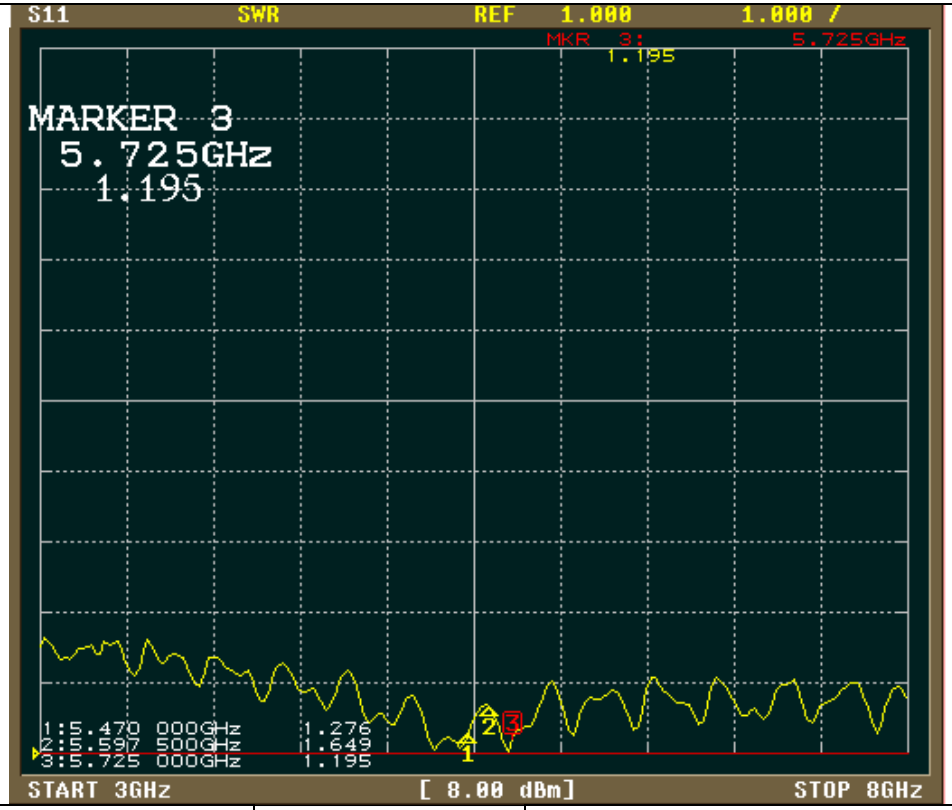
Antenna 2

Center freq. @MHz	Bandwidth @MHz	VSWR		
		2.4GHz	2.45GHz	2.5GHz
2450		1.68	1.21	1.51

4.2 VSWR 5.15 GHz ~ 5.35 GHz

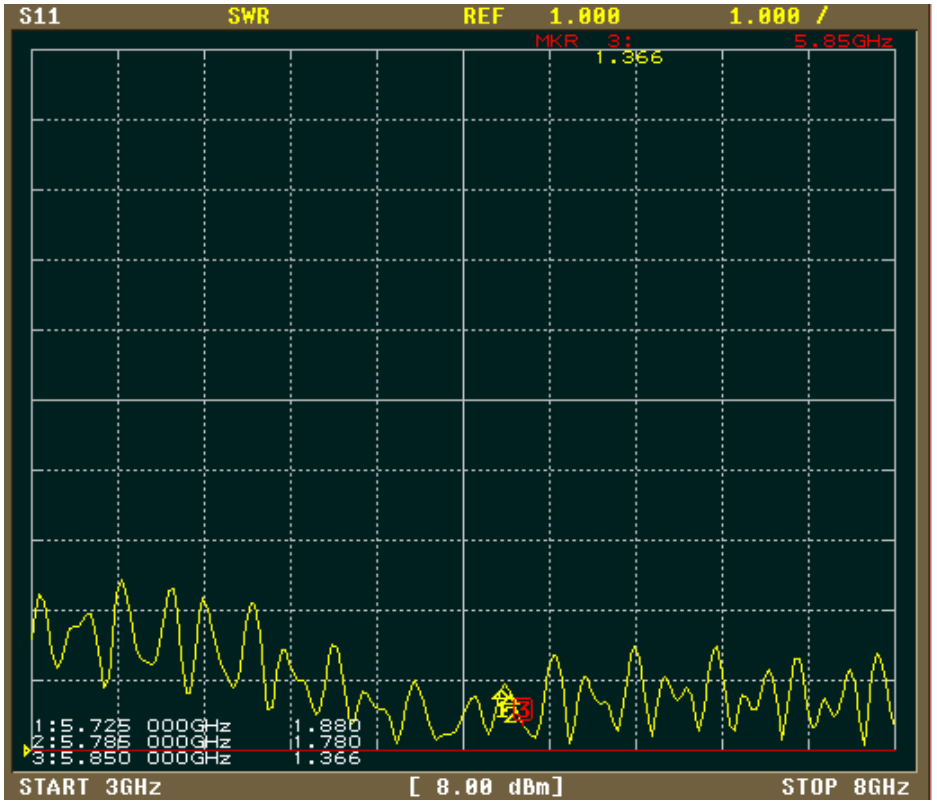
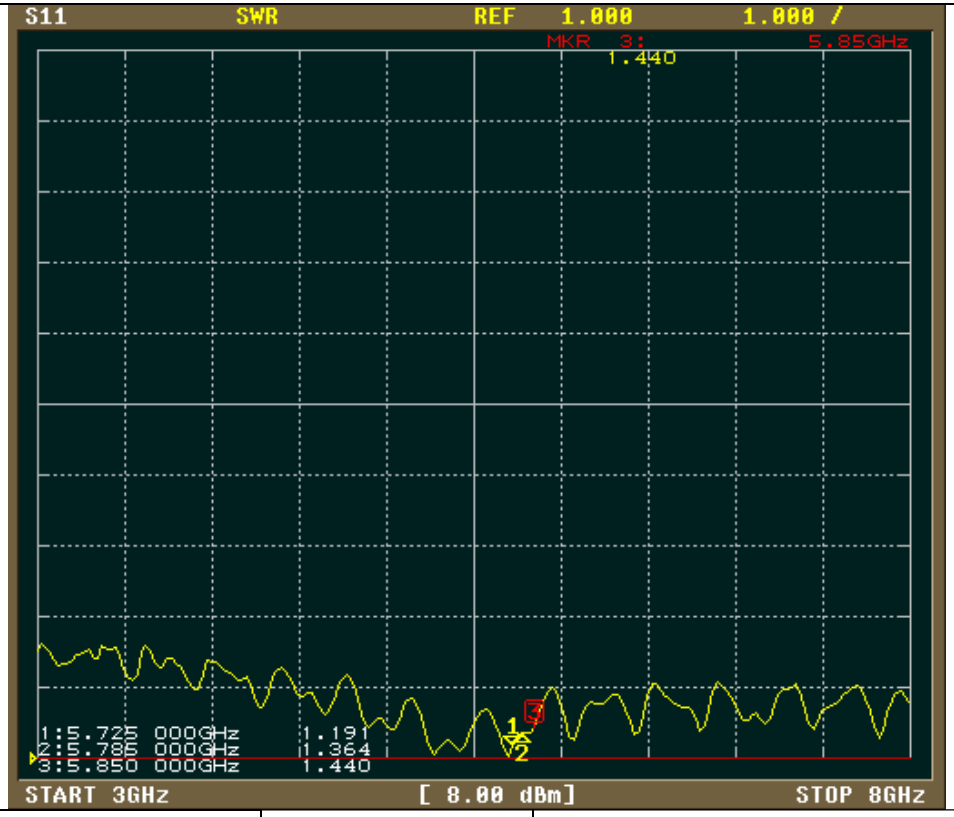
Antenna 1					Antenna 2				
									
Center freq. @MHz	Bandwidth @MHz	VSWR			Center freq. @MHz	Bandwidth @MHz	VSWR		
		5.15GHz	5.25GHz	5.35GHz			5.15GHz	5.25GHz	5.35GHz
5250		1.34	1.90	1.15	5250		1.82	1.17	1.22

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

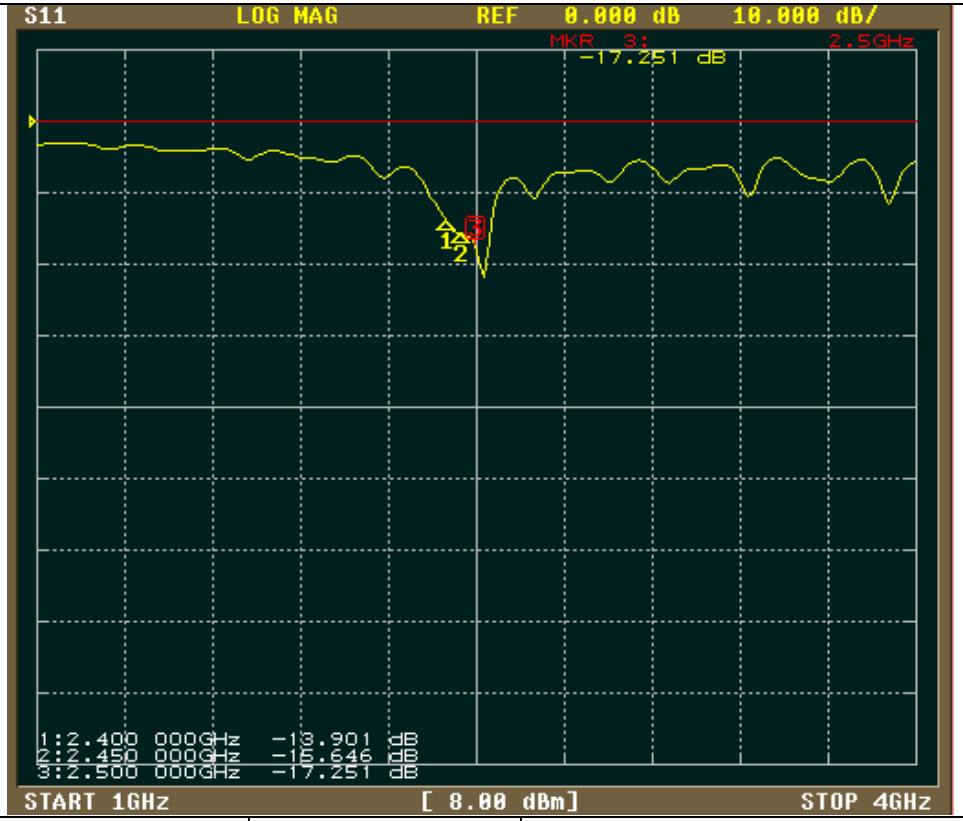
4.4 VSWR 5.725 GHz ~ 5.85 GHz

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

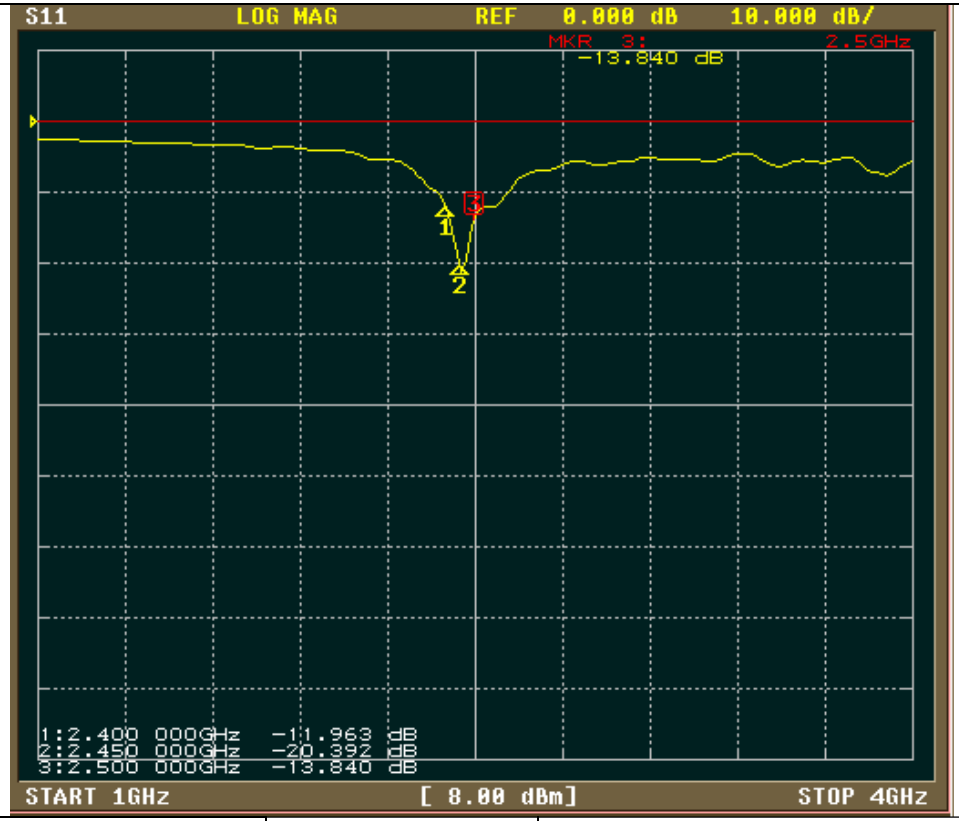
5. Return Loss

5.1 Return Loss 2.4GHz ~ 2.5GHz

Antenna 1

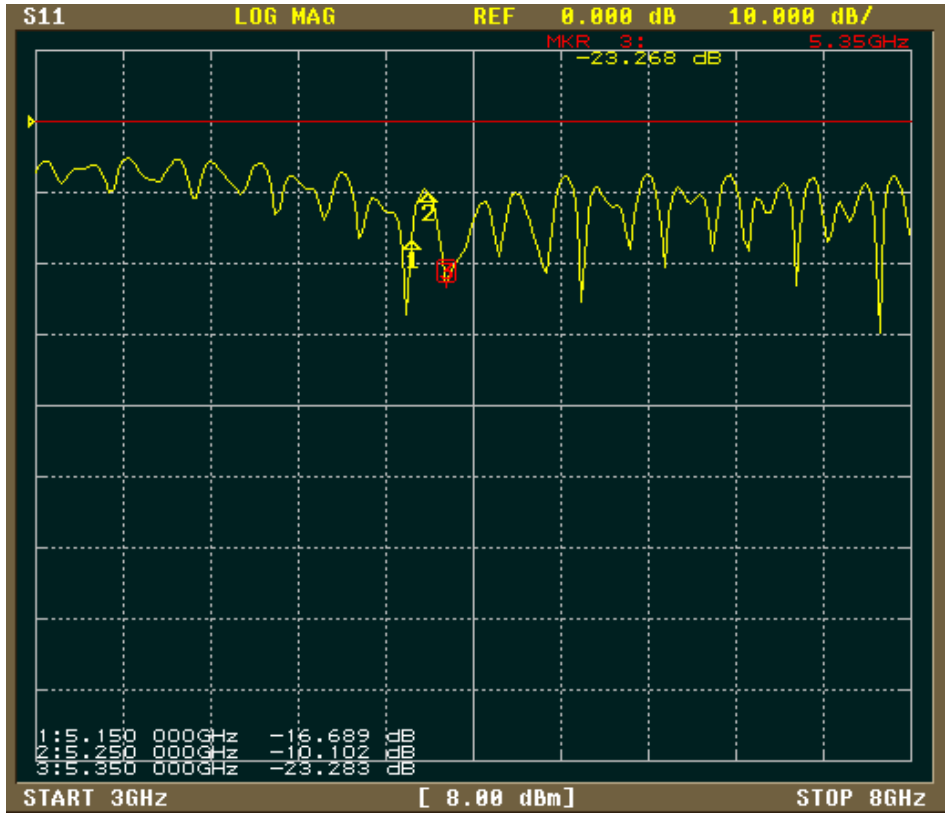
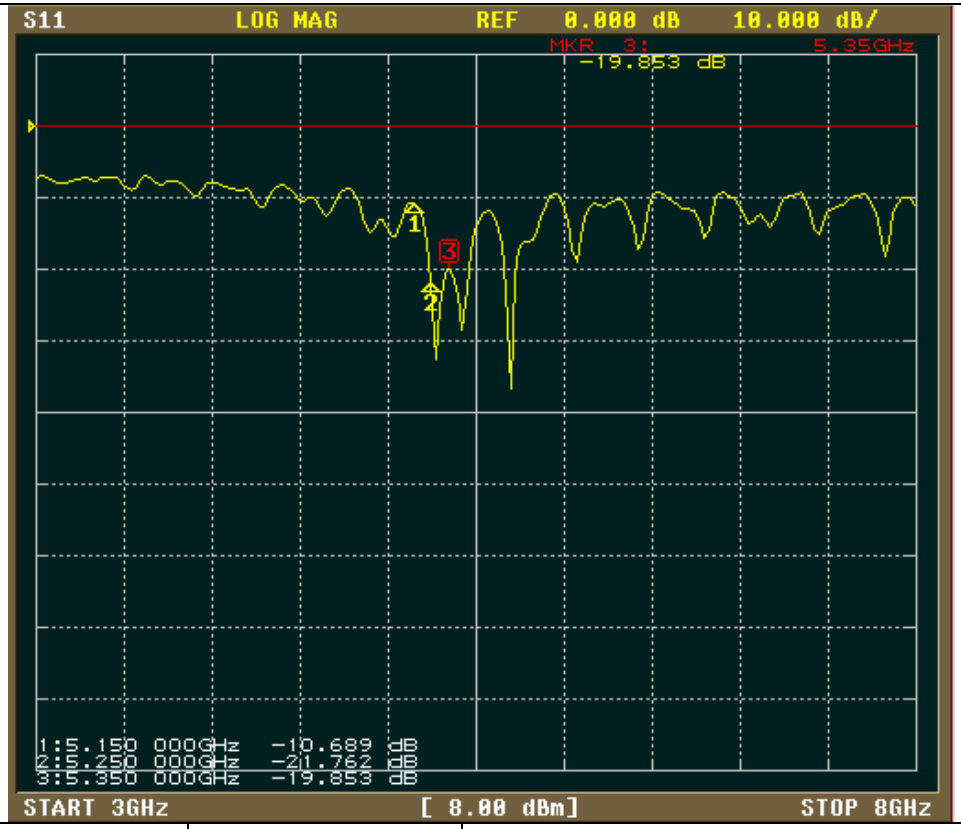


Antenna 2



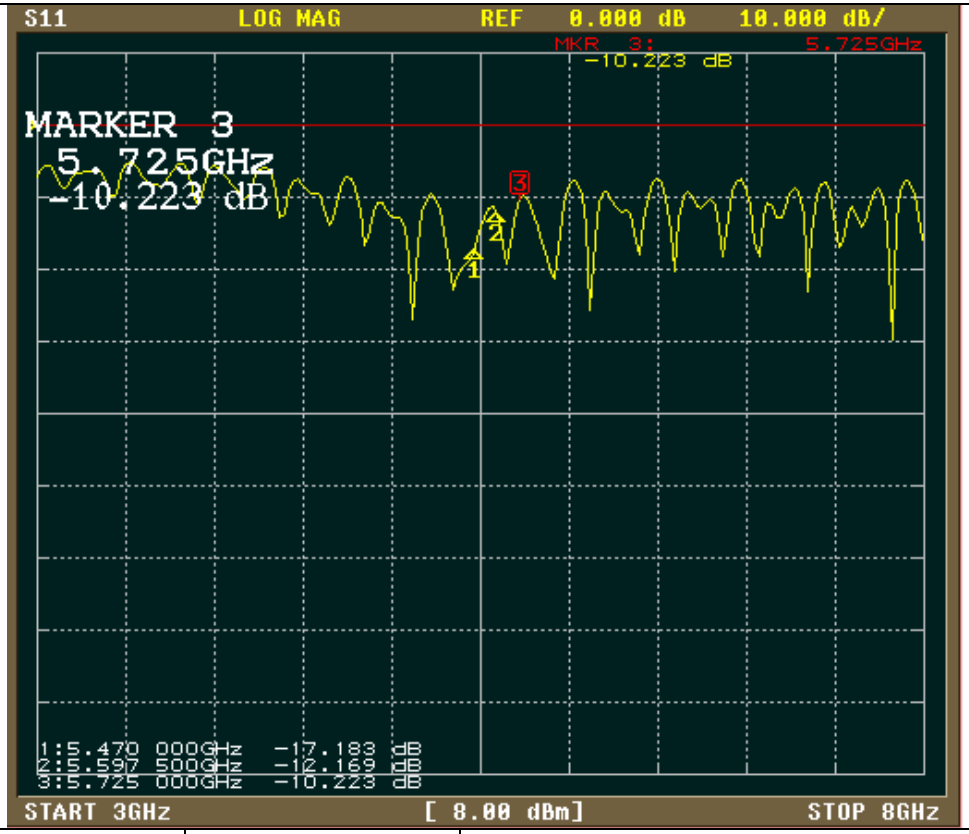
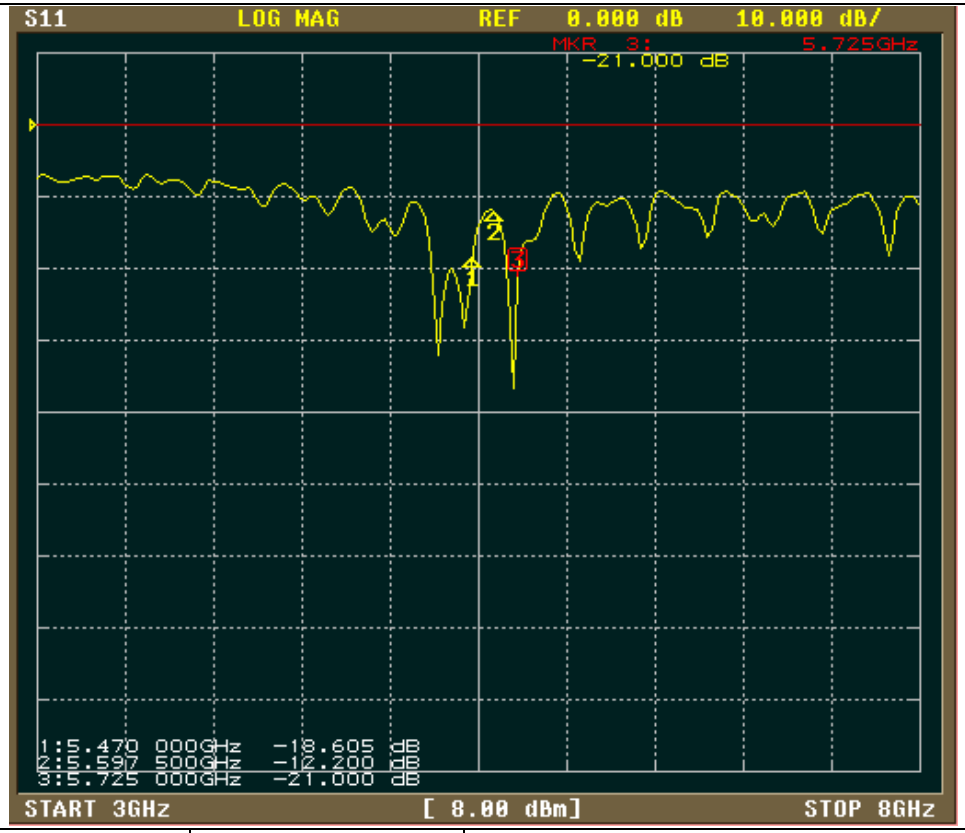
Center freq. @MHz	Bandwidth @MHz	Return Loss			Center freq. @MHz	Bandwidth @MHz	Return Loss		
		2.4GHz	2.45GHz	2.5GHz			2.4GHz	2.45GHz	2.5GHz
2450		-13.90	-15.64	-17.25	2450		-11.96	-20.39	-13.84

5.2 Return Loss 5.15GHz ~ 5.35GHz

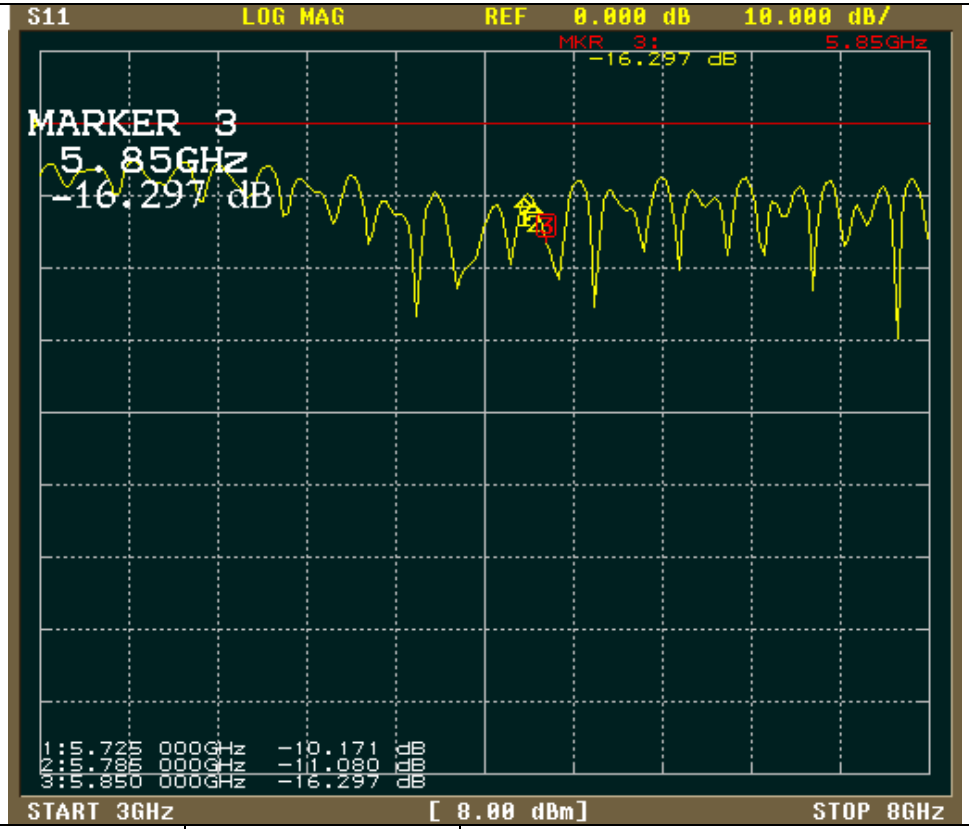
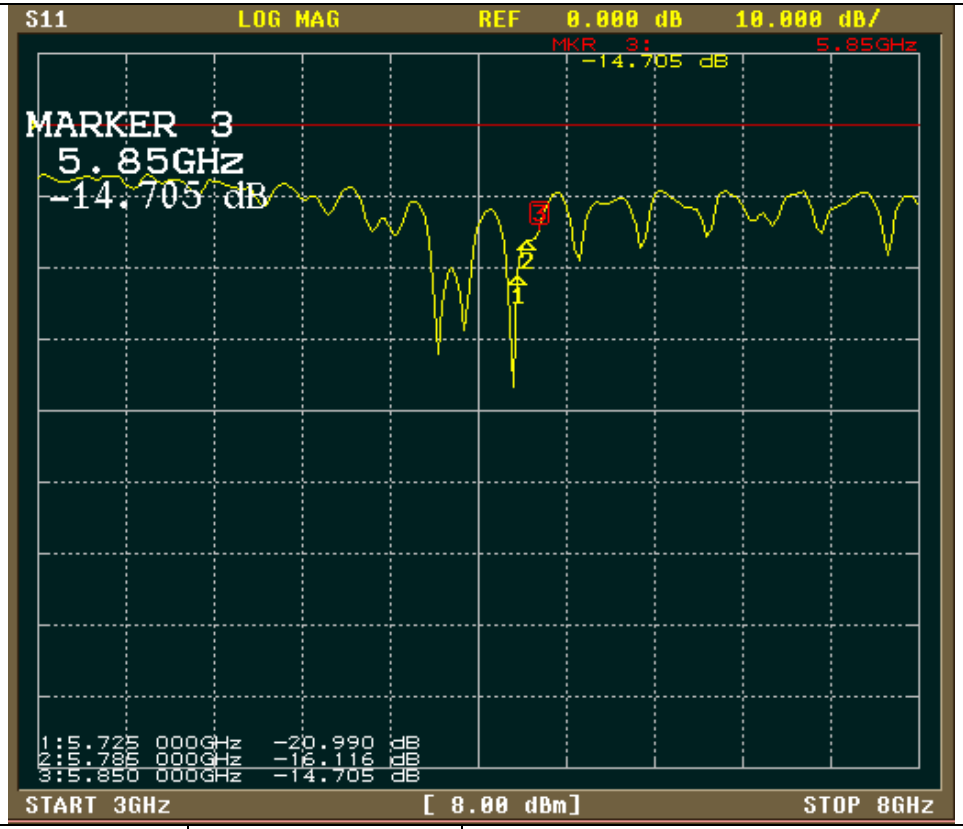
Antenna 1	Antenna 2
	

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

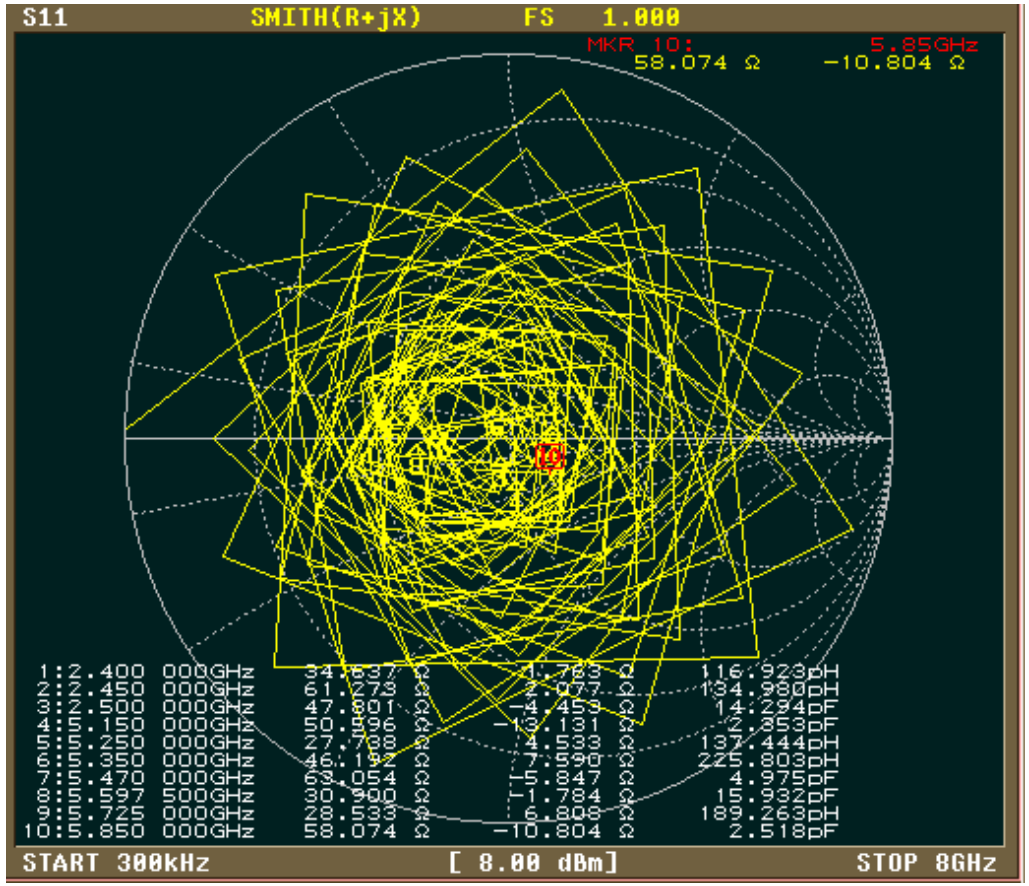
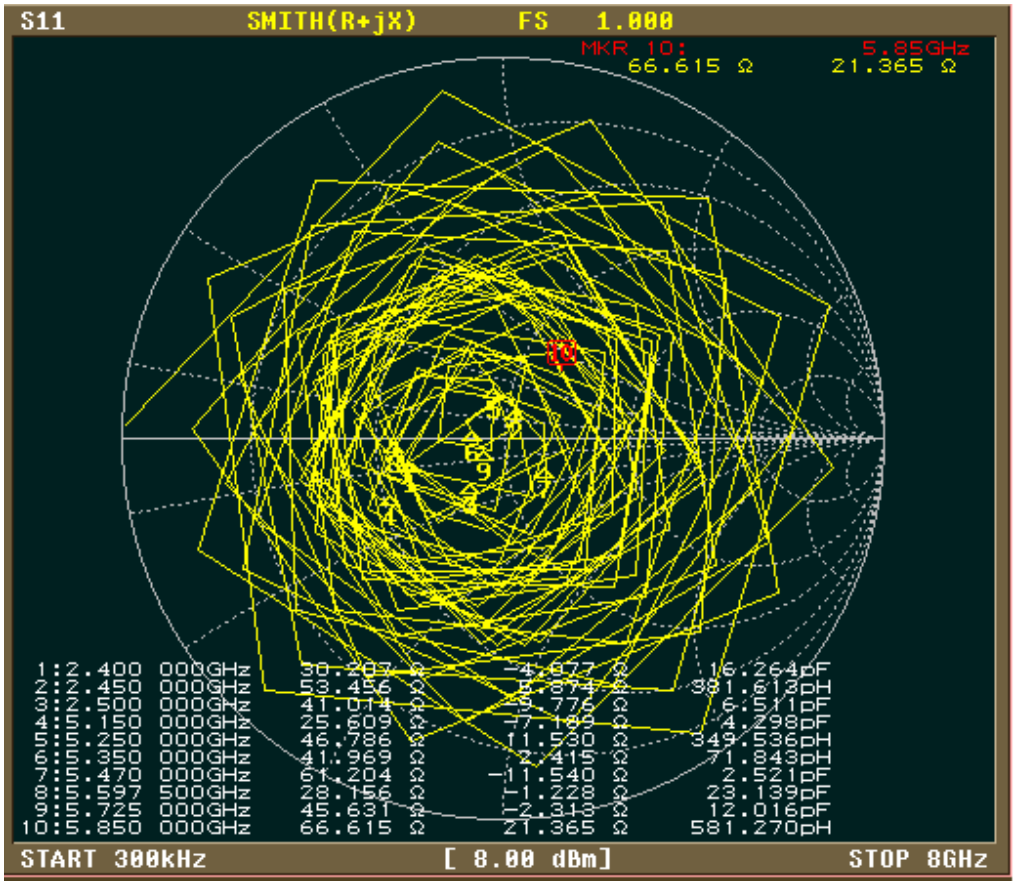
5.3 Return Loss 5.47GHz ~ 5.725GHz

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

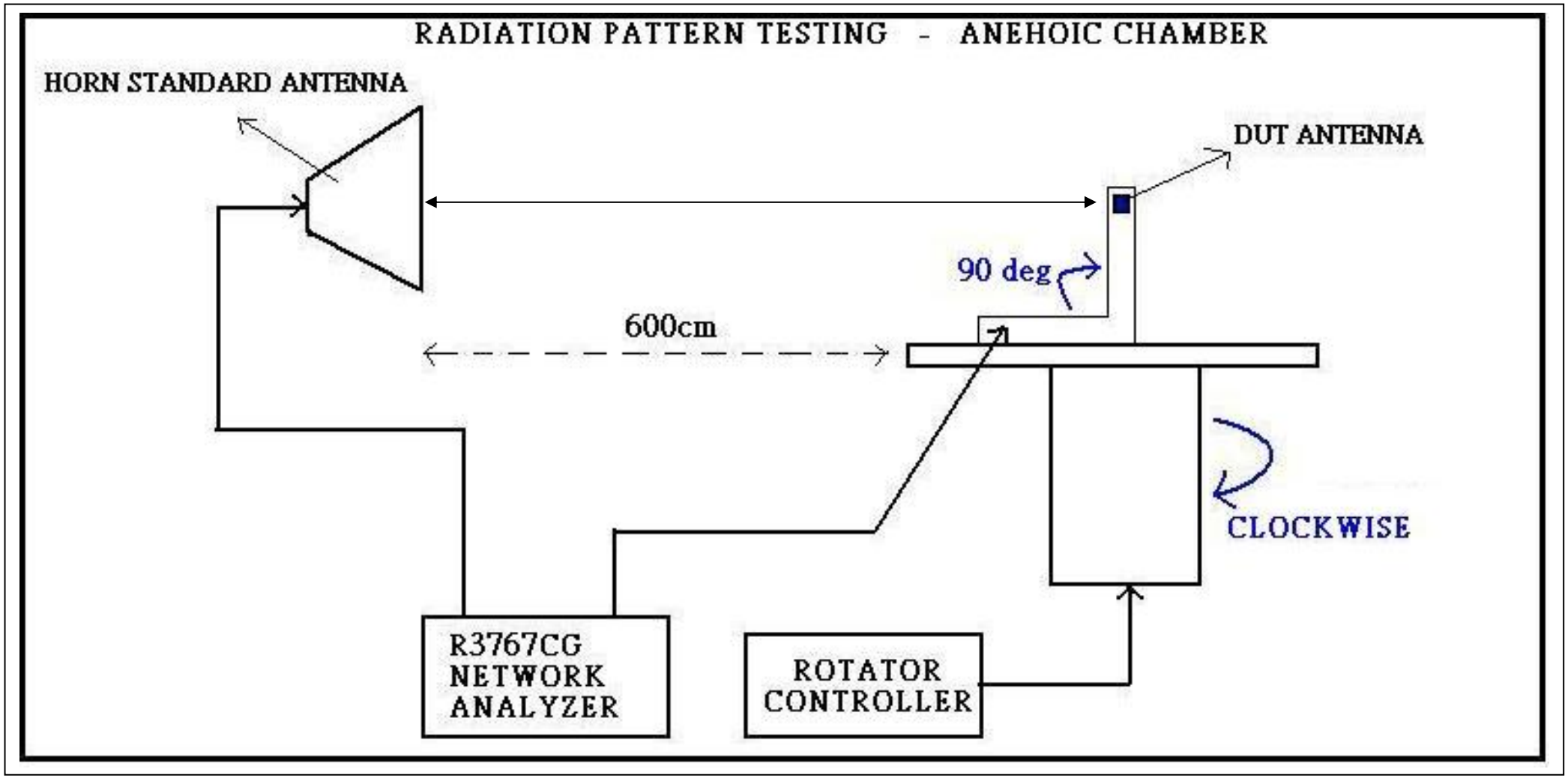
5.4 Return Loss 5.725GHz ~ 5.85GHz

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
	

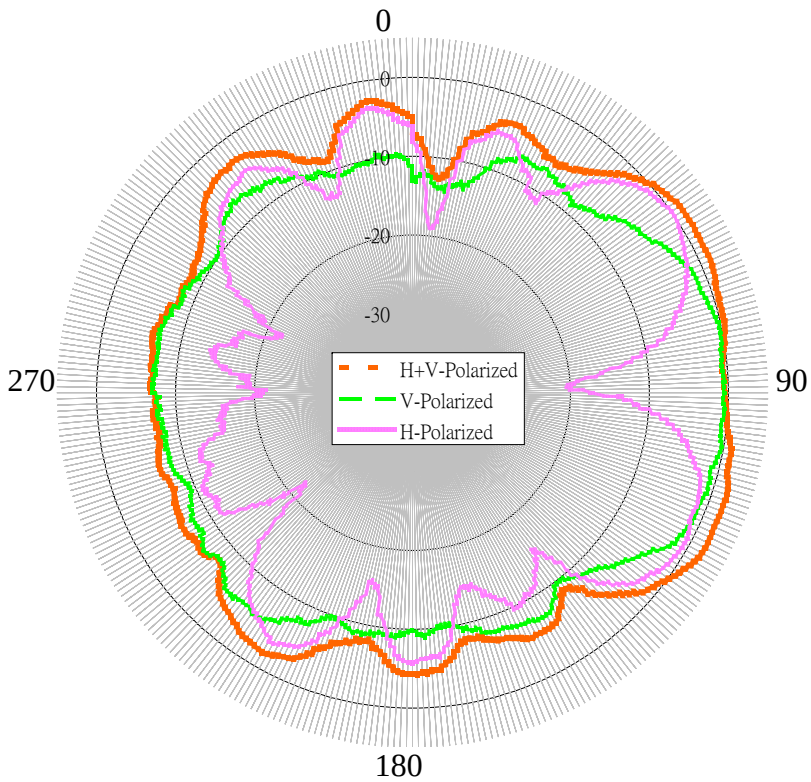
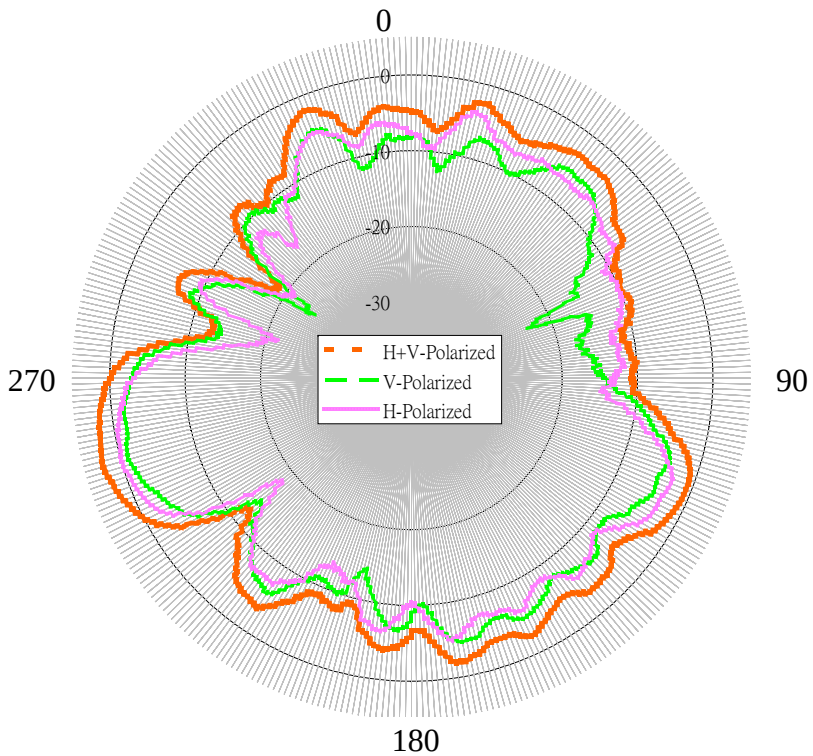
7. Antenna Radiation Pattern Testing Set Up



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

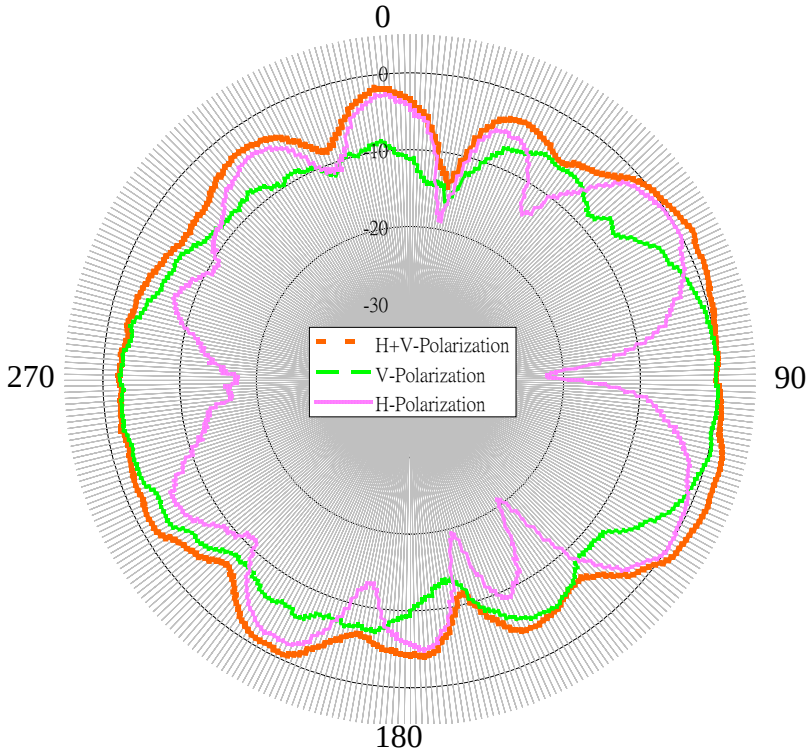
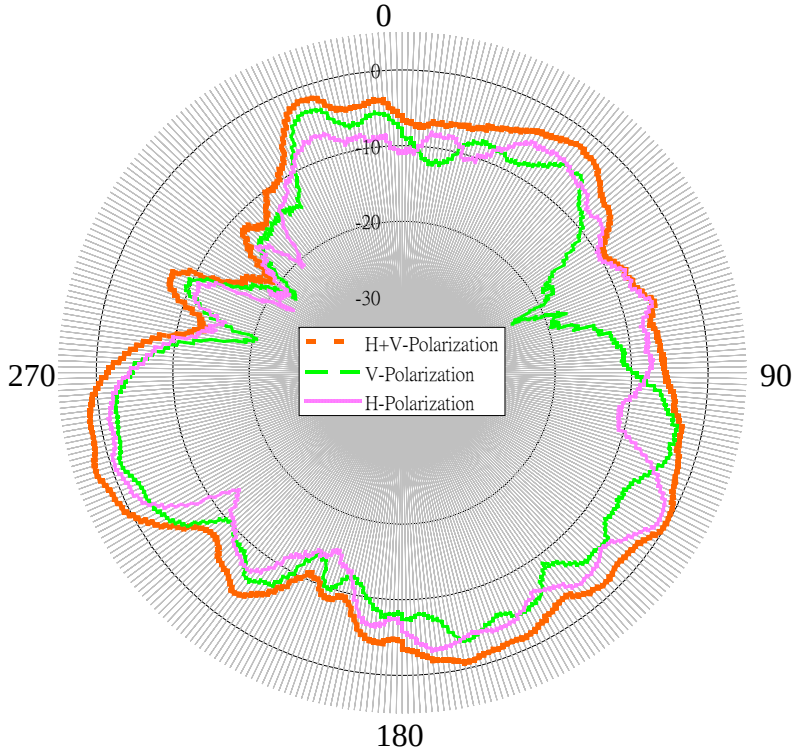
8.1 2.4 GHz

Antenna 1	Antenna 2
	

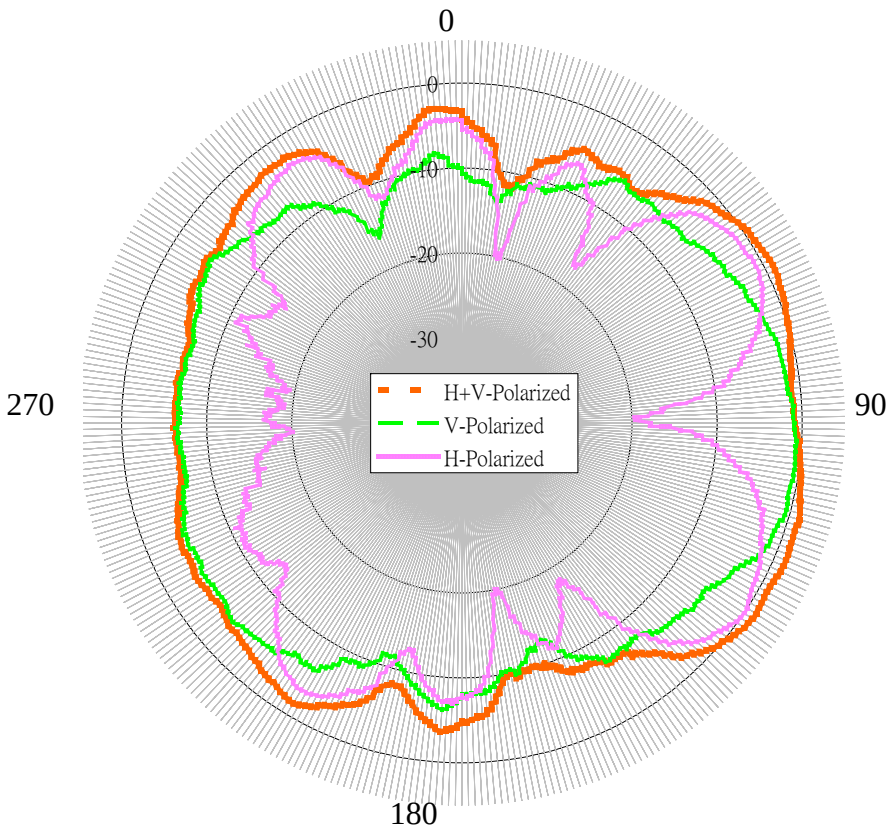
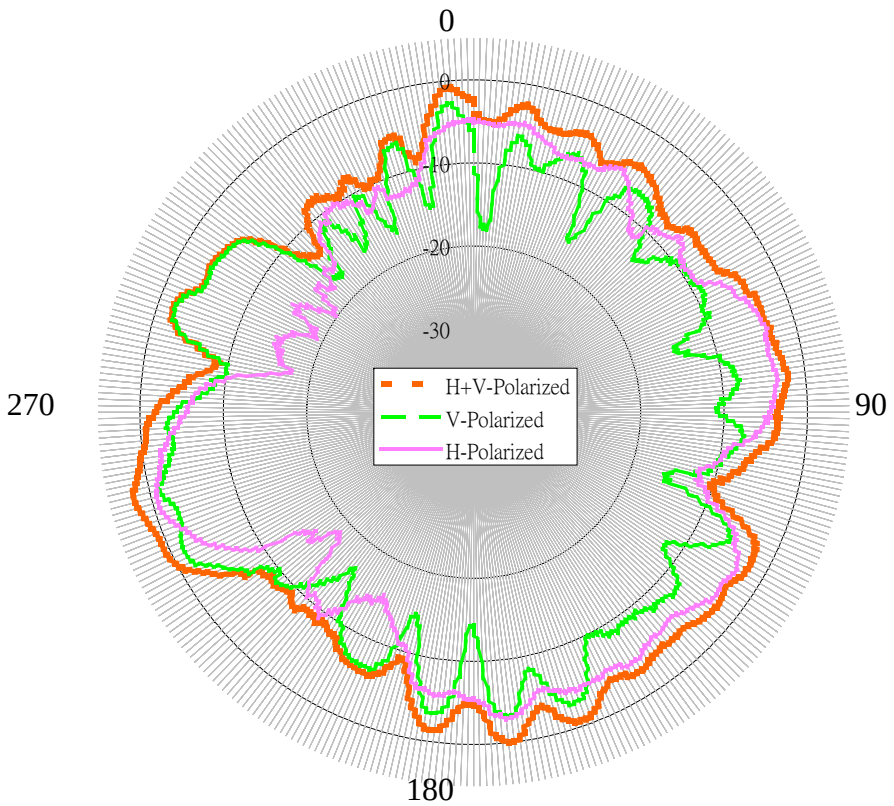
Horn Antenna Polarization	Gain of XY Plane (Azimuth)	
V	Peak	-0.17
	Average	-5.66
H	Peak	0.06
	Average	-6.34
H + V	Peak	2.01
	Average	-2.98
V Gain >= -4 Area	18.57%	
V Gain >= -5 Area	20.57%	

Horn Antenna Polarization	Gain of XY Plane (Azimuth)	
V	Peak	-0.92
	Average	-7.18
H	Peak	0.05
	Average	-6.71
H + V	Peak	2.57
	Average	-3.93
V Gain >= -4 Area	8.99%	
V Gain >= -5 Area	15.99%	

8.2 2.45 GHz

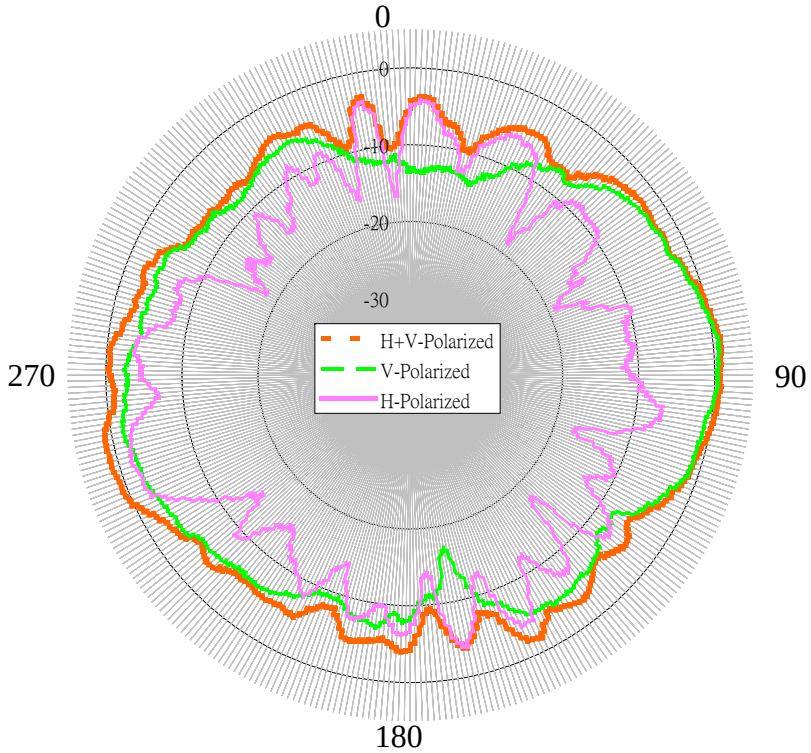
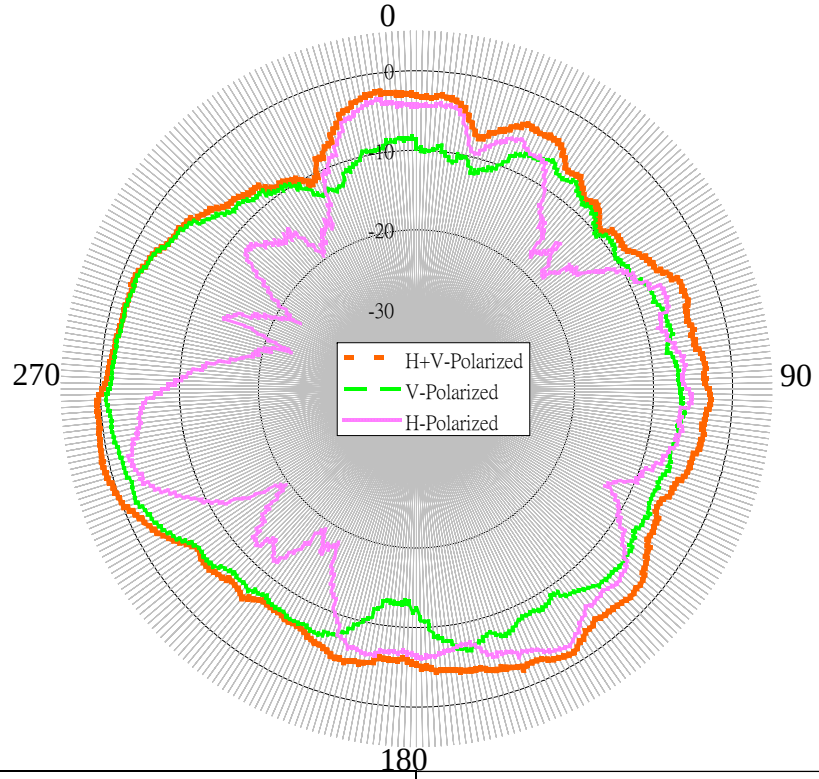
Antenna 1			Antenna 2		
					
Horn Antenna Polarization	**Gain of XY Plane (Azimuth)**		**Horn Antenna Polarization**	**Gain of XY Plane (Azimuth)**	
V	**Peak**	**0.00**	**V**	**Peak**	**-1.25**
	Average	**-5.12**		**Average**	**-6.94**
H	**Peak**	**-0.10**	**H**	**Peak**	**-0.40**
	Average	**-5.89**		**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

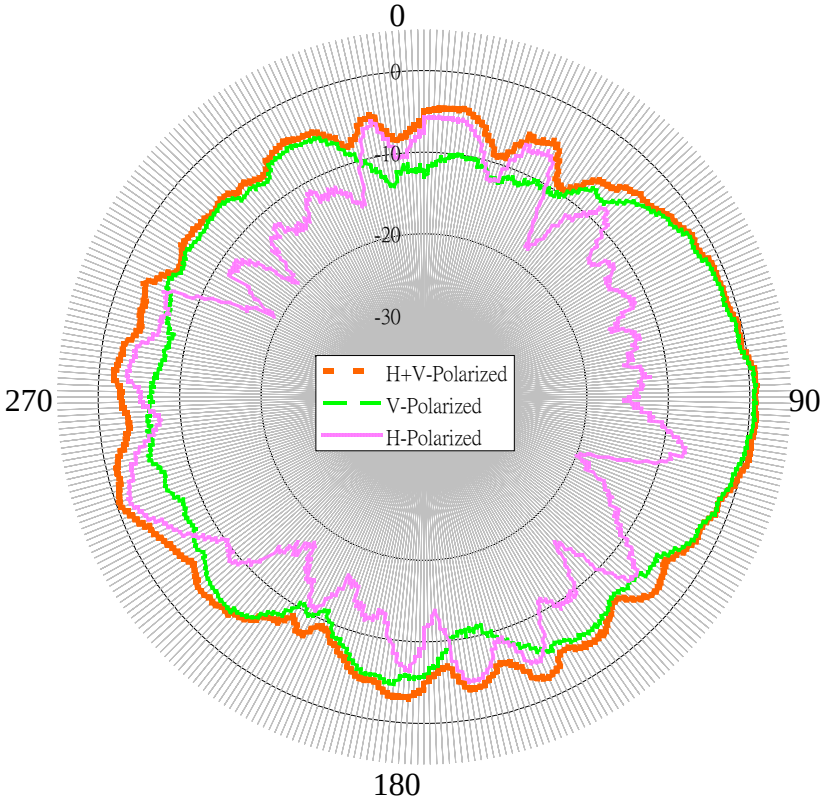
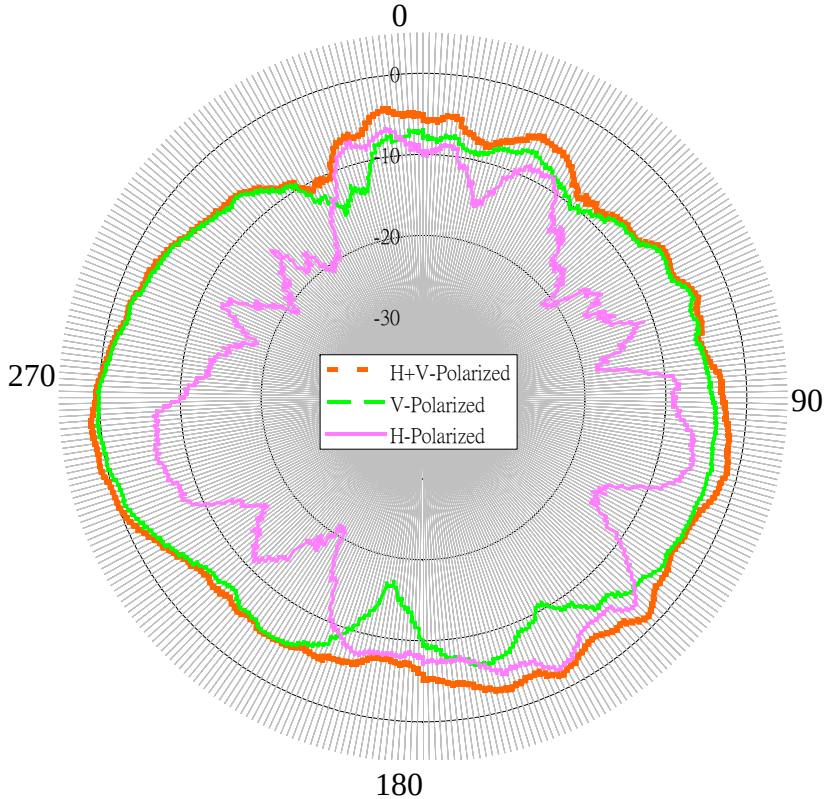
Antenna 1	Antenna 2
	

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%	

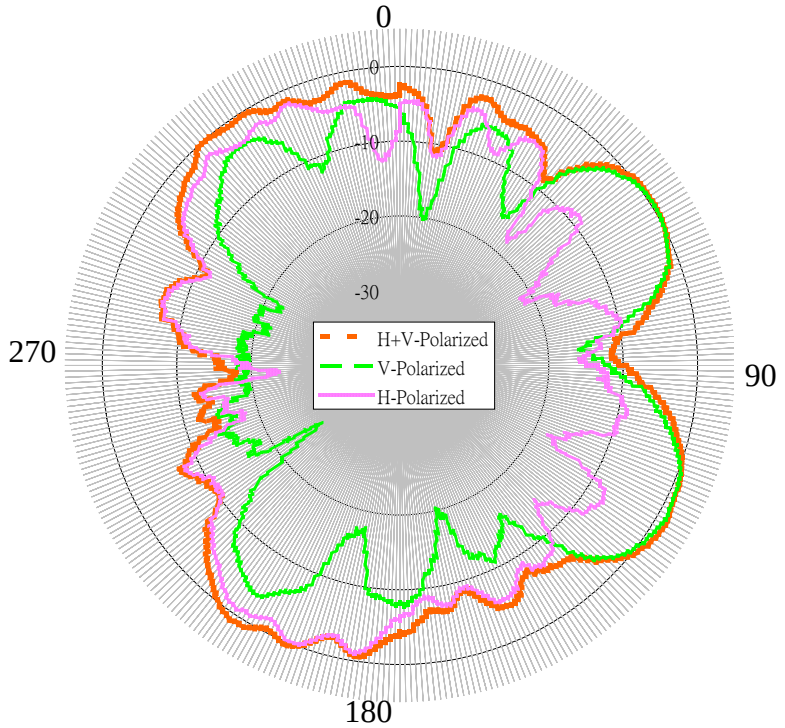
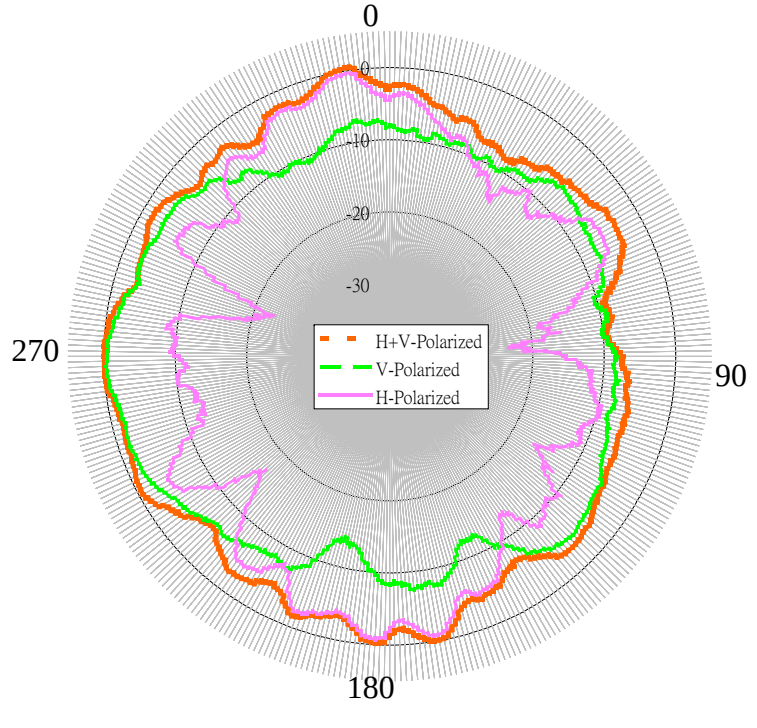
8.4 5.15 GHz

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%**	

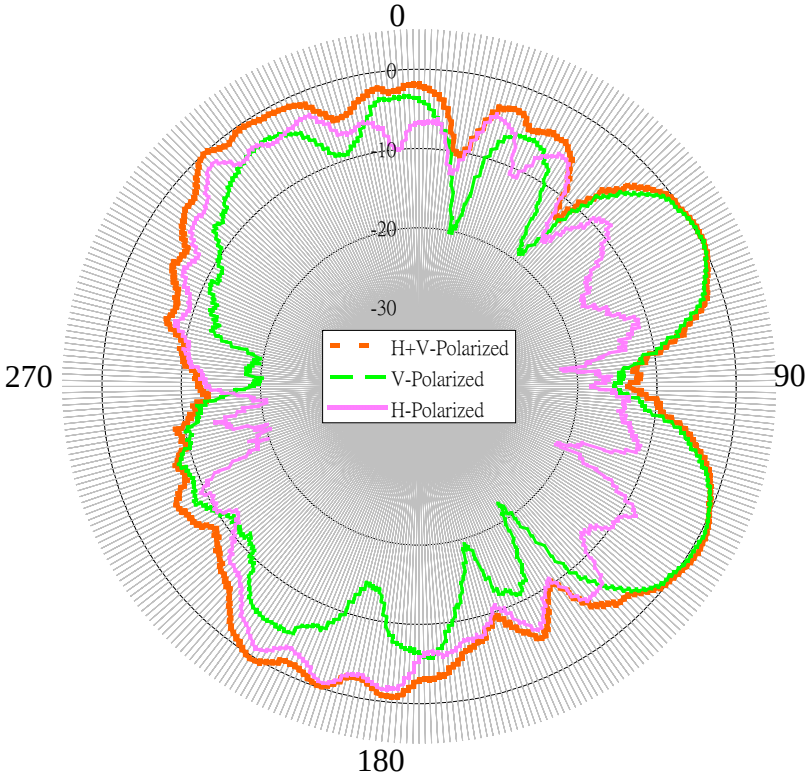
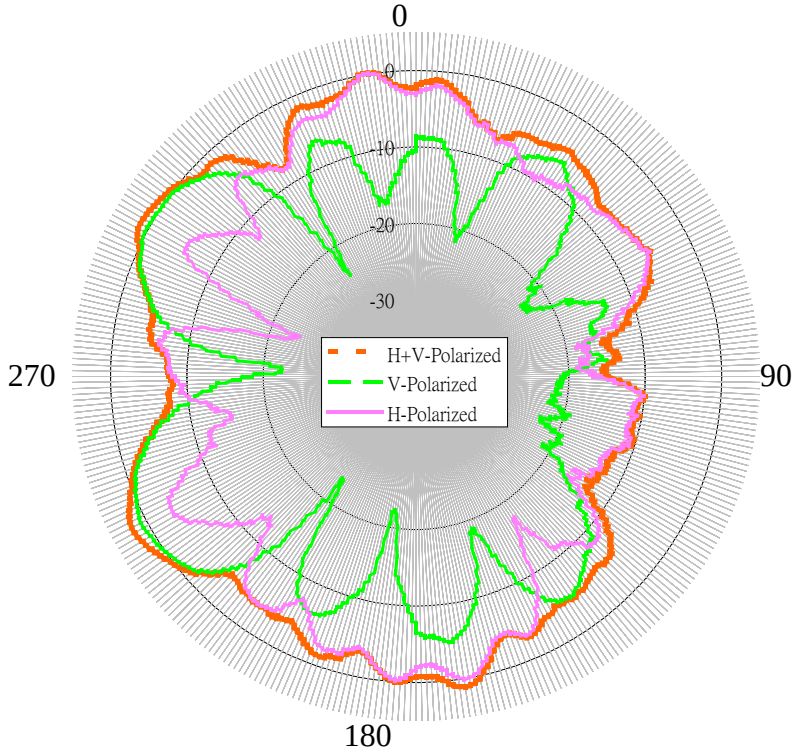
8.5 5.25 GHz

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%**	

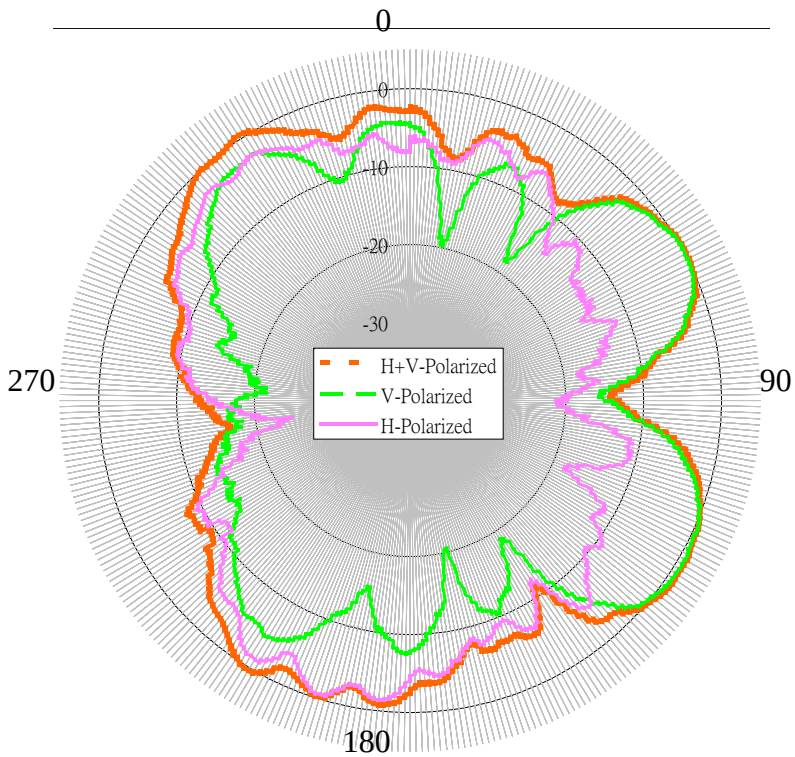
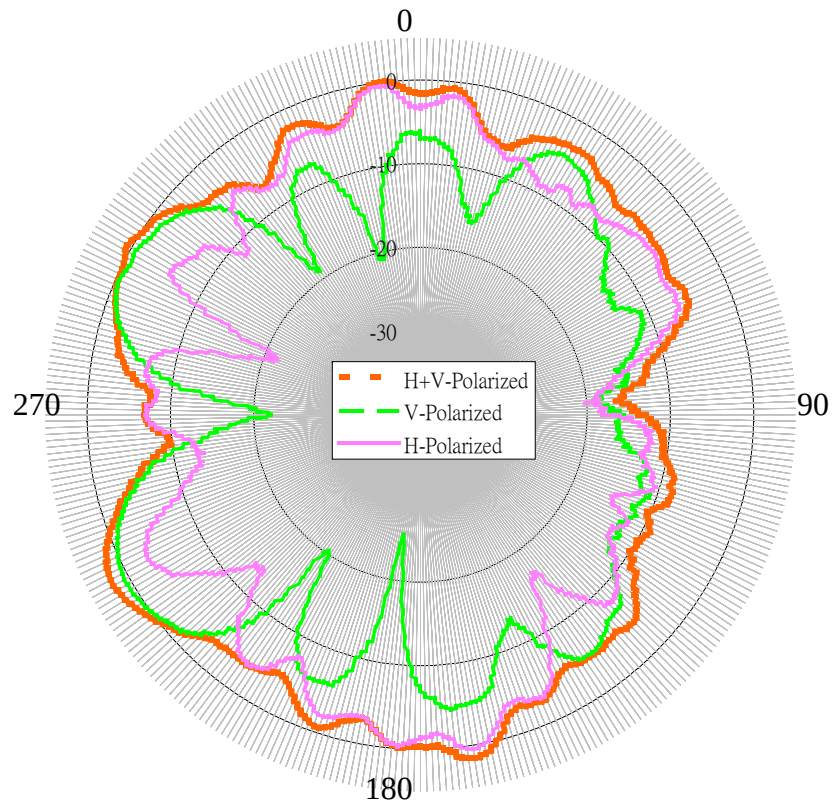
8.6 5.35 GHz

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%**	

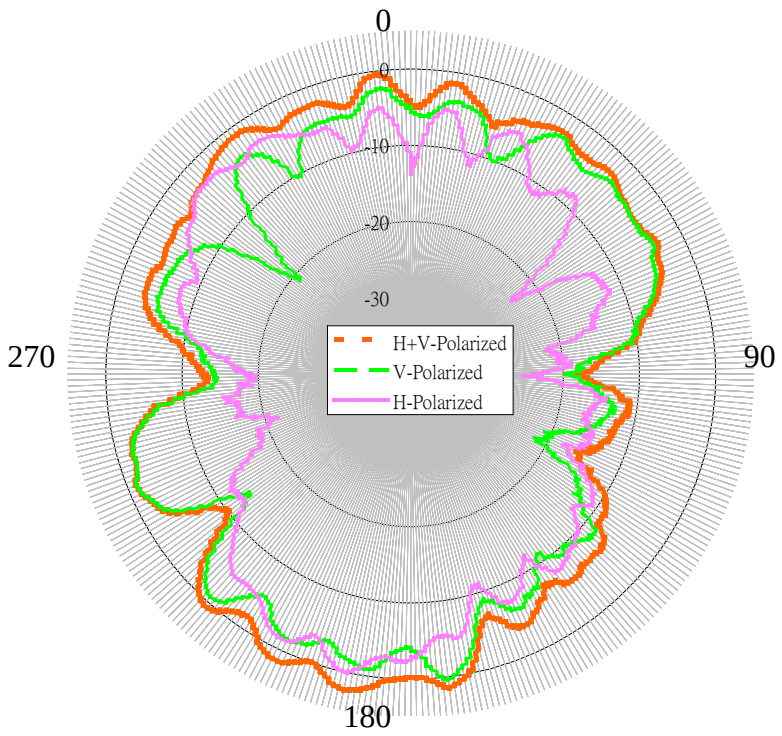
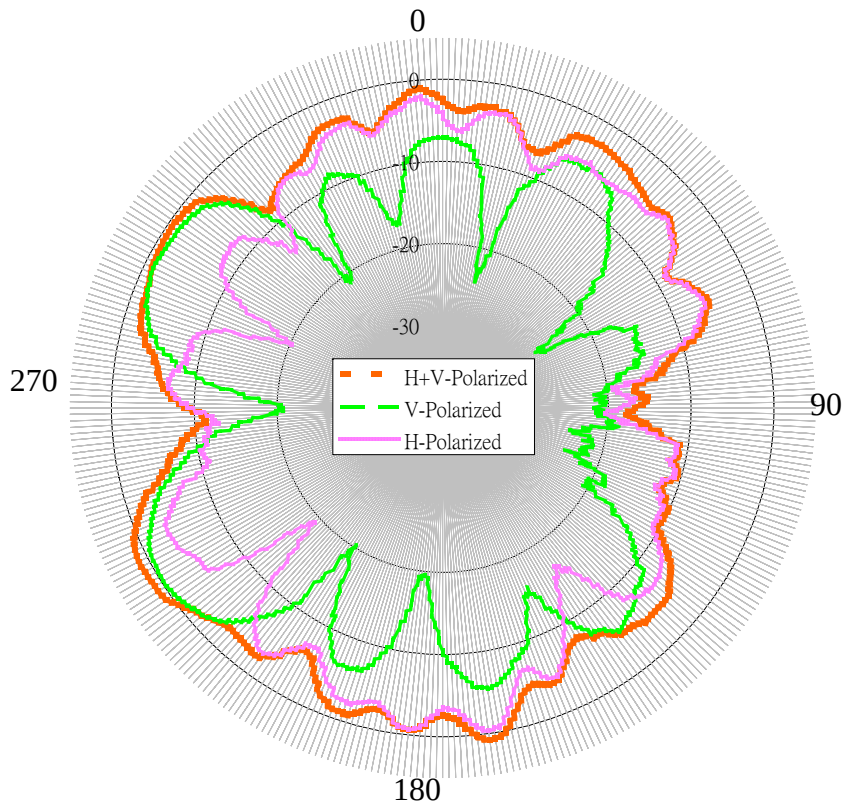
8.7 5.47 GHz

Antenna 1			Antenna 2		
					
Horn Antenna Polarization	**Gain of XY Plane (Azimuth)**		**Horn Antenna Polarization**	**Gain of XY Plane (Azimuth)**	
V	**Peak**	**0.59**	**V**	**Peak**	**0.85**
	Average	**-5.77**		**Average**	**-6.43**
H	**Peak**	**-0.65**	**H**	**Peak**	**0.18**
	Average	**-6.97**		**Average**	**-5.89**
H + V	**Peak**	**0.98**	**H + V**	**Peak**	**2.1**
	Average	**-3.21**		**Average**	**-3.14**
Gain >= -4 Area	**21.57%**		**Gain >= -4 Area**	**17.49%**	
Gain >= -5 Area	**28.39%**		**Gain >= -5 Area**	**19.98%**	

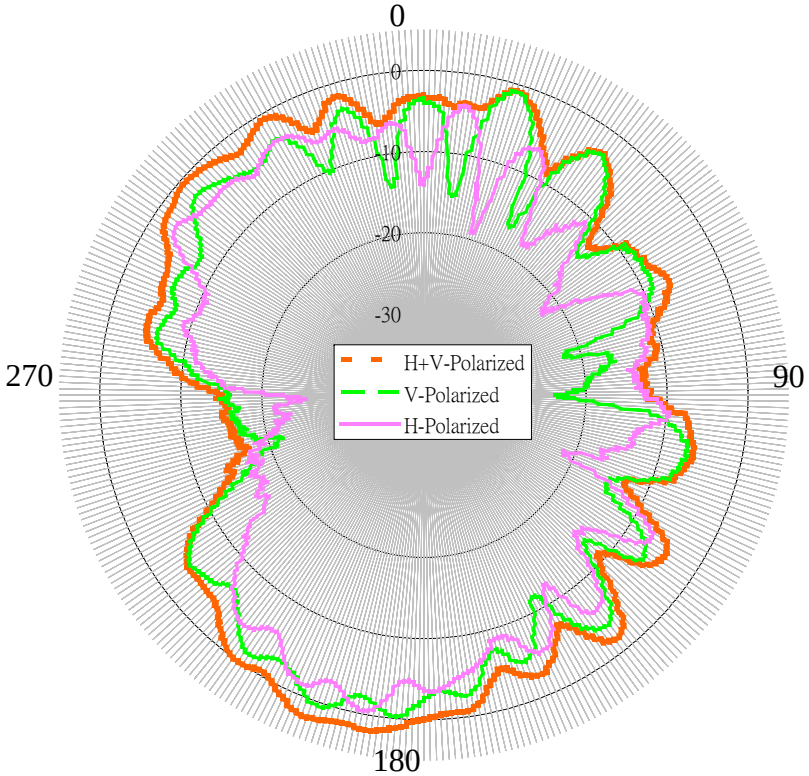
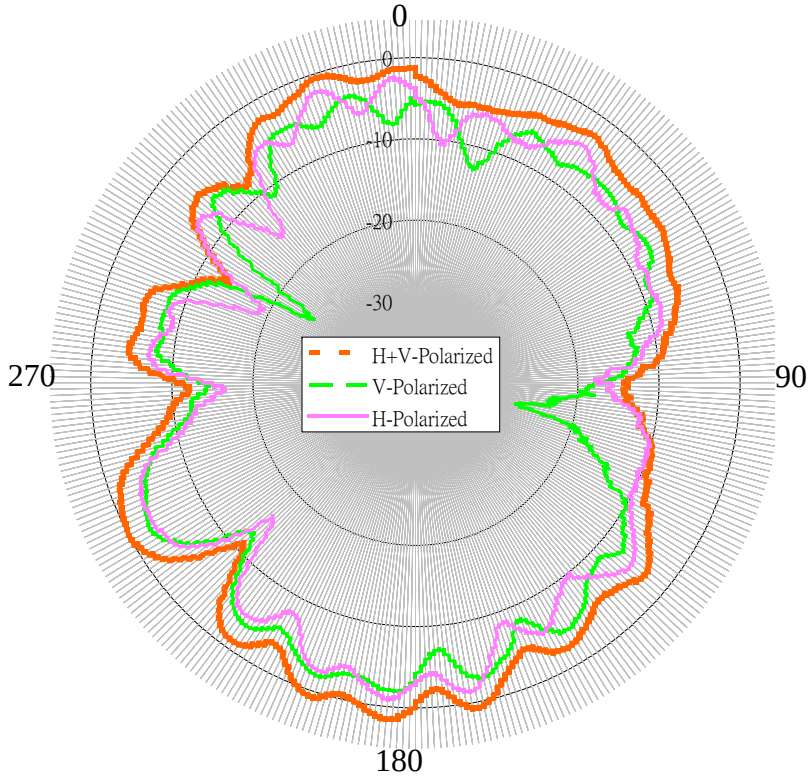
8.8 5.5975 GHz

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%**	

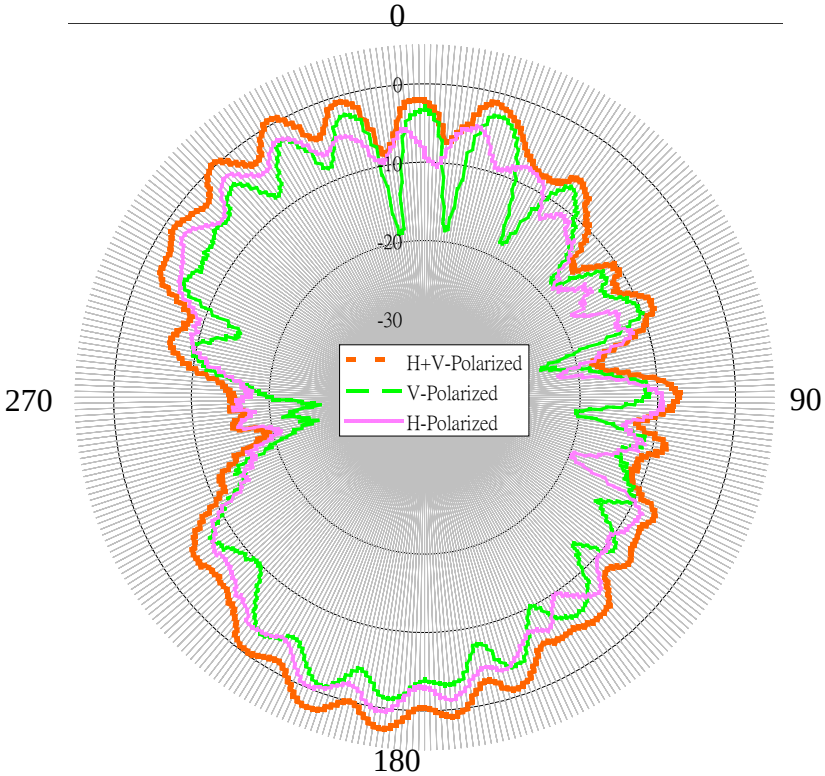
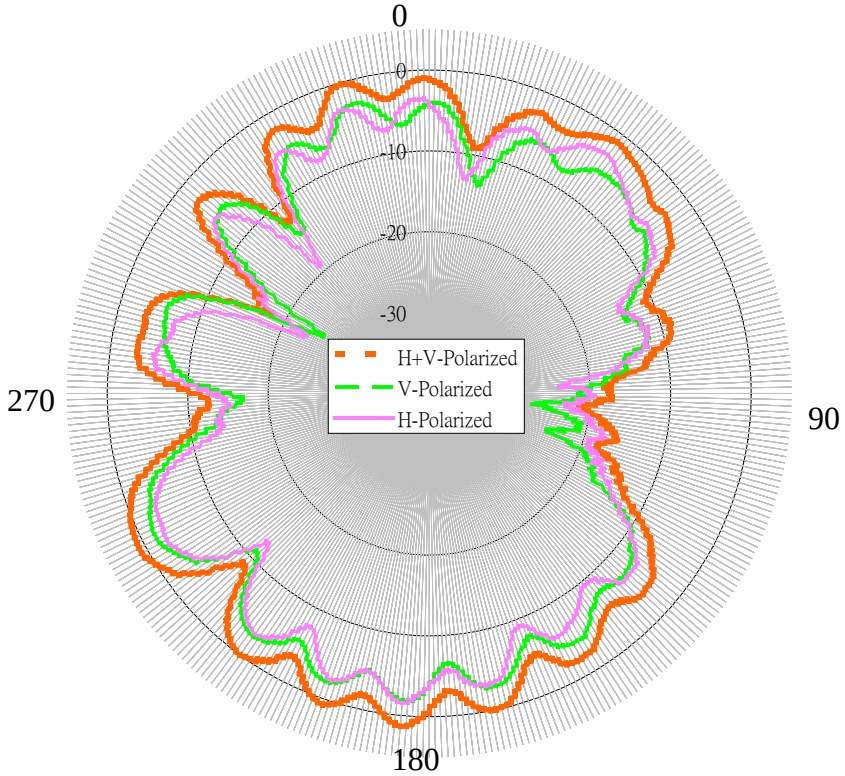
8.9 5.725 GHz

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

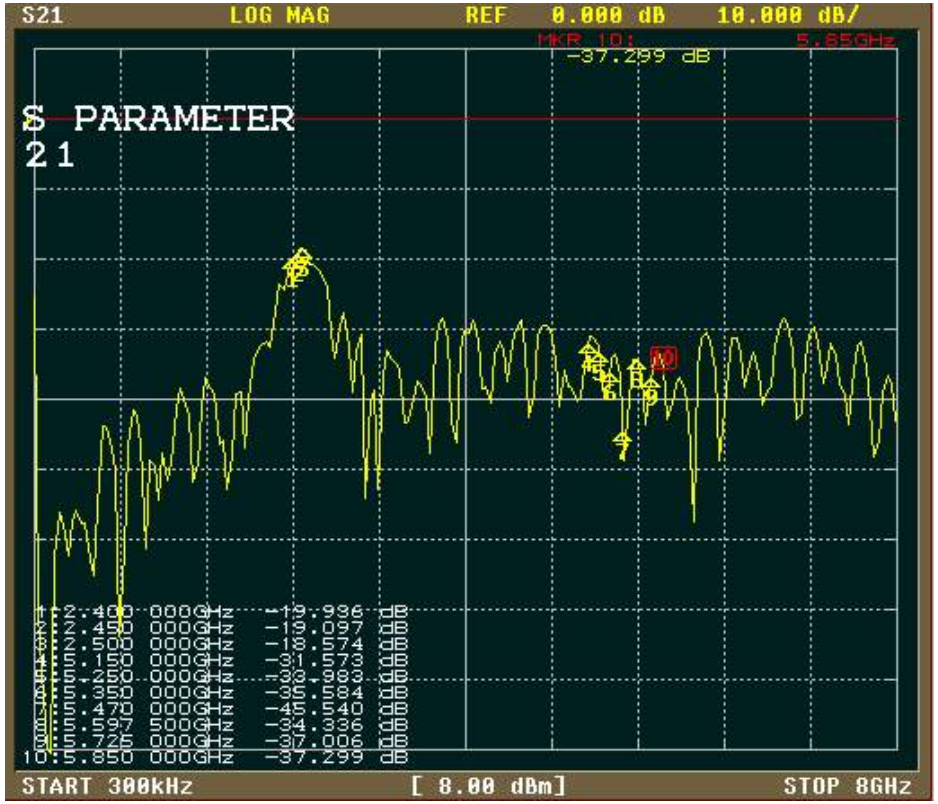
Antenna 1			Antenna 2		
					
Horn Antenna Polarization	**Gain of XY Plane (Azimuth)**		**Horn Antenna Polarization**	**Gain of XY Plane (Azimuth)**	
V	**Peak**	**0.54**	**V**	**Peak**	**-1.93**
	Average	**-5.83**		**Average**	**-6.73**
H	**Peak**	**0.34**	**H**	**Peak**	**-0.89**
	Average	**-7.42**		**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%**	

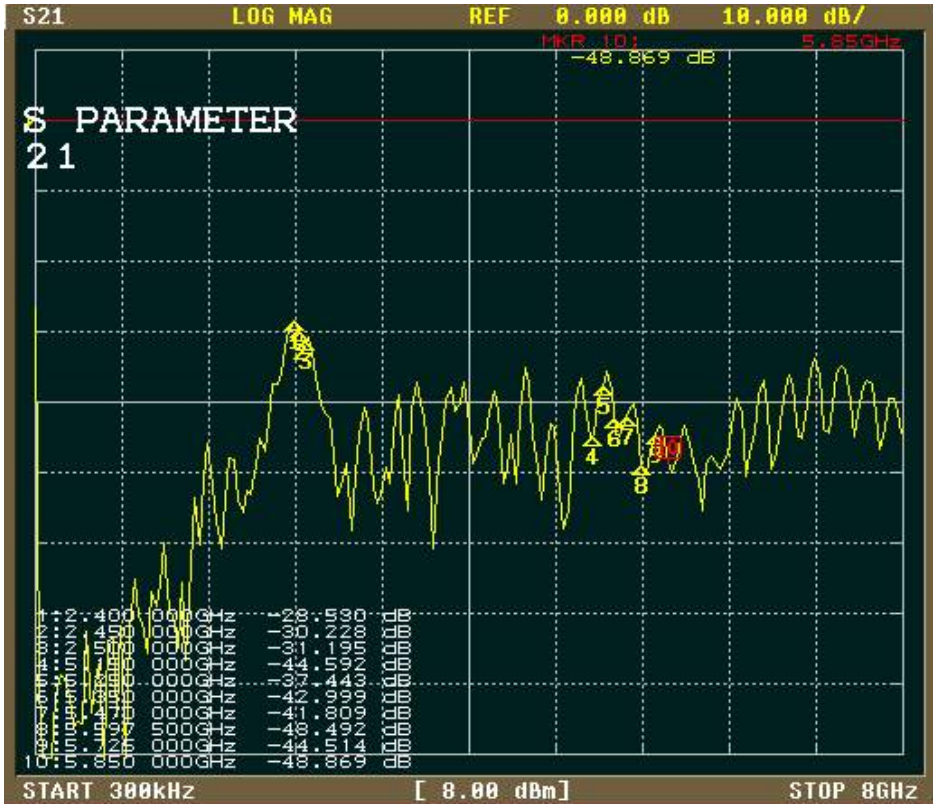
9.1 Isolation test result

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
21
1:2.400 000GHz -28.530 dB
2:2.450 000GHz -30.228 dB
3:2.500 000GHz -31.195 dB
4:5.190 000GHz -44.592 dB
5:5.350 000GHz -37.443 dB
6:5.390 000GHz -42.999 dB
7:5.470 000GHz -41.809 dB
8:5.597 500GHz -48.492 dB
9:5.725 000GHz -44.514 dB
10:5.850 000GHz -48.869 dB
START 300kHz
[8.00 dBm]
STOP 8GHz