



# Antenna Composite Gain Test Report

Equipment	Roamii BE Lite Mesh System
Brand Name	msi
Model Name	MRBE50
Applicant	Micro-Star Int'l Co., Ltd No.69, Lide St., Zhonghe Dist., New Taipei City 235, Taiwan
Standard	KDB 662911 D03 v01
Sample Received	Mar. 18, 2024
Start Test Date	Mar. 24, 2024
Final Test Date	Mar. 24, 2024



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Approved by: Jackson Tsai

**SPORTON INTERNATIONAL INC. Hsinhua Laboratory**

No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)



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### 1. Operation Mode and Antenna Information

Antenna Position	RF Port	Brand Name	Model Name	Ant. Type	Connector	Support
2G Ant1	1	Aristotle	JP887-2G-P1 (2G-1)	Dipole	UFL	2.4G
2G Ant2	2	Aristotle	JP868-2G-V2 (2G-2)	Dipole	UFL	2.4G
5G Ant1	3	Aristotle	JP887-5G-P1 (5G-1)	Dipole	UFL	5G
5G Ant2	4	Aristotle	JP887-5G-P2-V2 (5G-2)	Dipole	UFL	5G

Note:

#### 2GHz and 5GHz Operation Mode (2TX/2RX)

2G Ant1, 2G Ant2, 5G Ant1 and 5G Ant2 could transmit/receive simultaneously.

### 2. Test Frequency

The listed frequency of each bands are selected to represent each frequency bands

Band [MHz]	Test Frequency [MHz]
2400-2483.5	2400,2450,2483.5
5150-5250	5200
5250-5350	5300
5470-5725	5600
5725-5850	5785
5850-5895	5885

### 3. Testing Location

Test Lab. : Sporton International Inc. Hsinhua Laboratory				
<input checked="" type="checkbox"/> Wen 33rd.St.	ADD:	No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)		
	TEL:	886-3-318-0787	FAX:	886-3-318-0287
Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
Radiated	05CH03-HY	Vivi Jiang	23.5~24.5°C / 45~55%	24/Mar/2024

Note:

Testing Site Information

Brand Name: TDK

Dimension: 11m\*6m\*6m

Characteristic: Fully Anechoic Chamber

#### 4. Test Facility and Configuration

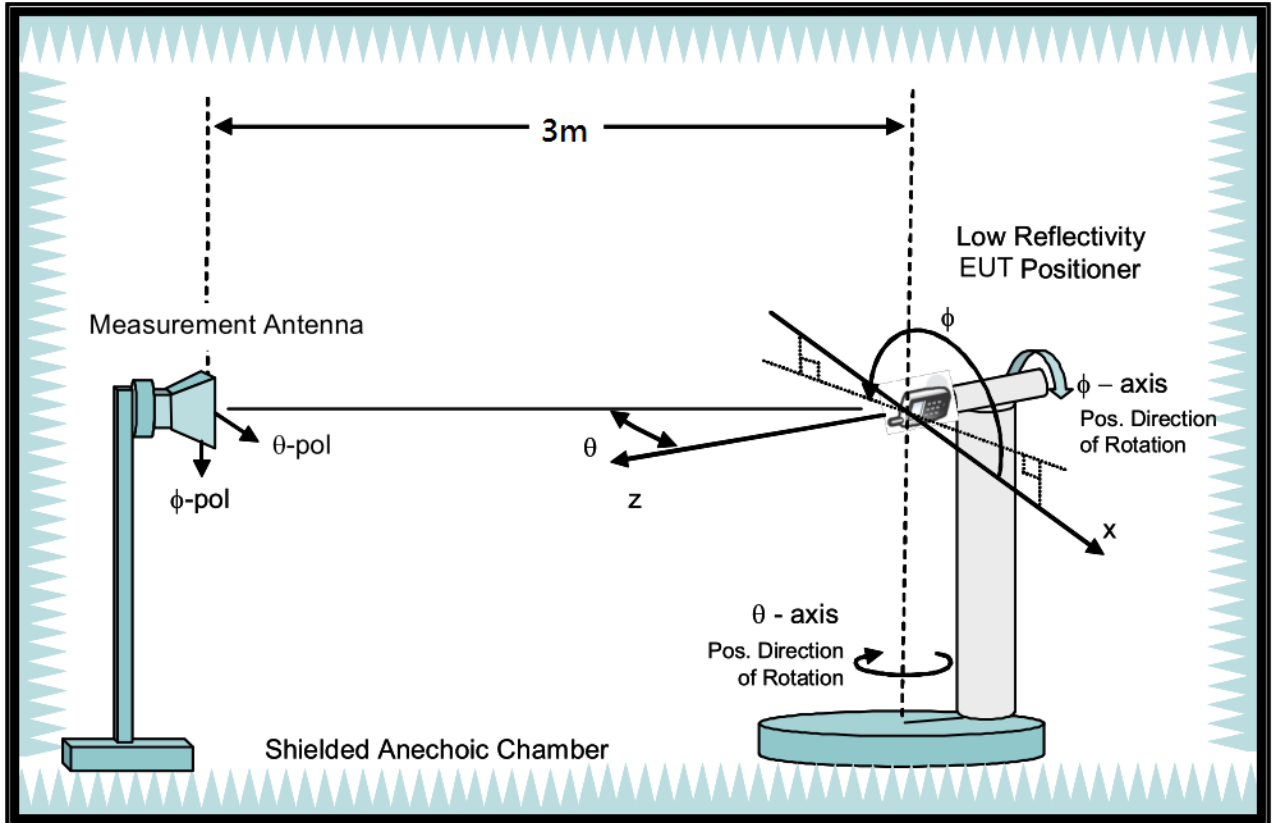
Test configuration: Reference to CITA OTA distributed-axes system configuration.

Chamber: Fully Anechoic Chamber.

Measurement antenna: Dual Polarization Horn antenna

Turntable: Multi-axis positioner (Theta and Phi angle).

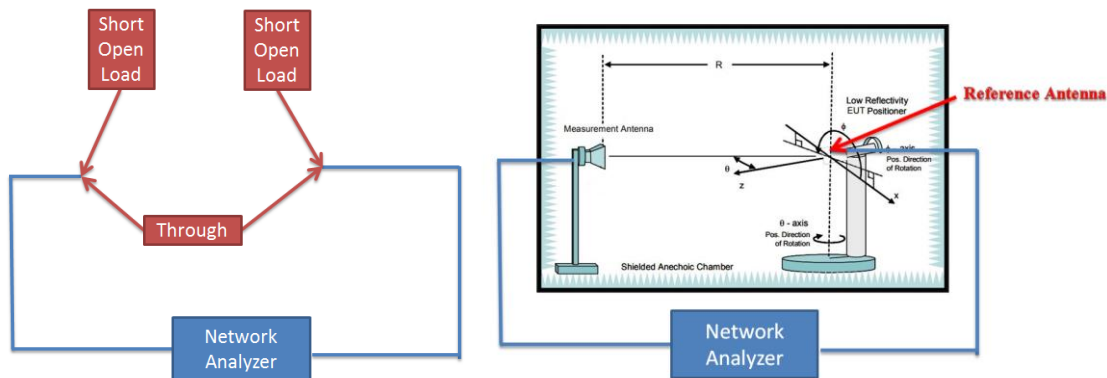
#Reference to CTIA “ctia-test-plan-for-wireless-device-over-the-air-performance-ver-3-7-1”



### 5. Reference Calibration

Connected cables to VNA calibration kit and use network analyzer internal function to do calibration. Do short, open and load to each side. Then connect through to both side and calibrate G values. The cable loss is calibrated and set inside the network analyzer.

Measurement Antenna is connected to port1 of Network analyzer and reference antenna connected to port 2 of Network Analyzer. Record G values and used with reference antenna gain to calculate gain factor.



Frequency (MHz)	2400	2450	2500	5150	5200	5300	5600	5750	5800	5900	6000	6500	7000	7200
G(theta) reading (dB)	-33.75	-33.64	-32.91	-32.21	-32.45	-32.33	-32.57	-32.94	-32.78	-33.35	-32.91	-33.81	-34.54	-35.64
G(phi) reading (dB)	-33.19	-32.12	-32.48	-32.51	-32.64	-31.68	-32.24	-32.45	-32.45	-32.85	-32.45	-33.62	-34.48	-35.24
Reference gain (dBi)	10	10.4	10.6	12.3	12.5	13.3	13.3	13.2	13.1	13	13.2	12.4	11.8	11.1
Factor(theta) (dB)	43.75	44.04	43.51	44.51	44.95	45.63	45.87	46.14	45.88	46.35	46.11	46.21	46.34	46.74
Factor(phi) (dB)	43.19	42.52	43.08	44.81	45.14	44.98	45.54	45.65	45.55	45.85	45.65	46.02	46.28	46.34

Note:

$$G \text{ reading (dB)} = 20 \cdot \log(V2/V1) = 10 \cdot \log(P2/P1)$$

V2 is the voltage of VNA port2 is measured, V1 is the voltage of VNA port1 is the reference source.

P2 is the power of VNA port2 is measured, P1 is the power of VNA port1 is the reference source.

$$\text{Factor} = \text{gain factor} + \text{power gain conversion} = (\text{Reference antenna gain}) - (G \text{ reading})$$



## **6. Test Method**

EUT set on multi-axis positioner and adjust EUT's physical center to measurement reference center. Measurement antenna set at phi polarization and 1.5 meter height. Port 1 of Network analyzer connect to antenna 1 of EUT. Record G value every 7.5 degree from 0 to 352.5 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.

DG steps:

1. Each Phi and Theta polarization antenna gain are measured for all test angles.
2. Composite Phi and Theta antenna gain are computed, using formula in KDB662911 D01 d) (i) and e) (ii), for all angles.
3. Composite antenna gain are examined for all angles to determine max gain and Phi/Theta position. Max gain and phi/theta position are listed in section 7 tables.

Note: Antenna gain = G reading + factor, The factor of chapter five includes reference antenna gain factor and power gain conversion.



### 7. Measured Values and Calculation of Maximum Gain Positions

DG\_1SS max value position

Frequency (Hz)	2.4G	2.45G	2.4835G
Ant. 1 (dBi)	0.97	-1.46	-2.24
Ant. 2 (dBi)	-0.92	0.59	1.16
DG [1SS] (dBi)	3.09	2.64	2.64
Polarization	Theta	Phi	Phi
$\Theta$ (°)	97.5	82.5	60
$\Phi$ (°)	30	337.5	322.5

Note: The DG 1SS max value position is the maximum value of section 11 table DG 1SS Result.

Frequency (Hz)	5.2G	5.3G	5.6G	5.785G	5.885G
Ant. 1 (dBi)	2.7	3.88	3.21	2.99	1.63
Ant. 2 (dBi)	-1.25	-1.32	2.91	3.01	3.44
DG [1SS] (dBi)	3.96	4.67	6.07	6.01	5.59
Polarization	Phi	Theta	Theta	Theta	Theta
$\Theta$ (°)	135	112.5	112.5	112.5	112.5
$\Phi$ (°)	345	255	255	255	285





DG\_1SS max value position calculation

Frequency (Hz)	2.4G	2.45G	2.4835G
Ant. 1 [10^(G/20)]	10^(0.97/20)	10^(-1.46/20)	10^(-2.24/20)
Ant. 2 [10^(G/20)]	10^(-0.92/20)	10^(0.59/20)	10^(1.16/20)
Ant. 1 [10^(G/20)] value	1.118	0.845	0.773
Ant. 2 [10^(G/20)] value	0.899	1.07	1.143
Sum All Antenna [Amax]	2.018	1.916	1.916
DG [10*log(Amax^2/Nant)]	3.09	2.64	2.64

Frequency (Hz)	5.2G	5.3G	5.6G	5.785G	5.885G
Ant. 1 [10^(G/20)]	10^(2.7/20)	10^(3.88/20)	10^(3.21/20)	10^(2.99/20)	10^(1.63/20)
Ant. 2 [10^(G/20)]	10^(-1.25/20)	10^(-1.32/20)	10^(2.91/20)	10^(3.01/20)	10^(3.44/20)
Ant. 1 [10^(G/20)] value	1.365	1.563	1.447	1.411	1.206
Ant. 2 [10^(G/20)] value	0.866	0.859	1.398	1.414	1.486
Sum All Antenna [Amax]	2.231	2.422	2.845	2.825	2.692
DG [10*log(Amax^2/Nant)]	3.96	4.67	6.07	6.01	5.59

Note:

Directional Gain (1SS) is the max value of every look angle. Each position value is calculated by KDB662911 D01 d) (i).

$$\text{Directional gain (1SS)} = 10 \cdot \log(10^{(G_{ant1}/20)} + 10^{(G_{ant2}/20)} + 10^{(G_{ant3}/20)} + 10^{(G_{ant4}/20)} + \dots)^2 / N_{ant}$$



**8. Summary of Test Result**

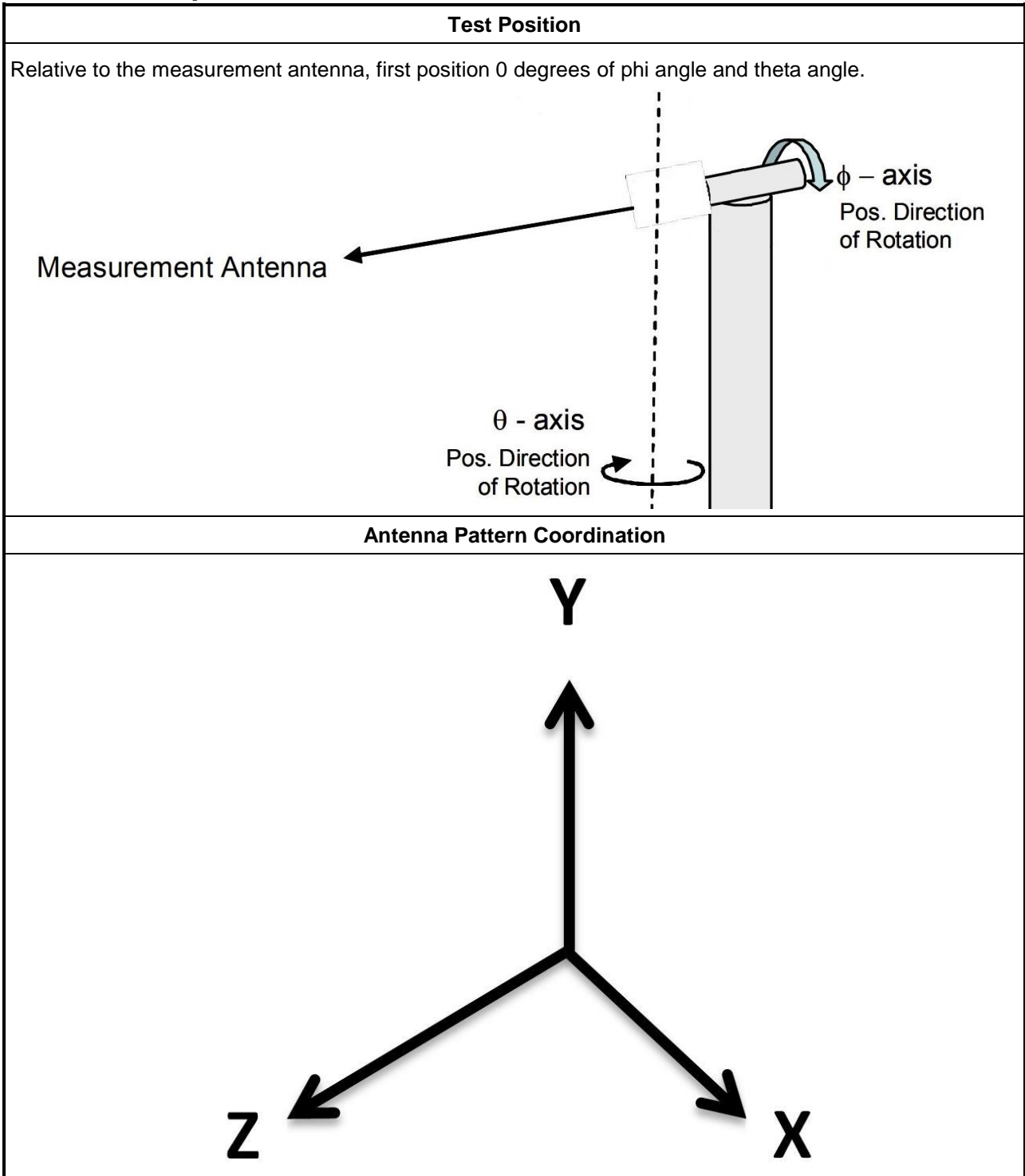
<b>Freq(Hz)</b>	<b>2.4G</b>	<b>2.45G</b>	<b>2.4835G</b>
Ant. 1 Max Gain (dBi)	2.27	1.85	2.41
Ant. 2 Max Gain (dBi)	1.81	2.17	2.36
Ant. 1 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Phi/120/45	Theta/157.5/300	Theta/157.5/300
Ant. 2 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/45/247.5	Theta/45/255	Theta/52.5/240
Max Gain (dBi)	2.27	2.17	2.41
DG [1SS] (dBi)	3.09	2.64	2.64
DG [2SS] (dBi)	2.27	2.17	2.41

<b>Freq(Hz)</b>	<b>5.2G</b>	<b>5.3G</b>	<b>5.6G</b>	<b>5.785G</b>	<b>5.885G</b>
Ant. 1 Max Gain (dBi)	3.66	3.88	3.24	2.99	3.33
Ant. 2 Max Gain (dBi)	3.76	4.34	4.09	3.74	3.48
Ant. 1 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/112.5/255	Theta/112.5/255	Theta/82.5/300	Theta/112.5/255	Theta/120/255
Ant. 2 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Phi/127.5/165	Phi/127.5/165	Theta/105/240	Theta/105/240	Theta/105/240
Max Gain (dBi)	3.76	4.34	4.09	3.74	3.48
DG [1SS] (dBi)	3.96	4.67	6.07	6.01	5.59
DG [2SS] (dBi)	3.76	4.34	4.09	3.74	3.48

**Note:**

1. Antenna max gain is the max value of each individual antenna through all measurement angles.
2. The max gain is the max value of all antennas.
3. Directional Gain (2SS) = Directional Gain (1SS) – 3dB. If directional gain is less than max gain, use max gain as directional gain. Refer to KDB662911D01 (F) (2) (e) (ii)

### 9. Test Setup



Note:

Photos of Test Position: Please refer to the test photos in the appendix.



### 10. Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA 9120D-1543	1GHz~18GHz	May 11, 2023	May 10, 2024
Dual Polarization Horn Antenna	Sporton	S0209DP	S0209DP-001	2GHz~9GHz	N.C.R.	N.C.R.
ENA Series Network Analyzer	AGILENT	E5071C	MY46419477	100kHz~8.5GHz	Jul. 28, 2023	Jul. 27, 2024
VNA Calibration Kit	TS RF	TS85033E-F	-	DC~9GHz	N.C.R.	N.C.R.
Multi-axis positioner	Sporton	MAPS01	MAPS01-001	Theta / Phi axis	N.C.R.	N.C.R.
Test Software	SPORTON	SENSE-RDG	V1.0.8	-	N.C.R.	N.C.R.

Note: Calibration Interval of instruments listed above is one year.

NCR means Non-Calibration required.



## 11. Test Results

Please refer to the appendix.

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————THE END————



Freq(Hz)	2.4G	2.45G	2.4835G
Ant. 1 Max Gain (dBi)	2.27	1.85	2.41
Ant. 2 Max Gain (dBi)	1.81	2.17	2.36
Ant. 1 Polarization/ $\theta(^{\circ})/\phi(^{\circ})$	Phi/120/45	Theta/157.5/300	Theta/157.5/300
Ant. 2 Polarization/ $\theta(^{\circ})/\phi(^{\circ})$	Theta/45/247.5	Theta/45/255	Theta/52.5/240
Max Gain (dBi)	2.27	2.17	2.41
DG [1SS] (dBi)	3.09	2.64	2.64
DG [2SS] (dBi)	2.27	2.17	2.41





# Radiated Composite Gain Data of 2GHz

# Appendix A

θ (22.5°)	-2.6/-2.99	-3.33/-3.62	-4.02/-4.72	-5.78/-5.95	-5.72/-4.87	-4.44/-4.26	-4.18/-4.19	-3.89/-3.07	-2.04/-1.22	-0.61/-0.22	-0.05/-0.09	-0.3/-0.67	-1.17/-1.85	-2.61/-3.44	-4.41/-5.12	-6.44/-7.66	-9.61/-12.16	-12.86/-11.3	-8.77/-6.48	-4.69/-3.4	-2.55/-2.03	-1.82/-1.83	-1.92/-2.04	-2.15/-2.26
θ (30°)	-3.69/-3.97	-4.03/-4.04	-4.25/-4.74	-5.55/-5.8	-5.43/-4.62	-4.34/-4.34	-4.55/-5.03	-5.75/-5.23	-3.81/-2.68	-1.92/-1.44	-1.19/-1.16	-1.33/-1.72	-2.24/-2.95	-3.28/-3.34	-3.45/-3.93	-4.8/-6.23	-7.92/-10.38	-11.67/-11.08	-8.14/-5.31	-3.31/-2	-1.28/-1.09	-1.31/-1.75	-2.29/-2.74	-3.14/-3.4
θ (37.5°)	-3.92/-4.01	-3.89/-3.85	-3.99/-4.26	-4.76/-4.73	-4.42/-3.66	-3.39/-3.36	-3.63/-4.31	-5.66/-6.8	-6.22/-4.86	-4.02/-3.55	-3.32/-3.28	-3.5/-3.92	-3.63/-3.2	-2.67/-2.51	-2.71/-3.21	-4.24/-5.79	-8.05/-10.11	-11.2/-8.77	-5.81/-3.2	-1.58/-0.6	-0.22/-0.33	-0.82/-1.43	-2.2/-2.99	-3.63/-3.93
θ (45°)	-3.42/-3.65	-3.82/-4.04	-4.42/-4.83	-5.39/-5.92	-5.08/-3.84	-3.09/-2.65	-2.47/-2.7	-3.59/-4.9	-5.28/-4.31	-3.53/-3.09	-2.79/-2.5	-2.11/-1.53	-0.96/-0.59	-0.51/-0.66	-0.95/-1.38	-2.11/-3.3	-4.88/-6.29	-6.58/-5.87	-4.52/-3.08	-2.14/-1.6	-1.35/-1.35	-1.42/-1.61	-1.96/-2.48	-3.02/-3.27
θ (52.5°)	-1.64/-2.38	-2.9/-3.41	-4.09/-4.93	-5.81/-6.58	-6.02/-4.76	-3.91/-3.1	-2.33/-1.8	-1.68/-1.95	-2.08/-1.69	-1.17/-0.89	-0.72/-0.57	-0.33/-0	0.30/-47	0.450/3	0.12/-0.2	-0.84/-1.8	-3.24/-5.32	-6.18/-5.17	-4.74/-9.3	-4.65/-3.8	-2.18/-1.06	-0.290/17	0.320/0.4	-0.54/-1.05
θ (60°)	0.920/19	-0.26/-0.42	-0.78/-1.42	-2.29/-3.29	-4.34/-4.98	-5.29/-5.09	-4.08/-2.77	-1.73/-0.91	-0.38/-0.13	0.020/0.9	0.080/0.2	-0.09/-0.06	0.190/42	0.430/15	-0.41/-1.24	-2.49/-4.01	-5.92/-7.98	-7.01/-5.86	-5.78/-5.09	-2.37/-0.17	1.22/0.5	2.492/6.4	2.612/4.4	2.031/4.7
θ (67.5°)	-1.33/-1.52	-1.48/-1.2	-0.99/-1.17	-1.66/-2.59	-4.04/-5.16	-6.14/-6.4	-6.51/-5.9	-4.24/-2.34	-0.8/-0.02	0.220/27	0.280/2	0.10/36	0.89/1.21	1.140/82	0.4/-0.13	-0.94/-2.08	-3.84/-5.76	-6.86/-6.86	-7.72/-6.34	-3.24/-1.16	0.030/56	0.580/25	-0.18/-0.43	-0.69/-1.06
θ (75°)	-0.33/-0.41	-0.67/-0.75	-0.63/-0.57	-0.79/-1.33	-2.25/-3.31	-4.03/-3.89	-3.93/-4.12	-4.09/-2.99	-1.130/14	0.660/73	0.580/25	0.020/39	0.880/98	0.740/52	0.420/23	-0.17/-0.74	-1.74/-3.28	-5.48/-7.81	-9.16/-7.82	-5.04/-3.25	-2.35/-1.79	-1.31/-0.92	-0.78/-0.77	-0.63/-0.43
θ (82.5°)	1.86/1.29	0.770/41	0.230/01	-0.45/-1.04	-1.72/-3.31	-5.67/-7.11	-6.11/-5.05	-4.11/-3.03	-1.61/-0.48	0.030/2	-0.34/-0.75	-0.490/21	0.560/62	0.710/81	0.59/-0.03	-0.89/-1.72	-2.38/-2.71	-2.87/-3.11	-3.61/-3.81	-3.44/-2.38	-1.27/-0.16	0.81/1.66	2.292/56	2.572/33
θ (90°)	2.25/1.88	1.220/53	0.03/-0.51	-1.21/-2.28	-2.9/-3.86	-6.03/-7.3	-6.74/-6.24	-4.72/-3.05	-1.97/-1.62	-1.66/-1.89	-2.03/-1.65	-0.730/2	0.81/22	1.41/1.17	0.35/-1	-2.6/-3.57	-3.11/-1.86	-1.02/-1.09	-2.07/-3.38	-3.36/-1.71	-0.490/24	0.62/1.05	1.62/0.4	2.262/4
θ (97.5°)	0.19/-0.07	-0.71/-1.22	-1.18/-1.2	-1.67/-2.27	-2.68/-3.34	-4.48/-4.84	-4.2/-3.9	-4.13/-3.39	-1.33/-0.14	0.460/81	1.131/41	1.61/86	2.172/12	1.480/46	-0.46/-1.25	-2.17/-2.78	-2.48/-1.76	-1.53/-1.84	-2.34/-2.17	-0.79/-0.06	-0.06/-0.41	-0.77/-0.84	-0.58/-0.33	-0.21/-0.08
θ (105°)	0.320/64	0.690/15	-0.54/-1.08	-1.72/-1.7	-1.92/-2.93	-4.41/-4.77	-3.67/-2.6	-1.79/-1.09	-0.210/68	1.33/1.8	2.092/08	1.84/1.72	1.74/1.19	0.180/13	0.92/1.1	0.67/0.01	-1.08/-2.3	-3.46/-4.21	-3.62/-2.09	-1.39/-1.75	-2.76/-3.89	-4.38/-4.04	-2.83/-1.29	-0.170/26
θ (112.5°)	-0.34/-0.67	-0.71/-0.83	-1.42/-1.87	-2.38/-2.85	-2.88/-3.92	-6.46/-10.42	-9.53/-5.19	-2.24/-0.39	0.620/94	0.98/1.03	1.030/79	0.26/-0.33	-0.71/-1.46	-0.920/77	1.78/1.94	1.67/1.27	0.61/-0.29	-1.24/-1.89	-2.05/-2.08	-2.26/-2.85	-3.91/-5.23	-6.52/-6.58	-4.78/-2.37	-0.69/-0.15
θ (120°)	-0.65/-0.86	-0.95/-0.44	0.050/03	-0.26/-0.38	-0.38/-0.72	-1.79/-3.66	-5.86/-7.69	-5.23/-2.23	-0.75/-0.6	-1.1/-1.64	-2.22/-2.78	-2.97/-2.7	-2.69/-2.25	-1.43/-0.71	-0.71/-1.19	-1.65/-2.04	-2.2/-3.23	-3.62/-3.44	-2.74/-1.81	-0.9/-0.32	-0.42/-1.27	-2.66/-4.5	-6.17/-5.16	-2.95/-1.21
θ (127.5°)	-1.65/-1.77	-2.67/-3.16	-2.64/-2.23	-2.21/-2.08	-1.67/-1.24	-1.28/-2.08	-3.65/-5.92	-6.45/-3.96	-2.28/-1.77	-1.71/-1.71	-2.05/-2.94	-3.45/-2.49	-1.88/-1.76	-2.01/-2.83	-3.66/-3.48	-2.91/-2.61	-2.44/-2.06	-1.5/-0.87	-0.280/18	0.410/21	-0.58/-1.89	-3.28/-4.46	-5.7/-6.32	-4.58/-5.28
θ (135°)	-0.68/-0.26	-0.52/-1.35	-2.33/-2.87	-3.28/-3.83	-4.24/-4.33	-4.19/-4.45	-5.6/-7.33	-7.29/-5.6	-4.13/-3.09	-2.26/-1.82	-1.87/-2.44	-3.35/-3.89	-3.97/-4.25	-4.66/-5.01	-5.03/-4.51	-3.76/-3.07	-2.43/-1.77	-1.14/-0.69	-0.47/-0.5	-0.87/-1.57	-2.4/-2.95	-3.01/-2.7	-2.45/-2.53	-2.43/-1.69
θ (142.5°)	0.260/2	-0.23/-1.18	-2.62/-4.23	-5.82/-7.65	-10.15/-13.21	-16.09/-13.59	-11.43/-8.4	-5.94/-4.24	-3.05/-2.21	-1.75/-1.77	-2.34/-3.48	-5.02/-6.57	-7.69/-8.04	-7.28/-5.81	-4.39/-3.29	-2.47/-1.77	-1.05/-0.48	-0.21/-0.29	-0.65/-1.14	-1.76/-2.38	-2.64/-2.45	-5.04/-4.82	-7.7/-6.72	-3.91/-2.61
θ (150°)	-0.92/-0.79	-1.04/-1.63	-2.65/-4.12	-5.73/-7.22	-8.13/-8.31	-8.15/-7.44	-6.25/-4.82	-3.45/-2.29	-1.34/-0.57	-0.170/16	-0.52/-1.17	-1.98/-2.93	-3.76/-4.4	-4.66/-4.56	-4.24/-3.82	-3.26/-2.56	-2.22/-1.77	-1.61/-1.81	-2.29/-3.06	-4.16/-4.73	-5.45/-5.51	-5.41/-4.22	-3.73/-2.56	-1.73/-1.22
θ (157.5°)	-1.65/-1.31	-1.41/-1.84	-2.67/-3.95	-5.52/-6.81	-7.41/-7.53	-7.44/-6.95	-6.35/-5.98	-5.39/-4.76	-3.72/-2.83	-1.87/-1.52	-1.47/-1.66	-2.04/-2.47	-3.03/-3.53	-3.79/-3.78	-3.56/-3.28	-3.07/-2.83	-2.53/-2.23	-2.02/-1.98	-2.05/-2.32	-2.95/-3.85	-5.07/-6.55	-8.08/-8.38	-7.18/-5.55	-3.91/-2.65
θ (165°)	-3.16/-3.42	-4.13/-4.02	-6.31/-8.12	-10.61/-11.78	-11.31/-10.32	-8.83/-7.32	-6.28/-5.9	-6.03/-6.66	-7.91/-8.09	-7.87/-7.15	-6.26/-5.73	-5.45/-5.36	-5.51/-5.77	-6.01/-6.12	-6.19/-6.08	-5.99/-6.99	-5.38/-5.03	-4.75/-4.5	-4.42/-4.58	-5.05/-5.1	-6.63/-6.74	-6.98/-6.72	-6.11/-5.3	-4.32/-5.53
θ (172.5°)	-5.39/-6.22	-7.24/-8.32	-9.36/-9.79	-9.23/-8.44	-8.01/-7.64	-7.09/-6.38	-5.96/-6.14	-6.84/-7.56	-8.78/-10.15	-11.65/-12.12	-10.93/-9.32	-8.06/-7.12	-6.6/-6.36	-6.41/-6.57	-6.81/-7.07	-7.46/-7.84	-8.01/-8.06	-8.06/-8.06	-8.34/-8.93	-8.35/-7.8	-7.51/-6.74	-5.84/-5.31	-5.14/-4.9	-4.68/-4.74
θ (180°)	-8.33/-7.57	-6.85/-6.53	-6.43/-6.35	-6.28/-6.54	-7.11/-7.88	-7.89/-7.68	-7.84/-8.31	-8.38/-8.2	-7.99/-7.82	-7.47/-6.93	-6.25/-5.52	-4.89/-4.47	-4.25/-4.27	-4.51/-4.91	-5.39/-5.81	-6.33/-6.87	-7.07/-6.97	-6.84/-6.77	-7.02/-7.26	-7.26/-7.05	-6.89/-6.63	-6.3/-6.3	-6.63/-6.93	-7.28/-7.8
Freq(Hz)	2.48350/Pol.	Theta	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi
D9(dB)	Φ(0°)Φ(7.5°)	Φ(15°)Φ(22.5°)	Φ(30°)Φ(37.5°)	Φ(45°)Φ(52.5°)	Φ(60°)Φ(67.5°)	Φ(75°)Φ(82.5°)	Φ(90°)Φ(97.5°)	Φ(105°)Φ(112.5°)	Φ(120°)Φ(127.5°)	Φ(135°)Φ(142.5°)	Φ(150°)Φ(157.5°)	Φ(165°)Φ(172.5°)	Φ(180°)Φ(187.5°)	Φ(195°)Φ(202.5°)	Φ(210°)Φ(217.5°)	Φ(225°)Φ(232.5°)	Φ(240°)Φ(247.5°)	Φ(255°)Φ(262.5°)	Φ(270°)Φ(277.5°)	Φ(285°)Φ(292.5°)	Φ(300°)Φ(307.5°)	Φ(315°)Φ(322.5°)	Φ(330°)Φ(337.5°)	Φ(345°)Φ(352.5°)
θ (0°)	-6.9/-6.32	-5.51/-4.8	-4.26/-3.83	-3.39/-2.89	-2.49/-2.33	-2.33/-2.46	-2.71/-3.22	-3.99/-5.03	-6.19/-7.09	-7.75/-8.14	-8.17/-7.83	-7.39/-6.7	-5.84/-5.02	-4.26/-3.56	-2.99/-2.55	-2.23/-2.04	-1.96/-1.92	-1.96/-2.21	-2.68/-3.12	-3.66/-4.44	-5.68/-6.83	-7.78/-8.46	-8.42/-8	-7.63/-7.25
θ (7.5°)	-7.76/-6.49	-5.33/-4.43	-3.69/-3.12	-2.58/-2.05	-1.71/-1.51	-1.48/-1.53	-1.72/-1.29	-2.89/-3.82	-5.11/-5.65	-6.05/-6.4	-5.91/-5.68	-5.63/-5.55	-5.35/-5.02	-4.52/-3.92	-3.37/-2.94	-2.62/-2.42	-2.35/-2.38	-2.57/-2.86	-3.29/-3.92	-4.68/-5.54	-6.57/-7.77	-9.05/-10.03	-10.46/-10.11	-9.43/-8.55
θ (15°)	-8.43/-7.36	-6.05/-4.97	-4.1/-3.31	-2.61/-2.03	-1.64/-1.38	-1.21/-1.04	-0.95/-1.06	-1.46/-2.14	-3.07/-3.43	-3.64/-3.28	-3.06/-3.07	-3.3/-3.72	-4.34/-5.18	-5.74/-5.58	-4.61/-3.85	-3.24/-2.81	-2.51/-2.47	-2.57/-2.78	-3.12/-3.75	-4.58/-5.32	-6.61/61	-7.18/-7.64	-8.02/-8.3	-8.52/-8.67
θ (22.5°)	-9.87/-9.32	-7.86/-6.5	-5.29/-4.15	-3.11/-2.33	-1.76/-1.31	-0.99/-0.66	-0.51/-0.51	-0.86/-1.47	-1.75/-1.87	-1.45/-1.1	-0.83/-0.75	-0.89/-1.25	-1.82/-2.62	-3.66/-4.77	-4.63/-4.27	-3.43/-2.8	-2.39/-2.18	-2.21/-2.47	-2.97/-3.57	-4.29/-5.09	-5.77/-6.12	-6.15/-6.21	-6.59/-7.24	-8.1/-9.12
θ (30°)	-11.28/-10.89	-9.9/-8.2	-6.77/-5.48	-4.33/-3.46	-2.94/-2.52	-2.21/-1.97	-1.8/-1.8	-2.15/-2.09	-2.05/-1.73	-1.23/-0.76	-0.35/-0.47	0.04/-0.01	-0.19/-0.47	-0.88/-1.3	-1.62/-1.9	-2.24/-2.4	-2.12/-2.11	-2.18/-2.33	-2.6/-2.9	-3.44/-4.07	-4.78/-5.33	-5.74/-6.02	-6.61/-7.45	-8.45/-9.85
θ (37.5°)	-10.99/-11.05	-11.21/-9.7	-8.31/-7.2	-6.18/-5.42	-4.91/-4.46	-4.07/-3.78	-3.58/-3.16	-2.73/-2.76	-2.32/-1.98	-1.61/-1.17	-0.78/-0.46	-0.28/-0.15	-0.010/0.5	0.090/18	0.19/-0.01	-0.3/-0.64	-0.84/-0.78	-0.82/-0.92	-1.14/-1.52	-2.19/-3.02	-4.04/-4.97	-5.61/-5.79	-6.16/-6.78	-7.77/-9.25
θ (45°)	-11.72/-12.56	-12.47/-12.88	-11.27/-10.04	-8.98/-8.06	-7.29/-6.42	-5.55/-4.92	-4.42/-3.35	-2.84/-1.91	-1.29/-0.95	-0.66/-0.33	0.010/17	0.20/19	0.230/4	0.640/87	0.880/74	0.610/48	0.2/-0.07	0.06/-0.11	-0.29/-0.94	-1.73/-2.74	-4.05/-4.92	-5.35/-5.66	-6.6/6.69	-7.98/-9.84
θ (52.5°)	-13.74/-13.92	-13.51/-11.35	-9.45/-8.39	-7.88/-7.38	-6.76/-5.83	-4.89/-4.07	-3.44/-2.6	-1.88/-1.18	-0.47/-0.02	0.470/97	1.31/1.39	1.180/9	0.750/84	1.030/98	0.780/71	0.91/1.01	0.830/45	0.02/-0.41	-0.83/-1.66	-2.62/-3.6	-4.55/-5.61	-6.72/-7.49	-8.1/-8.98	-10.59/-12.88
θ (60°)	-7.98/-7.88	-6.45/-5.09	-4.7/-5.39	-6.42/-6.56	-5.78/-4.84	-4.11/-3.19	-2.31/-1.57	-0.94/-0.46	-0.25/-0.17	0.120/63	1.05/1.01	0.570/11	0.040/35	0.480/17	-0.42/-0.64	-0.49/-0.51	-0.84/-1.19	-1.35/-1.72	-2.53/-3.62	-4.58/-5.39	-5.86/-5.91	-6.48/-6.8	-7.21/-6.86	-6.59/-7.12
θ (67.5°)	-4.2/-4.6	-3.92/-3.11	-3.3/-4.72	-6.15/-5.75	-4.89/-4.43	-4.12/-3.27	-2.21/-1.04	-0.160/28	0.340/2	0.340/67	0.690/07	-0.74/-0.9	-0.390/04	0.01/-0.35	-0.53/-0.37	-0.42/-0.91	-1.59/-1.93	-1.98/-2.22	-2.52/-2.7	-2.77/-2.71	-2.73/-2.83	-2.99/-3.55	-4.52/-4.69	-3.99/-3.7
θ (75°)	-2.11/-2.49	-2.35/-1.45	-1.02/-1.99	-3.98/-5.02	-4.74/-4.76	-5.18/-5.02	-4.15/-2.78	-1.5/-0.69	-0.29/-0.02	0.46/1.08	1.210/65	0.150/38	1.01/1.27	1.27/1.23	1.44/1.7	1.55/1.28	1.020/81	0.4/-0.07	-0.36/-0.44	-0.2/-0.13	-0.62/-1.5	-2.18/-2.63	-3.61/-4.5	-3.84/-2.48
θ (82.5°)	0.170/17	0.120/53	0.720	-1.5/-2.41	-2.44/-2.59	-2.93/-2.75	-2																	







# Radiated Composite Gain Data of 2GHz

# Appendix A

Theta (22.5°)	4.81/5.12	-5.27/5.06	4.77/4.71	-4.76/4.71	-4.56/4.81	-5.65/7.07	-8.74/10.72	-11.75/10.36	-8.03/6.15	-4.73/3.73	-2.98/2.4	-1.95/1.57	-1.35/1.32	-1.49/1.19	-2.63/3.64	-4.94/6.12	-9.25/12.62	-15.83/14.91	-11.6/8.8	-6.67/5.19	4.2/3.6	-3.42/3.54	-3.83/4.18	-4.47/4.55																							
Theta (30°)	-8.15/8.14	-7.61/6.66	-5.69/5.07	-4.66/4.27	-3.87/4.04	-4.96/6.59	-8.73/12.06	-11.76/17.33	-11.71/8.29	-6.14/6.68	-3.65/2.87	-2.27/1.81	-1.46/1.39	-1.32/1.46	-1.92/2.61	-3.61/5.12	-7.27/10.22	-14.17/17.17	-13.67/9.82	-7.2/5.45	-4.45/4.18	-4.49/5.1	-6.08/7.6	-7.93/8.14																							
Theta (37.5°)	-9.63/9.04	-8.03/8.83	-5.7/4.78	-4.66/3.31	-2.62/2.45	-5.69/8.04	-12.54/17.68	-14.98/9.95	-4.1/3.14	-2.46/2.81	-1.76/1.63	-1.69/1.97	-1.69/1.97	-2.44/3.11	-4.17/5.72	-8.11/11.62	-16.84/18.84	-14.34/9.71	-7.2/5.63	-4.94/9.3	-5.48/6.21	-7.41/8.92	-10.44/10.66	-10.44/10.66																							
Theta (45°)	-7.66/7.49	-7.29/6.84	-6.27/5.64	-5.11/4.43	-3.42/2.84	-3.01/3.57	-4.33/6.63	-8.21/11.96	-12.98/9.4	-6.63/4.85	-3.53/2.53	-1.87/1.49	-1.32/1.34	-1.57/1.93	-2.29/2.65	-3.15/3.9	-4.92/6.3	-8.28/10.49	-11.41/10.68	-9.92/9.18	-8.52/9.77	-7.31/6.81	-6.76/7.27	-8.09/8.12																							
Theta (52.5°)	-5.21/5.64	-5.85/5.76	-5.52/5.33	-5.26/5.38	-5.27/5.1	-5.45/5.85	-6.03/6.33	-7.33/8.81	-9.59/8.31	-6.45/5.04	-3.9/3.03	-2.45/2.19	-2.16/2.25	-2.42/2.52	-2.59/2.64	-2.72/2.83	-3.12/3.69	-4.71/6.41	-9.06/14.1	-17.74/16.5	-10.66/7.54	-5.53/4.4	-3.89/3.99	-4.62/5.02																							
Theta (60°)	-4.77/5.28	-5.33/4.77	-4.12/3.65	-3.52/3.64	-4.11/4.98	-6.77/8.93	-9.55/8.87	-8.09/7.32	-6.75/6.41	-5.86/5.09	-4.22/3.5	-3.15/3.1	-3.09/3.1	-3.21/3.61	-4.39/5.31	-6.08/6.51	-6.67/6.9	-7.61/9.67	-10.04/18.37	-10.26/7.58	-3.57/2.51	-2.22/2.24	-2.47/2.88	-3.63/4.43																							
Theta (67.5°)	-9.85/8.61	-7.44/6.2	-4.8/3.63	-2.88/2.66	-2.97/3.67	-5.11/7.7	-11.39/14.28	-12.52/8.89	-6.11/4.8	-4.08/3.34	-2.52/2.03	-1.92/1.86	-1.67/1.56	-1.79/2.28	-2.73/2.86	-2.81/2.97	-3.42/4.2	-5.71/8.6	-14.14/14.2	-8.37/5.25	-3.84/3.65	-4.3/5.43	-6.75/7.92	-9.28/10.39																							
Theta (75°)	-3.58/3.12	-2.83/2.62	-2.22/1.54	-0.9/0.57	-0.81/1.54	-2.61/4.07	-5.98/8.48	-11.10/13.3	-6.57/4.3	-3.19/2.54	-2.12/2.03	-2.11/1.81	-1.47/1.52	-1.89/1.28	-2.17/2	-2.88/2.23	-6.61/3.33	-16.21/18	-12.45/9.08	-7.4/6.5	-5.96/5.66	-5.54/5.26	-6.65/4	-6.65/4																							
Theta (82.5°)	-0.52/0.7	-0.84/1	-1.16/1.16	-0.99/0.87	-1.2/2.29	-4.16/6.62	-8.95/10.37	-10.91/9.87	-7.35/5.1	-3.7/2.98	-2.65/2.5	-2.92/3.02	-0.33/0.1	0.31/0.59	0.54/0.05	-1.09/2.32	-3.68/4.83	-6.72/6.7	-8.28/9.64	-9.16/7.29	-5.29/3.65	-2.53/1.74	-1.24/0.93	-0.62/0.42																							
Theta (90°)	0.06/0.53	0.49/0.04	-0.68/1.41	-1.74/2.19	-2.62/3.5	-5.09/7.69	-11.61/18.59	-18.98/14.02	-10.82/9.67	-8.81/7.94	-7.07/5.87	-4.48/3.33	-2.82/1.96	-1.38/1.29	-1.89/2.94	-3.85/4.35	-4.33/3.87	-3.68/4.56	-7.33/12.83	-14.84/9.21	-5.94/4.29	-3.58/2.93	-2.31/1.88	-1.46/0.66																							
Theta (97.5°)	-2.13/1.16	-0.72/0.82	-1.21/1.72	-2.22/2.7	-3.38/4.13	-4.84/5.68	-6.96/9.59	-14.85/15.66	-9.03/5.92	-4.22/3.1	-2.25/1.79	-1.82/1.95	-1.74/1.61	-2.22/3.41	-3.91/3.16	-2.4/2.07	-4.3/6.82	-11.54/15.79	-10.52/7.42	-6.24/6.02	-6.21/6.02	-5.28/4.63	-4.19/3.46	-4.19/3.46																							
Theta (105°)	-1.52/0.2	1.1/1.75	1.64/1.02	0.24/0.6	-1.74/3.47	-5.33/6.43	-6.56/5.63	-6.74/6.81	-5.92/4.41	-3.16/2.25	-1.59/1.64	-2.56/3.59	-3.64/4.13	-5.58/4.73	-1.85/0.11	0.41/0.25	-0.51/2.19	-5.28/9.88	-13.18/10.79	-8.59/7.84	-8.2/8.96	-9.56/9.81	-8.45/5.77	-3.47/2.24																							
Theta (112.5°)	-1.83/1.8	-1.01/0.04	0.45/0.24	0.4/1.16	2.22/4.3	-8.13/16.83	-19.2/10.73	-6.53/4.32	-3.43/3.46	-3.83/3.97	-4.04/4.82	-7.11/9.81	-10.08/10.53	-7.38/2.46	0.31/45	1.75/1.67	1.04/0.3	-2.28/4.29	-5.72/6.52	-6.98/7.55	-7.97/8.09	-8.23/8.63	-8.39/6.02	-3.47/2.13																							
Theta (120°)	-1.04/1.14	-1.16/0.11	1.21/1.82	1.74/1.37	0.91/0.06	-1.5/4.17	-8.45/16.38	-12.93/7.26	-5.19/5.38	-6.81/8.46	-10.69/14.48	-18.29/17.78	-16.61/8.27	-8.95/6.1	-4.81/4.33	-3.86/3.26	-4.33/8.66	-2.51/1.91	-1.28/0.97	-3.74/6.22	-5.32/4.82	-4.67/4.97	-5.71/5.79	-4.03/1.93																							
Theta (127.5°)	-1.86/2.23	-3.76/4.54	-3.2/1.8	-2.25/1.16	-1.04/0.99	-1.47/3	-6.11/12.84	-18.39/10.88	-7.17/6.19	-6.6/17	-7.72/12.08	-10.77/12.92	-10.3/9.33	-9.33/10.59	-10.82/7.73	-4.78/3.66	-2.51/1.99	-1.28/0.97	-1.18/1.78	-2.6/3.47	-4.41/5.24	-5.51/5.22	-6.33/5.22	-4.2/2.71																							
Theta (135°)	-1.33/0.82	-1.3/2.65	-3.92/3.94	-3.7/4.12	-4.78/4.95	-4.93/5.76	-8.24/12.64	-13.1/9.36	-6.67/5.16	-4.24/4.02	-4.75/6.81	-9.97/11.98	-11.75/11.75	-12.37/12.75	-11.5/8.73	-6.13/4.39	-3.14/2.15	-1.48/1.43	-2.13/3.48	-5.52/8.18	-10.84/11.23	-9.14/6.8	-5.2/4.45	-3.73/2.55																							
Theta (142.5°)	-0.72/0.6	-1.13/2.47	-4.41/5.94	-6.69/7.65	-9.91/14.37	-18.77/17.63	-18.51/13.8	-9.47/7.68	-4.9/3.61	-2.84/2.77	-3.51/4.94	-6.88/8.24	-8.89/8.6	-7.21/5.39	-3.92/2.92	-2.21/1.64	-1.02/0.46	-0.19/0.45	-0.27/1.51	-1.41/5.89	-6.86/5.52	-5.41/4.1	-2.87/2.01	-1.46/1																							
Theta (150°)	-2.24/1.83	-1.96/2.66	-3.93/5.46	-6.63/7.1	-7.53/8.61	-10.43/12.41	-13.28/12.46	-10.65/8.66	-6.85/4.99	-3.85/3.35	-3.43/3.94	-4.66/5.42	-5.92/6.06	-5.48/4.34	-3.62/1.16	-1.35/0.71	-0.150/27	0.420/22	-0.37/1.24	-2.54/4.24	-6.12/7.57	-8.04/7.44	-6.15/4.83	-3.79/2.96																							
Theta (157.5°)	-2.26/1.63	-1.58/2.02	-3.02/4.61	-6.54/8.1	-9.02/10.03	-11.55/13.24	-15.05/17.73	-18.62/17.91	-13.85/10.08	-7.6/6.24	-5.55/5.37	-5.46/5.61	-5.81/5.86	-5.54/4.92	-4.14/3.32	-2.58/1.99	-1.55/1.13	-1.26/1.53	-2.08/3	-4.48/6.25	-9.76/13.94	-18.82/17.85	-12.73/8.83	-5.89/3.79																							
Theta (165°)	-4.3/4.24	-4.78/5.74	-7.48/10.41	-15.6/18.85	-17.76/15.51	-12.67/10.56	-9.52/9.85	-10.56/12.74	-17.71/18.98	-17.73/14.37	-11.36/9.67	-8.59/7.82	-7.38/7.04	-6.75/6.45	-6.24/5.94	-5.64/5.46	-5.43/5.54	-5.79/6.19	-6.99/8.29	-10.41/13.39	-17.94/15.53	-18.5/15.69	-12.26/9.27	-6.83/5.12																							
Theta (172.5°)	-9.82/10.85	-12.10/13.29	-14.64/14.58	-12.54/10.41	-7.82/7.56	-6.76/5.8	-5.46/5.81	-6.47/7.83	-9.98/12.8	-16.35/16.18	-16.1/13.19	-11.04/9.34	-8.29/7.58	-7.74/7.37	-7.74/8.28	-9.04/10.01	-11.03/12.34	-14.57/18.54	-18.35/18.08	-18.3/15.52	-12.78/11.27	-10.43/9.6	-8.97/8.86	-8.97/8.86																							
Theta (180°)	-17.05/13.96	-11.26/9.78	-8.89/8.18	-7.5/7.2	-7.26/7.33	-7.03/6.73	-6.76/7.34	-6.19/9.17	-10.33/11.33	-11.77/10.73	-8.61/8.52	-7.65/7.04	-6.72/6.62	-6.64/6.72	-6.87/7.13	-7.47/7.77	-8.13/8.68	-9.81/10.85	-11.28/11.49	-11.55/11.13	-10.77/10.99	-11.85/12.73	-14.08/16.24	-14.08/16.24																							
Freq(Hz)	2.45GPol.	ThetaAnt.2	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+																						
Gain	Phi(7.5°)	Phi(15°)	Phi(22.5°)	Phi(30°)	Phi(37.5°)	Phi(45°)	Phi(52.5°)	Phi(60°)	Phi(67.5°)	Phi(75°)	Phi(82.5°)	Phi(90°)	Phi(97.5°)	Phi(105°)	Phi(112.5°)	Phi(120°)	Phi(127.5°)	Phi(135°)	Phi(142.5°)	Phi(150°)	Phi(157.5°)	Phi(165°)	Phi(172.5°)	Phi(180°)	Phi(187.5°)	Phi(195°)	Phi(202.5°)	Phi(210°)	Phi(217.5°)	Phi(225°)	Phi(232.5°)	Phi(240°)	Phi(247.5°)	Phi(255°)	Phi(262.5°)	Phi(270°)	Phi(277.5°)	Phi(285°)	Phi(292.5°)	Phi(300°)	Phi(307.5°)	Phi(315°)	Phi(322.5°)	Phi(330°)	Phi(337.5°)	Phi(345°)	Phi(352.5°)
Theta (0°)	-12/12.08	-11.22/10.03	-8.92/8	-7.02/6.03	-5.26/4.69	-4.31/4.02	-4.14/4.61	-5/5.9	-6.63/7.07	-7.38/7.88	-8.45/8.88	-9.27/9.24	-8.84/8.33	-7.74/7.08	-6.38/5.76	-5.25/4.83	-4.45/4.01	-3.63/3.53	-3.64/3.72	-3.81/4.04	-4.6/5.52	-6.7/7.83	-8.89/9.79	-10.62/11.44	-10.62/11.44																						
Theta (7.5°)	-10.93/10.1	-9.12/8.16	-7.26/6.48	-5.72/4.92	-4.23/3.62	-3.13/2.78	-2.73/2.81	-2.97/3.29	-3.81/4.21	-4.63/5.27	-6.1/7.24	-6.84/10.04	-11.07/11.47	-10.97/9.82	-8.52/7.35	-6.51/6.01	-5.64/5.18	-5.15/5.18	-5.42/5.87	-6.4/7.07	-7.87/8.87	-10.06/10.95	-11.56/11.64	-11.41/10.14																							
Theta (15°)	-10.1/9.29	-8.28/7.37	-6.62/5.84	-5.12/4.45	-3.79/3.09	-2.45/1.85	-1.41/1.02	-0.86/0.96	-1.22/1.52	-2.1/2.59	-3.41/4.55	-6.11/8.42	-10.97/11.07	-19.07/18.86	-13.75/10.86	-9.11/8.04	-7.25/6.94	-6.95/6.99	-7.13/7.79	-8.99/10.09	-11.01/11.64	-12.01/12	-11.57/11.07	-10.64/10.21																							
Theta (22.5°)	-10.69/9.83	-8.79/7.88	-7.02/6.09	-5.14/4.26	-3.31/2.29	-1.41/0.69	-0.16/0.3	0.47/0.43	0.31/0.06	-0.21/0.77	-1.34/1.25	-3.24/4.68	-6.48/9.01	-12.73/18.87	-18.7/17.72	-14.04/11.89	-10.73/10.2	-10.08/10.19	-10.81/11.93	-13.56/15.48	-16.74/16.31	-14.67/12.85	-11.91/11.45	-11.25/11.08																							
Theta (30°)	-11.17/10.76	-10.16/9.52	-8.9/7.98	-6.86/5.74	-4.6/3.38	-2.33/1.51	-0.88/0.37	-0.17/0.15	-0.2/0.4	-0.64/0.89	-1.22/1.69	-2.26/2.97	-3.78/4.73	-6.02/7.73	-9.81/12.38	-15.63/18.38	-17.67/18.28	-18.22/17.69	-18.15/18.36	-18.84/18.94	-18.65/14.37	-15.82/13.71	-12.46/11.69	-11.24/11.16																							
Theta (37.5°)	-11.07/11.57	-11.82/11.75	-11.57/11.07	-10.05/8.77	-7.24/5.6	-4.13/2.92	-1.97/1.24	-0.83/0.76	-1.01/1.49	-1.91/2.27	-2.73/3.21	-3.71/4.08	-4.35/4.76	-5.4/6.27	-7.43/9.14	-11.56/15.11	-18.44/18.61	-19.03/18.97	-19.31/19.11	-19.11/18.63	-18.96/18.42	-16.29/13.15	-11.07/9.99	-9.7/10.24																							
Theta (45°)	-12.61/13.3	-13.91/14.68	-15.13/15.11	-14.19/12.44	-10.35/7.9	-5.72/3.99	-2.65/1.49	-0.72/0.35	-0.42/0.85	-1.38/1.92	-2.53/3.35	-4.24/5.04	-6.65/6.08	-6.47/6.91	-7.6/8.7	-10.25/12.25	-15.34/19.31	-18.22/19.21	-17.92/18.74	-18.39/18.13	-18.73/16.31	-13.46/11.44	-10.01/9.51	-10.06/11.35																							
Theta (52.5°)	-15.38/15.2	-14.71/13.84	-12.38/11.22	-10.34/9.1	-7.65/5.95	-4.24/2.73	-1.52/0.56	0.12/0.51	0.59/0.41	0.18/0.12	-0.67/1.62	-2.92/4.25	-5.28/6.12	-6.91/7.91	-8.95/9.77	-10.17/10.8	-12.29/14.57	-17.12/19.02	-18.01/18.85	-18.7/17.23	-15.44/15.06	-15.18/14.99	-13.27/12.47	-12.95/14.36																							
Theta (60°)	-12.06/11.34	-9.18/7.3	-6.36/6.29	-5.62/6.27	-5.47/4.39	-3.26/2.05	-1.01/0.22	0.15/0.16	0/0.19	-0.23/0.22	-0.52/1.51	-3.04/4.25	-4.86/5.23	-6.27/7.38	-10.06/12.07	-13.96/14.51	-15.12/14.87	-13.75/13.25	-13.76/15.24	-16.98/18.78	-19.21/17.83	-19.33/18.28	-17.28/13.99	-11.58/11.28																							
Theta (67.5°)	-11.3/6.94	-8.88/4.73	-4.24/4.71	-5.78/6.05	-5.38/4.5	-3.59/2.48	-1.42/0.45	0.02/0.12	0.54/0.84	-0.75/0.79	-1.69/3.51	-3.04/4.76	-4.18/4.53	-5.38/6.06	-6.62/7.4	-7.95/10.01	-11.61/12.75	-12.12/13.4	-14.79/1																												



# Radiated Composite Gain Data of 2GHz

# Appendix A

Theta (°)	-2.87/-3.58	-4.69/-5.49	-5.92/-6.8	-8.64/-11.09	-13.71/-19.21	-18.66/-19.91	-9.23/-6.7	-5/-3.74	-2.86/-2.53	-2.75/-3.53	-4.17/-5.07	-5.44/-4.88	-4.17/-3.89	-3.91/-4.03	-4.37/-4.83	-5.28/-5.71	-6.06/-6.38	-6.37/-5.82	-4.8/-3.56	-2.56/-2.01	-1.81/-1.73	-1.53/-1.29	-1.22/-1.54	-2.05/-2.51
Theta (82.5°)	-1.3/-2.39	-3.73/-4.9	-5.59/-6.36	-7.9/-9.27	-9.25/-10.22	-14.25/-16.02	-9.61/-5.97	-3.99/-2.92	-2.39/-2.37	-2.8/-3.53	-4.58/-5.22	-5.02/-4.48	-4.22/-4.35	-4.64/-5.22	-6.15/-7.25	-8.19/-7.97	-6.44/-4.8	-3.66/-3.16	-2.9/-2.66	-2.41/-2.13	-1.82/-1.42	-0.91/-0.27	0.360/0.9	0.32/-0.34
Theta (90°)	-1.34/-2.75	-4.45/-5.92	-6.74/-7.36	-9.1/-10.97	-9.71/-8.7	-9.67/-9.96	-7.09/-4.16	-2.21/-1.05	-0.55/-0.67	-1.13/-1.65	-2.07/-2.21	-1.96/-1.47	-1.07/-0.93	-1.16/-1.74	-2.85/-4.83	-7.62/-9	-6.96/-4.11	-2.23/-1.29	-0.68/-0.19	0.180/0.37	0.340/0.15	-0.07/0.12	0.040/0.24	0.15/-0.37
Theta (97.5°)	-4.32/-6.15	-8.95/-10.97	-10.36/-9.26	-8.4/-9.15	-7.71/-6.97	-7.47/-7.44	-5.65/-3.58	2/0.91	-0.25/-0.13	-0.34/-0.62	-0.84/-0.96	-0.81/-0.37	-0.13/-0.34	-0.88/-1.68	-3.02/-5.38	-8.42/-10.9	-9.68/-6.18	-3.67/-1.95	-0.50/-0.53	0.920/0.72	0.08/-0.73	-1.45/-1.94	-2.36/-2.72	-2.99/-3.46
Theta (105°)	-4.43/-5.62	-8.04/-12.68	-17.69/-18.74	-17.1/-11.52	-8.43/-7.36	-7.54/-7.34	-5.72/-3.79	-2.25/-1.11	-0.27/0.16	0.27/0.25	0.14/0.04	0.20/0.48	0.43/-0.09	-0.72/-1.36	-2.37/-3.87	-5.43/-6.82	-7.78/-7.2	-5.5/-3.47	-1.74/-0.81	-0.84/-1.7	-3.07/-4.38	-4.9/-4.49	-3.66/-3.19	-3.16/-3.62
Theta (112.5°)	-5.95/-6.99	-8.63/-11.94	-18.19/-18.33	-18.66/-13.51	-9.34/-7.63	-7.52/-7.72	-6.74/-4.83	-3.02/-1.61	-0.6/-0.11	0.03/-0.02	-0.13/-0.16	-0.03/-0.02	-0.45/-1.12	-1.66/-2.32	-3.46/-4.99	-6.56/-7.47	-7.12/-6	-4.92/-4	-3.29/-2.99	-3.19/-4	-5.52/-7.6	-9.64/-9.5	-7.14/-5.28	-4.66/-5.05
Theta (120°)	-7.48/-8.13	-8.57/-9.5	-11.6/-14.21	-14.94/-12.62	-9.75/-7.85	-7.18/-7.06	-6.51/-5.15	-3.6/-2.41	-1.63/-1.38	-1.53/-1.8	-1.91/-1.76	-1.53/-1.43	-1.52/-1.71	-1.9/-2.37	-3.46/-5.13	-7.15/-8.77	-8.62/-7.26	-6.13/-5.23	-4.1/-2.82	-1.82/-1.53	-2.27/-4.11	-6.96/-10.53	-12.83/-10.47	-8.1/-7.12
Theta (127.5°)	-9.11/-8.82	-8.65/-6.79	-9.99/-12.04	-13.54/-12.76	-10.63/-8.53	-7.24/-6.56	-6.08/-5.24	-4.24/-3.53	-3.17/-3.08	-3.19/-3.22	-2.98/-2.54	-2.11/-1.89	-1.9/-2.07	-2.44/-3.2	-4.52/-6.38	-8.66/-10.76	-12.33/-12.32	-11.26/-9.17	-6.52/-4.25	-2.8/-2.43	-3.27/-5.17	-7.88/-11.16	-15.39/-17.11	-13.01/-10.23
Theta (135°)	-10.38/-9.46	-6.61/-8.73	-7.37/-8.86	-10.69/-11.53	-11.12/-10.41	-9.6/-8.82	-8.27/-8.05	-7.91/-7.85	-7.75/-7.42	-6.82/-6.15	-5.56/-5.11	-4.91/-4.97	-5.26/-5.61	-5.94/-6.45	-9.23/-9.74	-9.95/-9.89	-9.09/-7.51	-5.56/-3.94	-2.92/-2.5	-2.72/-3.48	-4.51/-5.53	-6.52/-7.51	-8.13/-9.3	
Theta (142.5°)	-4.98/-5.21	-5.43/-5.69	-6.39/-8.03	-10.83/-14.48	-17.82/-18.5	-19.13/-13.97	-10.47/-8.35	-7.19/-6.42	-5.88/-5.44	-5.24/-5.34	-5.71/-6.34	-7.28/-8.64	-10.27/-12.45	-15.52/-18.98	-17.8/-18.7	-16.51/-13.83	-12.06/-11.29	-10.82/-10.06	-8.76/-7.58	-6.52/-5.7	-5.25/-5.19	-5.28/-5.26	-5.01/-4.7	-4.56/-4.64
Theta (150°)	-5.43/-5.68	-5.88/-6.22	-6.92/-8.32	-10.78/-14.66	-18.23/-16.44	-12.65/-9.23	-6.56/-4.61	-3.25/-2.36	-1.77/-1.47	-1.44/-1.62	-2.01/-2.49	-3.02/-3.63	-4.27/-5.05	-6.06/-7.27	-8.69/-10.42	-12.62/-15.18	-17.42/-18.73	-18.25/-19.06	-18.22/-16.75	-13.58/-11.23	-9.64/-8.73	-8.29/-7.9	-7.13/-6.16	-5.53/-5.4
Theta (157.5°)	-7.76/-8.14	-8.46/-8.87	-9.32/-10.14	-11.31/-12.4	-12.45/-11.24	-9.47/-8.56	-5.84/-4.38	-3.35/-2.63	-1.71/-1.93	-1.91/-2.03	-2.24/-2.55	-3.89/-4.49	-5.15/-5.84	-6.57/-7.48	-9.51/-9.86	-13.71/-14.6	-14.98/-13.32	-15.53/-15.18	-14.27/-13.32	-12.47/-11.45	-10.28/-9.04	-7.96/-7.11	-6.6/-6.2	-5.87/-5.82
Theta (165°)	-7.71/-8.35	-9.11/-9.69	-10.01/-10.14	-10.26/-10.38	-10.36/-10.17	-9.81/-9.17	-8.27/-7.44	-6.85/-6.55	-6.4/-6.34	-6.44/-6.65	-6.91/-7.25	-7.66/-8.26	-8.9/-9.66	-10.32/-10.86	-11.32/-11.68	-11.94/-11.81	-11.25/-10.62	-9.86/-9.96	-7.96/-7.04	-6.31/-5.75	-5.51/-5.52	-5.72/-6.06	-6.57/-7	-7.18/-7.33
Theta (172.5°)	-6.22/-6.57	-6.98/-7.44	-7.87/-8.23	-8.67/-8.28	-10.09/-11.12	-12.15/-12.83	-12.81/-12.53	-12.76/-13.15	-13.34/-13.33	-13.41/-13.32	-13.13/-13.45	-13.71/-14	-14.35/-14.64	-14.98/-14.58	-15.53/-15.18	-14.27/-13.32	-12.47/-11.45	-10.28/-9.04	-7.96/-7.11	-6.6/-6.2	-5.94/-5.85	-5.92/-5.95	-5.87/-5.82	
Theta (180°)	-6.89/-7.03	-7.24/-7.49	-7.87/-8.3	-8.9/-8.88	-11.29/-13.35	-15.91/-18.16	-17.91/-16.49	-15.22/-13.64	-11.89/-10.45	-9.31/-8.46	-7.74/-7.23	-6.93/-6.97	-7.27/-6.2	-8.28/-9.12	-10.16/-11.36	-13.63/-13.37	-12.99/-12.16	-11.15/-10.14	-9.07/-8.26	-7.85/-7.46	-7.12/-6.95	-6.91/-6.81	-6.66/-6.59	
Freq(Hz)	2.45GPol.	ThetaAnt. 2	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Gain	Phi(0°)/Phi(7.5°)	Phi(15°)/Phi(22.5°)	Phi(30°)/Phi(37.5°)	Phi(45°)/Phi(52.5°)	Phi(60°)/Phi(67.5°)	Phi(75°)/Phi(82.5°)	Phi(90°)/Phi(97.5°)	Phi(105°)/Phi(112.5°)	Phi(120°)/Phi(127.5°)	Phi(135°)/Phi(142.5°)	Phi(150°)/Phi(157.5°)	Phi(165°)/Phi(172.5°)	Phi(180°)/Phi(187.5°)	Phi(195°)/Phi(202.5°)	Phi(210°)/Phi(217.5°)	Phi(225°)/Phi(232.5°)	Phi(240°)/Phi(247.5°)	Phi(255°)/Phi(262.5°)	Phi(270°)/Phi(277.5°)	Phi(285°)/Phi(292.5°)	Phi(300°)/Phi(307.5°)	Phi(315°)/Phi(322.5°)	Phi(330°)/Phi(337.5°)	Phi(345°)/Phi(352.5°)
Theta (0°)	-10.46/-9.46	-8.67/-8	-7.38/-6.96	-6.78/-6.71	-6.84/-7.31	-7.97/-8.48	-8.99/-9.73	-10.97/-12.48	-13.96/-14.89	-15.01/-14.46	-13.47/-12.35	-11.27/-10.18	-9.24/-8.5	-7.98/-7.51	-7.07/-6.8	-6.73/-6.77	-6.98/-7.38	-8.02/-9.01	-10.51/-12.39	-14.69/-17.58	-18.68/-18.94	-17.63/-15.35	-13.41/-11.72	
Theta (7.5°)	-13.92/-12.5	-11.15/-9.94	-8.83/-7.87	-7.17/-6.66	-6.33/-6.32	-6.74/-7.55	-8.49/-9.49	-11.01/-13.52	-17.54/-18.69	-18.12/-17.96	-14.82/-11.91	-10.03/-8.74	-7.86/-7.18	-6.73/-6.54	-6.42/-6.2	-5.94/-5.83	-5.98/-6.12	-6.25/-6.54	-7.07/-7.63	-8.14/-8.67	-9.41/-10.23	-11.29/-12.38	-13.51/-14.48	-15.12/-14.87
Theta (15°)	-16.47/-16.67	-15.01/-12.83	-10.8/-9.14	-7.88/-7.7	-6.49/-6.48	-6.94/-7.78	-8.77/-9.84	-11.56/-13.4	-18.58/-18.69	-18.84/-14.41	-11.26/-9.01	-7.51/-6.41	-5.74/-5.24	-4.93/-4.78	-4.63/-4.32	-4.3	-3.73/-3.69	-3.8/4.04	-4.32/-4.46	-4.64/-4.96	-5.64/-6.09	-6.78/-7.68	-8.89/-10.41	-12.31/-14.77
Theta (22.5°)	-17.22/-17.88	-17.61/-16.41	-12.95/-10.6	-8.99/-8.72	-7.29/-7.43	-8.1/-7.16	-10.36/-11.79	-13.91/-17.14	-17.87/-18.57	-14.21/-10.6	-8.73/-7.03	-5.83/-5.02	-3.94/-2.57	-2.51/-1.8	-1.53/-1.45	-1.61/-1.76	-1.87/-1.99	-2.24/-2.67	-3.28/-3.94	-4.66/-5.54	-6.67/-7.48	-9.73/-8.18	-10.99/-10.65	
Theta (30°)	-17.41/-18.33	-17.36/-15.99	-12.4/-10.17	-8.72/-7.79	-7.51/-8.03	-9.18/-10.95	-13.08/-15.78	-18.21/-18.76	-18.63/-15.26	-11.42/-8.97	-7.08/-5.65	-4.66/-3.99	-3.61/-3.34	-2.97/-2.44	-1.83/-1.3	-0.78/-0.35	0.06/0.05	0.06/0.05	-0.05/-0.27	-0.72/-1.36	-2.18/-3.11	4.08/-5.19	6.63/-8.33	-10.39/-13.34
Theta (37.5°)	-15.17/-18.42	-18.62/-18.36	-13.67/-11.05	-9.37/-8.41	-8.19/-7.89	-10.12/-12.25	-15.31/-18.4	-18.1/-17.86	-15.4/-11.4	-8.48/-6.48	-4.96/-3.85	-3.09/-2.64	-2.24/-1.85	-1.37/-0.87	-0.43/0.05	0.52/0.9	1.19/1.37	1.48/1.49	1.30/0.92	0.29/-0.54	-1.52/-2.6	-3.75/-4.93	-6.27/-7.79	-9.63/-11.99
Theta (45°)	-15.33/-18.73	-18.83/-17.71	-14.94/-11.71	-9.97/-8.98	-8.7/-9.09	-10.02/-11.54	-13.86/-16.68	-18.33/-15.98	-12.54/-9.62	-8.61/-6.21	-5.13/-4.25	-3.19/-2.42	-1.14/-1.07	-0.25/0.04	0.29/0.67	1.11/1.49	1.79/2.04	2.17/2.13	1.87/1.36	0.57/-0.43	-1.57/-2.86	-4.15/-5.37	-6.73/-8.34	-10.26/-12.67
Theta (52.5°)	-16.78/-18.46	-17.47/-14.95	-12.5/-11.26	-10.98/-11.24	-11.63/-12.19	-12.82/-14.34	-16.88/-18.53	-17.36/-18.04	-12.99/-10.04	-7.5/-5.31	-3.49/-2.26	-1.59/-1.33	-1.02/-0.48	0.02/0.22	0.42/0.82	1.27/1.57	1.71/1.72	1.64/1.4	0.89/0.14	-0.85/-1.97	-3.11/-4.16	-5.13/-6.11	-7.43/-9.11	-11.3/-13.96
Theta (60°)	-8.99/-9.61	-9.51/-9.4	-10.11/-11.32	-16.04/-18.16	-16.94/-15.84	-16.2/-16.92	-16.21/-14.94	-13.08/-10.85	-9.12/-8.23	-7.37/-5.87	-4.16/-3.01	-2.67/-2.83	-2.54/-1.73	-1.09/-0.92	-0.88/0.4	0.10/0.17	-0.10/-0.37	-0.63/-1.12	-1.77/-2.34	-2.78/-3.09	-3.32/-3.59	-3.91/-4.4	-5.07/-5.82	-6.77/-7.9
Theta (67.5°)	-7.64/-8.96	-9.56/-9.53	-10.99/-15.28	-19.11/-14.93	-13.37/-13.96	-15.82/-16.18	-11.41/-11.4	-9.72/-7.89	-6.41/-5.98	-2.89/-2.42	-2.39/-2.36	-2.57/-1.68	-1.47/-1.69	-1.33/0.56	-0.16/-0.15	-0.16/0.02	-0.04/0.32	-0.24/0.26	0.01/0.07	-0.69/-1.72	-2.62/-3.38	-4.45/-5.52	-6.2/-6.68	
Theta (75°)	-6.85/-7.79	-9.08/-9.19	-9.19/-11.02	-15.22/-17.43	-14.96/-14.55	-15.99/-18.67	-18.55/-15.14	-11.46/-8.85	-7.17/-6.61	-5.57/-3.59	-1.9/-1.47	-1.87/-1.64	-0.60/0.15	0.14/0.14	0.64/1.17	1.39/1.47	1.66/1.69	1.33/0.88	0.6/0.61	0.74/0.55	-0.22/-1.58	-2.89/-3.71	-4.67/-5.99	-6.89/-8.82
Theta (82.5°)	-7.8/-13.7	-7.46/-7.72	-7.67/-8.23	-9.54/-9.54	-8.44/-8.54	-9.64/-10.98	-11.09/-9.82	-8/-7.9	-6.58/-6.89	-5.87/-3.67	-2.26/-2.22	-2.34/-1.43	-0.38/-0.09	-0.24/-0.12	0.17/0.27	0.38/0.49	0.38/0.07	-0.52/-0.81	-1.01/-1.08	-1.18/-1.25	-1.63/-2.74	-4.26/-4.52	-6.27/-7.58	-9.17/-9.06
Theta (90°)	-11.38/-9.73	-7.77/-6.64	-6.67/-7.77	-9.08/-8.79	-7.66/-7.8	-9.16/-10.52	-10.55/-9.05	-6.96/-5.49	-5.22/-3.42	-2.48/-2.47	-2.31/-1.55	-1.11/-1.34	-1.77/-1.92	-2.21/-2.39	-2.11/-2.13	-2.74/-3.24	-3.2/-3.3	-3.49/-3.65	-3.68/-3.49	-3.71/-4.5	-5.74/-7.43	-9.4/-10.44	-10.69/-11.19	
Theta (97.5°)	-4.05/-4.4	-3.46/-2.2	-2.01/-3.32	-4.89/-4.88	-4.16/-4.19	-5.04/-5.91	-6.38/-6.82	-7.04/-7.42	-6.75/-5.46	-4.73/-4.4	-4.18/-3.92	-4.21/-4.91	-5.48/-6.28	-7.39/-6.95	-6.31/-6.63	-6.83/-6.68	-4.99/-4.89	-4.35/-3.4	-2.29/-1.64	-1.74/-2.07	-2.31/-2.68	-3.45/-4.16	-4.04/-3.71	
Theta (105°)	-3.95/-4.6	-4.28/-2.77	-2.08/-3.11	-4.82/-4.71	-3.51/-2.93	-3.22/-3.56	-3.56/-3.66	-4.11/-4.85	-5.67/-6.16	-5.92/-5.31	-4.99/-5.24	-5.95/-6.61	-6.82/-9.33	-7.48/-8.66	-8.83/-10.6	-6.14/-5.6	-4.38/-3.33	-3.44/-4.06	-4.34/-4.02	-3.3/-2.69	-2.75/-3.44	-4.11/-4.32	-4.82/-5.86	-5.19/-4.12
Theta (112.5°)	-4.75/-4.69	-4.3/-2.77	-1.62/-2.05																					



Freq(Hz)	5.2G	5.3G	5.6G	5.785G	5.885G
Ant. 1 Max Gain (dBi)	3.66	3.88	3.24	2.99	3.33
Ant. 2 Max Gain (dBi)	3.76	4.34	4.09	3.74	3.48
Ant. 1 Polarization/ $\theta$ (°)/ $\phi$ (°)	Theta/112.5/255	Theta/112.5/255	Theta/82.5/300	Theta/112.5/255	Theta/120/255
Ant. 2 Polarization/ $\theta$ (°)/ $\phi$ (°)	Phi/127.5/165	Phi/127.5/165	Theta/105/240	Theta/105/240	Theta/105/240
Max Gain (dBi)	3.76	4.34	4.09	3.74	3.48
DG [1SS] (dBi)	3.96	4.67	6.07	6.01	5.59
DG [2SS] (dBi)	3.76	4.34	4.09	3.74	3.48



# Radiated Composite Gain Data of 5GHz

# Appendix B

## DG 1SS Result

Freq(Hz)	5.2GPol.	PhiL	PhiR	Phi(15°)Phi(37.5°)	Phi(45°)Phi(52.5°)	Phi(60°)Phi(67.5°)	Phi(75°)Phi(82.5°)	Phi(90°)Phi(97.5°)	Phi(105°)Phi(112.5°)	Phi(120°)Phi(127.5°)	Phi(135°)Phi(142.5°)	Phi(150°)Phi(157.5°)	Phi(165°)Phi(172.5°)	Phi(180°)Phi(187.5°)	Phi(195°)Phi(202.5°)	Phi(210°)Phi(217.5°)	Phi(225°)Phi(232.5°)	Phi(240°)Phi(247.5°)	Phi(255°)Phi(262.5°)	Phi(270°)Phi(277.5°)	Phi(285°)Phi(292.5°)	Phi(300°)Phi(307.5°)	Phi(315°)Phi(322.5°)	Phi(330°)Phi(337.5°)	Phi(345°)Phi(352.5°)
DG(dB)	Phi(0°)Phi(7.5°)	Phi(15°)Phi(22.5°)	Phi(30°)Phi(37.5°)	Phi(45°)Phi(52.5°)	Phi(60°)Phi(67.5°)	Phi(75°)Phi(82.5°)	Phi(90°)Phi(97.5°)	Phi(105°)Phi(112.5°)	Phi(120°)Phi(127.5°)	Phi(135°)Phi(142.5°)	Phi(150°)Phi(157.5°)	Phi(165°)Phi(172.5°)	Phi(180°)Phi(187.5°)	Phi(195°)Phi(202.5°)	Phi(210°)Phi(217.5°)	Phi(225°)Phi(232.5°)	Phi(240°)Phi(247.5°)	Phi(255°)Phi(262.5°)	Phi(270°)Phi(277.5°)	Phi(285°)Phi(292.5°)	Phi(300°)Phi(307.5°)	Phi(315°)Phi(322.5°)	Phi(330°)Phi(337.5°)	Phi(345°)Phi(352.5°)	
Theta(°)	-1.61-1.8	-1.97-2.69	-2.69-2.88	-3.62-4.3	-4.61-5.38	-6.12-6.94	-8.11-8.87	-8.84-7.93	-7.34-7.39	-7.31-6.35	-5.57-4.17	-2.85-2.08	-1.56-1.46	-1.41-1.36	-1.51-1.93	-2.52-2.92	-3.51-3.95	-4.39-4.38	-4.43-4.51	-4.68-4.3	-3.96-3.96	-4.15-4.06	-3.82-2.99	-3.07-2.94	
Theta(7.5°)	-1.02-0.98	-1.26-1.65	-1.91-2.01	-2.54-2.92	-3.19-4.23	-3.59-6.08	-5.78-5.29	-5.04-6.43	-4.51-6.09	-5.09-5.35	-5.14-5.47	-5.34-5.58	-2.27-2.45	-2.71-2.77	-2.97-3.45	-4.34-4.86	-5.01-5.2	-5.85-6.48	-6.82-6.84	-6.76-6.61	-6.28-6.01	-5.82-5.52	-5.17-4.15	-3.81-3.2	
Theta(15°)	0.19-0.13	-0.98-1.38	-1.2-1.05	-2.12-2.92	-3.57-5.07	-6.48-7.92	-7.43-6.54	-5.43-4.42	-4.12-4.12	-4.68-5.4	-6.07-6.64	-8.82-6.64	-6.64-6.68	-6.83-7.07	-6.74-6.25	-6.53-6.05	-5.44-5.87	-6.14-6.13	-6.19-6.3	-5.92-5.44	-4.64-4.1	-3.62-3.17	-3.12-1.5	-1.18-0.73	
Theta(22.5°)	-1.16-0.99	-0.81-0.61	-1.01-1.61	-3.04-3.89	-4.67-6.27	-7.4-8.52	-7.4-8.62	-11.07-11.66	-10.8-8.3	-6.21-4.98	-4.55-5.05	-5.59-6.16	-6.97-7.44	-7.35-7.22	-6.82-5.95	-5.82-6.21	-6.83-7.74	-8.23-7.65	-6.98-6.02	-5.59-5.45	-4.38-3.86	-3.21-1.99	-0.71-1.09		
Theta(30°)	0.13-0.15	-0.43-1.88	-4.3-5.76	-6.2-6.42	-5.94-5.63	-5.18-5.98	-6.81-7.8	-9.74-11.27	-9.81-8.01	-5.94-4.74	-4.84-5.54	-5.9-5.76	-5.5-6.71	-9.59-8.22	-5.29-3.89	-4.05-4.55	-5.15-6.03	-7.27-8.75	-9.86-11.66	-9.82-7.15	-6.49-7.09	-5.93-5.33	-1.11-0.31	-0.11-0.36	
Theta(37.5°)	-2.27-3.91	-4.02-5.32	-8.07-9.96	-11.01-9.37	-5.91-3.91	-2.83-3.18	-4.17-5.45	-7.31-9.1	-10.99-10.9	-8.99-6.5	-5.28-4.97	-4.83-5.16	-6.46-8.09	-7.63-7.38	-7.2-6.4	-5.08-4.7	-5.64-6.6	-8.15-8.65	-6.66-6.5	-7.61-8.01	-7.29-6.07	-5.42-4.07	-2.41-1.13	0.1-0.46	
Theta(45°)	-1.05-3.41	-8.61-9.81	-10.06-6.18	-5.14-4.06	-3.52-3.97	-5.01-5.17	-4.46-3.47	-3.02-2.98	-3.71-4.68	-4.93-5.73	-6.39-4.87	-5.21-2.86	-3.31-5.73	-10.05-11.23	-5.71-2.97	-2.32-2.76	-3.13-3.84	-4.22-5.06	-7.04-8.54	-8.12-7.81	-9.16-9.47	-6.66-3.72	-1.64-1.6	0.14-0.54	
Theta(52.5°)	-7.74-0.08	-4.87-8.52	-7.23-7.75	-6.98-6.81	-6.79-6.68	-7.12-7.53	-6.67-4.1	-2.54-1.6	-1.59-2.37	-4.54-7.95	-7.72-4.58	-3.06-2.13	-2.86-5.88	-7.82-7.97	-9.48-8.06	-5.72-4.46	-4.99-5.68	-7.46-8.4	-7.98-7.89	-10.29-10.81	-9.43-8.57	-7.46-5.62	-2.93-2.6	-5.62-6.98	
Theta(60°)	-6.98-9.98	-6.5-3.62	-1.86-2.44	-4.38-6.65	-81-83	-7.45-6.72	-5.83-5.29	-5.55-6.87	-7.14-5.86	-6.51-9.62	-11.95-10.42	-2.77-1.15	-1.54-5.5	-9.28-14.48	-5.19-3.18	-2.26-2.69	-3.46-3.83	-4.91-4.81	-4.18-4.61	-5.38-6.31	-5.08-4.44	-4.13-3	-3.73-5.73		
Theta(67.5°)	-8.31-8.21	-7.74-7.46	-6.22-6.66	-6.72-5.73	-6.32-6.49	-6.78-6.24	-5.01-4.05	-3.77-3.97	-3.89-3.18	-3.41-5.56	-11.95-10.42	-2.77-1.15	-1.54-5.5	-9.28-14.48	-5.19-3.18	-2.26-2.69	-3.46-3.83	-4.91-4.81	-4.18-4.61	-5.38-6.31	-5.08-4.44	-4.13-3	-3.73-5.73		
Theta(75°)	-6.37-3.76	-1.66-2.38	-1.91-2.27	-3.64-5.53	-7.12-6.24	-5.33-4.49	-4.49-4.3	-4.27-4.78	-5-5.19	-4.61-4.9	-8.45-10.21	-6.35-1.77	-1.22-1.61	-2.22-4.51	-8.59-12.22	-13.85-12.98	-8.27-5.26	-4.63-5.76	-8.13-6.6	-5.2-6.22	-8.15-10.62	-5.97-4.93	-5.62-6.21	-5.09-5.14	
Theta(82.5°)	-9.54-10.42	-5.42-4.14	-5.23-4.79	-8.36-7.13	-4.67-3.38	-3.1-3.64	-4.66-4.74	-4.46-2.46	-5.55-9.27	-11.19-9.79	-10.77-10.89	-6.05-2.83	-1.38-1.09	-1.17-3.51	-81-82	-7.28-7.49	-4.09-5.73	-7.27-6.32	-6.81-8.41	-6.55-5.21	-4.41-2.32	-1.09-6.09	-0.72-0.01	-1.12-1.26	
Theta(90°)	-11.18-13.26	-11.75-8.29	-5.69-2.96	-3.25-4.6	-4.82-3.72	-2.25-1.74	-1.16-4.46	-5.95-5.48	-4.54-9.21	-7.21-8.89	-7.56-8.33	-12.18-6.27	-4.61-3.9	-1.81-3.74	-4.1-3.21	-4.77-5.52	-3.29-4.84	-6.81-9.94	-7.47-4.25	-4.03-4.02	-3.42-6.66	-1.61-2.07	-0.47-1.17	-4.71-7.1	
Theta(97.5°)	-8.83-9.65	-9.22-8.68	-5.71-3.74	-1.520.33	0.950.44	-0.4-0.95	-0.65-0.42	-1.5-2.41	-2.28-2.42	-3.65-6.11	-7.67-14.87	-13.95-11.56	-7.98-5.95	-5.08-2.36	-1.28-1.15	-3.4-5.1	-5.91-6.9	-7.5-7.36	-9.7-6.17	-4.47-3.51	-0.96-1.05	-4.53-2.97	-0.5-0.45	-1.26-4.18	
Theta(105°)	-4.66-8	-10.88-11.89	-10.94-5.88	-3.99-2.6	-1.81-1.02	-1.02-1.14	-1.93-2.14	-2.32-2.84	-3.33-2.38	-1.08-1.64	-3.03-6.81	-7.25-11.09	-6.94-4.59	-2.41-1.55	-1.72-1.02	-0.35-2.57	-2.85-1.18	-0.21-2.89	-4.41-2.32	-1.09-6.09	-0.72-0.01	-0.30-2.47	-0.89-1.32	-1.12-1.26	
Theta(112.5°)	-6.03-6.17	-6.68-8.11	-5.96-5.68	-5.11-2.93	-1.9-2.34	-2.25-1.74	-3.07-2.96	-3.42-4.07	-5.07-3.61	-3.43-2.05	-0.72-1.58	-2.57-6.79	-7.93-6.62	-6.91-5.26	-2.740.37	0.45-2.14	-4.86-1.77	-4.0-0.86	-2.36-2.26	-2.07-1.52	-0.57-1.17	-4.16-3.45	-2.61-2.07	-4.02-9.91	
Theta(120°)	-4.3-2.16	-1.03-2.53	-4.73-6.83	-9.79-8.85	-4.39-3.03	-3.24-3.17	-2.87-3.1	-2.59-2.75	-2.51-4.89	-9.27-4.97	-2.02-0.54	0.320.05	-0.13-1.93	-2.740.05	0.430.71	1.41-0.14	-2.3-2.32	-1.6-2.72	-3.75-3.85	-6.25-5.66	-2.05-2.61	-4.93-3.07	-2.31-4.19	-3.61-7.11	
Theta(127.5°)	-3.36-6.81	-7.13-6.12	-8.39-8.05	-9.43-11.59	-9.18-6.36	-5.31-6.49	-8.68-6.49	-5.11-3.25	-2.97-5.42	-8.06-3.55	0.177	1.990.56	1.131.46	-0.89-6.4	-7.97-3.30	-2.45-1.75	-4.83-6.55	-6.24-8.9	-10.1-3.65	-8.53-7.19	-3.52-3.16	-5.38-4.37	-0.29-0.16	-0.69-1.91	
Theta(135°)	1.01-1.57	-2.74-1.08	-1.24-2.05	-3.43-4.9	-6.08-5.07	-2.56-1.06	-0.94-1.02	-1.1-1.59	-2.19-2.25	-4.76-8.56	-8.01-4.34	-1.770.72	1.54-0.05	-1.34-4.4	-3.50.12	2.131.35	-1.46-4.46	-9.8-2.77	-6.41-8.36	-8.95-10.96	-4.71-5.4	-4.06-0.52	-1.272.12	3.96-1.5	
Theta(142.5°)	-0.09-1.3	-4.23-4.48	-5.42-4.93	-5.11-5.34	-5.52-4.93	-3.49-2.14	-1.02-1.21	-2.45-3.59	-5.04-8.25	-12.05-12.6	4.75-1.57	0.820.22	0.05-0.45	-1.15-5.43	-5.22-1.07	-6.61-1.81	-3.77-8.28	-9.78-5.67	-5.04-3.38	-1.95-7.85	-3.52-2.24	-4.49-8.69	-5.99-1.47	0.042.60	
Theta(150°)	-1.81-0.8	-1.67-3.39	-4.76-4.69	-3.23-2.92	-3.39-3.68	-2.89-1.82	-0.77-0.39	-1.1-2.97	-6.3-8.55	-6.82-3.45	-3.07-1.96	-1.03-1.18	-2.23-3.21	-2.22-1.91	-2.61-1.61	-0.95-2.28	-5.62-10.46	-6.87-3.56	-3.73-7.2	-9.41-9.44	-6.36-2.85	-1.41-1.96	-2.82-3.71	-3.65-3.15	
Theta(157.5°)	-0.520.38	0.01-1.02	-1.34-1.58	-2.56-1.46	-1.61-7.32	-6.49-5.65	-5.09-4.92	-5.2-4.8	-3.96-2.87	-2.67-2.27	-2.66-2.89	-3.07-3.88	-5.9-5.81	-2.73-1.27	-0.450.16	0.630.2	-1.67-4.79	-5.66-5.72	-6.34-6.69	-5.86-4	-1.820.03	-0.39-1.03	-3.13-5.27	6.37-3.09	
Theta(165°)	2.09-2.31	1.840.73	-0.53-2.03	-3.5-4.42	-5.33-6.19	-7.06-7.48	-7.11-6.5	-5.53-4.15	-3.07-2.48	-2.49-2.43	-2.43-2.6	-3.18-4.18	-4.06-2.9	-2.02-1.31	-0.97-0.59	0.30-1.4	-0.91-2.49	-4.18-5.8	-6.42-6.13	-5.05-3.82	-2.86-3.33	-4.4-3.75	-1.471.23		
Theta(172.5°)	-1.96-2.97	-3.77-3.77	-4.07-4.54	-4.44-4.86	-5.57-6.16	-6.47-6.99	-7.84-10.07	-11.85-11.53	-9.98-8.37	-6.59-4.49	-3.06-2.29	-1.69-1.3	-0.83-0.17	0.420.81	0.907.6	0.660.35	-0.36-1.25	-2.01-2.45	-2.77-3.05	-3.49-3.82	-4.13-3.85	-3.44-3.68	-4.01-3.42	-2.06-1.43	
Theta(180°)	-9.29-8.47	-6.32-4.81	-3.63-3.18	-3.22-3.83	-4.81-5.96	-7.38-9.7	-11.79-13.97	-13.68-12.02	-9.65-7.38	-5.34-3.26	-1.97-1.17	-0.58-0.35	-0.2-0.08	0.02-0.15	-0.77-1.49	-2.48-3.71	-5.17-7.4	-9.83-10.6	-10.84-9.02	-7.54-6.52	-6.1-5.41	-4.98-5.2	-6.25-7.98	-9.1-9.54	
Phi(Hz)	ThetaL	ThetaR	Phi(15°)Phi(37.5°)	Phi(45°)Phi(52.5°)	Phi(60°)Phi(67.5°)	Phi(75°)Phi(82.5°)	Phi(90°)Phi(97.5°)	Phi(105°)Phi(112.5°)	Phi(120°)Phi(127.5°)	Phi(135°)Phi(142.5°)	Phi(150°)Phi(157.5°)	Phi(165°)Phi(172.5°)	Phi(180°)Phi(187.5°)	Phi(195°)Phi(202.5°)	Phi(210°)Phi(217.5°)	Phi(225°)Phi(232.5°)	Phi(240°)Phi(247.5°)	Phi(255°)Phi(262.5°)	Phi(270°)Phi(277.5°)	Phi(285°)Phi(292.5°)	Phi(300°)Phi(307.5°)	Phi(315°)Phi(322.5°)	Phi(330°)Phi(337.5°)	Phi(345°)Phi(352.5°)	
Theta(0°)	-7.84-7.4	-6.59-5.57	-5.66-5.69	-6.2-6.31	-5.47-4.69	-4.09-3.7	-3.86-3.96	-4.03-3.6	-3.63-3.96	-4.82-5.2	5.12-4.89	5.18-5.46	5.98-6.02	-7.26-6.71	-6.75-6.15	-5.49-4.54	-3.79-3.66	-3.07-2.44	-1.84-1.75	-2.01-1.77	-1.87-2.13	-2.55-2.78	-3.72-4.71	-6.29-7.18	
Theta(7.5°)	-6.3-5.03	-3.71-3.17	-2.66-2.44	-2.68-2.65	-2.23-1.76	-1.18-1.15	-1.42-1.81	-1.75-1.71	-1.87-2.27	-3.75-5.4	-5.92-6.09	-5.47-5.18	-5.88-6.68	-7.36-7.83	-8.75-10.74	-1.11-10.03	-8.73-7.6	-6.76-5.97	-5.06-4.97	-5.17-4.58	-4.2-3.5	-3.22-3.51	-4.43-5.36	-6.24-6.14	
Theta(15°)	-4.61-4.17	-3.23-2.46	-1.66-0.99	-1.01-1.63	-1.17-1.06	-1.29-1.46	-1.34-1.27	-1.44-1.98	-2.3-6.69	-3.26-4.02	-4.94-6.62	-6.17-6.44	-6.82-7.48	-7.77-8.12	-9.71-11.97	-12.07-10.63	91-93	-9.15-8.71	-8.11-8.3	-8.42-7.64	-6.71-5.79	-5.58-6.22	-6.32-6.05	-5.29-4.51	
Theta(22.5°)	-3.98-2.84	-2.35-1.68	-1.3-0.74	-0.19-0.08	0.1-0.32	-0.99-1.65	-1.94-2.02	-1.99-2.42	-2.88-3.44	-4.13-4.81	-5.14-5.62	-6.37-6.72	-7.35-7.42	-8.47-10.5	-										



# Radiated Composite Gain Data of 5GHz

# Appendix B

Theta (22.5°)	0.380.08	0.090.16	0.580.62	-0.99-1.44	-2.99-4.12	-4.68-4.56	-3.75-3.01	-2.41-2.16	-2.52-3.39	-3.38-3.33	-3.32-3.08	-2.13-0.78	-0.090.37	0.430.22	-0.35-1.16	-1.93-2.93	-3.21-3.34	-3.98-4.15	-3.29-3.31	-4.14-5.47	-6.92-17.13	-5.56-5.35	-5.07-2.94	-0.130.34																							
Theta (30°)	2.063.06	3.153.15	2.531.77	0.37-0.89	-2.59-3.96	-4.71-5.12	-5.86-4.67	-3.49-2.89	-2.64-2.62	-2.26-1.86	-2.15-3.05	-3.06-2.16	-1.34-0.8	-0.61-1.21	-2.24-3.29	-4.16-4.69	-3.6-2.46	-3.31-3.38	-2.29-2.51	-3.53-4.97	-5.65-7.57	-9.46-9.35	-4.94-2.09	0.010.84																							
Theta (37.5°)	2.416.06	0.201.91	0.201.91	0.201.91	0.201.91	0.201.91	0.201.91	0.201.91	0.201.91	0.201.91	0.201.91	0.201.91	0.201.91	0.201.91	0.201.91	0.201.91	0.201.91	0.201.91	0.201.91	0.201.91	0.201.91	0.201.91	0.201.91	0.201.91																							
Theta (45°)	3.442.41	1.4771.54	-0.46-3.46	-5.16-5.29	-4.32-4.44	-2.82-3.12	-3.98-4.41	-6.69-7.55	-5.08-3.71	-2.99-4.32	-3.21-3.72	-5.99-7.08	-4.87-2.36	-0.92-0.37	-0.18-1.04	-1.91-3.22	-4.63-2.54	-2.07-1.62	-0.88-1.9	-4.34-6.94	-7.78-8.99	-9.51-6.49	-2.140.33	0.962.42																							
Theta (52.5°)	-0.16-1.57	0.11-1.71	-4.27-9.03	-10.22-7.85	-5.42-3.91	-2.71-2.45	-2.98-2.23	-4-6.22	-8.19-6.19	-3.06-1.33	-0.72-1.9	-3.52-4.96	-6.93-5.86	-2.44-0.2	0.820.95	-0.2-0.91	-1.1-0.81	-0.81-1.64	-2.46-3.16	-5.64-7.69	-7.25-5.91	-4.31-3.16	-2.57-1.13	0.520.17																							
Theta (60°)	-2.3-3.73	-3.85-2.88	-2.77-3.82	-5.36-4.87	-4.19-4.17	-4.2-3.77	-2.98-2.3	-1.57-1.6	-2.89-2.03	-4.35-4.16	-3.15-0.92	-0.2-2.05	-3.91-4.41	-4.64-3.61	-1.77-1.19	-1.11-1.17	-3.03-2.15	-1.57-1.58	-2.98-6.21	-4.44-5.6	-5.67-5.58	-4.48-2.1	-0.76-1.62	-2.14-1.55																							
Theta (67.5°)	-2.24-1.97	-4.12-3.65	-1.49-1.36	-1.9-3.82	-6.59-8.1	-8.15-7.15	-5.74-2.1	-2.8-2.43	-2.56-2.96	-3.35-2.97	-2.35-1.05	-1.25-0.78	-1.98-5.22	-5.65-6.63	-5.32-2.81	-1.65-2.82	-2.3-1.86	-1.63-0.76	-1.48-4.45	-8.6-6.51	-5.48-6.55	-7.11-5.06	-4.37-3.25	-1.52-2.24																							
Theta (75°)	-2.08-3.04	-5.27-7.13	-2.34-1.61	-2.65-5.01	-6.26-6.14	-5.62-5.82	-5.03-6.2	-3.93-3.3	-4.93-6.76	-8.88-7.19	-6.38-2.83	-1.37-1.78	-2.57-3.26	-6.42-8.6	-7.09-4.85	-4.01-3.24	-2.2-1.84	-1.99-3.53	-4.31-5.05	-7.6-2.5	-2.86-3.5	-4.33-5.48	-5.53-6.05	-9.28-2.63																							
Theta (82.5°)	-5.52-3.86	-4.34-4.22	-1.55-0.77	-1.38-3.69	-5.73-6.77	-5.85-5.49	-6.19-6.05	-3.78-3.69	-6.37-8.43	-7.36-5.68	-4.55-3.78	-1.59-0.06	-0.27-3.88	-4.56-8.23	-10.02-12.38	-11.11-7.45	-4.18-3.65	-2.41-2.87	-5.79-1.78	-5.63-6.49	-6.9-5.35	-2.81-5.16	-9.59-9.03	-5.34-5.13																							
Theta (90°)	-9.18-6.82	-4.17-2.92	-3.14-4.11	-5.53-4.34	-2.92-2.17	-3.53-5.44	-7.24-8.19	-4.71-9.8	-1.46-3.85	-6.93-5.13	-5.93-6.76	-5.23-2.05	-0.82-0.91	-1.61-3.75	-6.31-8.53	-6.28-6.21	-6.15-4.91	-3.65-5.33	-7.84-8.72	-6.61-8.72	-5.1-3.43	-4.92-7.33	-10.97-9.45	-4.39-3.8																							
Theta (97.5°)	-9.11-11.08	-7.03-8.55	-9.16-6.39	-1.68-1.17	-2.92-2.83	-6.24-7.36	-7.73-4.04	-2.69-3.54	-6.47-5.57	-5.12-4.49	-10.07-5.86	-3.33-0.98	1.380.66	0.470.02	-1.04-2.7	-5.22-4.93	-5.91-9.12	-8.73-9.21	-5.97-7.68	-9.29-5.06	-5.25-10.3	-10-7.2	-7.22-4.58	-1.81-2.8																							
Theta (105°)	-6.94-14.97	-15.04-11.14	-4.4-2.97	-2.0-2.3	-2.0-4.0	-0.56-1.97	-2.46-4.1	-0.001-3.7	-3.08-1.7	-0.001-3.7	-0.001-3.7	-0.001-3.7	-0.001-3.7	-0.001-3.7	-0.001-3.7	-0.001-3.7	-0.001-3.7	-0.001-3.7	-0.001-3.7	-0.001-3.7	-0.001-3.7	-0.001-3.7	-0.001-3.7	-0.001-3.7																							
Theta (112.5°)	-5.77-7.28	-8.03-6.13	-4.94-3.39	-2.76-4.66	-5.91-6.72	-6.04-4.44	-3.49-3.47	-5.15-6.6	-4.09-3.09	-1.04-1.57	-0.74-4.99	-6.84-9.34	-6.3-1.96	-1.23-0.29	0.170.04	0.47-0.79	-4.07-3.5	-3.73-6.93	-4.96-3.33	-2.82-6.19	-2.93-0.89	-3.09-1.9	1.060.6	0.56-1.94																							
Theta (120°)	-6.26-5.9	-3.14-3.81	-3.11-2.33	-2.22-2.29	-4.18-4.91	-6.18-5.94	-4.31-3.05	-3.32-4.8	-8.23-5.91	-3.77-2.97	-0.97-0.86	-1.87-5.18	-1.19-0.77	-1.19-0.77	0.99-0.2	0.69-1.21	-3.87-7.25	-1.65-3.12	-7.26-5.06	-2.15-2.51	-2.47-3.12	-1.52-4.68	-4.08-2.39	-0.46-1.01																							
Theta (127.5°)	-0.3-2.07	-3.88-1.93	-9.04-9.1	-9.8-9.62	-7.92-7.39	-6.44-5.98	-5.81-6.1	-5.51-6.59	-8.01-4.76	-3.95-1.01	-0.2-0.02	0.71-1.5	-0.34-1.05	-1.87-1.05	-1.860.68	-1.45-4.11	-8.44-6.54	-5.93-8.8	-10.26-5.68	-8.41-2.1	-1.04-1.53	-5.58-4.03	-6.26-10.32	-4.91-5.48																							
Theta (135°)	-0.97-4.95	-4.76-5.86	-9.51-7.14	-7.25-8.05	-9.78-9.46	-8.04-6.28	-5.23-5.19	-4.84-3.86	-5.17-6.18	-10.54-10.07	-5.76-0.04	0.440.82	0.76-3.01	-4.98-2.85	-0.33-0.24	0.98-1.44	-8.9-8.35	-8.05-11.23	-11.35-2.84	-1.24-0.41	-2.37-4.2	-0.62-1.41	1.632.19	2.82.05																							
Theta (142.5°)	1.130.28	-2.52-7.25	-3.61-3.33	-3.1-3.46	-4.87-3.94	-2.66-2.34	-2.81-2.44	-1.97-2.85	-5.29-6.96	-7.76-3.4	-3.09-0.23	0.15-1.87	-0.31-0.99	-1.81-6.77	-3.33-0.25	-0.74-3.35	-6.16-8.92	-13.6-12.05	-12.46-1.6	-4.03-3.1	-2.08-5.67	-3.41-2.2	-3.860.12	-0.41-2.3																							
Theta (150°)	1.362.02	0.81-2.02	-6.91-10.29	-9.57-10.81	-14.56-12.53	-7.54-3.99	-2.06-1.63	-2.41-3.43	-4.88-7.83	-6.56-2.9	-2.32-1.16	-0.14-0.85	-2.32-1.18	-3.51-2.75	-1.16-1.76	-2.57-2.85	-5.4-10.48	-17.06-8.13	-7.63-10.87	-8.51-9.02	-13.76-2.8	0.1-1.8	-1.240.27	0.430.19																							
Theta (157.5°)	-2.6-0.08	-0.35-1.84	-2.2-2.48	-3.2-4.26	-5.09-5.3	-4.94-4.44	-3.61-2.75	-2.73-3.25	-4.14-1.11	-3.64-3.34	-4.45-6.29	-4.58-6.23	-6.79-3.86	-1.36-0.2	0.390.67	0.35-0.67	-3.45-6.36	-5.63-4.47	-4.58-4.92	-5.66-5.81	-3.91-1.37	-0.95-2.22	-3.29-4.89	-6.51-5.82																							
Theta (165°)	-0.04-1.15	0.58-0.73	-2-3.18	-4.62-5.79	-6.87-8.5	-9.27-8.73	-6.71-5.01	-4.22-4.03	-4.22-4.12	-4.19-4.47	-4.77-6.42	-4.41-3.52	-1.84-0.21	0.971.99	2.72.83	2.36-1.32	-0.82-3.71	-6.01-6.87	-6.26-5.94	-5.08-4.14	-2.31-3.06	-0.36-0.2	0.280.39	-0.5-0.75																							
Theta (172.5°)	-1.62-2.4	-3.73-4.67	-5.79-7.78	-9.72-11.07	-11.33-10.53	-9.51-9	-8.51-6.95	-6.16-6.4	-6.47-5.4	-3.99-3.24	-2.61-1.74	-1.1-0.58	0.731.25	1.53-1.99	1.290.83	0.0-0.55	-0.84-0.97	-1.25-2.16	-3.42-4.84	-5.9-5.21	-3.82-3.65	-4.17-2.98	-1.21-0.83	-0.29-0.6																							
Theta (180°)	-11.39-13.83	-7.73-4.86	-3.93-4.06	-4.55-4.71	-10.98-14.64	-16.11-12.62	-9.88-7.85	-7.02-6.15	-5.59-4.81	-3.72-9.3	-2.41-1.92	-0.79-0.73	-1.13-1.93	-2.88-2.35	-3.96-3.86	-3.76-3.56	-3.67-4.1	-5.13-5.27	-5.42-6.75	-6.36-6.23	-4.71-3.22	-3.06-3.35	-4.29-6.92	-0.29-0.6																							
Freq(Hz)	5.650Pol.	Theta	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi																							
DG(dB)	Phi(7.5°)	Phi(15°)	Phi(22.5°)	Phi(30°)	Phi(37.5°)	Phi(45°)	Phi(52.5°)	Phi(60°)	Phi(67.5°)	Phi(75°)	Phi(82.5°)	Phi(90°)	Phi(97.5°)	Phi(105°)	Phi(112.5°)	Phi(120°)	Phi(127.5°)	Phi(135°)	Phi(142.5°)	Phi(150°)	Phi(157.5°)	Phi(165°)	Phi(172.5°)	Phi(180°)	Phi(187.5°)	Phi(195°)	Phi(202.5°)	Phi(210°)	Phi(217.5°)	Phi(225°)	Phi(232.5°)	Phi(240°)	Phi(247.5°)	Phi(255°)	Phi(262.5°)	Phi(270°)	Phi(277.5°)	Phi(285°)	Phi(292.5°)	Phi(300°)	Phi(307.5°)	Phi(315°)	Phi(322.5°)	Phi(330°)	Phi(337.5°)	Phi(345°)	Phi(352.5°)
Theta (0°)	-1.56-1.75	-1.77-2.55	-3.2-3.86	-3.86-4.01	-4.07-3.97	-4.14-4.31	-3.93-3.67	-3.54-3.44	-3.47-3.37	-2.87-2.4	-1.97-1.58	-0.94-0.69	-0.74-0.83	-0.81-0.86	-1.32-1.77	-2.29-2.45	-2.62-2.56	-2.74-3.54	-3.93-3.91	-3.53-3.32	-2.88-2.83	-3.06-2.3	-1.39-1.1	-1.15-1.61																							
Theta (7.5°)	-0.76-0.68	-0.61-0.65	-0.81-0.99	-1.21-1.83	-2.03-2.6	-3.03-2.84	-2.72-2.89	-3.17-3.63	-4.04-4.2	-3.65-3.28	-3.07-2.95	-2.82-3.08	-3.89-4.93	-5.71-5.96	-5.98-5.13	-4.88-4.66	-4.04-3.4	-3.1-2.99	-3.15-2.69	-2.77-2	-1.86-1.86	-1.71-1.41	-1.16-0.8	-0.5-0.46																							
Theta (15°)	-1.67-1.37	-0.83-0.23	0.450.73	0.910.56	0.16-0.54	-1.08-1.28	-2.04-3.01	-3.33-3.12	-3.03-3.39	-4.05-4.77	-5.14-5.01	-4.86-5.54	-6.57-8.42	-7.77-8.3	-8.41-9.35	-9.09-9.02	-7.77-8.3	-6.27-2.22	-1.95-1.93	-1.68-1.42	-1.51-2.26	-1.62-1.63	-1.62-2.28	-2.11-1.95																							
Theta (22.5°)	-0.64-0.28	-0.06-0.15	0.71-1.28	1.31-1.36	1.35-1.35	1.31-1.53	1.31-1.12	0.61-0	-0.81-1.54	-2.33-3.5	-5.22-5.72	-6.21-6.75	-8.01-7.78	-6.46-4.86	-3.45-2.24	-1.58-1.25	-1.38-1.61	-1.28-0.43	-0.31-0.04	-0.27-0.54	-0.71-0.9	-1.44-1.83	-2.29-3.23	-3.58-2.03																							
Theta (30°)	0.19-0.3	0.84-1.64	1.82-1.6	0.81-1.05	-0.6-0.28	0.490.94	1.79-2.45	2.47-2.18	1.22-0.7	-3.14-5.54	-7.49-7	-8.42-7.2	-5.54-4.43	-3.84-3.62	-3.81-4.27	-4.16-2.81	-0.480.76	1.08-1.06	0.63-0.07	-1.01-1.83	-1.29-0.98	-1.02-0.17	0.170.27																								
Theta (37.5°)	0.08-0.09	0.130.03	-0.65-1.09	-1.19-1.82	-1.28-0.69	-1.61-2.26	-1.09-0.37	1.05-1.16	1.02-0.4	-0.9-2.41	-5.48-9.14	-9.01-7.79	-7.53-7.21	-6.69-6.22	-5.53-5.26	-4.87-3.67	-2.36-1.51	-1.49-1.33	-0.24-0.21	0.590.98	1.53-1.4	0.630.3	-0.41-0.8	-1.35-0.49																							
Theta (45°)	-0.31-0.08	-0.58-1.03	-1.09-1.18	-1.07-1.14	0.3-0.45	-0.03-0.81	-2.07-2.64	-2.04-1.5	-1.43-1.76	-2.51-2.81	-3.21-4.32	-6.02-5.48	-6.11-5.4	-5.73-7.37	-6.33-4.34	-4.07-3.61	-1.680.17	1.07-1.22	0.610.84	1.57-1.04	-1.09-2.03	-1.08-1.76	-0.83-0.29	-0.16-0.7																							
Theta (52.5°)	-1.52-7.7	-4.77-4.96	-2.35-2.0	1.82-2.4	2.461.89	0.61-2.06	-4.86-3.75	-2.68-2.5	-2.48-2.33	-2.29-3.29	-5.42-6.42	-1.81-8.69	-8.37-4.73	-7.26-6.99	-5.88-4.94	-4.32-3.35	-2.62-1.41	0.88-1.75	2.02-1.74	1.57-1.46	-0.31-1.27	-0.13-0.42	-0.09-0.14	0.04-0.81																							
Theta (60°)	-5.24-5.88	-5.37-5.05	-2.99-2.3	0.62-2.38	3.180.11	2.110.78	0.75-1.48	-2.06-4.26	-5.66-5.75	-5.58-4.12	-4.12-6.05	-6.22-4.79	-7.17-6.56	-3.17-3.93	-3.87-3.94	-3.47-0.58	0.50-8.1	0.67-1.58	0.85-0.19	-1.18-1.57	-1.17-3.35	-2.19-0.82	-1.81-3.57																								
Theta (67.5°)	-6.13-6.8	-5.61-6.7	-4.93-2.24	0.08-1.04	1.040.71	0.48-0.1	-1.2-0.42	-0.21-1.42	-4.01-7.78	-7.36-4.04	-3.58-3.65	-4.41-7.55	-5.25-2.53	-5.43-3.12	-3.71-4.03	-3.57-6.1	-5.24-2.95	-1.29-1.52	-1.29-2.14	-2.67-4.09	-3.83-2.62	-1.24-1.26	-2.37-1.69	-1.22-2.83																							
Theta (75°)	-3.89-3.52	-4.24-3.95	-5.74-7.47	-3.47-4.31	-4.55-3.93	-1.89-1.93	-1.81-1.37	-0.06-0.24	-3.15-5.34	-7.19-4.97	-5.27-4.21	-3.38-2.53	-4.37-1.75	-6.06-8.9	-5.57-4.23	-8.59-12.59	-8.64-9.22	-6.76-5.71	-6.15-7.4	-4.9-3.22	-1.76-0.39	0.220.01	-0.37-1.8	-3.03-4.05																							
Theta (82.5°)	-3.71-3.1	-6-9.76	-9.48-6.63	-4.2-4.93	-5.92-7.56	-7.25-5																																									



# Radiated Composite Gain Data of 5GHz

# Appendix B

Theta (°)	-195/-0.49	-0.58/-1.98	-3.37/-4.52	-3.91/-4.43	-6.1/-8.55	-9.35/-7.93	-6.53/-4.35	-3.6/-3.03	-2.47/-4.23	-5.81/-4.45	-2.79/-1.07	0.22/0.05	-1.35/-3.42	-4.39/-5.4	-5.32/-5.15	-5.09/-5.4	-3.16/-2.4	-1.77/-1.91	-4.33/-8.81	-7.64/-6.62	-7.01/-6.16	-3.48/-3.63	-5.04/-6.92	-5.59/-3.73	
Theta (82.5°)	-2.61/-4.82	-5.6/-2.9	-3.19/-3.2	-3.19/-3.31	-3.06/-4.28	-6.74/-7.65	-6.58/-6.16	-6.74/-6.57	-5.83/-4.36	-4.51/-4.77	-4.75/-1.99	-0.42/-1.08	-1.7/-3.32	-9.5/-12.67	-15.34/-11.77	-10.07/-6.08	-3.83/-3.83	-3.91/-3.78	-4.37/-6.65	-5.12/-4.64	-3.42/-4.15	-1.61/-0.56	-2.75/-5.52	-7.98/-3.86	
Theta (90°)	-2.75/-5.56	-8.06/-4.37	-3.3/-4.55	-5.27/-6.62	-6.85/-8.45	-8.57/-8.68	-12.72/-13.55	-8.77/-7.08	-7.76/-6.16	-4.13/-3.41	-3.87/-4.25	-2.83/-2.7	-2.42/-2.94	-3.38/-4.57	-4.31/-4.07	-5.24/-3.94	-2.86/-3.11	-2.15/-4.51	-9.54/-5.55	-2.87/-5.91	-6.77/-7.05	-4.62/-3.11	-3.24/-4.5	-3.71/-1.84	
Theta (97.5°)	-7/-8.74	-15.08/-9.04	-5.89/-6.37	-5.17/-4.61	-7.41/-9.65	-7.58/-7.29	-6.99/-6.68	-7.63/-6.48	-5.19/-3.42	-3.48/-2.56	-3.83/-5.06	-7.15/-4.55	-3.27/-1.64	-1.12/-1.73	-1.61/-1.35	-2.09/-3.41	-3.46/-4.32	-4.98/-9.07	-13.29/-10.9	-3.83/-4.04	-5.22/-3.67	-3.8/-8.17	-6.91/-5.9	-6.99/-4.35	
Theta (105°)	-10.78/-14.05	-9.25/-7.19	-4.57/-1.49	-0.23/-0.09	-0.69/-1.7	-2.8/-1.77	-3.53/-7.13	-8.73/-4.53	-2.3/-2.81	-4.22/-1.98	-3.38/-3.81	-11.37/-10.53	-4.77/-1.87	-1.26/0.01	-0.96/-0.51	0.08/-1.57	-6.69/-6.87	-7.07/-9.19	-7.94/-12.09	-13.31/-8.5	-2.17/-1.03	-4.8/-6.43	-3.9/-2.49	-4.65/-6.36	
Theta (112.5°)	-10.07/-8.32	-7.61/-7.46	-4.14/-3.58	-2.36/-2.54	-2.77/-4.12	-5.69/-6.11	-6.18/-5.9	-5.65/-6.45	-4.21/-2.77	-1.01/-0.65	-1.12/-3.29	-6.27/-9.09	-5.89/-1.08	0.29/-1	1.17/1.04	1.37/0.5	-6.06/-3.92	-2.4/-7.01	-6.57/-5.73	-4.56/-9.06	-4.85/-4.54	-5.96/-2.72	0.41/-1.1	-2.83/-6.07	
Theta (120°)	-4.53/-5.4	-10.86/-14.4	-10.03/-6.09	-3.64/-2.95	-1.9/-3.11	-3.84/-4.48	-3.4/-2.81	-2.88/-4.17	-5.63/-5.47	-2.44/-1.64	0.04/0.64	-3.19/-7.4	9.05/-4.71	-3.24/-3.06	-1.82/-2.37	-0.54/-0.99	-6.28/-5.95	-2.22/-4.5	-6.62/-4.3	-2.55/-3.99	-3.66/-1.94	-1.38/-5.04	-3.58/-2.53	-2.32/-3.61	
Theta (127.5°)	-1.41/-1.04	-1.26/-2.92	-3.53/-5.73	-7.36/-7.59	-10.06/-8.1	-7.27/-6	-5.29/-5.04	-4.79/-5.58	-7.24/-5.06	-4.77/-2.16	-0.27/-1.49	-1.16/-4.37	-4.87/-2.63	-1.51/0.27	-2/0.77	-0.11/-3.33	-10.24/-6.08	-4.12/-5.78	-5.22/-2.34	-2.16/-3.15	-2.13/-1.7	-2.05/-1.77	-2.63/-6.96	-2.87/-3.84	
Theta (135°)	-1.52/-3.35	-2.17/-4.51	-6.44/-6.73	-8.41/-13.43	-15.44/-11.56	-9.91/-9.82	-8.66/-6.55	-5.25/-4.63	-7.45/-12.92	-15.09/-4.81	-2.77/-0.09	1.20/0.6	-1.8/-3.59	-6.71/-4.83	-0.91/-2.76	-3.92/-3.95	-7.9/-10.58	-6.71/-10.5	-8.38/-1.53	-2.18/-1.12	-3.51/-3.8	-0.65/-1	-2.6/-0.31	1.47/0.37	
Theta (142.5°)	-1.11/-2.21	-4.01/-3.98	-2.26/-2.22	-3.12/-4.36	-5.56/-4.96	-2.62/-1.45	-1.74/-2.47	-2.22/-2.41	-3.9/-4.81	-6.41/-7.59	-5.57/-4.97	-5.54/-0.76	0.4/0.5	0.3/-2.54	-2.87/-2.01	-1.45/-3.25	-6.4/-7.77	-10.61/-12.88	-14.41/-5.77	-2.28/-3.62	-5.15/-12.36	-4.27/-1.14	-2.27/0.81	0.1/-2.93	
Theta (150°)	2.64/2.59	1.02/-1.8	-6.3/-7.86	-8.8/-12.84	-15.4/-10.01	-8.32/-6.99	-4.36/-3.01	-4.06/-6.95	-10.49/-12.27	-9.14/-4.62	-4.56/-5.52	-4.28/-2.26	-4.1/-7.52	-4.48/-4.12	-3.77/-4.21	-6.14/-7.85	-9.89/-14.04	-12.34/-8.17	-8.31/-10.78	-8.16/-7.7	-12.61/-5.9	-2.43/-2.96	-1.09/-1.06	1.24/-1.79	
Theta (157.5°)	-3.25/-1.31	-1.18/-2.24	-2.86/-2.81	-2.74/-3.67	-4.67/-4.93	-5.13/-5.33	-5.15/-4.98	-4.33/-3.52	-2.85/-2.39	-2.44/-2.75	-4.05/-6.28	-6.84/-6.33	-8.08/-7.59	-4.2/-2.34	-0.97/0.06	0.08/-1.3	-3.71/-6.6	-6.19/-5	-6.07/-6.57	-5.45/-4.72	-1.89/-2.27	-2.19/-3.66	-7.26/-6.03		
Theta (165°)	-0.22/0.65	0.09/-2.16	-2.42/-2.5	-3.43/-4.97	-7.18/-9.24	-9.04/-7.75	-6.74/-6.09	-5.42/-4.72	-3.97/-3.25	-2.99/-2.9	-2.88/-2.85	-3.1/-2.83	-1.42/0.2	1.31/0.22	2.32/4.6	2.27/1.08	-1.78/-3.69	-4.33/-5.15	-5.8/-4.75	-3.32/-1.99	-0.63/0.47	1.43/1.67	1.56/0.99	0.02/-0.27	
Theta (172.5°)	0.31/0.36	-0.77/-2.49	-2.84/-3.78	-5.01/-6.23	-6.39/-7.11	-7.41/-7.64	-6.99/-6.13	-5.22/-4.84	-5.06/-5.81	-6.37/-6.09	-5.4/-4.59	-3.24/-1.83	-0.36/0.87	1.69/2.27	2.57/2.55	2.06/1.16	-0.06/-1.41	-2.14/-2.24	-2.3/-2.73	-4.63/-5.28	-3.9/-2.04	-0.94/-0.71	-0.98/-1.47	-0.74/0.08	
Theta (180°)	-7.69/-12.43	-12.61/-8.57	-6.57/-5.94	-6.92/-8.64	-10.15/-10.41	-9.11/-7.92	-7.4/-6.67	-6.33/-6.15	-8.01/-5.41	-4.57/-3.99	-3.18/-2.28	-1.43/-0.73	-0.22/0.06	0.02/0.33	-0.98/-1.67	-2.2/-2.4	-2.48/-2.85	-3.39/-3.92	-5.07/-6.51	-8.29/-8.44	-9.16/-7.42	-4.83/-2.84	-2.4/-2.08	-2.36/-4.48	
Freq(Hz)	5.885GPol.																								
Theta	Theta																								
Phi	Phi																								
DG(dB)	DG(dB)																								
Theta (7.5°)	-8.86/-9.2	-9.65/-9.31	-9.38/-7.4	-5.53/-4.08	-2.95/-2.07	-0.94/-0.41	0.16/0.16	0.02/0.03	-0.4/-1.07	-1.99/-2.69	-3.42/-4.22	-5.21/-6.05	-6.71/-6.86	-6.82/-6.23	-5.06/-4.2	-2.94/-1.93	-0.96/-0.07	0.44/0.66	0.62/0.38	0.51/0.53	0.24/-0.02	-0.47/0.93	-2.08/-3.92	-6.04/-7.55	
Theta (15°)	-4.46/-3.66	-3.81/-4.56	-5.01/-4.39	-2.81/-1.72	-1.17/-0.66	-0.67/-0.88	-1.35/-1.81	-2.16/-2.22	-2.38/-2.93	-3.82/-4.61	-5.45/-6.29	-7.08/-7.44	-7.22/-6.66	-6.04/-5.21	-4.47/-3.15	-1.85/-1.14	-0.88/-0.01	0.84/1.17	1.13/0.8	0.32/-0.37	-1.22/-1.57	-1.99/-3.15	-5.4/-5.91	-6.13/-5.07	
Theta (22.5°)	-0.91/0.84	-1.05/0.98	-1.13/-1.63	-2.25/-1.36	-0.53/-0.11	0.07/0.15	-0.05/0.16	0.09/0.64	-1.77/-2.88	-3.77/-4.25	-5.06/-6.05	-6.36/-6.79	-7.39/-7.27	-6.79/-6.17	-4.69/-2.97	-1.85/-1.17	-0.58/0.14	0.59/0.61	0.38/0.58	0.54/-0.19	-0.64/0.87	-2.14/-3.77	-3.84/-3.55	-3.14/-2.13	
Theta (30°)	-1.95/0.85	-0.08/0.76	0.80/0.62	0.69/1.05	1.33/1.53	1.23/0.54	0.19/0.23	-0.01/-0.21	-0.46/-1.62	-2.84/-3.04	-3.49/-4.15	-3.81/-3.77	-5.21/-7.01	-6.47/-5.47	-4.39/-3.68	-2.73/-1.89	-1.3/-0.84	-1.08/-1.13	-0.43/-0.73	-0.58/0.07	0.4/-0.49	-1.93/-2.27	-1.63/-2.41	-3.24/-3.35	
Theta (37.5°)	-0.057	1.13/0.49	0.05/0.37	0.31/-0.8	-2.22/-2.51	-1.59/-0.11	0.81/0.64	0.13/-0.05	-0.77/-2.23	-7.78/-8	-7.48/-7.47	-8.01/-8.91	-8.02/-6.9	-5.76/-4.14	-3.02/-3.68	-4.16/-3.27	-1.91/-0.66	-0.31/1.33	2.46/1.24	-0.01/-0.6	-0.89/-0.98	-0.31/0.73	0.56/0.28		
Theta (45°)	-0.27/1.84	-0.53/0.45	0.27/0.05	-0.67/-2.44	-2.66/-1.47	-0.67/-0.54	-0.41/-0.56	-1.35/-1.66	-1.75/-2.61	-4.21/-5.22	-6.79/-9.56	-11.83/-10.02	-8.46/-6.3	-5.31/-6.84	-9.07/-7.79	-7.2/-5.35	-4.3/-3.24	-2.54/0.02	1.78/0.64	-0.6/0.06	0.73/0.29	-0.18/0.3	0.39/0.31	0.49/0.65	
Theta (52.5°)	-0.66/-2.56	-2.94/-2.5	-2.03/-1.2	-0.54/0.56	1.53/1.79	1.30/5.2	-1.31/-3.19	-3.55/-3.96	-5.38/-5.35	-4.95/-4.53	-5.06/-7.84	-10.93/-12.89	-7.41/-5.51	-5.46/-5.91	-5.17/-7.14	-7.81/-4.82	-2.65/-1.42	0.15/-0.26	-0.24/0.55	1.39/1.22	0.52/0.19	-1.04/-1.72	-1.04/-0.53	0.1/-0.08	
Theta (60°)	-2.75/-3.92	-4.19/-2.43	-1.01/0.65	1.58/2.27	2.65/2.93	2.38/1.02	-0.62/-0.74	-0.57/-1.25	-2.71/-3.87	-3.19/-3.26	-4.61/-6.22	-8.24/-15.63	-7.83/-5.46	-4.39/-4.96	-4.41/-3.81	-3.73/-4.6	-1.23/1.15	2.19/2.48	1.87/1.2	1.54/1.34	-1.06/-1.16	-0.08/0.21	-0.93/-1.46	-1.2/-1.96	
Theta (67.5°)	-3.85/-5.14	-5.5/-3.55	-1.38/-0.68	1.11/2.14	3/3.39	2.25/-0.32	-0.48/-0.31	-0.34/0.83	-3.51/-6.85	-7.24/-3.8	-3.44/-5.06	-7.14/-7.41	-2.82/-2.44	-5.79/-4.7	-1.74/-2.54	-4.51/-5.41	-2.91/0.25	0.03/-0.56	-0.02/0.74	-1.19/-2.29	-3.38/-2.22	-1.92/-1.81	-0.93/-2.23	-2.89/-2.84	
Theta (75°)	-4.6/-4.66	-3.49/-4.27	-3.21/-0.75	0.77/1.78	1.75/0.76	-1.94/-2.73	-0.47/1.26	1.32/0.48	-0.77/-3.82	-7.51/-4.21	-3.65/-3.44	-4.55/-7.25	-5.73/-6.42	-5.97/-2.26	-0.42/-1.93	-1.84/-3.91	-2.96/-2.06	-2.87/-3	-2.44/-3.51	-5.69/-7.67	-4.25/-3.26	-3.26/-0.53	-0.32/-1.56	-2.22/-3.77	
Theta (82.5°)	-6.39/-5.49	-7.06/-6.71	-5.65/-3.65	-0.91/-2.07	-2.54/-3.78	-5.33/-4.1	-3.93/-4.05	-3.45/-4.49	-4.64/-4.51	-6.16/-5.01	-5.45/-4.99	-5.62/-2.53	-5.83/-4.42	-6.57/-6.48	-3.74/-5.28	-7.04/-8.17	-7.28/-5.57	-2.55/-1.26	-1.71/-4.31	-4.47/-1.69	1.2/1.67	0.31/-0.31	-1.88/-3.31	-3.97/-7.44	
Theta (90°)	-5.4/-1.52	-5.4/-6.44	-3.75/-1.8	0.39/0.46	-2.18/-2.86	-2.43/-2.59	-4.63/-4.16	-4.05/-4.05	-2.77/-0.5	-0.98/-2.14	-4.72/-5.15	-4.29/-2.96	-5.11/-4.43	-7.59/-3.77	-4.79/-4.55	-2.61/-1.66	-1.58/-0.44	1.39/1.41	0.38/0.47	1.44/0.58	1.49/1.27	-1.46/-3.43	-4.97/-6.04	-3.87/-2.55	
Theta (97.5°)	-5.05/-4.93	-5.37/-6.37	-4.44/-1	0.65/1.61	1.49/1.08	1.02/-0.75	-2.27/-1.93	-2.94/-1.75	-0.79/1.17	1.49/-0.77	-8/-9.71	-1.63/-0.53	1.6/-1	-1.91/-1.31	-3.67/-1.8	-0.42/0.24	0.04/1.99	2.52/2.06	0.89/0.41	-1.67/-0.36	0.36/-2.73	-3.17/-8.74	-6.92/-6.66	-6.41/-4.47	
Theta (105°)	-2.8/-3.37	-3.7/-3.32	-0.52/1.91	3.04/2.68	2.63/1.55	0.02/-1.56	-1.32/0.99	0.87/0.65	-0.42/-1.55	2.82/2.69	-0.85/-3.32	-5.31/-1.62	0.68/-0.81	-0.77/-1.91	-1.77/-0.86	-0.72/0.68	1.47/1.35	1.01/0.12	-0.04/0.6	0.96/-1.13	1.12/1.07	-2.51/-2.08	-4.88/-3.73	-1.68/-3.71	
Theta (112.5°)	-3.19/-3.42	-5.34/-4.17	-2.35/0.81	1.81/1.32	0.42/-2.87	-5.63/-7.7	-1.83/0.54	0.57/0.93	0.61/0.1	1.88/1.45	-0.85/-3.69	-5.98/-1.18	-0.97/-1.92	-3.68/-2.37	0.48/-1.22	0.27/3.18	3.39/4.25	5.11/4.42	3.27/3.79	5.59/2.99	1.36/-0.99	-3.1/-5.23	-3.37/-4.16	-3.88/-4.62	
Theta (120°)	-3.11/-6.5	-1.14/-7.62	-2.92/0.09	0.73/-1.75	-3.78/-7.79	-10.58/-3.56	-0.30/49	1.89/1.94	1.4/-0.43	0.61/-0.21	0.22/-3.33	-4.71/-1.01	-2.23/-4.75	-1.99/-3.1	-1.46/-2.14	0.22/1.31	1.47/3.79	5/2.64	1.55/2.98	3.69/2.38	-4.33/-3.74	-9.06/-10.96	-9.96/-10.35	-9.37/-5.91	
Theta (127.5°)	-11.04/-8.99	-10.66/-6.23	-3.13/-2.29	-2.14/-2.94	-2.61/-1.77	-1.52/-2.41	-0.73/0.15	1.77/1.59	0.87/0.43	-0.45/-1.28	-1.07/-0.77	0.16/0.49	-2.69/-1.35	-3.2/-6.35	-6.21/-4.96	-2.21/-0.53	-2.82/0.83	2.36/0.8	-5.85/-0.71	0.14/-2.03	-4.11/-6.82	-4.89/-6.49	-8.25/-14.1	-11.01/-9.23	
Theta (135°)	-11.68/-13.6	-10.42/-5.95	-4.75/-3.43	-2.13/-2.59	-4.12/-4.29	-3.28/-1.35																			



# Radiated Composite Gain Data of 5GHz

# Appendix B

## Gain Result

Freq(Hz)	5.2GPol.	PhiAnt.1	PhiAnt.2	PhiAnt.3	PhiAnt.4	PhiAnt.5	PhiAnt.6	PhiAnt.7	PhiAnt.8	PhiAnt.9	PhiAnt.10	PhiAnt.11	PhiAnt.12	PhiAnt.13	PhiAnt.14	PhiAnt.15	PhiAnt.16	PhiAnt.17	PhiAnt.18	PhiAnt.19	PhiAnt.20	PhiAnt.21	PhiAnt.22	PhiAnt.23	PhiAnt.24	PhiAnt.25	PhiAnt.26	PhiAnt.27	PhiAnt.28	PhiAnt.29	PhiAnt.30	PhiAnt.31	PhiAnt.32	PhiAnt.33	PhiAnt.34	PhiAnt.35	PhiAnt.36	PhiAnt.37	PhiAnt.38	PhiAnt.39	PhiAnt.40									
Gain	Phi(7.5°)	Phi(15°)	Phi(30°)	Phi(45°)	Phi(60°)	Phi(75°)	Phi(90°)	Phi(105°)	Phi(120°)	Phi(135°)	Phi(150°)	Phi(165°)	Phi(180°)	Phi(195°)	Phi(210°)	Phi(225°)	Phi(240°)	Phi(255°)	Phi(270°)	Phi(285°)	Phi(300°)	Phi(315°)	Phi(330°)	Phi(345°)	Phi(360°)	Phi(7.5°)	Phi(15°)	Phi(30°)	Phi(45°)	Phi(60°)	Phi(75°)	Phi(90°)	Phi(105°)	Phi(120°)	Phi(135°)	Phi(150°)	Phi(165°)	Phi(180°)	Phi(195°)	Phi(210°)	Phi(225°)	Phi(240°)	Phi(255°)	Phi(270°)	Phi(285°)	Phi(300°)	Phi(315°)	Phi(330°)	Phi(345°)	Phi(360°)
Gain	Phi(7.5°)	Phi(15°)	Phi(30°)	Phi(45°)	Phi(60°)	Phi(75°)	Phi(90°)	Phi(105°)	Phi(120°)	Phi(135°)	Phi(150°)	Phi(165°)	Phi(180°)	Phi(195°)	Phi(210°)	Phi(225°)	Phi(240°)	Phi(255°)	Phi(270°)	Phi(285°)	Phi(300°)	Phi(315°)	Phi(330°)	Phi(345°)	Phi(360°)	Phi(7.5°)	Phi(15°)	Phi(30°)	Phi(45°)	Phi(60°)	Phi(75°)	Phi(90°)	Phi(105°)	Phi(120°)	Phi(135°)	Phi(150°)	Phi(165°)	Phi(180°)	Phi(195°)	Phi(210°)	Phi(225°)	Phi(240°)	Phi(255°)	Phi(270°)	Phi(285°)	Phi(300°)	Phi(315°)	Phi(330°)	Phi(345°)	Phi(360°)
Gain	Phi(7.5°)	Phi(15°)	Phi(30°)	Phi(45°)	Phi(60°)	Phi(75°)	Phi(90°)	Phi(105°)	Phi(120°)	Phi(135°)	Phi(150°)	Phi(165°)	Phi(180°)	Phi(195°)	Phi(210°)	Phi(225°)	Phi(240°)	Phi(255°)	Phi(270°)	Phi(285°)	Phi(300°)	Phi(315°)	Phi(330°)	Phi(345°)	Phi(360°)	Phi(7.5°)	Phi(15°)	Phi(30°)	Phi(45°)	Phi(60°)	Phi(75°)	Phi(90°)	Phi(105°)	Phi(120°)	Phi(135°)	Phi(150°)	Phi(165°)	Phi(180°)	Phi(195°)	Phi(210°)	Phi(225°)	Phi(240°)	Phi(255°)	Phi(270°)	Phi(285°)	Phi(300°)	Phi(315°)	Phi(330°)	Phi(345°)	Phi(360°)





# Radiated Composite Gain Data of 5GHz

# Appendix B

Theta	379/5.46	552/4.91	337/2.59	324/2.26	329/3.46	348/1.47	472/5.59	684/8.74	1168/16.13	1339/10.08	735/5.38	406/3.39	332/3.47	384/2.44	465/5.25	567/5.64	506/4.72	444/4.43	449/5.42	718/8.62	957/11.03	1018/8.9	8/4.5	455/3.62
Theta(22.5)	-3.79/5.46	-5.52/4.91	-3.37/2.59	-3.24/2.26	-3.29/3.46	-3.48/1.47	-4.72/5.59	-6.84/8.74	-11.68/16.13	-13.39/10.08	-7.35/5.38	-4.06/3.39	-3.32/3.47	-3.84/2.44	-4.65/5.25	-5.67/5.64	-5.06/4.72	-4.44/4.43	-4.49/5.42	-7.18/8.62	-9.57/11.03	-10.18/8.9	-8/4.5	-4.55/3.62
Theta(30)	-3.25/5.15	-1.95/4.16	-1.79/2.02	-2.53/2.09	-2.39/2.83	-3.17/3.71	-4.65/5.99	-6.96/9.12	-12.78/18.18	-16.29/10.59	-7.44/5.46	-4.68/4.93	-5.45/5.45	-5.82/6.19	-6.84/7.48	-6.63/4.77	-3.16/2.48	-2.83/3.69	-3.95/4.81	-6.82/8.72	-11.51/17.03	-18.47/18.99	-13.06/9.64	-7.19/5.46
Theta(37.5)	-0.92/2.33	-3.02/1.5	-1.02/1.81	-3.35/4.14	-4.36/4.6	-4.93/5.79	-6.88/8.14	-11.69/15.39	-17.03/18.12	-18.94/13.59	-9.3/7.78	-7.88/3.32	-6.04/5.88	-6.81/6.57	-7.93/5.48	-5.34/5.37	-5.05/4.02	-2.93/2.39	-2.53/3.79	-6.96/11.29	-18.77/18.59	-12.64/9.07	-7.43/4.65	-1.75/0.85
Theta(45)	-0.63/0.82	0.39/0.61	-1.79/3.61	-4.01/4.63	-4.86/5.61	-5.55/5.01	-5.26/6.96	-10.46/18.52	-18.17/18.17	-19.05/18.96	-14.12/13.48	-15.63/13.22	9.5/8.15	-6.18/3.9	-3.47/5.52	-5.05/4.52	-5.81/4.55	-2.65/1.33	-1.16/2.07	-4.68/8.49	-12.28/14.65	-14.33/12.21	-9.53/6.98	-4.29/2.89
Theta(52.5)	-1.9/0.01	-0.09/0.9	-3.83/8.91	-9.99/7.97	-6.17/5.31	-5.46/7.46	-10.76/13.86	-16.2/16.2	-11.14/14.06	-10.33/9.19	-9.27/10.94	-10.93/11.88	-17.5/16.6	-9.4/6.7	-5.39/3.12	-1.86/1.8	-2.1/1.79	-1.83/2.51	-2.66/2.75	-4/6.83	-12.77/18.85	-14.53/8.64	-6.24/4.25	-1.85/1.71
Theta(60)	-4.91/4.68	-4.13/3.11	-2.56/4.82	-7.08/6.26	-5.2/5.44	-6.42/7.91	-10.41/11.87	-10.53/10.23	-11.42/10.43	-10.81/12.83	-12.25/10.57	-10.73/8.71	-7.62/5.1	-5.56/4.87	-2.26/2.7	-3.25/3.66	-3.39/3.26	-3.31/4.84	-6.49/8.71	-11.37/11.81	-11.94/10.58	-10.61/9.38	-6.28/4.4	
Theta(67.5)	-2.55/4.91	-8.57/7.71	-3.49/2.07	-1.89/2.85	-5.12/7.04	-7.12/6.63	-6.53/6.76	-7.75/10.31	-13.58/13.96	-11.6/10.11	-9.33/8.85	-9.62/6.97	-6.13/9.41	-11.14/16.5	-11.89/4.63	-2.04/1.1	-1.34/3.24	-4.16/3.1	-3.51/5.7	-7.73/9.72	-12.87/17.6	-13.99/13.09	-18.45/15.7	-5.15/3.18
Theta(75)	-5.2/4.06	-8.21/12.95	-3.56/1.57	-2.38/4.32	-5.57/5.33	-4.74/4.84	-5.29/7.02	-8.87/10.38	-13.77/18.64	-14.01/11.08	-9.39/11.1	-7.05/5.33	-7.52/8.74	-7.95/5.59	-3.65/2.59	-3.58/4.52	-5.19/6.28	-6.14/5.16	-5.52/7.7	-8.22/10.8	-10.39/11.27	-12.32/15.45	-17.37/12.15	
Theta(82.5)	-8.13/4.51	-4.38/4.44	-1.93/0.95	-2.13/5.3	-7.85/8.38	-7.97/6.73	-7.87/9.73	-9.45/10.67	-14.28/17.75	-18.07/14.92	-10.53/7.02	-5.94/5.66	-7.01/16.22	-8.98/10.29	-9.53/12.97	-13.01/7.36	-4.58/4.28	-5.1/5.83	-7.15/5.92	-6.57/8.65	-10.23/13.24	-8.44/10.85	-9.71/9.89	-8.77/11.21
Theta(90)	-18.83/9.66	-4.63/3.95	-7.16/6.86	-7.46/6.36	-5.88/6.47	-7.97/9.85	-15.17/18.38	-11.16/7.52	-6.28/8.4	-12.27/12.75	-15.11/11.78	-9.55/7.91	-10/10.35	-6.91/8.99	-8.27/7.82	-4.94/5.48	-7.33/7.53	-7.32/8.11	-7.05/8.49	-8.19/11.64	-8.51/9.84	-14.24/14.98	-13.92/9.42	-8.16/11.97
Theta(97.5)	-10.67/11.69	-8.11/9.95	-16.99/6.37	-4.52/5.41	-7.12/6.87	-7.11/9.61	-13.34/17.63	-15.27/10.91	-9.71/8.86	-9.37/8.81	-10.7/10.22	-14.29/8.96	-18.64/3.79	-3.03/1.61	0.19/0.27	-0.34/2.28	-4.43/4.21	-5.87/8.73	-8.04/9.51	-9.08/10.42	-13.66/9.28	-13.92/13.45	-11.18/11.44	-9.86/10.83
Theta(105)	-12.44/18.22	-18.65/13.16	-5.2/1.98	-1.23/3.6	-5.28/2.88	-2.55/0.27	-7.21/6.22	-3/7.54	-6.05/6.69	-6.49/10.62	-15.74/17.76	-18.49/10.76	-5.91/9.97	-4.01/7.12	-2.54/1.1	-2.6/6.07	-6.94/13.52	-12.33/10.53	-9.42/12.24	-8.38/5.14	-10.62/9.91	-8.85/14.54	-3.82/3.65	-5/5.9
Theta(112.5)	-10.83/17.93	-12.83/8.19	-6.05/3.07	-3.83/5.89	-9.15/9.8	-10.52/8.28	-7.13/7.24	-6.59/5.35	-4.94/7.59	-7.84/12	-11.39/18.94	-16.55/15.98	-7.13/3.17	-2.93/2.67	-1.91/1.49	-0.01/0.19	-2.31/1.56	-2.07/10.43	-9.04/8.42	-6.38/8.41	-7.61/4.68	-2.87/1.69	-1.72/1.53	-2.31/6.43
Theta(120)	-9.44/9.82	-4.19/14.8	-4.07/3.12	-2.19/2.48	-4.18/9.73	-9.78/10.15	-8.41/6.73	-5.97/4.86	-7.84/8.53	-9.88/13.33	-13.91/14.13	-18.04/15.56	-6.29/2.41	-5.69/3.9	-3.07/3.53	-4.47/1.05	-2.59/3.22	-2.14/7.05	-10.29/8.56	-4.16/5.25	-6.33/8.95	-6.45/4.58	-2.34/3.69	-4.83/3.33
Theta(127.5)	-1.53/1.98	-3.83/8.58	-13.53/12.34	-12.31/11.68	-9.66/9.97	-7.86/7.7	-8.19/9.79	-6.71/7.48	-4.69/4.77	-8.78/12.69	-15.82/18.32	-17.25/14.84	-4.55/1.1	0.1/1.64	-4.68/5.72	-5.9/9.2	-11.18/8.35	-7.42/18.5	-11.45/6.1	-10.62/9.91	-10.88/8.54	-12.88/9.9	-5.99/2.87	
Theta(135)	-1.2/3.36	-5.64/10.25	-18.12/17.95	-15.9/12.71	-10.07/9.95	-11.3/10.54	-8.81/8.43	-6.76/4.18	-6.35/8.91	-10.21/17.06	-16.28/11.02	-11.36/8.73	-9.73/16.84	-17.06/7.89	-5.09/5.27	-3.36/6.14	-18.67/11.49	-10.68/16.68	-11.49/4.8	-5.88/5.75	-5.61/8.48	-5.9/4.65	-1.15/0.48	-1.12/1.15
Theta(142.5)	-0.55/0.03	-2.66/1.62	-4.47/4.78	-1.13/6.14	-5.74/8.44	-4.23/5.53	-6.88/11.33	-3.73/4.75	-6.74/7.13	-8.6/11.45	-11.93/12.3	-11.78/11.36	-13.92/6.65	-4.72/4.53	-2.62/1.27	-3.62/7.28	-12.36/18.89	-17.27/12.38	-14.05/13.1	-9.7/8.11	-4.66/0.03	-8.08/7.33	-4.64/4.32	-3.17/2.19
Theta(150)	-1.46/1.12	-0.14/4.7	-8.01/10.57	-11.83/14.89	-18.37/18.56	-14.62/8.97	-6.1/5.3	-5.43/5.25	-6.1/7.94	-7.29/10.91	-11.07/11.35	-15.72/11.02	-9.56/14.9	-14.91/10.19	-13.18/15.09	-10.69/7.07	-7.99/15.44	-16.8/18.27	-15.02/12.12	-10.22/7.3	-5.75/2.87	-0.57/1.09		
Theta(157.5)	-1.39/0.49	0.73/0.16	-0.16/0.48	-1.27/2.73	-4.31/5.93	-7.38/8.39	-8.47/7.95	-7.94/8.37	-7.99/5.79	-4.26/4.3	-5.91/8.17	-8.92/7.05	-5.72/5.7	-6.7/7.12	-5.03/2.17	-1.81/1.46	-3.7/6.34	-7.17/7.57	-9.35/12.61	-13.35/14.59	-14.77/10.98	-9.79/10.24	-11.13/12.37	-8.63/4.51
Theta(165)	1.13/1.8	1.12/0.23	-0.13/1.32	-3.09/5.19	-7.59/10.16	-12.5/13.54	-12.42/10.53	-8.74/7.53	-6.62/4.58	-4.58/4.53	-4.77/5.06	-5.96/6.29	-5.2/3.64	0.56/1.58	1.93/1.44	0.07/1.91	-4.62/7.89	-11.18/18.01	-17.13/15.16	-9.86/6.3	-4.33/3.27	-1.85/4.07	-0.10/1.8	
Theta(172.5)	-0.12/1.46	-3.26/4.63	-6.81/9.34	-11.16/13.16	-15.18/15.75	-15.11/14.22	-13.53/11.37	-10.97/12.85	-16/12.78	-10.07/9.28	-8.54/6.99	-5.93/5.52	-5.57/5.39	-4.55/3.28	-2.07/0.94	-0.38/0.36	-0.85/1.4	-2.23/3.23	-4.64/7.04	-10.19/15.31	-18.69/13.69	-8.06/4.38	-2.47/1.12	-1.50/1.7
Theta(180)	-18.98/15.18	-8.84/6.65	-5.27/5.08	-6.26/8.2	-11.11/16.6	-19.05/18.46	-17.04/16.56	-18.32/18.26	-17.27/15.49	-12.63/11.31	-10.42/9.37	-7.97/6.65	-5.48/4.98	-5.03/5.43	-5.86/5.9	-5.79/5.42	-6.66/7.53	-9.52/11.2	-11.9/11.91	-10.88/9.49	-7.33/5.93	-6.41/7.95	-6.65/14.05	
Freq(Hz)	5.66Pol	ThetaAnt 1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Gain	Phi(0)/Phi(7.5)	Phi(15)/Phi(22.5)	Phi(30)/Phi(37.5)	Phi(45)/Phi(52.5)	Phi(60)/Phi(67.5)	Phi(75)/Phi(82.5)	Phi(90)/Phi(97.5)	Phi(105)/Phi(112.5)	Phi(120)/Phi(127.5)	Phi(135)/Phi(142.5)	Phi(150)/Phi(157.5)	Phi(165)/Phi(172.5)	Phi(180)/Phi(187.5)	Phi(195)/Phi(202.5)	Phi(210)/Phi(217.5)	Phi(225)/Phi(232.5)	Phi(240)/Phi(247.5)	Phi(255)/Phi(262.5)	Phi(270)/Phi(277.5)	Phi(285)/Phi(292.5)	Phi(300)/Phi(307.5)	Phi(315)/Phi(322.5)	Phi(330)/Phi(337.5)	Phi(345)/Phi(352.5)
Theta(0)	-5.01/5.53	-5.95/7.03	-7.46/7.87	-4.79/7.19	-7.17/7.14	-7.25/6.77	-5.43/4.18	-3.53/3.15	-3.04/3	-2.69/2.61	-2.85/2.98	-2.91/3.12	-3.51/4.04	-4.33/4.89	-5.67/6.12	-6.43/6.33	-6.4/5.79	-5.97/5.67	-5.21/4.29	-3.6/3.35	-3.33/3.66	-3.86/3.42	-3.18/3.51	-4.03/4.71
Theta(7.5)	-4.36/4.92	-4.89/4.78	-5.07/5.45	-5.4/5.05	-6.6/7.27	-6.7/6.41	-5.4/5.32	-4.26/4.19	-4.57/4.83	-4.33/4.15	-4.04/4.26	-4.51/4.94	-6.07/7.31	-6.84/8.93	-10.77/13.58	-9.41/8.43	-7.52/6.32	-5.93/5.57	-4.91/3.96	-3.01/3.24	-1.75/1.45	-1.57/1.77	-1.8/2.24	-2.85/3.48
Theta(15)	-3.44/3.91	-4.01/4.59	-5.28/6.08	-6.74/7.9	-8.53/12.01	-12.31/11.16	-10.48/9.71	-7.88/5.68	-3.92/3.21	-3.44/6.06	-4.77/5.16	-7.17/8.94	-10.9/12.23	-12.54/12	-10.34/8.48	-6.93/6.19	-5.93/5.59	-4.72/3.42	-2.42/1.66	-0.99/0.32	0.22/0.33	0.49/2.01	-2.81/3.7	
Theta(22.5)	-1.3/1.8	-3.25/5.05	-7.02/8.84	-11.29/13.61	-18.11/18.35	-18.13/12.77	-10.68/8.56	-6.66/5.24	-3.83/3	-2.75/3.12	-3.61/4.27	-4.73/5.7	-7.04/8.66	-9.86/10.31	-10.45/10.01	-9.6/9.32	-9.48/9.43	-9.02/6.68	-4.51/2.35	-1.42/0.96	-0.19/0.59	0.70/1.9	-1.04/1.93	-2.08/1.53
Theta(30)	-1.62/2.75	-4.27/4.91	-6.6/9.2	-11.27/14.59	-17.23/14.31	-10.18/10.44	-9.8/9.95	-7.45/6.04	-5.35/5.82	-7.01/7.76	-6.83/6.07	-6.32/7.26	-7.17/7.29	-6.6/6.84	-7.48/8.98	-12.88/11.39	-17.65/13.48	-9.4/7.56	-5.31/3.01	-1.11/0.18	0.0/13	0.88/1.4	0.720/5.8	0.22/0.62
Theta(37.5)	-1.09/2.32	-3.12/4.42	-6.62/8.32	-9.23/10.4	-9.58/8.88	-10.28/13.44	-13.31/11.42	-9.86/8.57	-7.2/6.4	-6.24/6.01	-7.27/9.04	-8.24/9.84	-11.33/10.38	-9.04/9.49	-11.36/15.97	-18.62/11.29	-8.61/8.32	-6.83/4.19	-1.19/0.2	0.13/0.6	2.122/69	2.952/57	1.580/33	0.88/1.11
Theta(45)	-3.35/4.25	-5.18/6.39	-7.42/9.93	-14.92/11.04	-7.48/5.78	-5.76/7.1	-9.46/12.02	-13.35/13.33	-11.3/10.36	-12.77/12.85	-12.7/12	-8.68/8.34	-9.1/8.15	-9.53/15.5	-13.47/18.66	-7.21/6.68	-4.92/1.9	-0.5/0.08	-0.5/0.16	1.752/17	1.94/1.97	0.980/31	1.32/6.01	0.51/2.23
Theta(52.5)	-1.25/2.75	-5.57/3.98	-10.37/9.91	-7.08/6.12	-5.14/5.11	-6.99/12.43	-17.76/9.83	-6.2/5.83	-6.62/7.79	-8.63/10.7	-18.9/18.5	-17.28/14.3	-13.76/15.26	-17.89/15.24	-9.73/6.99	-5.36/4.12	-3.35/1.73	0.32/1.34	2.352/54	2.031/98	1.160/93	1.230/56	0.520/27	-0.36/0.55
Theta(60)	-7.57/6.54	-6.98/10.25	-12.02/18.44	-12.15/6.43	-3.63/3.03	-4.35/6.02	-13.97/13.07	-9.99/10.32	-10.42/8.95	-8.29/8.51	-9.53/12.39	-7.25/6.58	-6.52/8.09	-17.65/14.25	-5.99/6.11	-5.77/5.38	-4.27/1.53	0.571/2	1.011/25	1.011/42	0.93/0.57	-0.72/2.25	-2.19/0.91	-1.91/4.52
Theta(67.5)	-4.85/8.93	-11.07/13.73	-7.39/14.07	-11.93/7.85	-5.67/5.43	-7.13/10.69	-14.28/11.1	-6.47/7.27	-8.52/9.13	-10.56/11.02	-13.01/11.72	-8.19/9.83	-5.64/8.21	-12.4/7.77	-5.9/4.89	-4.91/5.3	-4.36/2.15	-1.46/1.23	-2.6/2.84	-2.34/0.91	-1.45/1.92	-1.4/2.38		
Theta(75)	-3.38/5.28	-7.58/8	-12.94/12.46	-1																				







# Radiated Composite Gain Data of 5GHz

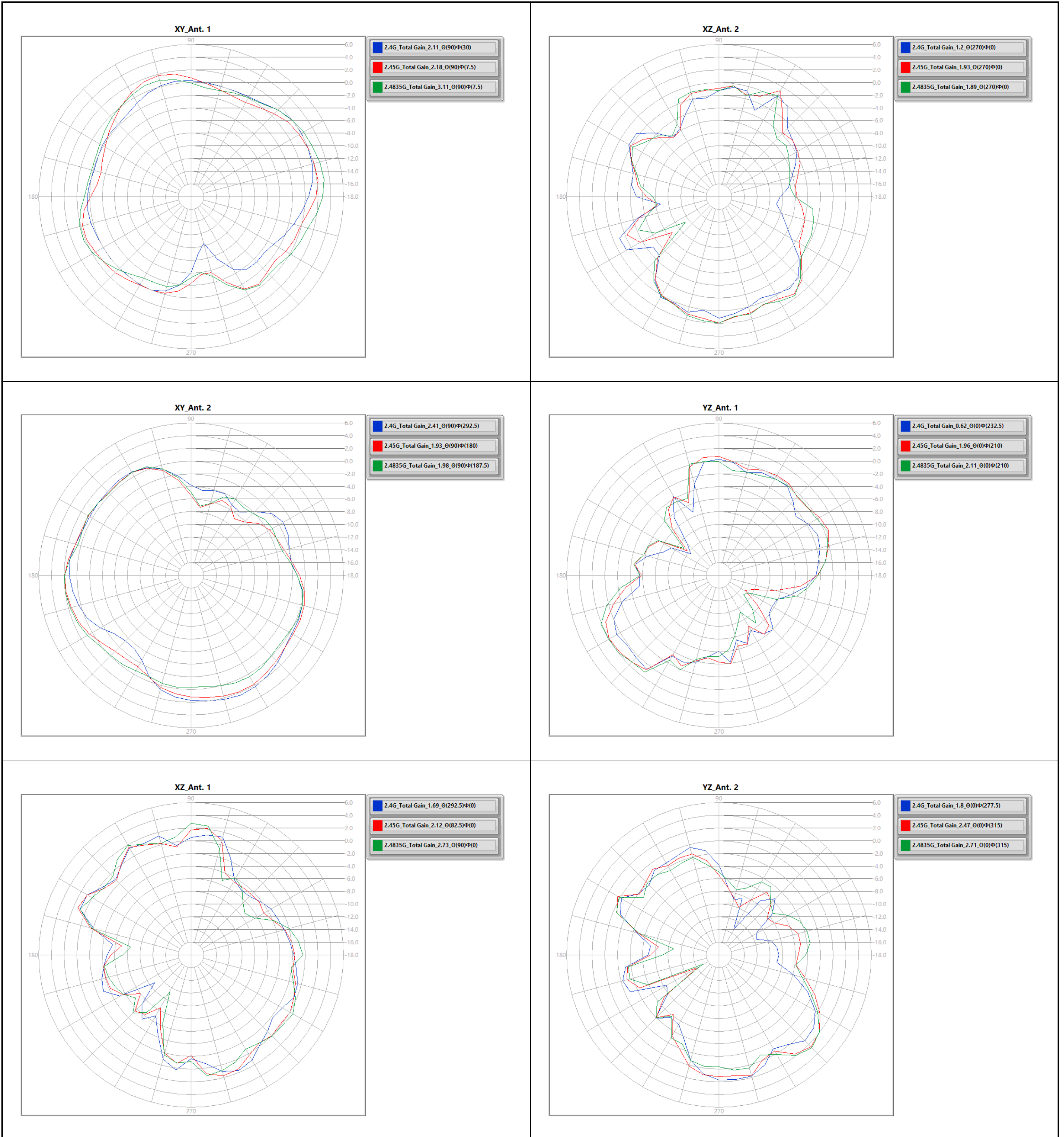
# Appendix B

Theta (°)	-16.77-18.79	-17.53-12.81	-10.93-10.81	-14.34-18.59	-18.57-18.44	-13.82-10.32	-8.27-6.71	-5.54-4.34	-3.82-3.18	-2.37-1.73	-1.54-1.91	-2.41-2.67	-2.68-2.73	-3.17-4.09	-5.41-6.61	-7.27-7.77	-7.91-7.92	-7.32-6.14	-5.43-6.57	-7.33-7.03	-8.26-7.69	-6.37-5.55	-5.98-5.67	-6.18-9.42
Freq(Hz)	5.785GPol	ThetaAnt. 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gain	Phi(0°)Phi(7.5°)	Phi(15°)Phi(22.5°)	Phi(30°)Phi(37.5°)	Phi(45°)Phi(52.5°)	Phi(60°)Phi(67.5°)	Phi(75°)Phi(82.5°)	Phi(90°)Phi(97.5°)	Phi(105°)Phi(112.5°)	Phi(120°)Phi(127.5°)	Phi(135°)Phi(142.5°)	Phi(150°)Phi(157.5°)	Phi(165°)Phi(172.5°)	Phi(180°)Phi(187.5°)	Phi(195°)Phi(202.5°)	Phi(210°)Phi(217.5°)	Phi(225°)Phi(232.5°)	Phi(240°)Phi(247.5°)	Phi(255°)Phi(262.5°)	Phi(270°)Phi(277.5°)	Phi(285°)Phi(292.5°)	Phi(300°)Phi(307.5°)	Phi(315°)Phi(322.5°)	Phi(330°)Phi(337.5°)	Phi(345°)Phi(352.5°)
Theta(0°)	-11.94-17.63	-18.85-18.17	-17.36-12.28	-9.55-8.35	-6.79-5.39	-4.22-3.27	-2.75-2.48	-2.32-2.54	-3.08-3.58	-4.21-5.23	-6.35-7.59	-9.21-11.18	-14.05-16.35	-17.91-16.77	-14.76-11.86	-9.67-7.73	-6.72-6.35	-5.95-5.3	-4.73-4.18	-4.81-4.81	-5.09-4.62	-3.62-3.3	-4.17-5.6	-7.19-9.59
Theta(7.5°)	-11.06-11.68	-12.22-11.89	-12.17-10.04	-7.96-6.87	-5.95-4.86	-4.85-4.75	-4.8-5.47	-4.32-4.24	-4.36-4.82	-5.14-5.66	-6.01-6.83	-8.14-10.27	-12.67-13.91	-13.96-12.35	-10.98-8.73	-6.56-5.21	-3.62-2.98	-2.95-3.08	-3.05-3.41	-3.78-4.54	-5.21-5.17	-4.87-5.78	-6.74-9.72	-10.73-11.14
Theta(15°)	-7.45-6.26	-3.42-2.57	-2.67-2.5	-2.63-2.08	-1.74-1.23	-0.99-0.81	-0.99-1.81	-3.31-4.47	-6.01-8.72	-10.43-10.99	-11.35-11.38	-12.07-13.53	-15.5-15.25	-12.51-9.43	-6.97-5.16	-3.56-2.6	-1.95-1.01	-0.66-1.23	-1.97-2.99	-4.31-6.45	-8.63-9.59	-11.9-18.5	-18.96-19.37	-15.81-11.31
Theta(22.5°)	-6.74-4.19	-2.02-0.4	0.52-0.82	0.36-0.47	-0.16-0.74	-0.61-0.28	-0.11-0.28	-0.88-1.76	-3.62-7.3	-13.83-18.59	-17.08-15.44	-15.85-17.91	-18.99-16.59	-10.45-6.98	-4.64-3.09	-2.15-1.56	-1.05-1.06	-1.55-2.41	-3.37-3.51	-4.22-5.45	-7.08-11.22	-16.31-18.2	-19.08-16.13	-15.94-11.18
Theta(30°)	-6.74-3.88	-2.06-1.14	-0.14-0.15	0.57-1.15	1.21-1.34	1.59-1.97	1.94-1.5	0.81-0.05	-1.4-3.46	-8.95-18.04	-17.77-13.05	-10.46-11.74	-18.76-18.98	-11.1-7.76	-5.52-3.11	-1.61-0.7	0.08-0.03	-0.58-0.85	-1.87-4.77	-8.55-10.72	-13.69-15.41	-19.25-18.91	-18.01-18.49	-13.2-10.94
Theta(37.5°)	-6.3-4.08	-1.51-0.21	-0.24-0.03	0.26-0.35	0.12-0.19	-0.29-0.53	1.08-1.69	1.69-0.82	-1.03-3.31	-6.77-10.34	-11.44-11.72	-14.42-17.28	-16.29-12.83	-10.33-7.76	-5.17-3.95	-3.49-3.06	-3.77-4.77	-3.96-3.35	-2.99-1.93	-3.16-6.38	-8.3-8.82	-10.57-13.68	-17.79-16.75	-8.23-7.22
Theta(45°)	-3.07-4.55	-4.19-1.59	-0.53-0.11	0.95-0.75	-0.17-1.47	-1.96-1.69	-1.32-0.54	0.03-0.2	-0.79-1.43	-3.02-6.12	-10.79-15.66	-17.81-15.81	-12.66-10.39	-9.54-10.59	-10.05-8.37	-7.58-9.38	-7.9-5.12	-4.99-4.42	-4.85-7.65	-9.5-10.83	-10.37-16.08	-18.24-10.77	-10.14-9.43	-7.93-5.04
Theta(52.5°)	-4.25-7.44	-13.31-8.03	-3.26-0.36	1.82-1.7	1.58-1.16	0.89-0.33	-0.36-1.65	-3.06-3.45	-4.17-5.36	-7.11-3.88	-4.58-7.25	-14.4-13.31	-9.27-7.15	-8.11-7.72	-7.04-6.38	-5.93-5.95	-6.74-5.56	-4.62-6.18	-7.65-6.8	-6.45-4.89	-13.9-18.31	-13.06-10.77	-14.89-15.54	-13.07-7.32
Theta(60°)	-16.47-11.67	-9.35-6.55	-3.05-0.01	2.42-2.72	2.89-2.7	2.61-1.95	0.89-0.68	-2.21-3.98	-6.82-9.53	-7.39-4.33	-4.85-7.36	-10.11-18.85	-13.63-8.41	-4.3-4.52	-6.2-7.44	-9.94-10.78	-10.55-6.58	-4.4-2.9	-5.63-6.34	-6.66-10.49	-16-8.01	-7.62-7.03	-9.28-10.88	-11.07-13.76
Theta(67.5°)	-9.48-8.76	-9.27-6.17	-2.04-0.31	2.36-1.8	1.94-2.21	2.74-1.76	0.83-0.45	-1.08-2.27	-7.21-11.93	-9.52-6	-4.67-4.28	-7.58-17.54	-10.08-6.4	-5.71-5.6	-5.22-7.51	-7.73-10.05	-8.51-7.39	-5.39-4.69	-7.11-8.65	-11.55-15.42	-18.34-11.27	-5.68-5.79	-7.68-14.98	-8.86-6.46
Theta(75°)	-8.37-6.91	-5.34-6.17	-4.2-1.51	0.71-0.76	0.58-0.17	-0.91-1.92	-2.07-0.62	-0.19-1.09	-3.69-7.48	-13.38-9.76	-3.77-1.63	-3.01-5.68	-18.28-17.96	-5.83-3.47	-3.17-4.26	-4.97-7.03	-7.97-7.75	-8.43-6.86	-8.47-10.3	-18.76-18.45	-10.51-7.7	-7.26-4.87	-7.81-17.59	-18.01-11.16
Theta(82.5°)	-12.53-11.48	-18.05-13.38	-9.17-5.97	-2.19-2.79	-2.88-4.21	-5.34-6.23	-4.93-4.27	-2.93-2.74	-3.95-5.39	-12.54-10.85	-3.86-1.88	-1.93-3.49	-11.57-18.44	-10.78-15.23	-8.4-8.01	-8.41-7.36	-7.92-17.22	-12.04-9.39	-7.43-13.4	-14.5-10.53	-6.5-4.78	-7.54-8.52	-14.33-18.97	-11.52-15.78
Theta(90°)	-12.13-7.31	-16.51-16.61	-13.86-8.84	-4.29-3.42	-3.31-4.28	-3.94-5.46	-8.06-8.01	-5.45-5.63	-6.68-7.25	-6.47-5.05	-4.34-4.59	-3.45-5.21	-6.33-11.4	-11.72-6.16	-6.79-5.47	-4.59-4.23	-6.06-4.79	-3.96-6.79	-7.13-10.09	-10.92-4.64	-2.96-2.93	-5.96-13.42	-14.94-18.43	-12.91-8.02
Theta(97.5°)	-17.41-11.99	-17.34-19.49	-10.54-7.49	-4.44-1.52	-0.92-1.73	-2.38-4.4	-6.72-10.3	-12.88-11.77	-7.27-3.47	-2.26-2.52	-8.8-6.45	-2.87-3.16	-0.84-4.45	-4.09-4.72	-5.38-4.87	-2.86-1.59	-1.22-0.22	-1.10-10.28	-1.26-2.43	-0.56-1.7	-0.56-1.1	-11.82-11.51	-16.65-15.92	-18.79-14.22
Theta(105°)	-17.93-16.25	-11.47-19.05	-13.42-7.98	-2.97-3.1	-2.08-3.71	-3.95-3.98	-3.61-4.08	-5.92-9.31	-16.18-10.45	-3.43-0.55	-1.9-1.06	-7.16-7.31	-3.14-10.35	-3.65-2.1	-2.66-1.71	-0.56-1.3	3.74-2.9	2.12-1.18	-1.3-2.67	-0.04-1.72	-1.34-3.43	-11.06-11.61	-8.86-19.15	-6.82-16.77
Theta(112.5°)	-13.98-7.58	-15.63-13.36	-7.46-5.15	-3.76-3.49	-2.99-5.12	-8.95-18.04	-10.22-6.83	-5.62-5.35	-12.17-17.82	-7.88-1.62	-1.2-2.02	-7.7-4.22	-6.59-7.73	-3.95-1.66	0.38-1.22	-0.81-0.93	1.73-0.03	3.01-1.71	-0.63-1.21	3.18-0.13	-3.1-5.32	-4.73-6.94	-9.32-17.86	-19-14.26
Theta(120°)	-17.23-18.49	-16.55-14.4	-10.41-6.86	-5.18-6.45	-7.94-8.38	-14.91-6.91	-5.37-4.08	-3.42-4.8	-5.89-8.7	-7.77-3.47	-1.79-2.86	-4.45-2.19	-5.67-7.17	-4.68-3.55	-2.55-6.86	-5.92-2.57	-0.180-79	-0.57-0.74	-3.19-1.39	1.36-2.4	-13.26-7.78	-6.71-6.83	-13.9-18.84	-18.26-16.77
Theta(127.5°)	-17.47-18.18	-18.34-10.48	-8.74-8.5	-10.12-17.42	-19.66-10.07	-8.02-10.07	-8.33-3.93	-2.02-1.09	-11.76-8.83	-11.44-8.51	-2.99-1.6	0.71-0.97	-1.65-3.48	-4.59-5.47	-1.15-1.58	-1.21-0.44	-1.04-1.08	-6.62-2.36	-1.42-5.85	-8.54-7.92	-7.8-12	-19.65-13.45	-16.87-15.17	
Theta(135°)	-13.27-15.78	-11.81-5.97	-5.87-7.52	-8.47-10.21	-13.11-13.73	-13.08-8.14	-6.15-4.34	-2.32-1.96	-3.05-4.8	-9.75-14.48	-9.24-3.89	-1.33-0.39	1.88-1.22	1.92-2.46	-0.8-10.24	-5.03-2.69	1.32-1.23	-0.01-6.69	-7.21-3.39	1.17-1.45	-6.95-10.06	-6.91-7.95	-14.8-14.32	-18.35-16.72
Theta(142.5°)	-8.76-5.68	-5.57-6.18	-7.03-5.95	-5.92-7.87	-10.1-10.03	-7.4-6.73	-7.86-11.61	-11.93-9.7	-8.02-9.13	-13.77-18.39	-11.82-7.63	-1.82-1.93	2.19-2.49	-1.16-4.23	-2.96-6.69	2.24-2.75	2.56-1.94	-5.56-2.31	0.19-0.53	-2.71-17.3	-6.42-7.25	-15.9-11.04	-10.49-16.19	-9.46-11.94
Theta(150°)	-18.12-17.84	-13.27-14.26	-16.53-13.43	-13.81-10.87	-10.68-15.29	-19.06-18.85	-18.1-15.14	-11.83-11.89	-11.85-9.92	-9.18-12.5	-15.79-11.6	-8.67-5.89	-10.81-8.42	-1.28-0.42	-0.99-4.65	-6.34-2.17	-1.81-0.31	-1.67-8.42	-10.57-3.22	0.02-0.38	-1.24-2.29	-8.36-3.03	-1.44-5.6	-9.16-12.96
Theta(157.5°)	-10.24-6.97	-6.51-7.33	-11.79-18.74	-19.21-18.29	-12.19-8.88	-8.97-9.81	-11.11-13.3	-13.79-12.53	-11.58-11.43	-13.52-15.86	-12.69-7.7	-4.35-3.14	-2.9-2.12	-0.51-0.78	1.38-0.73	-1.44-4.11	-5.17-6.18	-10.17-15.5	-11.06-4.09	-0.83-0.83	-2.63-5.18	-10.36-8.69	-7.42-10.91	-10.04-11.2
Theta(165°)	-8.76-5.68	-4.45-3.85	-4.13-5.57	-6.66-5.94	-3.21-3.31	-1.2-2.04	-3.6-5.53	-6.94-7.18	-7.16-7.79	-9.12-10.94	-13.34-15.37	-10.89-17.19	-16.42-10.74	-6.23-3.97	-2.8-2.24	-0.93-0.34	-1.49-5	-8.4-6.1	-3.91-7.72	-2.04-1.25	-0.57-0.81	-2.68-5.57	-13.42-18.72	-15.02-12.49
Theta(172.5°)	-10-7.68	-5.95-4.72	-4.47-4.18	-3.4-2.69	-2.46-2.61	-3.84-5.55	-4.62-4.65	-6.1-7.6	-7.63-5.44	-9.17-9.95	-7.18-6.4	-10.16-12.56	-18.09-18.69	-15.12-8.95	-4.92-2.06	-0.4-0.24	0.79-1.36	1.96-2.07	1.54-0.99	0.43-0.1	-0.77-2.28	-5.05-11.14	-18.94-17.68	-18.67-15.17
Theta(180°)	-13.99-17.22	-14.76-11.16	-7.59-5.19	-4.35-3.55	-3.11-3.56	-4.12-4.69	-5.81-6.59	-7.03-7.06	-6.74-8.01	-8.51-9.22	-9.45-8.33	-6.62-5.75	-5.29-4.38	-3.36-2.57	-1.88-1.57	-1.49-1.79	-1.82-1.82	-2.51-4.03	-5.84-8.76	-11.77-14.94	-18.21-17.88	-18.34-18.57	-17.65-19.04	-17.62-15.57
Freq(Hz)	5.885GPol	PhiAnt. 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gain	Phi(0°)Phi(7.5°)	Phi(15°)Phi(22.5°)	Phi(30°)Phi(37.5°)	Phi(45°)Phi(52.5°)	Phi(60°)Phi(67.5°)	Phi(75°)Phi(82.5°)	Phi(90°)Phi(97.5°)	Phi(105°)Phi(112.5°)	Phi(120°)Phi(127.5°)	Phi(135°)Phi(142.5°)	Phi(150°)Phi(157.5°)	Phi(165°)Phi(172.5°)	Phi(180°)Phi(187.5°)	Phi(195°)Phi(202.5°)	Phi(210°)Phi(217.5°)	Phi(225°)Phi(232.5°)	Phi(240°)Phi(247.5°)	Phi(255°)Phi(262.5°)	Phi(270°)Phi(277.5°)	Phi(285°)Phi(292.5°)	Phi(300°)Phi(307.5°)	Phi(315°)Phi(322.5°)	Phi(330°)Phi(337.5°)	Phi(345°)Phi(352.5°)
Theta(0°)	-3.55-3.57	-3.78-3.47	-3.23-2.99	-3.79-5.86	-7.78-9.54	-11.48-14.14	-17.75-16.79	-14.23-11.03	-9.17-7.64	-6.51-5.3	-4.13-3.56	-3.13-3.24	-3.53-3.72	-3.86-4.08	-4.87-5.77	-6.04-6.55	-8.34-11.19	-14.34-16.32	-19.21-18.86	-16.72-12.58	-9.74-8.95	-6.52-5.67	-5.46-5.06	-4.88-2.96
Theta(7.5°)	-5.29-5.21	-6.08-7.03	-8.44-8.59	-8.18-9.19	-11.34-13.41	-15.23-17.63	-19.06-17.86	-15.29-12.26	-9.52-8.08	-6.77-5.35	-4.61-4.02	-3.23-2.99	-2.74-2.86	-2.96-3.3	-4.18-4.04	-5.73-6.92	-8.26-10.49	-13.96-14.96	-12.91-12.61	-11.51-9.72	-7.92-7.43	-5.83-6.46	-4.02-4.45	-5.19-4.45
Theta(15°)	-6.16-4.99	-5.13-6.13	-7.18-9.32	-13.49-16.33	-18.11-17.77	-17.52-14.59	-11.79-10.13	-9.14-8.81	-8.07-7.03	-6.27-5.69	-4.84-4.07	-3.24-2.68	-2.24-2.38	-2.78-3.39	-3.87-5.21	-8.14-12.79	-13.37-11.38	-10.06-7.68	-5.01-4.26	-4.39-4.52	-5.62-5.59	-5.91-6.33	-6.44-5.83	
Theta(22.5°)	-2.48-2.74	-2.12-2.83	-4.38-5.59	-8.85-9.87	-12.68-15	-14.87-12.19	-9.46-7.08	-5.67-5	-4.35-3.62	-3.59-3.77	-4.09-3.65	-2.71-1.83	-1.6-1.75	-2.28-3.58	-5.31-7.06	-10.22-14.77	-15.41-10.62	-7.35-5.84	-4.74-4.02	-3.88-3.32	-3.33-3.32	-3.51-5.43	-6.62-6.63	-4.3-2.83
Theta(30°)	0.87-0.05	-0																						





E1 (XY plane) –  $\Theta(90)\Phi(0-360)$   
 E2 (XZ plane) –  $\Theta(0-180)\Phi(0)$  and  $\Theta(0-180)\Phi(180)$   
 E3 (YZ plane) –  $\Theta(0-180)\Phi(90)$  and  $\Theta(0-180)\Phi(270)$









# Antenna Pattern of 5GHz

# Appendix D

Theta (°)	Phi (°)	Gain (dBi)	Phi (°)	Gain (dBi)	Phi (°)	Gain (dBi)	Phi (°)	Gain (dBi)	Phi (°)	Gain (dBi)	Phi (°)	Gain (dBi)	Phi (°)	Gain (dBi)	Phi (°)	Gain (dBi)	Phi (°)	Gain (dBi)	Phi (°)	Gain (dBi)	Phi (°)	Gain (dBi)	Phi (°)	Gain (dBi)	Phi (°)	Gain (dBi)	Phi (°)	Gain (dBi)	Phi (°)	Gain (dBi)	Phi (°)	Gain (dBi)	Phi (°)	Gain (dBi)	Phi (°)	Gain (dBi)	Phi (°)	Gain (dBi)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
0	0	-1.14/0.94	0	-1.24/1.32	0	-2.93/3.60	0	-4.66/3.59	0	-2.98/3.09	0	-3.14/3.14	0	-2.93/2.95	0	-3.30/3.31	0	-3.61/3.77	0	-3.75/3.66	0	-3.12/2.93	0	-3.10/3.53	0	-3.92/4.16	0	-3.89/3.27	0	-2.81/2.30	0	-1.63/1.33	0	-1.58/1.84	0	-1.89/1.41	0	-1.51/1.80	0	-1.66/1.20	0	-1.29/1.48	0	-1.57/1.66	0	-1.54/1.26	0	-1.17/0.52	0	-1.10/1.32	0	-1.57/1.73	0	-1.43/1.99	0	-1.07/2.01	0	-2.66/3.09	0	-3.38/3.68	0	-4.50/4.56	0	-3.43/2.78	0	-2.50/3.23	0	-2.42/2.13	0	-1.20/0.58	0	-0.88/2.12	0	-3.44/4.52	0	-4.98/4.83	0	-3.94/3.33	0	-2.60/2.31	0	-2.17/2.14	0	-1.49/1.56	0	-1.08/0.66	0	0.57/0.49	0	-0.21/1.07	0	0.90/1.10	0	0.05/0.21	0	0.00/0.40	0	0.03/0.03	0	0.48/0.14	0	-1.05/2.28	0	-0.87/6.32	0	-3.73/3.99	0	-3.92/4.44	0	-6.19/8.22	0	-8.23/7.22	0	-6.56/6.54	0	-5.29/4.47	0	-2.99/4.00	0	-4.81/5.77	0	-5.59/4.55	0	-2.80/2.92	0	-1.71/4.22	0	-1.66/0.96	0	1.77/1.42	0	1.51/1.42	0	1.01/1.40	0	2.16/2.29	0	1.72/1.16	0	1.60/1.22	0	0.33/0.03	0	-0.29/1.22	0	-2.98/5.65	0	-6.72/5.54	0	-4.29/3.99	0	-3.71/3.95	0	-4.79/4.94	0	-5.42/6.27	0	-7.44/8.23	0	-9.52/11.09	0	-9.68/6.13	0	-7.47/7.38	0	-5.25/7.00	0	-9.98/9.24	0	-7.18/4.61	0	-1.54/0.02	0	0.23/0.85	0	1.54/0.49	0	-0.28/0.84	0	1.11/1.18	0	1.99/2.83	0	3.04/2.51	0	2.11/2.01	0	1.35/1.72	0	1.75/2.04	0	0.95/1.02	0	-4.39/1.01	0	-5.60/3.64	0	-3.61/3.94	0	-4.73/6.13	0	-9.17/12.51	0	-13.64/12.65	0	-15.09/13.35	0	-9.26/9.96	0	-7.64/5.85	0	-5.50/5.91	0	-4.87/1.96	0	-0.02/1.10	0	2.23/3.36	0	1.64/1.53	0	2.14/1.76	0	2.09/2.62	0	1.51/1.29	0	2.33/2.91	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.64	0	0.99/1.04	0	0.91/0.57	0	1.47/3.15	0	3.40/3.03	0	2.48/1.79	0	0.99/1.04	0	0.12/0.05	0	0.62/0.15	0	-0.23/1.27	0	1.93/1.



Antenna Pattern of 5GHz

Appendix D

Table with columns for Azimuth (Theta) and Elevation (Phi) angles, and corresponding Gain values. The table lists data for various angles from 75 to 180 degrees.

E1 (XY plane) –  $\Theta(90)\Phi(0-360)$   
 E2 (XZ plane) –  $\Theta(0-180)\Phi(0)$  and  $\Theta(0-180)\Phi(180)$   
 E3 (YZ plane) –  $\Theta(0-180)\Phi(90)$  and  $\Theta(0-180)\Phi(270)$

