

1. Testing Information

Equipment Docsis3.1 cable gateway
Brand Name SAGEMCOM
Model Name FAST3896-15 US
Manufacturer SAGEMCOM BROADBAND SAS
250 Route de l’Empereur – 92848 RUEIL
MALMAISON CEDEX - FRANCE
Test date 2022/4/26
Test by INPAQ Technology Co., Ltd.

2. Testing Location

INPAQ TECHNOLOGY CO.,LTD

3. Test Frequency

Band(MHz)	Test Frequency[MHz]
2412-2472	2400, 2450
5150-5250	5150, 5250
5250-5350	5350
5470-5725	5470, 5600, 5725
5725-5850	5785, 5850

4. Antenna System

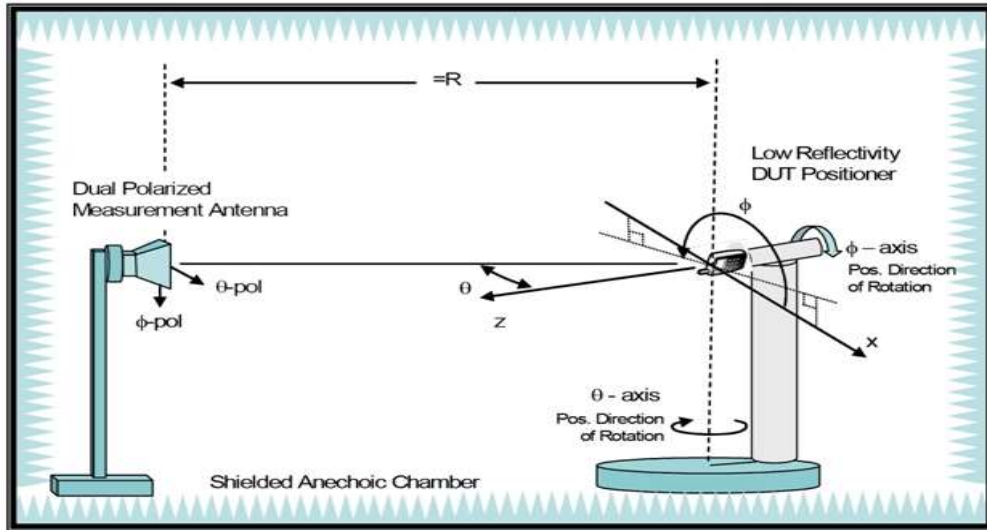
Antenna Placement & Solution



Antenna	ANT Type	Size (L * W * H)	Cable Type
Ant.1 (Dual Band)	PCB	27*15.6*0.6mm	85mm/1.13LLS
Ant.2 (Dual Band)	PCB	36*10.5*0.6mm	50mm/1.13LLS
Ant.3 (Dual Band)	PCB	54*10.3*0.6mm	87.5mm/1.13LLS
Ant.4 (Dual Band)	PCB	31*13.5*0.6mm	115mm/1.13LLS

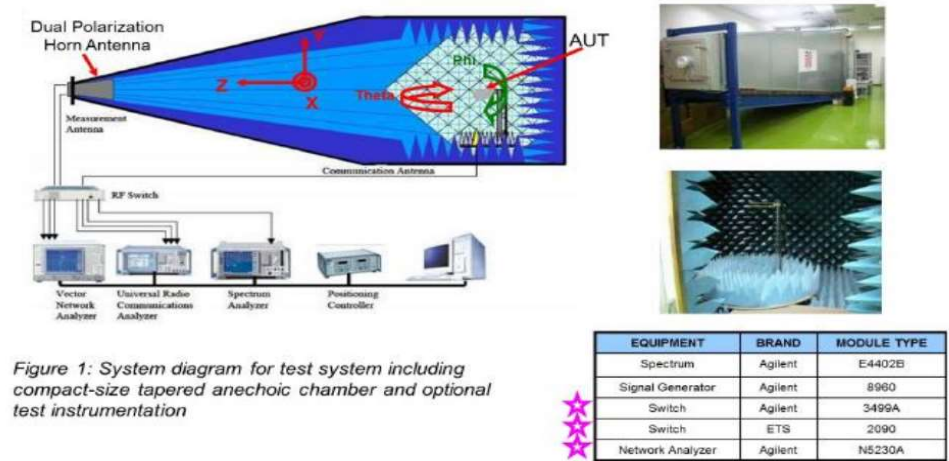
5. Test Configuration

'Reference to CTIA "ctia-test-plan-for-wireless-device-over-the-air-performance-ver-3-7-1"



6.Test Site

ETS Ams-8600 10x3.05x3.05m3 Chamber



7.Test Method

EUT set on multi-axis positioner. Measurement antenna set at phi polarization and 1.5 meter height. Port 1 of Network analyzer connect to antenna 1 of EUT. Record S21 value every 15 degree from 0 to 345 degree on Phi angle and 0 to 180 on theta angle of multi-axis positioner. Then set measurement antenna to theta polarization and repeat process. Repeat process to each antenna of EUT.

7.Summary of Test Result

Calcuat directional gain of 4TX antennas by same angle according to FCC KDB662911 D01 Multiple Transmitter Output v02r01
The maximum DG gain was selected and recorded in following table

Spatial Multiplexing DG calculations

If antenna gains are not equal & each transmit antenna is driven by only one spatial stream

$$DG = 10 \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

Band(MHz)	Test Frequency[MHz]	Ant.1	Ant.2	Ant.3	Ant.4	Directional Gain MIMO@same angle
2412-2472	2400	2.09	3.78	3.77	1.82	3.569159767
	2450	1.07	3.78	3.77	1.82	3.493442457
	2500	2.25	3.64	3.59	1.66	3.853880721
5150-5250	5150	4.37	5.33	4.35	4.46	6.447185685
5250-5350	5250	3.45	4.25	3.25	4.65	5.40483058
	5350	2.77	4.4	3.3	3.97	5.502639293
	5470	2.43	4.67	3.3	4.01	5.739118502
5470-5725	5600	2.95	4.54	2.62	3.16	5.889855253
	5725	4	4.57	3.42	2.82	6.763748372
	5785	4.05	4.99	4.11	3.25	7.153441766
5725-5850	5850	2.78	4.6	4.15	3.16	5.90146484

Appendix - 2400MHz Test Result

(i) If transmit signals are correlated, then

Directional gain = $10 \log[(10G_1/20 + 10G_2/20 + \dots + 10G_N/20)^2 / NANT]$ dBi [Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

2400MHz XY		Peak gain	2.09	3.78	3.77	1.82	MAX DG gain	3.56916
	Angle		Ant1	Ant2	Ant3	Ant4		DG gain
Theta	0	Gain theta(XY)	-13.44	-13.97	2.21	-12.33		-0.24405
	15		-9.89	-12.43	3.09	-10.63		1.140639
	30		-9.96	-9.79	3.71	-10.13		1.889545
	45		-8.19	-7.99	3.77	-11		2.323431
	60		-8.74	-7.98	3.06	-12.78		1.643364
	75		-11.09	-8.8	1.98	-13.71		0.441724
	90		-16	-13.02	0.74	-11.95		-1.2928
	105		-10.38	-14.17	3.06	-9.63		1.025631
	120		-7.45	-11.67	-3.03	-7.78		-0.9206
	135		-8.72	-8.16	-3.94	-6.2		-0.52642
	150		-9.27	-6.22	-5.15	-5.21		-0.29045
	165		-9.84	-5.16	-6.74	-5.3		-0.54812
	180		-13.52	-5.48	-7.86	-8.48		-2.35947
	195		-8.21	-4.58	-8.06	-10.07		-1.4739
	210		-5.45	-3.98	-7.51	-11.08		-0.59852
	225		-7.04	-5.15	-6.55	-12.01		-1.3167
	240		-8.6	-5.92	-6.42	-10.29		-1.6146
	255		-10.44	-6.69	3.06	-10.05		1.939113
	270		-13.58	-9.35	-5.03	-15.73		-3.91648
	285		-7.96	-12.97	-1.99	-18.07		-2.24362
	300		-5.41	-19.23	0.21	-16		-0.77801
	315		-6.95	-11.82	1.34	-12.75		0.435895
	330		-10.78	-13.18	2.22	-14.64		-0.06574
	345		-27.24	-19.37	2.69	-19.93		-1.85825
	360		-13.44	-13.97	2.21	-12.33		-0.24405

Peak

Phi	Frequency Angle	(dB				
	0	-5.75	-6.26	-10.56	-0.72	0.903181
	15	-10.48	-7.17	-9.95	-2.32	-0.81487
	30	-11.95	-5.03	-9.74	-5.51	-1.57068
	45	-6.07	-0.69	-8.02	-8.78	0.756117
	60	-4.87	1.34	-7.47	-13.36	1.494754
	75	-5.06	2.68	-7.21	-12.35	2.269497
	90	-9.91	3.65	-7.03	-6.71	2.762304
	105	-17.4	3.78	-8.08	-4.36	2.54193
	120	-12.45	3.43	-10.32	-2.46	2.863037
	135	-5.12	2.02	-11.48	-0.6	3.56916
	150	-3.3	-0.52	-13.98	-0.96	2.674457
	165	-2.16	-5.94	-20.51	-1.62	0.861897
	180	-0.8	-11.36	-18.88	-2.59	0.164905
	195	-0.49	-12.24	-14.08	-2.1	0.718292
	210	-0.97	-9.47	-11.79	-2.2	1.077088
	225	-4.16	-8.11	-12.62	-4.91	-0.84488
	240	-5.48	-2.83	-14.67	-5.53	-0.14092
	255	-5.68	-0.24	-17.62	-6.48	0.417611
	270	-8.63	-0.1	-13.94	-13.93	-1.10612
	285	-8.29	-2.19	-12.37	-6.87	-0.6476
	300	-6.75	-7.62	-11.54	-4.48	-1.22199
	315	-6.37	-3.38	-12.71	-5.33	-0.30595
	330	-4.75	-2.19	-14.79	-4.02	0.69894
	345	-3.26	-1.67	-21.62	-2.25	1.463118
	360	-5.75	-6.26	-10.56	-0.72	0.903181

Peak

XZ	Polarization Theta	Frequency Angle	2400 (dB
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	0	-3.64	-6.77	-11.04	-3.72	0.208116
	15	-3.54	-6.61	-13.11	-15.29	-2.35228
	30	-1.56	-10.3	-5.44	-6.91	0.534732
	45	-3.77	-9.89	-1.83	-3.84	1.6588
	60	-9.76	-9.06	0.09	-8.69	0.238084

75	-9.12	-15.8	2.38	-15.17	0.00752
90	-13.44	-13.97	2.21	-12.33	-0.24405
105	-10.74	-8.76	2.87	-9.16	1.565682
120	-14.6	-12.14	3.23	-31.46	-0.39742
135	-9.85	-7.27	0.85	-19.7	-0.17073
150	-9.73	-4.67	-1.11	-15.75	-0.20441
165	-1.1	-6.27	-4.3	-13.27	0.801968
180	-3.11	-5.69	-6.65	-4.02	1.262879
195	-2.55	-3.95	-8.12	-10.29	0.335148
210	-0.09	-6.62	-8.93	-8.35	0.813707
225	-5.09	-3.39	-5.78	-14.07	-0.24053
240	-12.57	-2.65	-16.72	-10.66	-3.02846
255	-14.57	-6.03	-5.8	-8.67	-2.11519
270	-13.52	-5.48	-7.86	-8.48	-2.35947
285	-13.39	-3.13	-7.32	-4.9	-0.39606
300	-12.73	-2.49	-12.93	-1.45	0.229864
315	-6.82	-2.29	-10.19	0.79	2.37483
330	-8.92	-2.79	-14.51	-0.45	0.910473
345	-7.88	-2.11	-11.28	-1.93	1.067835
360	-3.64	-6.77	-11.04	-3.72	0.208116

Phi

Peak

0	-2.83	-6.23	-14.51	-2.21	0.722714
15	-0.29	-15.36	-15.42	-0.33	1.099633
30	-0.23	-19.03	-21.77	-0.37	0.528801
45	-2.12	-11.05	-20.31	-1	0.220386
60	-4.35	-13.04	-12.04	1.21	0.939234
75	-5.16	-9.64	-12.19	0.86	0.951414
90	-5.75	-6.26	-10.56	-0.72	0.903181
105	-2.85	-10.31	-11.27	-2.27	0.293128
120	-3.79	-12.59	-23.51	-1.51	-0.97191
135	-1.33	-13.56	-23.27	-2.55	-0.52758
150	-1.74	-14.28	-16.27	-1.46	0.045823
165	0.24	-10.39	-25.08	-1.15	1.06952
180	-1.32	-7.08	-13.92	-2.69	0.971334
195	-1.66	-6.75	-15.98	-1.74	1.073415
210	-15.61	-11.58	-19.65	-4.18	-4.7951

225	-4.99	-6.87	-22.81	-9.28	-2.89976
240	-4.37	-10.75	-10.91	-4.19	-0.93065
255	-4.13	-14.92	-10.38	1.82	1.352031
270	-0.8	-11.36	-18.88	-2.59	0.164905
285	-2.64	-13.69	-29.6	-4.35	-2.02642
300	-2.93	-13.01	-12.66	-5.49	-1.40348
315	-1.36	-10.37	-17.49	-4.55	-0.51965
330	-1.82	-10.62	-23.04	-3.1	-0.55727
345	-1.14	-11.29	-26.56	1.59	1.57441
360	-2.83	-6.23	-14.51	-2.21	0.722714

Peak

YZ

Polarization

Theta

Frequency

2400

Angle (dB

0	-2.82	-6.22	-14.42	-2.21	0.736106
15	-2.32	-16.85	-7.22	-0.3	1.254924
30	-2.09	-12.29	-9.23	1.44	2.127023
45	-3.51	-16.89	-3.73	-0.71	1.521944
60	-1.02	-8.47	-1.45	-2.03	3.239873
75	-7.06	-13.35	0.7	-6.36	0.919773
90	-16	-13.02	0.74	-11.95	-1.2928
105	-11.76	-9.92	1.66	-12.46	0.113089
120	-2.13	-19.58	1.08	-13.72	0.929692
135	-5.8	-13.06	1.04	-7.66	1.124332
150	-5.87	-14.17	-3.42	-4.32	-0.05635
165	-0.62	-5.88	-5.51	0.17	3.490807
180	-3.11	-5.69	-6.65	-4.02	1.262879
195	-5.32	-12.19	-19.8	-5.29	-2.88986
210	-4.96	-5.6	-10.67	-4.07	0.036358
225	-8.87	-10.04	-4.34	-9.91	-1.93171
240	-11.25	-14.32	-5.15	-12.47	-4.03512
255	-10.33	-8.36	-13.83	-23.38	-6.39676
270	-13.58	-9.35	-5.03	-15.73	-3.91648
285	-4.39	-13.06	-18.46	-7.06	-3.16911
300	-2.44	-11.67	-7.37	-12.76	-1.54441

315	-1.79	-14.83	-23.38	-10.56	-3.35393
330	2.09	-10.36	-19	-4.43	1.168941
345	-1.62	-22.7	-12.07	-3.65	-0.87084
360	-2.82	-6.22	-14.42	-2.21	0.736106

Phi

Peak

0	-3.65	-6.78	-11.08	-3.73	0.194014
15	-12.89	-2.88	-11.69	-20.72	-3.7626
30	-7.55	-1.17	-14.24	-16.58	-1.74709
45	-6.56	2.24	-14.26	-11.93	0.870992
60	-3.13	3.06	-15.74	-12.02	2.054414
75	-5.95	3.65	-9.31	-9.85	2.576026
90	-9.91	3.65	-7.03	-6.71	2.762304
105	-13.5	2.53	-6.37	-10.69	1.296079
120	-8.34	2.61	-11.55	-16.43	0.623001
135	-13.71	-1.56	-5.45	-10.97	-0.63657
150	-18.42	-2.67	-14.03	-17.81	-4.56219
165	-9.79	-1.41	-7.85	-8.39	-0.17639
180	-1.32	-7.08	-13.92	-2.69	0.971334
195	-9.55	-14.56	-12.31	-10.55	-5.52008
210	-3.71	-3.71	-5.95	-13.66	0.070633
225	0.48	-3.07	-13.55	-15.11	0.607163
240	-1.14	-0.63	-10.39	-11.02	1.549431
255	-8.25	0.28	-16.78	-11.69	-0.79646
270	-8.63	-0.1	-13.94	-13.93	-1.10612
285	-18.52	0.54	-8.22	-11.53	-0.74303
300	-6.06	-0.13	-12.65	-11.13	-0.02779
315	-9.73	-2.92	-16.34	-14.32	-3.18895
330	-7.59	-1.73	-22.04	-6.14	-0.87183
345	-17.66	-1.98	-15.75	-10.1	-3.08067
360	-3.65	-6.78	-11.08	-3.73	0.194014

Peak

Appendix - 2450MHz Test Result

method 3 d) Unequal antenna gains, with equal transmit powers. For an

(i) If transmit signals are correlated, then

Directional gain = $10 \log[(10G_1/20 + 10G_2/20 + \dots + 10G_N/20)^2/NANT]$ dBi [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

2450MHz XY		Angle	Peak gain	1.07	3.78	3.77	1.82	MAX DG gain	3.49344
	Theta	Gain theta(XY)	Ant1	Ant2	Ant3	Ant4			DG gain
		0	-16.63	-13.97	2.21	-12.33			-0.54125
		15	-13.97	-12.43	3.09	-10.63			0.670992
		30	-14.21	-9.79	3.71	-10.13			1.449071
		45	-7.03	-7.99	3.77	-11			2.50645
		60	-6.62	-7.98	3.06	-12.78			1.999231
		75	-7.98	-8.8	1.98	-13.71			0.923788
		90	-9.65	-13.02	0.74	-11.95			-0.47228
		105	-9.43	-14.17	3.06	-9.63			1.159607
		120	-9.13	-11.67	-3.03	-7.78			-1.28843
		135	-14.16	-8.16	-3.94	-6.2			-1.35136
		150	-11.77	-6.22	-5.15	-5.21			-0.68561
		165	-9.16	-5.16	-6.74	-5.3			-0.42762
		180	-10.44	-5.48	-7.86	-8.48			-1.86255
		195	-8.26	-4.58	-8.06	-10.07			-1.48538
		210	-6.62	-3.98	-7.51	-11.08			-0.91738
		225	-8.65	-5.15	-6.55	-12.01			-1.70546
		240	-11.03	-5.92	-6.42	-10.29			-2.10225
		255	-13.23	-6.69	3.06	-10.05			1.647365
		270	-11.57	-9.35	-5.03	-15.73			-3.5525
		285	-8.02	-12.97	-1.99	-18.07			-2.25912
		300	-6.05	-19.23	0.21	-16			-0.96091
		315	-6.12	-11.82	1.34	-12.75			0.619997
		330	-8.74	-13.18	2.22	-14.64			0.262847
		345	-14.65	-19.37	2.69	-19.93			-1.12771
		360	-16.63	-13.97	2.21	-12.33			-0.54125
							Peak	DG	
Phi	Frequency								
	Angle	(dB							

0	-10.98	-6.26	-10.56	-0.72	-0.06177
15	-13.83	-7.17	-9.95	-2.32	-1.28408
30	-10.56	-5.03	-9.74	-5.51	-1.34547
45	-5.75	-0.69	-8.02	-8.78	0.830076
60	-5.13	1.34	-7.47	-13.36	1.432986
75	-5.92	2.68	-7.21	-12.35	2.091623
90	-9	3.65	-7.03	-6.71	2.873112
105	-12.83	3.78	-8.08	-4.36	2.839492
120	-11.94	3.43	-10.32	-2.46	2.907971
135	-5.54	2.02	-11.48	-0.6	3.493442
150	-3.47	-0.52	-13.98	-0.96	2.632042
165	-1.93	-5.94	-20.51	-1.62	0.943803
180	-0.09	-11.36	-18.88	-2.59	0.489773
195	-0.5	-12.24	-14.08	-2.1	0.713943
210	-2.13	-9.47	-11.79	-2.2	0.637195
225	-3.9	-8.11	-12.62	-4.91	-0.75525
240	-6.14	-2.83	-14.67	-5.53	-0.3145
255	-9.21	-0.24	-17.62	-6.48	-0.33266
270	-11.56	-0.1	-13.94	-13.93	-1.64546
285	-10.92	-2.19	-12.37	-6.87	-1.13149
300	-9.46	-7.62	-11.54	-4.48	-1.86087
315	-9.07	-3.38	-12.71	-5.33	-0.9033
330	-6.37	-2.19	-14.79	-4.02	0.295085
345	-4.78	-1.67	-21.62	-2.25	1.048609
360	-10.98	-6.26	-10.56	-0.72	-0.06177

Peak	DG
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XZ	Polarization		2450					
	Theta	Frequency Angle						
			(dB					
	0			-3.32	-6.77	-11.04	-3.72	0.312141
	15			-6.78	-6.61	-13.11	-15.29	-3.61977
	30			-3.46	-10.3	-5.44	-6.91	-0.16298
	45			-2.85	-9.89	-1.83	-3.84	1.914722
	60			-7.36	-9.06	0.09	-8.69	0.664615
	75			-9.54	-15.8	2.38	-15.17	-0.06446
90			-16.63	-13.97	2.21	-12.33	-0.54125	
105			-20.19	-8.76	2.87	-9.16	0.837645	

120	-12.01	-12.14	3.23	-31.46	-0.10819
135	-12.62	-7.27	0.85	-19.7	-0.56883
150	-18.39	-4.67	-1.11	-15.75	-1.17159
165	-4.27	-6.27	-4.3	-13.27	-0.33627
180	-4.04	-5.69	-6.65	-4.02	0.992161
195	-0.96	-3.95	-8.12	-10.29	0.939472
210	-0.28	-6.62	-8.93	-8.35	0.728609
225	-7.48	-3.39	-5.78	-14.07	-0.85984
240	-9.51	-2.65	-16.72	-10.66	-2.43758
255	-21.81	-6.03	-5.8	-8.67	-2.72128
270	-10.44	-5.48	-7.86	-8.48	-1.86255
285	-10.64	-3.13	-7.32	-4.9	-0.04104
300	-13.38	-2.49	-12.93	-1.45	0.159149
315	-6.68	-2.29	-10.19	0.79	2.399278
330	-9.03	-2.79	-14.51	-0.45	0.892832
345	-8.95	-2.11	-11.28	-1.93	0.886276
360	-3.32	-6.77	-11.04	-3.72	0.312141

Phi

0	-1.82	-6.23	-14.51	-2.21	1.071376
15	-0.94	-15.36	-15.42	-0.33	0.828607
30	0.83	-19.03	-21.77	-0.37	1.030567
45	-1.7	-11.05	-20.31	-1	0.383191
60	-4.14	-13.04	-12.04	1.21	0.99685
75	-2.6	-9.64	-12.19	0.86	1.658407
90	-10.98	-6.26	-10.56	-0.72	-0.06177
105	-2.19	-10.31	-11.27	-2.27	0.528665
120	-3.75	-12.59	-23.51	-1.51	-0.95743
135	-3.36	-13.56	-23.27	-2.55	-1.3947
150	-2.09	-14.28	-16.27	-1.46	-0.09496
165	-0.41	-10.39	-25.08	-1.15	0.780136
180	-1.76	-7.08	-13.92	-2.69	0.804971
195	-2.86	-6.75	-15.98	-1.74	0.654371
210	-9.32	-11.58	-19.65	-4.18	-3.55833
225	-4.48	-6.87	-22.81	-9.28	-2.69571
240	-5.07	-10.75	-10.91	-4.19	-1.15996
255	-1.55	-14.92	-10.38	1.82	2.116452
270	-0.09	-11.36	-18.88	-2.59	0.489773

Peak

DG

285	-2.73	-13.69	-29.6	-4.35	-2.06824
300	-2.65	-13.01	-12.66	-5.49	-1.28494
315	-1.87	-10.37	-17.49	-4.55	-0.74743
330	-1.51	-10.62	-23.04	-3.1	-0.42188
345	1.07	-11.29	-26.56	1.59	2.449402
360	-1.82	-6.23	-14.51	-2.21	1.071376

Peak DG

YZ

Polarization

Theta

Frequency

2450

Angle (dB

0	-3.32	-6.22	-14.42	-2.21	0.573266
15	-6.78	-16.85	-7.22	-0.3	0.014836
30	-3.46	-12.29	-9.23	1.44	1.72802
45	-2.85	-16.89	-3.73	-0.71	1.711948
60	-7.36	-8.47	-1.45	-2.03	1.739748
75	-9.54	-13.35	0.7	-6.36	0.478307
90	-16.63	-13.02	0.74	-11.95	-1.34887
105	-20.19	-9.92	1.66	-12.46	-0.6032
120	-12.01	-19.58	1.08	-13.72	-1.44071
135	-12.62	-13.06	1.04	-7.66	-0.01125
150	-18.39	-14.17	-3.42	-4.32	-1.94533
165	-4.27	-5.88	-5.51	0.17	2.509117
180	-4.04	-5.69	-6.65	-4.02	0.992161
195	-0.96	-12.19	-19.8	-5.29	-0.97653
210	-0.28	-5.6	-10.67	-4.07	1.625975
225	-7.48	-10.04	-4.34	-9.91	-1.59909
240	-9.51	-14.32	-5.15	-12.47	-3.62519
255	-21.81	-8.36	-13.83	-23.38	-8.70233
270	-10.44	-9.35	-5.03	-15.73	-3.31601
285	-10.64	-13.06	-18.46	-7.06	-5.35934
300	-13.38	-11.67	-7.37	-12.76	-4.9329
315	-6.68	-14.83	-23.38	-10.56	-5.94246
330	-9.03	-10.36	-19	-4.43	-3.28833
345	-8.95	-22.7	-12.07	-3.65	-3.50306
360	-3.32	-6.22	-14.42	-2.21	0.573266

Phi					Peak	DG	
	0	-3.32	-6.78	-11.08	-3.73		0.301381
	15	-12.04	-2.88	-11.69	-20.72		-3.60788
	30	-8.4	-1.17	-14.24	-16.58		-1.95718
	45	-7.11	2.24	-14.26	-11.93		0.756979
	60	-2.67	3.06	-15.74	-12.02		2.183485
	75	-6.26	3.65	-9.31	-9.85		2.518781
	90	-9	3.65	-7.03	-6.71		2.873112
	105	-11.66	2.53	-6.37	-10.69		1.480655
	120	-10.29	2.61	-11.55	-16.43		0.306107
	135	-11.78	-1.56	-5.45	-10.97		-0.39994
	150	-15.66	-2.67	-14.03	-17.81		-4.23882
	165	-11.53	-1.41	-7.85	-8.39		-0.44103
	180	-1.76	-7.08	-13.92	-2.69		0.804971
	195	-9.2	-14.56	-12.31	-10.55		-5.40851
	210	-3.17	-3.71	-5.95	-13.66		0.249049
	225	-0.36	-3.07	-13.55	-15.11		0.203411
	240	-2.03	-0.63	-10.39	-11.02		1.233418
	255	-10.68	0.28	-16.78	-11.69		-1.25782
	270	-11.56	-0.1	-13.94	-13.93		-1.64546
	285	-14.69	0.54	-8.22	-11.53		-0.43759
	300	-5.84	-0.13	-12.65	-11.13		0.027657
	315	-15.56	-2.92	-16.34	-14.32		-4.25125
	330	-9.77	-1.73	-22.04	-6.14		-1.32842
	345	-9.6	-1.98	-15.75	-10.1		-1.92184
	360	-3.32	-6.78	-11.08	-3.73		0.301381

Peak DG

Appendix - 2500MHz Test Result

(i) If transmit signals are correlated, then
Directional gain = 10 log[(10G1 /20 + 10G2 /20 + ... + 10GN /20)2 /NANT] dBi [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

2500MHz		Peak gain	2.25	3.64	3.59	1.66	MAX DG gain	3.85388
XY	Angle		Ant1	Ant2	Ant3	Ant4		DG gain
Theta	0	Gain theta(XY)	-15.77	-12.8	2.38	-9.89		0.117811
	15		-18.69	-12.28	2.83	-10.97		0.1185
	30		-17.16	-10.66	3.46	-9.2		1.091736
	45		-10.67	-7.2	3.59	-15.73		1.600188
	60		-10.17	-7.6	2.96	-10.14		1.74209
	75		-10.89	-9.68	2.21	-7.7		1.271758
	90		-9.87	-14.09	1.78	-7.24		0.750184
	105		-11.04	-12.81	0.62	-7.62		-0.00319
	120		-14.41	-9.23	-1.36	-7.51		-0.85674
	135		-19.89	-5.5	-2.78	-6.18		-0.68105
	150		-17.07	-3.91	-4.11	-5.65		-0.34345
	165		-13.85	-3.21	-5.43	-5.04		-0.04802
	180		-13.01	-4.15	-6.85	-4.17		-0.36833
	195		-10.37	-3.68	-7.49	-5.57		-0.41595
	210		-8.89	-3.28	-7.33	-8.06		-0.58274
	225		-10.96	-4.75	-6.57	-11.41		-1.93767
	240		-12.11	-5.54	-6.86	-9.01		-2.021
	255		-12.88	-6.1	-7.07	-8.33		-2.22069
	270		-15.1	-8.06	-4.85	-14.58		-3.544
	285		-8.4	-11.43	-2.53	-18.97		-2.45077
	300		-6.05	-23.66	-0.68	-16.7		-1.75109
	315		-9.56	-14.5	1.28	-12.36		-0.35099
	330		-13.22	-11.82	2.09	-13.8		-0.21575
	345		-15.55	-10.77	2.31	-17.63		-0.48054
	360		-15.77	-12.8	2.38	-9.89		0.117811
Phi	Frequency						Peak	DG
	Angle	(dB						
	0		-15.29	-9.16	-11.16	-1.38		-1.67029

15	-10.11	-8.06	-10.65	-2.93	-1.33676
30	-6.63	-4.77	-10.39	-6	-0.69087
45	-4.9	-1.38	-8.24	-9.96	0.534334
60	-5.47	0.8	-7.64	-13.85	1.012062
75	-7.72	2.35	-7.33	-10.63	1.748438
90	-10.17	3.31	-7.02	-5.61	2.746513
105	-13	3.64	-7.82	-4.35	2.787824
120	-13.99	3.52	-9.28	-2.97	2.776767
135	-9.6	2.36	-8.64	-1.08	3.216088
150	-4.38	0.17	-9.94	-0.97	3.034957
165	-1.71	-3.8	-13.79	-1.01	2.149576
180	-0.56	-7.36	-19.61	-1.13	1.396003
195	-1	-10.62	-14.56	-1.43	0.910233
210	-2.4	-10.82	-11.2	-2.28	0.385944
225	-4.27	-7.37	-11.31	-5.09	-0.59212
240	-7.41	-3.4	-13.79	-4.77	-0.51893
255	-14.57	-1.16	-23.31	-4.99	-1.44675
270	-16.8	-0.6	-16.69	-11.25	-2.51021
285	-13.14	-2.81	-13.75	-6.54	-1.82909
300	-10.84	-10.07	-12.18	-4.35	-2.77623
315	-11.39	-4.08	-14.21	-5.11	-1.69907
330	-8.79	-2.35	-15.49	-3.52	-0.16957
345	-8.02	-1.74	-22.23	-1.35	0.624392
360	-15.29	-9.16	-11.16	-1.38	-1.67029

Peak DG

XZ

Polarization
Theta Frequency
Angle (dB)

0	-2.34	-6.22	-11.91	-5.26	0.223163
15	-8.83	-4.33	-9.97	-10.58	-2.03436
30	-6.33	-7.42	-6.13	-7.02	-0.68891
45	-5.26	-12.67	-1.69	-5.24	0.622127
60	-7.32	-9.63	0.15	-5.98	1.139156
75	-11.06	-11.95	1.09	-20.7	-1.11776
90	-15.77	-12.8	2.38	-9.89	0.117811
105	-15.13	-9.1	2.41	-13.68	0.226026
120	-10.93	-8.16	3.36	-19.78	1.022423

135	-11.21	-11.18	0.21	-12.15	-0.80714
150	-20.89	-3.54	-2.22	-16.01	-1.47159
165	-6.47	-5.98	-4.63	-14.19	-1.11453
180	-3.48	-5.99	-7.1	-4.25	0.930978
195	-0.6	-7.29	-13.41	-7.16	0.075031
210	0.23	-5.88	-8.71	-8.43	1.140882
225	-6.34	-4.25	-5.37	-13.93	-0.74772
240	-11.08	-2.08	-14.06	-12.8	-2.53626
255	-15.45	-4.55	-4.34	-6.81	-0.79824
270	-13.01	-4.15	-6.85	-4.17	-0.36833
285	-8.55	-3.76	-7.38	-2.99	0.662999
300	-9.28	-3.61	-10.73	-2.05	0.357341
315	-9.92	-4.87	-8.85	0.47	1.238734
330	-8.32	-5.53	-13.27	-0.22	0.443497
345	-21.14	-2.88	-16.98	-2.29	-1.3337
360	-2.34	-6.22	-11.91	-5.26	0.223163

Phi

0	-0.7	-7.19	-13.93	-2.88	1.132476
15	1	-11.1	-15.83	-0.7	1.885312
30	1.81	-16.65	-20.19	-1.26	1.369476
45	-0.58	-12.74	-15.58	-0.91	0.957001
60	-4.42	-8.51	-20.24	0.58	0.599472
75	-2.04	-19.33	-13.93	0.66	0.743688
90	-15.29	-9.16	-11.16	-1.38	-1.67029
105	-1.82	-9.97	-14.44	-3.61	-0.09657
120	-0.96	-10.81	-28.7	-2.2	-0.0156
135	-4.88	-16.43	-16.06	-1.97	-1.53785
150	-2.8	-13.47	-22.28	-2.39	-1.04701
165	-1.37	-8.69	-24.91	-2.25	0.21617
180	-2.15	-6.38	-14.09	-3.14	0.646563
195	-2.96	-5.54	-18.7	-2.02	0.621319
210	-8.3	-9.2	-19.29	-2.87	-2.16665
225	-4.99	-6.72	-21.48	-8.37	-2.55603
240	-3.87	-7.21	-14.96	-7.56	-1.54587
255	-1.05	-10.99	-13.73	1.33	2.074676
270	-0.56	-7.36	-19.61	-1.13	1.396003
285	-2.62	-10.11	-24.13	-8.14	-2.46552

Peak

DG

300	-2.29	-9.22	-13.94	-5.25	-0.62343
315	-1.89	-9.06	-13.24	-3.65	0.135714
330	0.05	-11.57	-14.83	-3.19	0.602601
345	2.25	-13.72	-17.54	1.2	2.868549
360	-0.7	-7.19	-13.93	-2.88	1.132476

Peak DG

YZ

Polarization

Theta

Frequency

Angle (dB

0	-0.7	-7.16	-13.87	-2.88	1.143548
15	0.82	-9.8	-8.88	-3.13	1.867656
30	-1.04	-16.33	-11.47	1.66	1.998196
45	-3.29	-12.35	-2.6	-0.28	2.396844
60	-4.73	-10.43	-1.68	-1.3	2.165149
75	-8.34	-12.04	0.76	-7.58	0.596316
90	-9.87	-14.09	1.78	-7.24	0.750184
105	-14.32	-16.39	1.62	-17.41	-1.49574
120	-2.13	-9.99	-0.45	-13.81	1.032966
135	-7.89	-26.39	0.41	-6.99	-0.23492
150	-2.23	-10.33	-4.68	-2.33	1.677826
165	1.06	-5.7	-6.02	-0.28	3.853881
180	-3.48	-5.99	-7.1	-4.25	0.930978
195	-11.27	-14.81	-15.79	-4.1	-4.14464
210	-4.93	-4.16	-13.06	-6.37	-0.49619
225	-10.31	-9.53	-4.83	-8.04	-1.89118
240	-15.19	-13.79	-3.78	-10.44	-3.56882
255	-14.41	-6.76	-12.83	-15.71	-5.66581
270	-15.1	-8.06	-4.85	-14.58	-3.544
285	-4.34	-12.79	-21.01	-9.09	-3.90178
300	-0.72	-15.04	-9.53	-15.72	-1.96564
315	-2.59	-16.26	-23.64	-11.46	-4.22924
330	1.63	-10.36	-19.32	-3.61	1.130054
345	-0.1	-27.04	-17.13	-5.25	-1.31732
360	-0.7	-7.16	-13.87	-2.88	1.143548

Phi

Peak DG

0	-2.35	-6.24	-11.95	-5.25	0.212404
15	-17.28	-3.2	-10.36	-19.72	-4.18537
30	-8.83	-2.32	-18.12	-9.77	-2.06782
45	-9.84	1.31	-15.13	-8.81	0.098201
60	-5.51	2.63	-14.6	-14.91	1.022249
75	-8.89	3.6	-7.56	-9.72	2.339715
90	-10.17	3.33	-7.02	-5.61	2.757189
105	-9.81	2.01	-8.13	-10.15	1.163218
120	-7.43	2.4	-9.41	-15	1.060215
135	-7.4	-1.88	-5.46	-10.27	0.306532
150	-15.57	-3.09	-11.14	-15.55	-3.6657
165	-11.26	-1.33	-8.31	-9.64	-0.69921
180	-2.15	-6.38	-14.09	-3.14	0.646563
195	-8.6	-13.72	-13.56	-9.11	-4.89897
210	-3.83	-4.31	-5.88	-12.18	0.028009
225	-2.17	-6.43	-12.67	-13.83	-1.45298
240	-2.5	-0.85	-10.64	-12.1	0.822911
255	-14.63	-0.02	-17.07	-12.69	-2.1838
270	-16.8	-0.6	-16.69	-11.25	-2.51021
285	-12.14	-0.6	-8.46	-11.54	-0.80559
300	-5.67	-0.83	-15.5	-11.34	-0.59138
315	-10.92	-2.89	-14.35	-16.3	-3.43861
330	-7.74	-2.55	-23.91	-6.49	-1.44621
345	-13.57	-5.44	-15.81	-7.44	-3.53814
360	-2.35	-6.24	-11.95	-5.25	0.212404

Peak DG

Appendix - 5150MHz Test Result

(i) If transmit signals are correlated, then

Directional gain = $10 \log[(10G_1 / 20 + 10G_2 / 20 + \dots + 10G_N / 20)^2 / NANT]$ dBi [Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

eg	Theta	0 Gain phi(XY)	-9.03	-9.96	-2.24	1.27	
		Directional gain = $10 \log[(10G_1 / 20 + 10G_2 / 20 + \dots + 10G_N / 20)^2 / NANT]$ dBi					
5150MHz		Peak gain	4.37	5.33	4.35	4.46	MAX DG gain
XY							6.44719
	Angle		Ant1	Ant2	Ant3	Ant4	DG gain
	Theta	0 Gain theta(XY)	-9.03	-6.52	-2.19	-4.12	0.92637
	15		-7.23	-6.51	0.48	-4.12	2.23444
	30		-8.06	-9.9	-1.69	-2.49	1.17309
	45		-13.32	-13.96	-3.7	-3.51	-1.22497
	60		-8.61	-11.41	-0.06	-4.71	0.884918
	75		-5.18	-8.51	1.41	-4.75	2.546067
	90		-5.87	-7.04	-0.6	-2.97	2.268925
	105		-7.31	-8.14	-1.19	-5.3	0.976531
	120		-8.85	-10.12	-0.08	-9.87	-0.06665
	135		-7.25	-6.35	2.78	-9.44	2.378186
	150		-7.44	-6.95	1.18	-6.49	1.914163
	165		-8.08	-8.41	-6.48	-5.46	-1.00349
	180		-7.53	-6.3	0.7	-6.74	1.757751
	195		-6.94	-4.31	-0.84	-8.21	1.419342
	210		-6.42	-2.8	-9.97	-7.39	-0.23615
	225		-6.13	-1.72	-3.05	-3.83	2.481615
	240		-6.97	-2.68	-3.42	-2.73	2.237238
	255		-7.68	-5.34	-5.25	-2.84	0.911528
	270		-5.96	-11.08	-1.4	-5.93	0.584167
	285		-4.08	-5.64	-1.93	-7.87	1.409752
	300		-3.41	-2.3	-3.75	-7.49	1.987502
	315		-7.28	-2.29	0.58	-4.43	3.137934
	330		-6.67	-3.67	1.17	-4.31	3.144303
	345		-5.2	-6.35	0.73	-4.34	2.687838
	360		-9.03	-6.52	-2.19	-4.12	0.92637

Peak DG

Phi Frequency

Angle	(dB				
0	1.91	-4.21	-30.8	1.12	3.603382
15	1.14	-6.36	-18.93	0.17	2.778564
30	-1.11	-15.42	-16.63	-1.9	0.001719
45	-3.99	-14.55	-16.06	-3.82	-1.82743
60	-4.73	-1.42	-18.77	-7.86	-0.22407
75	-3.83	2.04	-12.48	-18.66	1.071285
90	-5.38	2.51	-6.26	-13.97	2.144034
105	-4.51	3.03	-2.91	-15.47	3.215917
120	-3.42	3.12	-1.43	-9.93	4.280193
135	-4.56	-0.28	-6.45	-4.36	2.414976
150	-0.02	-2.03	-9.16	0.76	4.160942
165	1.68	-2.51	-6.86	1.92	5.257906
180	3.02	-6.29	-6.97	2.17	5.183658
195	2.67	-9.81	-8.64	2.79	4.689646
210	1.82	-6.87	-12.34	2.61	4.293134
225	0.6	-1.27	-14.01	-0.65	3.70145
240	-0.07	-2.98	-15.72	-4.46	1.81096
255	-1.04	-14.27	-11.53	-9.03	-1.41509
270	-6.58	-9.27	-4.54	-5.07	-0.15989
285	-10.57	-2.05	-4.63	-6.79	0.548374
300	-7.07	0.77	-6.57	-7.89	1.613721
315	-3.36	0.17	-6.39	-4	2.950766
330	1.01	-2.7	-8.56	-0.61	3.977445
345	2.75	-8.31	-20.79	0.44	3.226995
360	1.91	-4.21	-30.8	1.12	3.603382

Peak DG

XZ

Polarization
Theta Frequency 5150
Angle (dB

0	-2.58	-0.97	-2.32	-2.84	3.873781
15	-6.82	-3.6	2.07	-4.94	3.381968
30	-0.79	-5.19	-1.9	-2.36	3.604928
45	-7.8	-4.02	-2.01	-7.62	1.008412
60	-6.39	-0.95	-7.9	-5.58	1.230225
75	-1.51	-8.72	-2.68	-5.33	1.87808
90	-9.03	-6.52	-2.19	-4.12	0.92637

105	-5.9	-0.98	2.2	-1.67	4.894529
120	-3.89	3.96	3.93	-7.69	6.447186
135	-12.3	-5.77	4.35	-2.97	3.856234
150	-10.98	4.21	-2.59	-0.28	5.14543
165	-6.87	3.71	2.65	-6.36	5.629441
180	-4.29	0.29	0.42	-2.74	4.66802
195	-12.33	-0.24	-0.63	-7.52	2.162281
210	-3.06	-6.54	1.62	-2.68	3.844655
225	-6.65	1.6	-0.71	-3.99	4.13789
240	-6.77	1.2	1.96	-5.78	4.542322
255	-8.21	-3.18	-0.05	-7.52	1.927806
270	-7.53	-6.3	0.7	-6.74	1.757751
285	-2.29	0.47	-6.99	-2.11	3.680697
300	-0.44	-0.73	-8.09	-5.22	2.960558
315	-2.89	1.75	-6.02	0.15	4.754969
330	-14.51	4.5	-6.3	-3.43	3.593553
345	-3.02	3.93	-7.1	-2.4	4.807583
360	-2.58	-0.97	-2.32	-2.84	3.873781

Phi

0	-1.89	-2.56	-9.02	-0.87	2.946945
15	0.82	-22.72	-12.09	-1.18	1.190096
30	0.44	-14.58	-11.44	-8.49	-0.52458
45	1.64	-14.65	-14.6	-6.14	0.308605
60	1.35	-14.31	-10.12	-4.73	1.03335
75	0.95	-17.71	-15.11	-2.07	0.864444
90	1.91	-4.21	-30.8	1.12	3.603382
105	0.54	-20.66	-19.47	3.07	2.565029
120	3.37	-13.58	-11.34	2.09	4.153971
135	2.76	-14.32	-11.08	0.57	3.267493
150	-3	-5.35	-16.49	2.51	2.711975
165	-1.57	-8.02	-19.37	2.47	2.504026
180	-4.45	-1.24	-3.27	-0.88	3.682439
195	-4.8	-12.19	-9.09	1.21	1.295993
210	-3.51	-8.85	-7.83	3.01	3.072363
225	0.34	-4.5	-6.72	1.47	4.30033
240	0.06	-10.42	-6.15	2.15	3.75519
255	0.5	-7.75	-6.96	4.46	5.078438

Peak

DG

270	3.02	-6.29	-6.97	2.17	5.183658
285	4.37	-4.39	-12.73	2.89	5.762347
300	2.51	-7.46	-7.46	2.34	4.839704
315	1.68	-7.89	-11.77	-5.35	1.636415
330	-0.65	-5.34	-16.44	1.85	3.096643
345	-0.42	-22.11	-13.13	3.36	2.683824
360	-1.89	-2.56	-9.02	-0.87	2.946945

Peak DG

YZ

Polarization
Theta Frequency
Angle (dB) 5150

0	-1.88	-2.54	-8.81	-0.87	2.98185
15	2	-15.32	-3.84	1.38	4.204241
30	1	-3.87	-2	3.5	6.135048
45	-1.57	-8.09	-15.27	-7.97	-0.91267
60	-2.59	-5.75	-0.94	-10.91	1.727869
75	-7.45	-4.26	-3.92	-2.74	1.593515
90	-5.87	-7.04	-0.6	-2.97	2.268925
105	-9.16	-2.5	2.22	-4.55	3.468661
120	-11.79	-4.49	-3.45	1.33	2.578815
135	-1.13	-2.66	1.67	-0.41	5.529476
150	-7.31	-3.48	-5.17	3.24	3.819124
165	-1.62	-10.99	-1.95	1.46	3.78972
180	-4.29	0.29	0.42	-2.74	4.66802
195	-2.48	-5.51	-17.48	-1.32	1.117385
210	-6.03	-7.49	-0.72	-4.84	1.637337
225	-4.72	-0.41	-3.51	-6.78	2.478257
240	-4.8	-5.6	2.86	-5.51	3.580901
255	-3.59	-2.08	-9.74	-6.2	1.077373
270	-5.96	-11.08	-1.4	-5.93	0.584167
285	-11.4	-2.98	-5.03	-5.9	0.198041
300	0.92	-7.14	-1.2	-7.45	3.065221
315	-2.5	-5.08	-5.41	-3.22	2.054619
330	3.38	-0.55	-10.11	-4.29	4.446097
345	-3.71	-6.62	-4.04	-5.29	1.179799
360	-1.88	-2.54	-8.81	-0.87	2.98185

Phi				Peak	DG	
0	-2.59	-0.99	-2.37	-2.84		3.853443
15	-18.06	-0.29	-5.86	-12.93		-0.78486
30	-20.26	-4.08	-4.3	-12.12		-2.05019
45	-5.18	-1.92	-13.92	-5.54		0.35028
60	-7.13	2.54	-12.16	-10.6		1.294585
75	-2.7	4.88	-17.6	-6.56		3.774141
90	-5.38	2.51	-6.26	-13.97		2.144034
105	-11.95	1.25	-2.01	-7.29		2.387926
120	-19.14	-2.4	-11.08	-7.2		-2.02135
135	-22.08	-1.51	-1.1	-16.38		-0.21151
150	-7.97	3.26	0	-7.81		4.248694
165	-5.71	5.33	2.73	-9.68		6.155788
180	-4.45	-1.24	-3.27	-0.88		3.682439
195	-13.08	-1.82	-3.8	-16.56		-0.78569
210	-24.6	-8.78	-8.94	-11.07		-5.51736
225	-5.69	-7.36	-11.43	-11.9		-2.67266
240	-6.87	0.34	-13.48	-9.43		0.184136
255	-13.98	-5.43	-6.46	-8.09		-1.91378
270	-6.58	-9.27	-4.54	-5.07		-0.15989
285	-10.34	-1.1	-15.04	-8.95		-1.31503
300	-9.43	-0.23	-12.49	-13.94		-1.16052
315	-8	-3.14	-8.23	-8.32		-0.60169
330	-12.68	-0.42	-7.46	-14.41		-0.91979
345	-15.84	0.68	-8.76	-12.67		-0.72346
360	-2.59	-0.99	-2.37	-2.84		3.853443

Peak DG

Appendix - 5250MHz Test Result

method 3 d) Unequal antenna gains, with equal transmit powers. For an

(i) If transmit signals are correlated, then

Directional gain = $10 \log[(10G_1/20 + 10G_2/20 + \dots + 10G_N/20)^2 / NANT]$ dBi [Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

eg	Theta	0 Gain phi(XY)	-9.03	-9.96	-2.24	1.27	
		Directional gain = $10 \log[(10G_1/20 + 10G_2/20 + \dots + 10G_N/20)^2 / NANT]$ dBi					
5250MHz		Peak gain	3.45	4.25	3.25	4.65	MAX DG gain 5.40483
XY	Angle	Ant1	Ant2	Ant3	Ant4		DG gain
	Theta	0 Gain theta(XY)	-3.7	-9.96	-2.24	-12.33	-0.06398
	15		-8.49	-9.3	-0.69	-10.63	-0.27901
	30		-5.31	-9.04	-1.46	-10.13	0.22556
	45		-5.8	-5.3	0.74	-11	1.680367
	60		-7.83	-3.6	-0.63	-12.78	0.931154
	75		-12.34	-2.82	-3.85	-13.71	-0.85473
	90		-9.37	-6.06	-7.75	-11.95	-2.49805
	105		-4.07	-6.83	-5.78	-9.63	-0.33001
	120		-2.07	-5.97	-2.92	-7.78	1.633028
	135		-5.28	-7.32	-2.44	-6.2	0.90607
	150		-7.01	-8.03	-0.01	-5.21	1.549764
	165		-7.14	-8.84	1.57	-5.3	2.084008
	180		-8.18	-13.41	-2.37	-8.48	-1.20264
	195		-8.44	-14.03	-4.56	-10.07	-2.60052
	210		-8.33	-12.28	-3.91	-11.08	-2.25176
	225		-8.65	-12.54	-5.04	-12.01	-2.99867
	240		-5.39	-14.05	-2.96	-10.29	-1.14452
	255		-3.98	-9.9	-1.19	-10.05	0.58232
	270		-7.5	-2.22	-2.38	-15.73	0.506027
	285		-10.83	-3.31	-2.12	-18.07	-0.54278
	300		-10.45	-9.29	-1.42	-16	-1.66516
	315		-5.91	-13.13	-2.58	-12.75	-1.40967
	330		-2.87	-12.79	-3.47	-14.64	-0.89596
	345		-1.84	-10.88	-4.58	-19.93	-0.98363
	360		-3.7	-9.96	-2.24	-12.33	-0.06398

Peak DG

Phi	Frequency Angle	(dB				
	0	1.52	-4.62	-17.44	0.17	3.324968
	15	0.57	-7.41	-13.71	-0.36	2.475774
	30	-2.85	-20.68	-11.16	-1.98	-0.5116
	45	-6.07	-15.97	-13.35	-4.58	-2.72502
	60	-6	-0.07	-15.53	-8.29	0.195377
	75	-4	3.5	-10.23	-14.94	2.326235
	90	-3.21	4.25	-4.53	-15.76	3.746877
	105	-1.82	4.01	-1.25	-13.02	4.828443
	120	-0.91	1.72	0.22	-8.33	4.931057
	135	-1.62	-1.44	-4.59	-4.17	3.183305
	150	-1.3	-2.67	-6.48	0.34	3.836049
	165	0.16	-2.69	-4.26	1.89	5.123992
	180	2.87	-4.94	-5.21	1.45	5.316118
	195	2.66	-6.94	-6.81	0.46	4.399656
	210	1.18	-6.2	-9.43	-0.98	3.125751
	225	-0.38	-2.14	-12.93	-3.26	2.449475
	240	-0.92	-4.01	-16.58	-7.07	0.510537
	255	-1.59	-16.45	-13.03	-13.75	-3.02599
	270	-7.42	-10.19	-6.12	-8.33	-1.87028
	285	-8.26	-3.35	-5.72	-8.87	-0.24612
	300	-4.27	-0.57	-6.79	-7.7	1.647956
	315	-1.3	-0.96	-9.91	-3.86	2.661479
	330	0.77	-4	-12.85	-1.92	2.775855
	345	2.11	-7.61	-17.78	0.72	3.248024
	360	1.52	-4.62	-17.44	0.17	3.324968

XZ	Polarization				Peak	DG	
	Theta	Frequency	5250				
		Angle	(dB				
		0	-2.95	0.02	-2.28	-1.36	4.450519
		15	-8.02	2.34	-0.13	-3.43	4.519798
	30	-13.86	-1.68	-1.94	-11.09	0.447222	
	45	-4.54	-8.94	-4.48	-7.74	-0.18684	
	60	-4.57	-1.21	-7.84	-5.73	1.523201	
	75	-25.37	-5.71	-6.53	-6.11	-2.27869	

90	-3.7	-9.96	-2.24	-11.94	-0.01553
105	-10.47	-14.7	-1.89	-6.68	-1.15216
120	-11.2	-4.85	-0.98	-10.78	0.129035
135	-4.02	1.12	-0.6	-16.95	3.053278
150	-2.88	-0.94	2.05	-9.74	4.102065
165	-4.01	3.01	-4.55	-6.9	3.774338
180	-2.56	0.27	-1.61	-2.42	4.516377
195	-5.22	-6.96	1.58	-6.07	2.58634
210	-9.99	-1.02	3.25	-9.26	3.533189
225	-7.14	-4.36	2.05	-8.09	2.623
240	-6.12	-2.28	-5.13	-3.41	1.912918
255	-8.53	-5.07	0.96	-8.7	1.643189
270	-8.18	-13.41	-2.37	-9.48	-1.40941
285	-9.31	-3.67	-1.67	-8.44	0.83296
300	-4.94	-0.18	-6.78	-1.76	2.985779
315	-12.32	2.5	-14.46	-15.19	-0.26977
330	-3.61	1.73	-8.68	-7.18	2.56145
345	-7.65	1.77	-5.99	-13.12	1.448926
360	-2.95	0.02	-2.28	-1.36	4.450519

Phi

Peak

DG

0	-1.28	-1.87	-7.99	-0.62	3.518809
15	1.17	-24.8	-18.18	-0.39	1.142447
30	-0.95	-15.76	-14.02	-7.57	-1.53147
45	0.57	-22.61	-12.13	-10.56	-1.48442
60	0.56	-14.43	-8.31	-6.16	0.55789
75	0.03	-16.99	-16.81	-3.64	-0.23367
90	1.52	-4.62	-17.44	0.17	3.324968
105	0.21	-24.72	-12.04	1.61	2.06318
120	2.23	-8.79	-8.84	0.16	3.62602
135	1.53	-25.29	-9.31	0.98	2.634981
150	-2.57	-6.41	-9.92	1.92	2.886787
165	-1.87	-6.53	-21.21	1.66	2.196363
180	-4.68	-1.14	-3.62	-1.6	3.379913
195	-3.36	-12.91	-9.98	-0.93	0.509504
210	-3.59	-4.8	-8.41	4.34	4.256555
225	1.84	-2.8	-8.28	2.8	5.40483
240	1.49	-10.72	-4.71	3.63	5.05327

255	0.29	-7.42	-7.21	4.65	5.114158
270	2.87	-4.94	-5.21	1.45	5.316118
285	3.45	-6.79	-12.19	2.71	5.001495
300	1.75	-1.96	-18.65	2.99	4.981347
315	0.73	-7.23	-17.53	-5.99	0.657791
330	0.17	-4.54	-17.15	2.04	3.568781
345	1.77	-19.23	-12.97	2.51	3.212374
360	-1.28	-1.87	-7.99	-0.62	3.518809

Peak DG

YZ	Polarization	Theta	Frequency	5250
		Angle	(dB	
		0	-1.28	-1.85
		15	-1.53	-5.5
		30	-7.96	-8.3
		45	-11.86	-6.92
		60	-12.51	-10.01
		75	-7.98	-10.17
		90	-9.37	-6.06
		105	-5.16	-12.63
		120	-1.97	-8.62
		135	-7.14	-11.11
		150	-2.56	-28.63
		165	0.11	-1.94
		180	-2.56	0.27
		195	-8.14	-8.6
		210	-8.54	-6.61
		225	-3.12	-8.11
		240	-11.67	-1.64
		255	-7.06	-11.45
		270	-7.5	-2.22
		285	-5.36	-7.67
		300	0.67	-2.35
		315	2.86	-3.06
		330	-3.37	-7.6
		345	1.43	-9.69

	-7.83	-0.61	3.548709
	-3.63	2.55	4.529456
	-12.67	-3.94	-1.65825
	-1.87	-4	0.601264
	-5.74	-5.67	-1.99408
	-10.2	-15	-4.46611
	-7.75	-11.81	-2.47432
	-5.46	-7.91	-1.30357
	0.38	-9.82	2.060079
	-3.14	1.39	2.238703
	-0.33	1.92	3.498228
	-11.08	0.55	3.965448
	-1.61	-2.42	4.516377
	-5.63	-5.98	-0.97025
	-10.09	-7.52	-2.07498
	-11.88	-6.48	-0.81796
	-5.47	-4.55	0.882254
	-1.17	-9.96	-0.43236
	-2.38	-6.03	1.783768
	-8.39	-7.7	-1.18092
	-4.41	-9.4	2.872338
	-18.12	-9.41	2.129409
	-6.42	-4.12	0.80857
	-13.02	-0.27	2.604844

	360	-1.28	-1.85	-7.83	-0.61		3.548709
Phi					Peak	DG	
	0	-2.95	0	-2.32	-1.37		4.43275
	15	-10.78	1.94	-2.47	-10.3		2.269869
	30	-14.27	-3.01	-3.08	-9.69		-0.3107
	45	-8.27	0.7	-11.38	-4.59		1.323332
	60	-3.55	2.1	-10.16	-17.17		1.536386
	75	-1.7	4.06	-6.12	-7.17		4.481485
	90	-3.21	4.25	-4.53	-15.76		3.746877
	105	-8.72	-0.52	-1.71	-8.72		1.924505
	120	-16.67	-0.38	-7.61	-11.96		-1.04811
	135	-15.41	0.18	-0.34	-7.07		2.263081
	150	-4.23	1.32	0.87	-9.63		4.120142
	165	-3.54	2.54	1.63	-10.67		4.870994
	180	-4.68	-1.14	-3.62	-1.6		3.379913
	195	-13.28	-4.34	-6.03	-13.11		-2.24754
	210	-17.75	-11.1	-9.72	-12.84		-6.34985
	225	-6.11	-5.19	-10.03	-13.12		-2.04201
	240	-6.93	-0.47	-11.06	-9.37		0.075842
	255	-11.02	-4.9	-5.22	-9.62		-1.26626
	270	-7.42	-10.19	-6.12	-8.33		-1.87028
	285	-8.58	-2.23	-13.52	-9.76		-1.50453
	300	-10.45	-3.96	-9.72	-18.62		-3.236
	315	-8.9	-1.35	-6.99	-8.49		0.165368
	330	-14.92	0.19	-6.29	-12.34		-0.31907
	345	-10.92	1.31	-8.94	-9.69		0.556054
	360	-2.95	0	-2.32	-1.37		4.43275
					Peak	DG	

Appendix - 5350MHz Test Result

(i) If transmit signals are correlated, then

Directional gain = $10 \log[(10G_1 / 20 + 10G_2 / 20 + \dots + 10G_N / 20)^2 / NANT]$ dBi [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

eg	Theta	0 Gain phi(XY)	-9.03	-9.96	-2.24	1.27	
		Directional gain = $10 \log[(10G_1 / 20 + 10G_2 / 20 + \dots + 10G_N / 20)^2 / NANT]$ dBi					
5350MHz		Peak gain	2.77	4.4	3.3	3.97	MAX DG gain
XY							5.50264
	Angle		Ant1	Ant2	Ant3	Ant4	DG gain
	Theta	0 Gain theta(XY)	-10.74	-9.28	-3.82	-7.54	-1.42242
	15		-7.47	-9.63	-3.07	-7.34	-0.51463
	30		-10.28	-13.44	-6.28	-7.62	-2.97355
	45		-8.77	-9.22	-2.83	-9.42	-1.05978
	60		-8.43	-10.68	-4.48	-9.56	-1.93284
	75		-9.04	-16.4	-8.21	-8.14	-3.84336
	90		-15.03	-10.46	-8.43	-5.93	-3.34183
	105		-11.03	-6.73	-7.66	-5.81	-1.57707
	120		-8.23	-4.95	-5.13	-6.59	-0.10683
	135		-12.49	-6.96	-0.12	-9.41	0.047165
	150		-11.39	-9.5	-0.52	-8.13	-0.27123
	165		-9.1	-10.13	-3.07	-7.7	-1.0286
	180		-9.29	-4.63	-1.6	-9.88	0.350544
	195		-7.95	-5.26	-3.67	-10.31	-0.41498
	210		-6.53	-5.52	-8.56	-8.93	-1.24905
	225		-5.73	-1.49	-2.1	-6.23	2.387432
	240		-7.87	-2.85	-2.14	-4.92	1.845851
	255		-13.2	-7.86	-4.39	-5.1	-0.99996
	270		-10.72	-5.19	-5.91	-10.77	-1.73934
	285		-5.53	-4.45	-8.78	-14.05	-1.46055
	300		-3.48	-4.32	-11.62	-12.86	-1.07119
	315		-5.59	-5.26	-1.72	-9.67	0.906439
	330		-8.92	-6.55	-1.19	-7.04	0.608472
	345		-13.14	-6.74	-2.63	-6.05	-0.36538
	360		-10.74	-9.28	-3.82	-7.54	-1.42242

Phi Frequency Peak DG

Angle	(dB				
0	0.88	-8.65	-13.02	-2.78	1.675388
15	-0.12	-11.46	-11.57	-2.04	1.244852
30	-3.37	-16.51	-10.55	-1.93	-0.32994
45	-4.11	-9.39	-16.28	-5.47	-1.67917
60	-4.48	1.09	-18.79	-8.26	0.953497
75	-4.49	3.43	-10.04	-11	2.532975
90	-4.02	4.4	-4.27	-14.18	3.795904
105	-1.42	3.99	-1.67	-11.94	4.886204
120	0.2	2.51	-0.5	-8.59	5.283069
135	-0.59	-1.22	-3.86	-5.47	3.45562
150	-0.63	-3.23	-4.21	-1.78	3.665602
165	0.2	-3.17	-2.74	-0.33	4.633711
180	2.17	-3.09	-4.76	-0.55	4.863724
195	2.35	-4.31	-6.96	-1.49	4.11122
210	1.58	-5.34	-9.4	-2.4	3.038654
225	-1.05	-3	-11.57	-2.37	2.34284
240	-1.46	-4.72	-10.32	-5.49	1.070514
255	-1.47	-11.52	-7.85	-10.88	-0.91241
270	-6.93	-10.94	-5.55	-6.32	-1.18476
285	-7.15	-3.42	-5.36	-8.22	0.177217
300	-3.76	-0.5	-6.11	-9.54	1.659302
315	-1.58	-1.35	-10.88	-5.26	2.011718
330	-0.53	-3.99	-15.81	-3.61	1.563398
345	0.68	-6.53	-15.93	0.48	2.827563
360	0.88	-8.65	-13.02	-2.78	1.675388

Peak DG

XZ

Polarization
Theta Frequency 5350
Angle (dB

0	-3.65	0.21	-2.28	-3.09	3.948786
15	-7.62	-2.01	-0.3	-16.6	1.301456
30	-2.77	-3.54	1.39	-4.04	4.065608
45	-15.03	-3.85	-4.94	-13.16	-1.91008
60	-13.69	-1.98	-11.58	-12.06	-2.40646
75	-3.56	-18.51	-6.84	-15.63	-3.08049
90	-10.74	-9.28	-3.82	-7.54	-1.42242

105	-8.6	-8.37	-2.12	-7.25	-0.12916
120	-9.89	0.82	0.62	-8.43	3.143487
135	-16.3	-1.12	3.3	-6.45	3.435088
150	-9.75	2.28	-0.46	-1.7	4.599502
165	-4.36	2.63	-0.4	-12.12	3.977829
180	-4.65	-0.5	0.01	-4.05	3.967676
195	-14.28	-1.24	0.07	-11.96	1.2914
210	-4.46	-3.8	2.42	-7.22	3.524353
225	-13.2	-0.75	0.36	-10.28	1.88441
240	-11.72	-2.08	-1.5	-10.63	0.756345
255	-8.53	-5.04	-1.27	-4.83	1.480697
270	-9.29	-4.63	-1.6	-9.88	0.350544
285	-3.68	-3.7	-14.25	-5.34	0.182158
300	-2.84	-2.08	-8.95	-3.09	2.163393
315	-2.91	-2.83	-4.6	-0.55	3.419142
330	-13.53	2.74	-6.36	-3.7	2.656306
345	-8.72	3.81	-3.87	-4.56	3.943051
360	-3.65	0.21	-2.28	-3.09	3.948786

Phi

0	-2.92	-1.56	-7.03	-0.67	3.29005
15	-0.41	-19.36	-23.97	-1.53	-0.16065
30	-0.22	-15.48	-18.62	-13.16	-2.61382
45	-0.38	-19.38	-14.27	-14.46	-2.80975
60	-1.27	-14.96	-10.1	-9.69	-1.49919
75	-0.29	-13.74	-10.63	-6.17	-0.18288
90	0.88	-8.65	-13.02	-2.78	1.675388
105	-1.14	-18.43	-14.6	-1.19	0.235587
120	1.17	-12.28	-11.65	-3.18	1.372466
135	0.08	-19.13	-9.37	0.4	1.962255
150	-3.26	-19.91	-8.63	0.23	0.769214
165	-3.6	-16.17	-15.16	0.72	0.328627
180	-4.7	-1.37	-3.73	-2.12	3.138534
195	-3.44	-10.38	-11.95	-2.31	-0.02268
210	-5.13	-3.27	-11.05	2.44	3.060519
225	2.01	-3.09	-8.47	3.03	5.47295
240	2.77	-11.8	-4.17	3.62	5.502639
255	0.48	-7.23	-6.97	3.97	4.908985

Peak

DG

270	2.17	-3.09	-4.76	-0.55	4.863724
285	2.26	-6.02	-12.01	1.18	4.065082
300	0.66	-2.33	-14.23	2.58	4.567583
315	-1.3	-8.32	-16.27	-8.25	-0.9871
330	-0.91	-4.81	-12.5	1.44	3.205677
345	-1.95	-16.01	-12.38	2.67	2.135833
360	-2.92	-1.56	-7.03	-0.67	3.29005

Peak DG

YZ

Polarization
Theta Frequency
Angle (dB) 5350

0	-2.91	-1.53	-6.9	-0.67	3.320999
15	-0.87	-8.85	-11.83	-1.19	1.561174
30	-0.99	-6.28	-4.04	1.41	4.033064
45	-4.88	-6.89	-12.55	-10.66	-2.20609
60	-6.51	-7.64	-4.84	-13.66	-1.57747
75	-8.04	-6.58	-6.28	-4.27	-0.16651
90	-15.03	-10.46	-8.43	-5.93	-3.34183
105	-8.39	-6.22	-1.71	-9.33	0.138568
120	-6.16	-10.12	2.34	-1.34	3.434963
135	-7.13	-7.82	2.23	-1.67	3.417801
150	-4.52	-3.87	-1.76	-1.33	3.255383
165	0.71	-12.22	-5.92	2.27	3.902988
180	-4.65	-0.5	0.01	-4.05	3.967676
195	-5.57	-8	-6.64	-3.88	0.12954
210	-9.37	-8.88	-4.96	-8.13	-1.6347
225	-8.37	-2.04	-6.37	-9.37	-0.03269
240	-8.11	-10.65	-0.44	-11.9	-0.48573
255	-7.6	-3.4	-11.9	-6.8	-0.89521
270	-10.72	-5.19	-5.91	-10.77	-1.73934
285	-6.05	-4.56	-7.9	-17.04	-1.75985
300	2.53	-9.66	-6.77	-7.84	2.045809
315	-1.26	-10.63	-5.18	-2.33	1.849482
330	1.56	-5.98	-7	-15.08	1.296511
345	-4.15	-5.97	-5.32	1.43	3.058112
360	-2.91	-1.53	-6.9	-0.67	3.320999

Phi					Peak	DG	
	0	-3.66	0.19	-2.32	-3.08		3.932677
	15	-11.76	2.66	-1.64	-7.45		3.132838
	30	-13.7	-0.83	-1.82	-7.31		1.428021
	45	-8.3	0.3	-9.89	-5.07		1.205719
	60	-3.57	2.77	-12.64	-15.37		1.7356
	75	-3.27	4.12	-3.45	-4.96		4.935776
	90	-4.02	4.4	-4.27	-14.18		3.795904
	105	-7.43	0.65	-1.74	-8.85		2.549459
	120	-15.5	0.97	-3.7	-12.56		0.72725
	135	-9.06	1.1	0.58	-5.96		3.69365
	150	-3.54	0.49	1.8	-10.89		4.187638
	165	-1.45	1.91	1.03	-8.22		5.120521
	180	-4.7	-1.37	-3.73	-2.12		3.138534
	195	-11.66	-2	-3.59	-11.84		-0.11869
	210	-13.54	-8.82	-10.31	-11.86		-4.93576
	225	-6.24	-4.91	-10.83	-15.82		-2.4702
	240	-7.4	-0.48	-12.29	-9.06		-0.13953
	255	-9.18	-5.58	-6.31	-8.36		-1.21404
	270	-6.93	-10.94	-5.55	-6.32		-1.18476
	285	-8.05	-2.76	-13.22	-8.5		-1.32159
	300	-12.05	-4.93	-9.25	-18		-3.82716
	315	-6.74	-0.77	-9.42	-10.82		0.005329
	330	-16.48	0.16	-6.38	-11.58		-0.39118
	345	-10.18	1.51	-8.41	-12.75		0.464121
	360	-3.66	0.19	-2.32	-3.08		3.932677
					Peak	DG	

Appendix - 5470MHz Test Result

(i) If transmit signals are correlated, then

Directional gain = $10 \log[(10G_1 / 20 + 10G_2 / 20 + \dots + 10G_N / 20)^2 / NANT]$ dBi [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

eg	Theta	0 Gain phi(XY)	-9.03	-9.96	-2.24	1.27	
		Directional gain = $10 \log[(10G_1 / 20 + 10G_2 / 20 + \dots + 10G_N / 20)^2 / NANT]$ dBi					
5470MHz		Peak gain	2.43	4.67	3.3	4.01	MAX DG gain
XY							5.73912
	Angle	Ant1	Ant2	Ant3	Ant4		DG gain
	Theta	0 Gain theta(XY)	-5	-9.94	-4.27	-7.58	-0.39885
	15		-9.1	-9.25	-1.58	-6.73	-0.04368
	30		-5.69	-7.37	-1.72	-7.22	0.840938
	45		-7.05	-4.16	0.61	-10.69	1.68578
	60		-8.01	-4.11	-0.06	-11.83	1.099671
	75		-8.28	-5.18	-1.72	-11.74	0.066879
	90		-7.07	-9.1	-3.64	-11.33	-1.2957
	105		-5.34	-8	-4.12	-6.94	0.047389
	120		-4.5	-5.81	-3.85	-5.46	1.150342
	135		-6.73	-6.93	-6.34	-6.67	-0.6443
	150		-6.39	-6.66	-2.21	-8.36	0.4279
	165		-5.68	-6.17	0.34	-10.26	1.431351
	180		-8.62	-6.94	-4.79	-10.88	-1.50242
	195		-11.82	-9.37	-5.5	-9.08	-2.62177
	210		-15.02	-12.33	-3.29	-8.12	-2.51856
	225		-15.51	-8.29	-7.3	-8.7	-3.40413
	240		-6.71	-9.58	-9.55	-7.73	-2.28451
	255		-4.01	-13.75	-7.18	-6.79	-1.25606
	270		-4.7	-10.03	-3.5	-6.13	0.253904
	285		-6.99	-7.3	-3.18	-6.99	0.083594
	300		-12.38	-5.95	-3.7	-7.94	-0.92232
	315		-15.15	-9.31	-2.91	-7.58	-1.66931
	330		-7.87	-11.79	-5.04	-7.26	-1.64614
	345		-6.05	-11.22	-9.66	-6.76	-2.15171
	360		-5	-9.94	-4.27	-7.58	-0.39885

Peak DG

Phi Frequency

Angle	(dB				
0	0	-14.66	-10.09	-4.35	0.440039
15	-0.64	-16.8	-12.03	-3.59	-0.06413
30	-2.84	-13.14	-17.61	-3.4	-1.16402
45	-6.26	-6.21	-21.36	-7.44	-2.58169
60	-8.25	1.01	-21.57	-10.3	-0.44974
75	-7.26	4.08	-10.46	-11.43	2.28291
90	-5.09	4.65	-4.42	-10.31	4.003069
105	-3.38	4.41	-3.46	-11.32	4.302735
120	-2.32	2.85	-3.74	-12.21	3.663312
135	-2.34	-2.43	-5.88	-11.21	1.225517
150	-1.71	-4.13	-6.4	-7.48	1.379217
165	-0.34	-2.48	-5.83	-4.17	3.05511
180	2.05	-4.16	-6.48	-1	4.220079
195	2.19	-6.76	-7.89	-2.66	3.18338
210	1.3	-7.5	-9.85	-4.78	1.874203
225	-0.89	-2.61	-9.67	-2.99	2.543073
240	-0.82	-3.34	-10.05	-6.11	1.583536
255	-0.71	-6.54	-9.54	-10.71	0.074899
270	-6.88	-8.25	-5.98	-4.74	-0.34788
285	-7.74	-3.49	-5.63	-7.4	0.124593
300	-4.36	-1.1	-6.39	-11.34	0.971129
315	-3.59	-5.27	-11	-5.5	0.083448
330	-2.44	-9.01	-14.96	-5.03	-0.68398
345	1.2	-12.39	-13.25	-1.5	1.752892
360	0	-14.66	-10.09	-4.35	0.440039

Peak DG

XZ	Polarization	Frequency	5470
Theta	Angle	(dB	
0		-3.25	0.1
15		-6.7	0.6
30		-12	-0.45
45		-4.25	-10.46
60		-7.15	-1.31
75		-23.16	-4.9
90		-5	-9.94

-1.66	-3.09	4.153025
2.07	-2.73	4.943036
-4.55	-3.75	1.735467
-3.66	-11.4	-0.73241
-7.78	-6.1	0.838935
-5.33	-7.72	-1.98784
-4.27	-7.58	-0.39885

105	-8.5	-8.11	-5.49	-6.36	-1.006
120	-8.19	-11.7	-1.18	-13.99	-1.29874
135	-4.57	0.79	-3.59	-14.81	2.039451
150	-7.18	-9.08	-0.15	-6.45	1.014724
165	-5.37	2.99	-3.21	-8.72	3.542862
180	-4.79	-1.32	-1.5	-4.6	3.122969
195	-5.56	-5.7	1.16	-7.44	2.323943
210	-8.78	0.16	0.26	-8.77	2.851627
225	-7.96	-4.47	3.3	-10.4	2.803371
240	-5.61	-8.16	-4.93	-4.47	0.339243
255	-8.29	-7.11	-0.98	-13.77	-0.33522
270	-8.62	-6.94	-4.79	-10.88	-1.50242
285	-4.63	-3.86	-4.47	-8.86	0.773693
300	-5.06	-0.77	-8.58	-6.74	1.237659
315	-7.42	1.17	-9.57	-4.8	1.859708
330	-3.94	2.62	-16.54	-7.48	2.140834
345	-9.02	4.03	-8.87	-7.38	2.709334
360	-3.25	0.1	-1.66	-3.09	4.153025

Phi

0	-3.79	-1.42	-5.92	-1.37	3.093001
15	-1.63	-11.51	-12.6	-3.11	0.121281
30	-1.33	-11.94	-22.89	-15.84	-3.45205
45	-1.71	-17.62	-18.43	-13.16	-3.79255
60	-1.9	-14.13	-16.25	-10.7	-2.81829
75	-0.42	-12.57	-11.44	-6.98	-0.42881
90	0	-14.66	-10.09	-4.35	0.440039
105	-2.48	-15.97	-16.13	-2.97	-1.02592
120	-0.93	-21.83	-10.52	-3.93	-0.38458
135	-0.11	-12.83	-9.56	-0.31	1.984326
150	-4.98	-15.15	-9.61	-0.85	-0.10509
165	-3.76	-18.18	-28.06	-2.3	-2.05382
180	-5.52	-2.26	-4.35	-3.3	2.247128
195	-4.16	-10.37	-12.75	-1.64	-0.08364
210	-4.78	-3.5	-10.26	1.6	2.779552
225	-1.19	-2.73	-10.62	3.01	4.378247
240	2.43	-12.97	-3.61	3.2	5.232007
255	1.15	-7.79	-6.94	3.21	4.726456

Peak

DG

270	2.05	-4.16	-6.48	-1	4.220079
285	1.03	-6.38	-9.88	-0.6	3.105248
300	-0.16	-4.5	-10.87	1.44	3.647776
315	-1.56	-7.53	-16.29	-9.62	-1.21211
330	-2.21	-4.09	-11.33	-1.73	1.905292
345	-0.6	-16.32	-12.94	4.01	3.221829
360	-3.79	-1.42	-5.92	-1.37	3.093001

Peak DG

YZ

Polarization
Theta Frequency
Angle (dB) 5470

0	-3.77	-1.39	-5.81	-1.37	3.126017
15	-3.28	-9.02	-3.87	2.26	3.455375
30	-13.16	-11.7	-9.71	-3.24	-2.52535
45	-9.43	-10.58	-3.04	-3.62	-0.01154
60	-8.42	-7.65	-10.29	-6.62	-2.12313
75	-10.77	-10.73	-7.8	-15.98	-4.83408
90	-7.07	-9.1	-3.64	-11.33	-1.2957
105	-7.15	-5.73	0.8	-3.23	2.740657
120	-4.63	-8.09	-3.23	-5.72	0.779827
135	-5.67	-8.05	-3.2	2	3.128479
150	-6.64	-18	-8.2	1.37	0.633704
165	-4.84	-4.52	-7.37	-5.72	0.476364
180	-4.79	-1.32	-1.5	-4.6	3.122969
195	-16.42	-13.43	-4.46	-8.19	-3.40125
210	-9.92	-6.87	-10.06	-9.13	-2.8765
225	-3.14	-6.7	-15.4	-7.14	-1.06912
240	-14.4	-3.13	-7.24	-6.6	-0.96247
255	-6.99	-4.61	-3.28	-10.58	0.072027
270	-4.7	-10.03	-3.5	-6.13	0.253904
285	-13.18	-4.64	-8.07	-11.74	-2.73859
300	-1.04	-4.33	-3.95	-8.54	1.949664
315	-0.46	-5.64	-5.43	-4.96	2.181211
330	-1.25	-6.4	-10.69	-5.53	0.691475
345	1.4	-6.55	-7.39	-5.7	2.249432
360	-3.77	-1.39	-5.81	-1.37	3.126017

Phi					Peak	DG	
	0	-3.27	0.08	-1.71	-3.09		4.129705
	15	-15.73	2.13	-1.56	-3.81		3.292757
	30	-16	-3.94	-2.64	-8.24		-0.35918
	45	-12.03	-2.04	-6.72	-4.87		0.311972
	60	-4.72	0.56	-10.91	-17.19		0.300199
	75	-2.67	4.67	-2.02	-7.22		5.285394
	90	-5.09	4.65	-4.42	-10.31		4.003069
	105	-6.04	1.8	-1.48	-9.44		3.256589
	120	-9.02	0.96	-4.82	-14.32		0.973831
	135	-6.38	2.13	1.15	-5.32		4.713616
	150	-5.26	0.06	1.09	-9.46		3.587893
	165	-2.79	3.87	0.81	-6.23		5.73912
	180	-5.52	-2.26	-4.35	-3.3		2.247128
	195	-9.99	-2.65	-2.83	-11.08		0.234959
	210	-17.88	-9.94	-12.95	-10.37		-6.24703
	225	-4.68	-4.52	-11.28	-14.29		-1.70463
	240	-7.26	-1.42	-11.8	-10.34		-0.70623
	255	-7.23	-7.01	-9.2	-12.2		-2.65426
	270	-6.88	-8.25	-5.98	-4.74		-0.34788
	285	-8.52	-1.82	-14.72	-8.01		-1.0747
	300	-11.47	-4.42	-8.46	-15.06		-2.96051
	315	-9.92	-1.22	-10.88	-14.05		-1.55455
	330	-13.26	0.82	-9.42	-10.56		-0.21624
	345	-19.52	1.59	-5.51	-17.38		-0.12227
	360	-3.27	0.08	-1.71	-3.09		4.129705
					Peak	DG	

Appendix - 5600MHz Test Result

(i) If transmit signals are correlated, then

Directional gain = $10 \log[(10G_1 / 20 + 10G_2 / 20 + \dots + 10G_N / 20)^2 / NANT]$ dBi [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

eg	Theta	0 Gain phi(XY)	-9.03	-9.96	-2.24	1.27	
		Directional gain = $10 \log[(10G_1 / 20 + 10G_2 / 20 + \dots + 10G_N / 20)^2 / NANT]$ dBi					
5600MHz		Peak gain	2.95	4.54	2.62	3.16	MAX DG gain
XY							5.88986
	Angle	Ant1	Ant2	Ant3	Ant4		DG gain
	Theta	0 Gain theta(XY)	-11.86	-11.45	-1.68	-13.43	-2.15769
	15		-7.76	-8.82	-7.12	-12.09	-2.72963
	30		-11.13	-6.05	-5.92	-13.54	-2.54427
	45		-13.71	-11.72	-9.38	-9.03	-4.73943
	60		-16.34	-16.21	-4.94	-8.84	-4.18896
	75		-17.71	-14.33	-3.37	-8.82	-3.33119
	90		-14.55	-12.4	-6.46	-8.2	-3.79839
	105		-14.38	-13.67	-8.87	-11.04	-5.68875
	120		-15.34	-17.11	-7.23	-18.28	-7.25634
	135		-16.82	-14.57	-1.31	-19.72	-3.77961
	150		-12.88	-9.91	-1.94	-12.18	-1.97967
	165		-11.13	-7.99	-5.74	-10.38	-2.52589
	180		-16.77	-10.43	-4.51	-11.57	-3.70898
	195		-10.51	-8.11	-2.82	-10.11	-1.27822
	210		-7.4	-6.2	-2.08	-9.79	0.118063
	225		-8.91	-6.51	-5.1	-13.41	-1.93511
	240		-6.01	-7.28	-5.57	-10.44	-1.10859
	255		-4.32	-7.61	-4.42	-8.09	0.085146
	270		-5.78	-5.02	-5.84	-6.54	0.242287
	285		-7.6	-5.89	-5.5	-8.16	-0.69517
	300		-9.39	-8.93	-4.81	-11.05	-2.20323
	315		-8.4	-12.7	-9.79	-11.99	-4.52885
	330		-9.13	-12.68	-5.51	-12.38	-3.39769
	345		-11.62	-10.63	-2.84	-12.82	-2.46299
	360		-11.86	-11.45	-1.68	-13.43	-2.15769

Peak DG

Phi Frequency

Angle	(dB				
0	0.3	-14.68	-10.85	-1.94	1.237436
15	-0.36	-14.4	-11.63	-3.54	0.329551
30	-2.8	-13.26	-13.98	-7.07	-2.02116
45	-3.44	-7.9	-11.46	-9.32	-1.48874
60	-5.47	0.1	-14.05	-12.91	-0.13619
75	-8.13	3.26	-10.27	-18.23	1.125913
90	-2.6	4.27	-4.07	-16.25	3.962495
105	-1.54	3.97	-1.18	-6.03	5.550783
120	-1.6	2.8	0.19	-3.77	5.76085
135	-2.68	-0.92	-2.42	-4.2	3.543338
150	-1.06	-3.44	-5.47	-4.12	2.64876
165	0.59	-3.87	-9.59	-2.89	2.795187
180	1.09	-3.05	-11.48	-0.48	3.666849
195	2.31	-5.51	-14.3	-2.09	2.96537
210	2.95	-8.28	-15.17	-4.15	2.226743
225	0.39	-2.02	-9.51	-2.75	3.23222
240	-0.17	-2.75	-10.56	-5.4	2.085478
255	-0.27	-6.47	-15.75	-10.06	-0.34847
270	-4.95	-10.11	-11.94	-7.01	-2.06432
285	-6.23	-2.46	-7.76	-8.84	0.052461
300	-4.1	0.39	-5.67	-9	2.093384
315	-2.97	-4.46	-10.69	-4.41	0.838711
330	-1.82	-10.72	-19.7	-4.79	-1.00415
345	0.74	-17.2	-34.93	-3.23	-0.28994
360	0.3	-14.68	-10.85	-1.94	1.237436

XZ	Polarization					Peak	DG
	Theta	Frequency	5600				
		Angle	(dB				
		0	-6.36	0.54	-1.67	-3.07	3.728766
		15	-10.7	2.02	2.62	-3.06	5.126452
		30	-8.61	-7	-3.89	-7.64	-0.57567
		45	-8	-3.5	-17.41	-14.76	-3.19786
		60	-8.22	-9.39	-9.06	-8.59	-2.78295
		75	-11.29	-4.86	-4.16	-8.78	-0.78384
		90	-11.86	-11.45	-1.68	-13.43	-2.15769

105	-11.09	-11.98	-6.04	-9.37	-3.28871
120	-6.64	-3.76	-1.49	-10.82	1.001114
135	-13.6	-9.54	-1.87	-9.94	-1.58146
150	-16.6	-5.36	-4.7	-14.9	-2.79676
165	-12.83	-1.2	-0.1	-7.15	2.030987
180	-6.2	-2.03	-1.96	-2.82	2.929174
195	-6.58	-2.83	-0.69	-8.34	1.928503
210	-18.89	-6.3	-1.96	-8.8	-1.11589
225	-9.67	-1.01	1.67	-10.79	2.668947
240	-10.42	-2.08	-3	-7.09	0.978043
255	-10.78	-5.96	-2.36	-13.68	-1.10215
270	-16.77	-10.43	-4.51	-11.57	-3.70898
285	-15.29	-5.68	-8.11	-20.73	-4.60492
300	-11.56	-2.78	-4.48	-4.44	0.777064
315	-13.14	-2.18	-23.32	-5.82	-2.05711
330	-3.01	2.57	-8.76	-8.17	2.942974
345	-11.2	4.43	-5.5	-13.14	2.580671
360	-6.36	0.54	-1.67	-3.07	3.728766

Phi

				Peak	DG
0	-3.94	-1.01	-4.16	-2.47	3.219828
15	-2.43	-13.49	-7.37	-6.41	-0.56665
30	-3.19	-12.18	-13.75	-17.45	-3.88904
45	-3.26	-11.3	-22.5	-11.18	-3.67262
60	-1.47	-15.16	-14.35	-7.79	-1.83897
75	-0.21	-9.11	-9.31	-7.03	0.481409
90	0.3	-14.68	-10.85	-1.94	1.237436
105	-3.56	-14.63	-15.43	-1.93	-0.82249
120	-1.9	-10.48	-15	-2.01	0.315553
135	-0.96	-12.5	-18.54	-2.56	-0.0194
150	-5.45	-9.03	-15.1	-3.85	-1.38469
165	-6.85	-16.62	-18.69	-3.66	-3.25796
180	-6.43	-2.59	-3.45	-3.64	2.106811
195	-3.17	-6.97	-15.04	1.17	1.811014
210	-0.92	-2.35	-10.34	1.43	3.933209
225	1.24	-3.15	-10.1	1.61	4.520484
240	2.78	-10.51	-1.66	3.16	5.88986
255	2.44	-6.55	-8.32	2.84	5.021176

270	1.09	-3.05	-11.48	-0.48	3.666849
285	-0.38	-6.56	-10.2	-0.09	2.68931
300	0.79	-4.05	-9.48	1.7	4.282236
315	-1.44	-11.13	-12.17	-8.38	-1.1486
330	-1.25	-5.54	-9.24	-3.48	1.617715
345	-0.49	-16.44	-12.24	2.71	2.626942
360	-3.94	-1.01	-4.16	-2.47	3.219828

Peak DG

YZ

Polarization
Theta Frequency
Angle (dB) 5600

0	-3.94	-0.98	-4.1	-2.46	3.244496
15	-6.3	-10.73	-6.79	1.5	1.65939
30	-4.09	-10.81	-16.14	-8.19	-2.74561
45	-4.01	-7.08	-4.52	-10.02	-0.07584
60	-7.85	-17.57	-8.6	-11.18	-4.54684
75	-8.66	-9.27	-7.2	-11.42	-2.98719
90	-14.55	-12.4	-6.46	-8.2	-3.79839
105	-18.55	-9.99	-0.27	-3.84	0.201083
120	-15.27	-11.89	1.44	-2.17	1.532913
135	-9.11	-14.18	1.2	-1.67	2.004044
150	-7.86	-11.74	0.05	-2.22	1.740116
165	-6.63	-18.22	-8.92	0.94	0.262044
180	-6.2	-2.03	-1.96	-2.82	2.929174
195	-4.92	-8.24	-11.16	1.02	1.42328
210	-12.6	-19.7	-5.75	-11.31	-4.99202
225	-6.31	-14.31	-7.94	-9.56	-3.03824
240	-9.97	-4.36	-8.46	-8.53	-1.54146
255	-11.41	-9.6	-2.77	-11.16	-1.91862
270	-5.78	-5.02	-5.84	-6.54	0.242287
285	-8.73	-9.26	-8.77	-13.77	-3.87925
300	1.35	-3.68	-5.93	-9.37	2.503276
315	0.33	-4.54	-6.5	-8.43	1.881308
330	-4.11	-10.49	-6.03	-6.45	-0.45815
345	-2.56	-20.15	-11.56	-5.1	-1.60189
360	-3.94	-0.98	-4.1	-2.46	3.244496

Phi					Peak	DG	
	0	-6.36	0.53	-1.7	-3.08		3.714967
	15	-12.3	2.62	-0.14	-4.74		3.968119
	30	-11.59	-2.36	-1.95	-11.84		0.341424
	45	-14.03	2.77	-6.26	-7.55		1.868946
	60	-7.4	1.69	-12.77	-15.42		0.174895
	75	-2.19	4.54	-4.68	-6.99		4.846697
	90	-2.6	4.27	-4.07	-16.25		3.962495
	105	-6.62	2.24	-2.05	-11.89		2.938101
	120	-8.74	0.52	-3.34	-12.32		1.401358
	135	-8.01	0.94	2.19	-13.76		3.532899
	150	-9.03	1.1	0.62	-11.67		2.995174
	165	-5.46	3.77	1.51	-9.51		5.108496
	180	-6.43	-2.59	-3.45	-3.64		2.106811
	195	-10.82	-3.45	0	-8.17		1.401989
	210	-10.7	-13.11	-16.66	-12		-6.83139
	225	-4.69	-4.46	-9.67	-12.09		-1.11895
	240	-7.79	-2.68	-8.24	-13.22		-1.1703
	255	-6.76	-4.71	-10.36	-14.32		-2.29091
	270	-4.95	-10.11	-11.94	-7.01		-2.06432
	285	-13.45	-2.3	-14.69	-5.6		-1.46787
	300	-9.59	-3.75	-11.23	-12.56		-2.55179
	315	-12.37	-3.42	-15.14	-22.89		-4.71705
	330	-13.9	2.96	-7.53	-7.82		1.707845
	345	-11.22	1.98	-3.25	-17		1.437394
	360	-6.36	0.53	-1.7	-3.08		3.714967

Peak DG

Appendix - 5725MHz Test Result

(i) If transmit signals are correlated, then

Directional gain = $10 \log[(10G_1 / 20 + 10G_2 / 20 + \dots + 10G_N / 20)^2 / NANT]$ dBi [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

eg	Theta	0 Gain phi(XY)	-9.03	-9.96	-2.24	1.27	
		Directional gain = $10 \log[(10G_1 / 20 + 10G_2 / 20 + \dots + 10G_N / 20)^2 / NANT]$ dBi					
5725MHz		Peak gain	4	4.57	3.42	2.82	MAX DG gain
XY	Angle	Ant1	Ant2	Ant3	Ant4		DG gain
	Theta	0 Gain theta(XY)	-6.48	-13.86	-9.65	-8.38	-3.17715
	15		-7.73	-11.12	-5.38	-9.72	-2.19434
	30		-9.73	-14.41	-5.84	-8.3	-3.02615
	45		-8.2	-6.17	-4.67	-15.27	-1.73952
	60		-7.7	-5.37	-2.58	-17.41	-0.77752
	75		-7.44	-5.5	-1.9	-15.59	-0.33117
	90		-6.37	-4.88	-4.21	-14.68	-0.67323
	105		-6	-6.61	-6.42	-6.89	-0.45335
	120		-6.04	-10.97	-8.21	-4.56	-1.10119
	135		-6.59	-8.58	-8.19	-4.31	-0.72899
	150		-8.88	-6.13	-3.15	-6.08	0.197124
	165		-11.82	-4.28	-0.54	-7.71	0.901517
	180		-7.1	-2.75	-2.77	-6.4	1.495455
	195		-7.77	-4.6	-4.83	-8.98	-0.32423
	210		-9.89	-6.54	-5.79	-13.57	-2.41613
	225		-6.87	-1.55	-4.12	-11.26	0.771656
	240		-7.37	-2.54	-3.15	-11.96	0.517079
	255		-9.3	-6.14	-3.16	-12.09	-1.01432
	270		-11.48	-4.07	-9.09	-10.02	-2.16237
	285		-4.96	-4.67	-16.11	-8.41	-1.48705
	300		-2.69	-6.46	-11.74	-7.9	-0.58125
	315		-7.18	-6.52	-4.91	-9.5	-0.85385
	330		-8.04	-8.31	-6.13	-10.41	-2.07048
	345		-6.87	-12.64	-10.9	-10.48	-3.93705
	360		-6.48	-13.86	-9.65	-8.38	-3.17715

Peak DG

Phi Frequency

Angle	(dB)				
0	-0.25	-10.87	-11.4	-3.99	0.662658
15	-1.26	-13.38	-11.97	-5.4	-0.59145
30	-4.45	-17.75	-12.6	-7.89	-3.30985
45	-5.13	-9.94	-13.74	-5.76	-1.97506
60	-7.6	-1.33	-11.53	-8.18	-0.30949
75	-10.08	1.93	-9.14	-12.74	0.595644
90	-2.25	3.17	-6.94	-12.51	3.22404
105	-0.53	3.43	-1.12	-4.9	5.740142
120	-0.09	3.08	1.52	-2.49	6.76375
135	-1.27	0.67	-0.13	-2.01	5.39661
150	-0.52	-1.58	-2.65	-0.88	4.650458
165	0.62	-3.33	-7.71	-0.38	3.874623
180	1.03	-2.18	-10.12	-0.96	3.837933
195	2.94	-4.66	-13.89	-2.65	3.307048
210	4	-7.8	-14.06	-4	2.988643
225	0.88	-1.26	-6.86	-2.47	4.022538
240	0.38	-1.77	-8.09	-5.25	2.924896
255	0.7	-4.91	-16.82	-9.46	0.5586
270	-3.09	-11.29	-12.06	-5.12	-1.0253
285	-4.45	-2.94	-8.63	-7.82	0.37672
300	-3.42	0.14	-6.83	-11	1.684829
315	-3.16	-5.04	-10.57	-5.15	0.438817
330	-2.56	-14.1	-16.4	-5.82	-1.91103
345	0.18	-13.55	-18.09	-3.59	0.074055
360	-0.25	-10.87	-11.4	-3.99	0.662658

XZ	Polarization		5725						Peak	DG
	Theta	Frequency								
		Angle (dB)								
		0		-4.39	0.52	-2.32	-3.83		3.733404	
		15		-11.61	-3.31	-0.17	-7.12		1.463446	
		30		-4.6	-6.05	-0.45	-11.48		1.226602	
		45		-15.27	-6.12	-2.85	-10.13		-1.41927	
		60		-23.21	-1.94	-8.2	-17.16		-3.1188	
		75		-6.43	-19.97	-17.81	-15.73		-7.23525	
		90		-6.48	-13.86	-9.65	-8.38		-3.17715	

105	-8.17	-9.21	-7.24	-14.58	-3.36339
120	-17.76	-7.87	-11.39	-16.19	-6.3928
135	-6.3	-2.84	-27.74	-12.41	-2.58076
150	-4.87	-8.27	-1.05	-4.96	1.611865
165	-5.8	-3.53	-0.59	-8.61	1.883614
180	-5.75	-4.51	-1.41	-5.39	1.933363
195	-9.39	-7.12	1.95	-15.66	0.813253
210	-8.76	-1.11	-2.63	-9.43	1.293723
225	-11.59	-7.8	0.55	-9.46	0.30967
240	-8.31	-5.03	-7.88	-9.5	-1.49808
255	-8.84	-0.04	-6.73	-8.47	0.807061
270	-7.1	-2.75	-2.77	-6.4	1.495455
285	-7.56	-2.61	-14.47	-6.41	-0.78893
300	-5.85	0.07	-10.69	-5.2	1.436274
315	-3.93	-1.86	-4.66	-3.39	2.622584
330	-10.79	3.7	-2.88	-4.13	3.970946
345	-8.21	4.57	-0.86	-7.25	4.661772
360	-4.39	0.52	-2.32	-3.83	3.733404

Phi

				Peak	DG
0	-4.16	-1.17	-4.41	-3.72	2.756297
15	-3.08	-17.27	-6.56	-7.91	-1.35797
30	-1.92	-10.7	-11.33	-14.66	-2.21577
45	-4.28	-9.19	-25.01	-12.75	-4.11961
60	-1.51	-12.74	-17.21	-8.6	-2.04462
75	-1.6	-9.11	-11.43	-7.77	-0.63442
90	-0.25	-10.87	-11.4	-3.99	0.662658
105	-2.54	-14.22	-18.55	-2.53	-0.88403
120	-2.21	-8.47	-14.2	-4.31	-0.19184
135	-1.93	-8.93	-15.07	-5.13	-0.49675
150	-6.75	-8.63	-16.32	-6.07	-2.61594
165	-6.7	-19.04	-17.86	-2.42	-2.74046
180	-5.55	-2.83	-2.12	-3.69	2.565038
195	-1.31	-5.14	-10.6	0.68	2.891198
210	1.47	-1.31	-11.51	2.37	5.162889
225	1.46	-2.58	-9.3	0.68	4.480977
240	2.19	-7.84	-1.49	2.29	5.657668
255	2.74	-6.17	-10.36	2.33	4.794546

270	1.03	-2.18	-10.12	-0.96	3.837933
285	0.65	-6.87	-9.25	1.7	3.78435
300	-0.46	-3.54	-9.79	1.58	3.910126
315	-2.96	-9.62	-13.61	-6.09	-1.17826
330	-0.63	-4.46	-10.95	-3.99	1.739994
345	-0.29	-14.71	-8.44	0.85	2.386042
360	-4.16	-1.17	-4.41	-3.72	2.756297

Peak DG

YZ

Polarization
Theta Frequency 5725
Angle (dB)

0	-4.15	-1.14	-4.35	-3.7	2.786006
15	-0.93	-12.72	-11.47	-5.66	-0.36428
30	-4.21	-8.85	-4.74	-2.46	1.250375
45	-11.77	-13.7	-3.34	-8.92	-2.4795
60	-9.32	-7.87	-6.49	-9.07	-2.09292
75	-10.43	-9.01	-6.99	-9.31	-2.82366
90	-6.37	-4.88	-4.21	-14.68	-0.67323
105	-7.22	-6.28	-1.66	-2.18	2.024197
120	-8.87	-6.98	-2.56	-0.2	2.041283
135	-3.88	-4.96	0	1.84	4.712132
150	-7.8	-4.68	-2.61	2.82	3.84814
165	-7.74	-8	-2.47	-5.01	0.516331
180	-5.75	-4.51	-1.41	-5.39	1.933363
195	-4.11	-16.02	-3.11	-2.96	0.793802
210	-7.03	-7.39	-16.7	-4.15	-1.73121
225	-6.97	-3.29	-11.26	-2.36	0.702726
240	-6.48	-15.36	-3.49	-9.31	-1.63762
255	-7.95	-3.56	-8.37	-7.08	-0.49945
270	-11.48	-4.07	-9.09	-10.02	-2.16237
285	-6.38	-7.9	-5.36	-6.64	-0.50264
300	3.24	-4.62	-9.88	-9.44	2.598678
315	-3.64	-8.57	-6.09	-5.78	0.174316
330	0.08	-6.01	-2.11	-9.35	2.394999
345	-5.9	-6.66	-6.44	-0.3	1.634102
360	-4.15	-1.14	-4.35	-3.7	2.786006

Phi				Peak	DG
0	-4.4	0.5	-2.35	-3.85	3.712878
15	-13.57	2.63	0.11	-8.18	3.422733
30	-9.96	0.05	-2.42	-15.17	1.041078
45	-10.29	2.39	-7.68	-8.03	1.699978
60	-6.02	1.78	-13.18	-16.01	0.444695
75	-1.63	4.02	-9.32	-10.76	3.662994
90	-2.25	3.17	-6.94	-12.51	3.22404
105	-3.26	2.7	-1.4	-13.46	3.848879
120	-8.36	-0.81	-1.51	-10.62	1.683568
135	-12.12	-0.67	1.34	-14.19	2.060756
150	-8.51	0.44	1.94	-16.11	3.027767
165	-4.18	2.51	3.42	-8.46	5.60511
180	-5.55	-2.83	-2.12	-3.69	2.565038
195	-9.37	-6.04	0.93	-6.98	1.582274
210	-9.23	-17.4	-12.35	-14.58	-6.8556
225	-4.55	-3.74	-10.46	-9.09	-0.47555
240	-4.89	-2.36	-5.6	-11.99	0.456288
255	-4.5	-6.05	-11.07	-13.57	-2.02988
270	-3.09	-11.29	-12.06	-5.12	-1.0253
285	-13.72	-2.52	-17.55	-7.78	-2.52697
300	-9.19	-5.01	-10.33	-9.97	-2.32342
315	-8.67	-3.45	-14.26	-11.99	-2.58095
330	-14.9	3.33	-6.3	-8.21	2.007042
345	-12.22	1.01	-4.19	-14.1	0.759539
360	-4.4	0.5	-2.35	-3.85	3.712878

Peak DG

Appendix - 5785MHz Test Result

(i) If transmit signals are correlated, then

Directional gain = $10 \log[(10G1/20 + 10G2/20 + \dots + 10GN/20)^2 / NANT]$ dBi [Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

eg	Theta	0 Gain phi(XY)	-9.03	-9.96	-2.24	1.27	
		Directional gain = $10 \log[(10G1/20 + 10G2/20 + \dots + 10GN/20)^2 / NANT]$ dBi					
5785MHz		Peak gain	4.05	4.99	4.11	3.25	MAX DG gain
XY							7.15344
	Angle	Ant1	Ant2	Ant3	Ant4		DG gain
	Theta	0 Gain theta(XY)	-23.39	-13.61	-4.78	-15.21	-5.79154
	15		-8.22	-11.15	-11.22	-10.07	-4.05713
	30		-16.32	-9.66	-9.27	-10.43	-4.98585
	45		-12.28	-7.18	-5.44	-8.48	-1.98168
	60		-12.32	-7.58	-5.7	-7.49	-1.93323
	75		-14.23	-8.6	-6.79	-7.33	-2.77234
	90		-17.23	-5.66	-7.73	-8.3	-2.76916
	105		-10.16	-6.63	-10.25	-7.67	-2.51409
	120		-7.54	-9.78	-13.65	-7.14	-3.15174
	135		-10.3	-8.59	-6.25	-7.31	-1.96296
	150		-12.79	-9.39	-4.53	-8.81	-2.35604
	165		-14.75	-9.39	-3.55	-11.1	-2.70163
	180		-16.2	-5.16	-1.94	-14.67	-1.45512
	195		-12.26	-5.19	-2.22	-15.55	-1.23294
	210		-9.64	-5.23	-3.45	-15.8	-1.35236
	225		-9.05	-2.75	-4.42	-17.15	-0.81247
	240		-6.42	-3.33	-3.46	-14.06	0.123604
	255		-5.23	-5.19	-2.67	-11.54	0.415634
	270		-7.89	-5.45	-7.6	-9.42	-1.45226
	285		-7.19	-6.91	-9.71	-10.15	-2.34876
	300		-5.79	-9.7	-7.73	-11.43	-2.38547
	315		-6.35	-10.73	-8.15	-12.09	-3.02378
	330		-9.63	-13.11	-5.56	-15.38	-4.0929
	345		-23.32	-17.39	-4.4	-24.64	-7.28571
	360		-23.39	-13.61	-4.78	-15.21	-5.79154

Phi Frequency Peak DG

Angle	(dB)				
0	-0.78	-11.12	-11.74	-5.62	-0.11143
15	-1.82	-12.18	-12.24	-5.99	-0.90018
30	-4.43	-14.37	-12.46	-6.77	-2.5651
45	-4.4	-10.67	-13.29	-5.34	-1.65731
60	-5.94	-1.42	-11.35	-7.16	0.269721
75	-7.48	1.95	-9.07	-10.3	1.333321
90	-2	3.37	-6.83	-12.05	3.445039
105	-0.18	3.74	-0.8	-5.2	5.975307
120	0.35	3.45	1.91	-2.13	7.15344
135	-1.47	0.76	0.56	-0.23	5.968787
150	-0.87	-1.8	-1.66	0.37	5.074214
165	0.39	-3.66	-6.05	0.37	4.200743
180	0.87	-1.78	-9.8	-0.89	3.935287
195	2.89	-4.17	-15.03	-1.83	3.523946
210	4.05	-8.07	-14.46	-2.62	3.280493
225	1.5	-1.37	-7.23	-2.96	4.051971
240	0.48	-1.43	-8.57	-5.92	2.871743
255	0.09	-3.41	-19.1	-9.97	0.481335
270	-3.02	-8.45	-12.5	-5.92	-0.78447
285	-3.84	-3.66	-7.83	-8.26	0.38721
300	-3.01	-0.83	-5.6	-10.52	1.722413
315	-2.92	-5.22	-9.26	-5.6	0.554862
330	-2.05	-12.01	-13.89	-5.99	-1.18717
345	0.12	-11.05	-26.43	-5.97	-0.70184
360	-0.78	-11.12	-11.74	-5.62	-0.11143

XZ	Polarization		5785						Peak	DG
	Theta	Frequency								
		Angle		(dB						
		0		-6.71	0.63	-1.36	-3.97			3.594719
		15		-14.22	-0.14	0.46	-7.75			2.420246
		30		-7.51	-10.93	-1.31	-12.62			-0.91893
		45		-16.58	-4.87	-4.91	-14.62			-2.65624
		60		-7.84	-10.81	-15.36	-9.85			-4.53946
		75		-7.67	-11.46	-7.9	-11.45			-3.40653
		90		-23.39	-13.61	-4.78	-15.21			-5.79154

105	-8.76	-27.23	-9.68	-9.02	-5.2693
120	-12.9	-4.51	-12.26	-13.2	-3.84931
135	-12.63	-6.15	-12.51	-17.48	-5.21849
150	-7.6	-11.89	-0.43	-12.65	-0.64887
165	-6.31	-11.86	-0.67	-6.2	0.646038
180	-5.52	-4.52	-1.62	-3.69	2.304517
195	-9.32	-4.54	1.15	-12.07	1.310252
210	-13.63	-4.58	-0.68	-13.21	-0.25726
225	-13.47	-4.37	-0.89	-12.36	-0.17404
240	-18.06	-1.14	-6.05	-15.62	-1.58755
255	-10.49	-1.22	-5.92	-8.22	0.264405
270	-16.2	-5.16	-1.94	-14.67	-1.45512
285	-15.82	-5.89	-13.23	-17.11	-5.7902
300	-7.67	-3.29	-6.25	-5.29	0.543184
315	-9.78	-3.64	-13.9	-10.44	-2.58934
330	-5.4	3.84	-4.13	-10.04	3.606408
345	-14.89	4.99	-3.1	-10.36	3.403939
360	-6.71	0.63	-1.36	-3.97	3.594719

Phi

0	-4.87	-0.95	-4.22	-3.5	2.768385
15	-4.77	-12.53	-8.94	-6.99	-1.83984
30	-3.97	-15.17	-14.54	-14.04	-4.4832
45	-4.77	-11.78	-27.84	-13.36	-5.26891
60	-2.11	-12.34	-18.01	-9.39	-2.55186
75	-2.24	-13.22	-12.1	-6.89	-1.45442
90	-0.78	-11.12	-11.74	-5.62	-0.11143
105	-2.73	-18.29	-29.94	-2.35	-1.68749
120	-2.14	-7.84	-14.92	-4.92	-0.29078
135	-2.69	-12.37	-16.22	-4.34	-1.23139
150	-6.41	-12.76	-25.37	-5.45	-3.76809
165	-9.34	-13.77	-19.63	-2.38	-3.03159
180	-5.99	-3.1	-1.4	-3.49	2.676711
195	-0.87	-4.66	-8.16	0.51	3.348696
210	1.5	-1.3	-11.32	3.12	5.46773
225	0.97	-2.96	-9.05	0.71	4.263222
240	1.65	-7.37	-1.65	2.3	5.500274
255	2.94	-6.71	-10.16	2.36	4.829232

Peak

DG

270	0.87	-1.78	-9.8	-0.89	3.935287
285	1.36	-7.19	-8.94	2.75	4.444577
300	-0.43	-4.87	-12.5	2.05	3.596352
315	-4.34	-8.76	-13.47	-5.9	-1.45998
330	-0.71	-3.18	-11.44	-4.97	1.752575
345	-0.92	-14.35	-6.81	1.42	2.687724
360	-4.87	-0.95	-4.22	-3.5	2.768385

Peak DG

YZ

Polarization
Theta Frequency
Angle (dB) 5785

0	-4.86	-0.92	-4.15	-3.49	2.798352
15	-3.09	-9.55	-12.9	-1.62	0.382351
30	-0.78	-7.7	-5.29	-5.52	1.582721
45	-7.64	-12.36	-5.21	-20.72	-3.76248
60	-11.79	-12.56	-4.59	-22.34	-4.74083
75	-8.14	-8.23	-10.99	-10.08	-3.25494
90	-17.23	-5.66	-7.73	-8.3	-2.76916
105	-7.22	-12.91	-4.32	-4.9	-0.73037
120	-7.32	-9.83	0.27	-2.7	1.998452
135	-9.01	-8.65	-0.27	3	3.822698
150	-7	-10.45	0.46	3.25	4.230731
165	-3.84	-11.77	-6.2	-0.69	1.266778
180	-5.52	-4.52	-1.62	-3.69	2.304517
195	-1.89	-9.04	-5.63	-0.34	2.418862
210	-11.41	-10.98	-11.12	-9.55	-4.71389
225	-9.34	-8.83	-7.28	-6.62	-1.92631
240	-7.12	-6.86	-4.4	-13.2	-1.3311
255	-13.18	-8.06	-3.46	-8.22	-1.54432
270	-7.89	-5.45	-7.6	-9.42	-1.45226
285	-6.26	-12.2	-6.47	-12.8	-2.879
300	1.72	-4.27	-7.84	-10.89	2.012835
315	-1.65	-6.21	-4.94	-6.11	1.501168
330	-3.37	-9.42	-4.64	-6.45	0.334434
345	-7.04	-22.7	-10.55	-2.95	-2.34512
360	-4.86	-0.92	-4.15	-3.49	2.798352

Phi

					Peak	DG
0	-6.71	0.61	-1.4	-3.99		3.572129
15	-9.9	3.11	0.9	-10.22		3.994893
30	-12.57	-0.91	-3.38	-13.11		0.1484
45	-7.24	2.21	-9.33	-9.06		1.649247
60	-4.39	1.45	-11.95	-13.39		1.029284
75	-2.26	4.47	-11.06	-14.18		3.284829
90	-2	3.37	-6.83	-12.05		3.445039
105	-2.21	3.52	-0.69	-13.37		4.642657
120	-10.3	-1.79	-0.18	-12.37		1.361721
135	-15.7	1.34	1.98	-10.79		3.154072
150	-7.36	0.66	1.17	-15.09		3.008021
165	-5.67	1.73	4.11	-9.3		5.317217
180	-5.99	-3.1	-1.4	-3.49		2.676711
195	-9.68	-5.57	2.22	-6.44		2.353275
210	-9.29	-14.96	-10.84	-15.03		-6.14214
225	-5.16	-3.55	-8.43	-9.07		-0.23137
240	-4.36	-2.82	-8.08	-10.39		0.107519
255	-3.7	-7.74	-10.17	-14.54		-2.15292
270	-3.02	-8.45	-12.5	-5.92		-0.78447
285	-15.08	-3.3	-22.61	-6.45		-3.03598
300	-8.95	-4.88	-10.89	-9.79		-2.29039
315	-9.64	-3.85	-13.15	-10.47		-2.55007
330	-16.29	3.17	-6.36	-8.73		1.729319
345	-11.12	0.6	-3.4	-14.79		0.858411
360	-6.71	0.61	-1.4	-3.99		3.572129

Peak

DG

Appendix - 5850MHz Test Result

(i) If transmit signals are correlated, then
Directional gain = 10 log[(10G1 /20 + 10G2 /20 + ... + 10GN /20)2 /NANT] dBi [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

eg	Theta	0 Gain phi(XY)	-9.03	-9.96	-2.24	1.27	
		Directional gain = 10 log[(10G1 /20 + 10G2 /20 + ... + 10GN /20)2 /NANT] dBi					
5850MHz		Peak gain	2.78	4.6	4.15	3.16	MAX DG gain 5.90146
XY	Angle	Ant1	Ant2	Ant3	Ant4		DG gain
	Theta	0 Gain theta(XY)	-7.89	-14.05	-6.26	-8.81	-2.78947
	15		-13.91	-13.58	-6.16	-9.64	-4.2037
	30		-11.07	-10.5	-4.88	-6.98	-1.95999
	45		-12.27	-7.38	-11.04	-8.6	-3.58847
	60		-13.22	-7.24	-7.76	-11.63	-3.58177
	75		-13.09	-8.15	-5.68	-12.44	-3.27584
	90		-9.98	-12.19	-7.22	-8.4	-3.23302
	105		-11.5	-12.64	-10.19	-9.64	-4.8946
	120		-14.41	-10.54	-15.4	-10.97	-6.55683
	135		-8.93	-8.97	-7.77	-9.15	-2.66685
	150		-9.63	-6.06	-5.69	-7.83	-1.14447
	165		-11.89	-4.51	-4.89	-7.84	-0.79828
	180		-9.67	-5.73	-7.73	-11.8	-2.42267
	195		-11.39	-9.03	-5.17	-10.77	-2.71039
	210		-16.45	-8.23	-3.26	-9.87	-2.23497
	225		-11.61	-1.32	-6.85	-11.17	-0.66507
	240		-11.27	-2.46	-7.54	-13.19	-1.59046
	255		-12.42	-8.17	-6.29	-15.88	-3.90939
	270		-16.94	-9.07	-10.04	-17.25	-6.50076
	285		-5.38	-6.28	-14.77	-10.79	-2.5284
	300		-2.79	-4.47	-15.6	-8.94	-0.69491
	315		-7.74	-7.89	-5.34	-10.69	-1.69085
	330		-7.56	-11.8	-6.12	-11.24	-2.82744
	345		-5.37	-12.39	-9.85	-10.79	-3.1633
	360		-7.89	-14.05	-6.26	-8.81	-2.78947
						Peak	DG
	Phi	Frequency					

Angle	(dB				
0	-3.19	-13.17	-14.82	-6.73	-2.18879
15	-3.96	-13.88	-13.04	-6.92	-2.44203
30	-5.62	-12.83	-12.13	-6.86	-2.77352
45	-5.87	-6.68	-14.81	-4.97	-1.31893
60	-6.95	-1.79	-13.64	-5.87	-0.08842
75	-6.82	0.97	-13.05	-7.59	0.883437
90	-1.63	3.16	-16.61	-9.56	2.760034
105	-0.83	3.28	-4.61	-7.36	4.569021
120	-1.24	2.47	-0.74	-3.52	5.531591
135	-2.75	-0.21	1.04	0.14	5.684501
150	-2.89	-2.84	-0.31	0.29	4.702905
165	-1.36	-4.76	-5.73	0.16	3.430918
180	1.65	-2.37	-8.78	-0.14	4.397801
195	2.65	-4.53	-12.45	-1.2	3.693343
210	2.78	-6.55	-11.85	-2.6	3.059578
225	1.25	-0.2	-5.76	-3.99	4.294048
240	0.47	-0.76	-7.06	-7.46	3.042933
255	-0.12	-3.89	-15.49	-15.21	-0.14481
270	-1.91	-6.97	-10.58	-11.42	-0.84227
285	-2.01	-4.86	-8.07	-12.65	-0.03097
300	-1.43	-2.9	-6.76	-11.68	1.153931
315	-1.66	-7.02	-10.37	-7.24	0.040056
330	-2.07	-13.85	-13.66	-5.63	-1.30274
345	-2.17	-14.58	-24.74	-10.04	-3.48961
360	-3.19	-13.17	-14.82	-6.73	-2.18879

XZ	Polarization					Peak	DG
	Theta	Frequency	5850				
		Angle	(dB				
		0	-4.43	-0.04	-2.63	-5.34	3.153353
		15	-8.16	-3.46	-1.16	-20	0.160302
		30	-12.43	-6.01	-0.73	-9.68	-0.05598
		45	-8.15	-17.93	-0.32	-13.05	-1.38806
		60	-14.79	-5.97	-2.67	-27.84	-2.72753
		75	-11.26	-8.96	-12.27	-13.13	-5.24005
		90	-7.89	-14.05	-6.26	-8.81	-2.78947

105	-11.74	-5.21	-2.18	-27.99	-1.8002
120	-8.37	-15.71	-4.62	-10.81	-2.96911
135	-7.43	-12.64	-3	-8.31	-1.15711
150	-11.33	-8.06	-7.24	-9.2	-2.80556
165	-19.96	-8.3	3.21	-20.65	0.107677
180	-7.11	-5.05	-0.51	-4.45	2.08377
195	-7.38	-6.25	-0.03	-9.77	0.968043
210	-11.41	-5.9	-3.53	-10.94	-1.28147
225	-11.1	-5.15	0.41	-15.32	0.218951
240	-9	0.13	-2.36	-10.22	1.728231
255	-9.56	-1.01	-4.72	-11	0.363553
270	-9.67	-5.73	-7.73	-11.8	-2.42267
285	-6.25	-1.68	-9.06	-7.24	0.415455
300	-7.16	-1.91	-17.99	-10.91	-1.6607
315	-7.29	-0.74	-5.59	-6.03	1.493477
330	-8.14	3.49	-1.78	-4.63	4.317438
345	-6.11	4.1	-1.46	-9.62	4.280374
360	-4.43	-0.04	-2.63	-5.34	3.153353

Phi

				Peak	DG
0	-4.32	-1.03	-5.38	-4.01	2.492738
15	-4.99	-11.15	-18.04	-6.74	-2.94081
30	-5.6	-13.46	-17.3	-14.73	-5.53883
45	-6.84	-14.06	-16.13	-16.75	-6.42368
60	-3.21	-17.95	-14.88	-11.69	-4.02511
75	-3.66	-15.32	-17.86	-4.86	-2.34406
90	-3.19	-13.17	-14.82	-6.73	-2.18879
105	-2.53	-10.48	-19.31	-6.37	-1.74977
120	-2.72	-6.56	-17.04	-6.54	-0.85449
135	-2.5	-16.96	-16.52	-3.75	-1.4605
150	-5.06	-13.13	-22.21	-4.76	-2.88569
165	-11.87	-10.23	-13.88	-2.98	-2.64582
180	-6.78	-4.47	-1.29	-3.97	2.113578
195	-1.2	-6.06	-9.03	-1.19	2.259662
210	1.59	-0.58	-13.27	3.16	5.557008
225	0.72	-4.5	-9.3	0.87	3.890859
240	-0.38	-7.83	-2.3	0.75	4.138448
255	2.51	-7.52	-11.7	1.57	4.120099

270	1.65	-2.37	-8.78	-0.14	4.397801
285	1.45	-7.02	-10.42	2.31	4.172334
300	-0.97	-4.15	-8.72	1.12	3.575379
315	-3.13	-10.16	-11.09	-8.03	-1.49607
330	-1.1	-2.79	-14.76	-5.35	1.323765
345	-1.59	-12.6	-5.12	1.95	3.147533
360	-4.32	-1.03	-5.38	-4.01	2.492738

Peak DG

YZ

Polarization
Theta Frequency
Angle (dB) 5850

0	-4.31	-1.01	-5.31	-4	2.518221
15	-3.51	-17.19	-6.39	-3.88	-0.33339
30	-7.9	-11.82	-8.34	-3.91	-1.5169
45	-4.1	-7.52	-0.85	-8.15	1.373098
60	-5.96	-12.05	-12.3	-6.18	-2.57545
75	-13.69	-9.87	-4.17	-19.98	-4.10514
90	-9.98	-12.19	-7.22	-8.4	-3.23302
105	-16.28	-9.79	-2.05	-3.56	-0.30522
120	-12.11	-9.81	0.64	-0.11	2.39544
135	-4.8	-10.71	1.48	0.85	3.960554
150	-9.77	-2.81	0.19	0.92	4.033848
165	-8.33	-18.69	-2.71	2.14	1.976013
180	-7.11	-5.05	-0.51	-4.45	2.08377
195	-8.18	-14.79	-9.36	-4.32	-2.37993
210	-8.76	-7.78	-11.35	-4.06	-1.56422
225	-4.73	-5.83	-16.69	-3.55	-0.43601
240	-7.2	-10.23	-5.04	-9.94	-1.81606
255	-8.54	-2.07	-3.84	-9.42	0.599096
270	-16.94	-9.07	-10.04	-17.25	-6.50076
285	-9.64	-9.03	-5.55	-8.51	-2.01212
300	1.01	-8.64	-14.92	-11.59	-0.28275
315	-5.09	-11.31	-3.88	-7.6	-0.51389
330	-1.56	-9.61	-3.34	-11.3	0.503628
345	-2.34	-12.94	-9.71	-0.45	1.083581
360	-4.31	-1.01	-5.31	-4	2.518221

Phi					Peak	DG
0	-4.45	-0.05	-2.67	-5.35		3.133566
15	-6.9	2.71	-0.97	-14.68		3.217912
30	-12.34	-1.06	-3.58	-13.97		-0.04749
45	-8.17	2.76	-8.07	-9.03		1.983025
60	-3.38	-0.57	-12.72	-11.11		0.520947
75	-2.83	3.36	-7.03	-12		3.199108
90	-1.63	3.16	-16.61	-9.56		2.760034
105	-0.29	4.6	-0.95	-8.32		5.90146
120	-13	-0.61	-1	-11.41		1.274724
135	-19.66	1.75	1.29	-8.1		3.169847
150	-7.94	-1.2	1.2	-13.08		2.417411
165	-5.61	-0.55	4.15	-6.76		4.94607
180	-6.78	-4.47	-1.29	-3.97		2.113578
195	-9.24	-7.52	2.02	-7.27		1.800609
210	-7	-15.68	-7.52	-18.29		-4.77945
225	-5.58	-5.97	-8.52	-9.23		-1.16255
240	-3.98	-4.06	-9.61	-11.57		-0.65975
255	-2.58	-9.9	-10.18	-12.86		-1.93733
270	-1.91	-6.97	-10.58	-11.42		-0.84227
285	-13.84	-3.2	-14.09	-8.23		-2.61396
300	-6.62	-5.96	-12.37	-11.69		-2.66723
315	-8.13	-3.39	-13.35	-9.17		-1.76608
330	-15.63	2.91	-6.28	-9.48		1.526944
345	-8.72	0.03	-3.4	-17.56		0.742211
360	-4.45	-0.05	-2.67	-5.35		3.133566

Peak DG