



Antenna Composite Gain Test Report

Equipment	Wi-Fi 7 Tri-Band Mesh Router
Brand Name	LITEON
Model Name	WRB8326A, WRB8326B, WRB8326C, WRB8326D
Applicant	LITE-ON TECHNOLOGY CORP. Bldg. C, 90, Chien 1 Road, Chung Ho, New Taipei City 23585, Taiwan, R.O.C.
Manufacturer	LITE-ON TECHNOLOGY CORP. Bldg. C, 90, Chien 1 Road, Chung Ho, New Taipei City 23585, Taiwan, R.O.C.
Standard	KDB 662911 D03 v01
Sample Received	Aug. 29, 2024
Start Test Date	Sep. 02, 2024
Final Test Date	Sep. 02, 2024


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	Modes of Operation
2G 5GAnt1	1	LITEON	20301-002000A000	PIFA	I-Pex	2.4G+5G
2G 5GAnt2	2	LITEON	20301-002020A000	PIFA	I-Pex	2.4G+5G

Note:

2.4GHz and 5GHz Operation Mode (2TX/2RX)

2G 5GAnt1~2G 5GAnt2 could transmit/receive simultaneously.

2. Table for Multiple Listing

The brand/model names in the following table are all refer to the identical product.

Brand Name	Model Name	SKU	5GE	2.5GE	USB 2.0	IoT(2.4G)
LITEON	WRB8326A	SKU 1	V	V	V	V
	WRB8326B	SKU 2	V	V	-	V
	WRB8326C	SKU 3	V	-	-	V
	WRB8326D	SKU 4	-	V	-	V

From the above models, model: WRB8326A was selected as representative model for the test and its data was recorded in this report.

3. Test Frequency

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

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

4. 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%	02/Sep/2024

Note:

Testing Site Information

Brand Name: TDK

Dimension: 11m*6m*6m

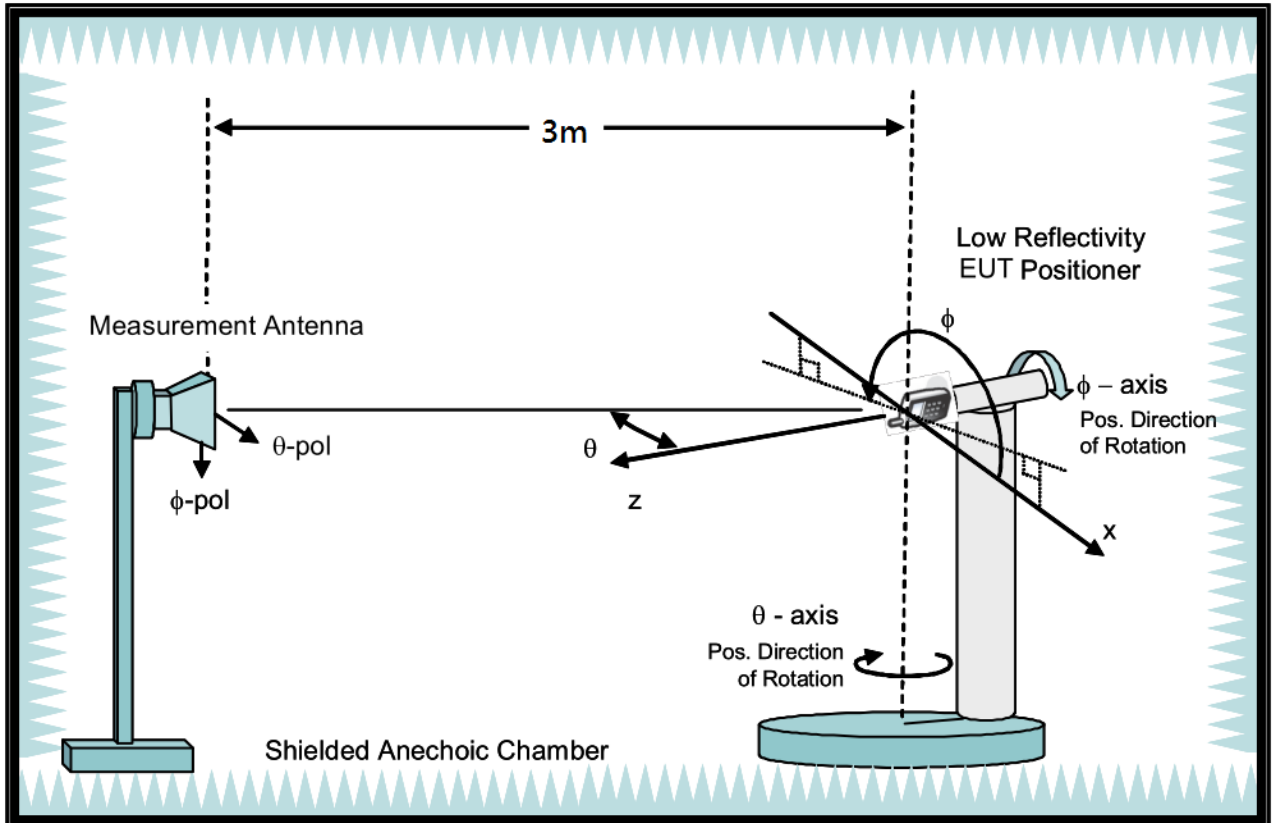
Characteristic: Fully Anechoic Chamber

5. 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).

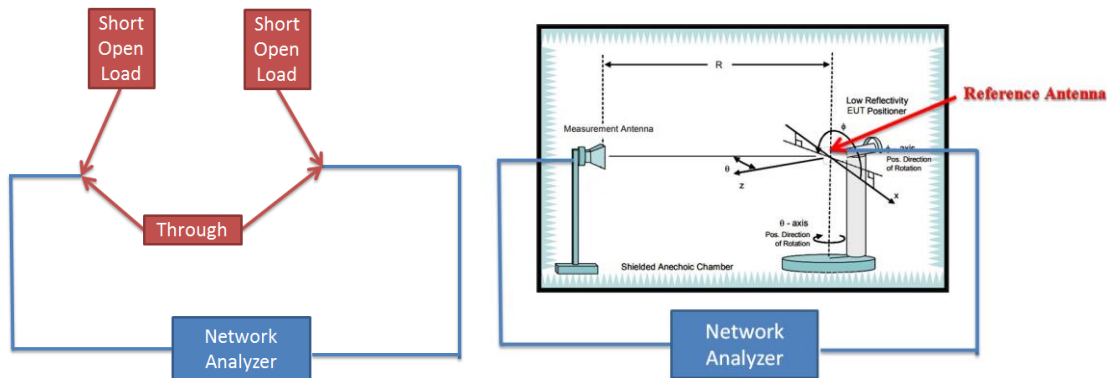
#Reference to CTIA "ctia-test-plan-for-wireless-device-over-the-air-performance-ver-3-7-1"



6. 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)	-33.55	-33.38	-32.91	-32.29	-32.48	-32.25	-32.33	-32.85	-32.67	-33.37	-32.53	-33.75	-34.72	-35.33
G(phi) reading (dB)	-33.11	-32.68	-32.48	-32.45	-32.85	-31.35	-32.76	-32.68	-32.57	-32.81	-32.85	-33.62	-34.33	-35.29
Reference gain (dBi)	10.3	10.3	10.1	11.1	11.3	11.7	12.1	11.5	11.2	11.1	11.3	11	11.1	10.5
Factor(theta) (dB)	43.85	43.68	43.01	43.39	43.78	43.95	44.43	44.35	43.87	44.47	43.83	44.75	45.82	45.83
Factor(phi) (dB)	43.41	42.98	42.58	43.55	44.15	43.05	44.86	44.18	43.77	43.91	44.15	44.62	45.43	45.79

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.

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



7. 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 8 tables.

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



8. Measured Values and Calculation of Maximum Gain Positions

DG_1SS max value position

Frequency (Hz)	2.45G	5.2G	5.3G	5.6G	5.785G
Ant. 1 (dBi)	-2.23	-0.62	1.5	3.41	3.72
Ant. 2 (dBi)	1.25	2.51	1.62	0.94	-0.85
DG [1SS] (dBi)	2.69	4.1	4.57	5.27	4.74
Polarization	Phi	Theta	Phi	Theta	Theta
$\Theta(^{\circ})$	135	97.5	22.5	97.5	97.5
$\Phi(^{\circ})$	150	225	172.5	255	255

Note: The DG 1SS max value position is the maximum value of section 12 table DG 1SS Result.

DG_1SS max value position calculation

Frequency (Hz)	2.45G	5.2G	5.3G	5.6G	5.785G
Ant. 1 [$10^{(G/20)}$]	$10^{(-2.23/20)}$	$10^{(-0.62/20)}$	$10^{(1.5/20)}$	$10^{(3.41/20)}$	$10^{(3.72/20)}$
Ant. 2 [$10^{(G/20)}$]	$10^{(1.25/20)}$	$10^{(2.51/20)}$	$10^{(1.62/20)}$	$10^{(0.94/20)}$	$10^{(-0.85/20)}$
Ant. 1 [$10^{(G/20)}$] value	0.774	0.931	1.189	1.481	1.535
Ant. 2 [$10^{(G/20)}$] value	1.155	1.335	1.205	1.114	0.907
Sum All Antenna [Amax]	1.928	2.266	2.394	2.595	2.441
DG [$10^{*log(Amax^2/Nant)}$]	2.69	4.1	4.57	5.27	4.74

Note:

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

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



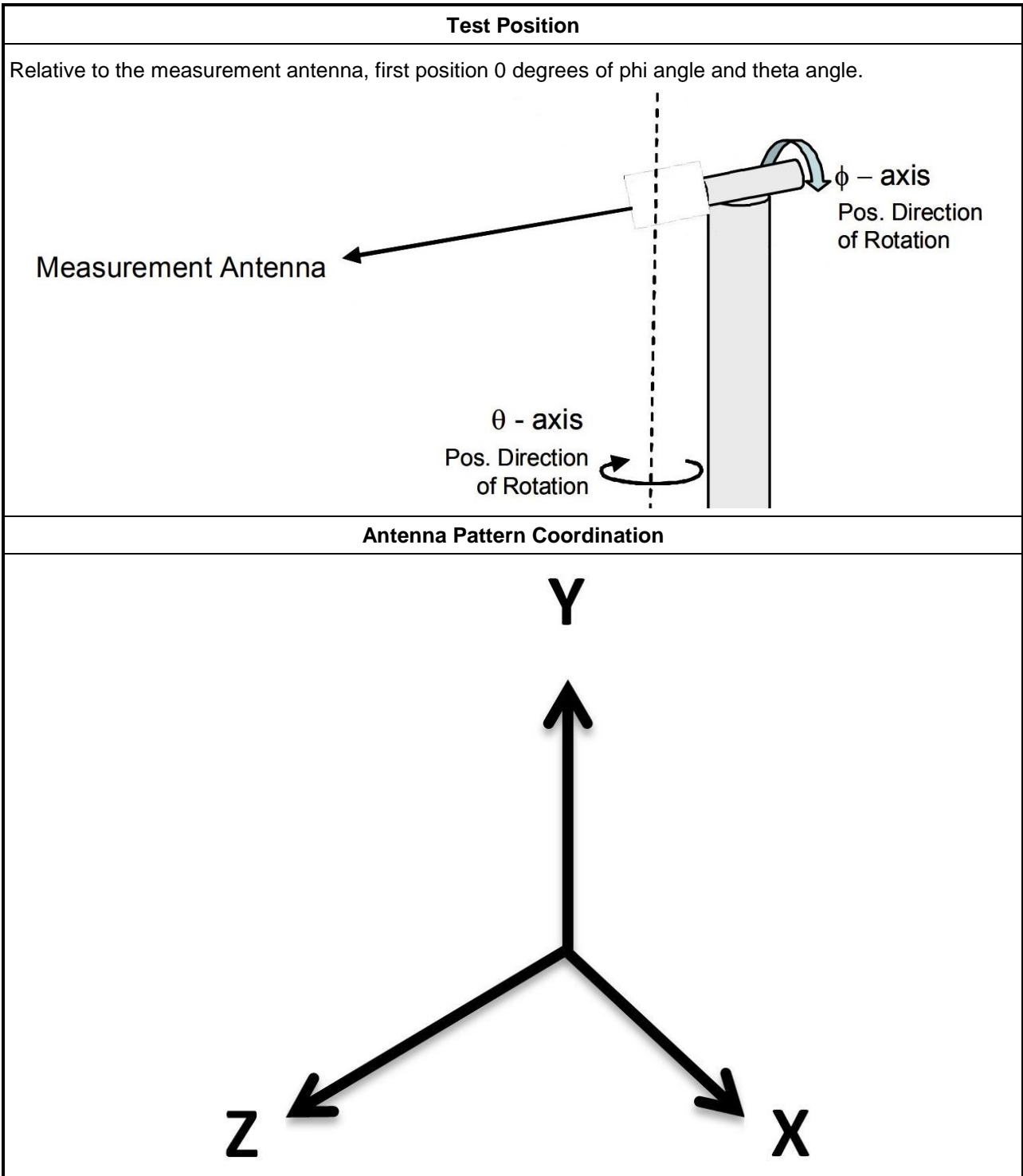
9. Summary of Test Result

Freq(Hz)	2.45G	5.2G	5.3G	5.6G	5.785G
Ant. 1 Max Gain (dBi)	2.35	2.35	2.46	3.44	3.72
Ant. 2 Max Gain (dBi)	2.33	2.51	2.18	3.35	3.43
Ant. 1 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Phi/157.5/315	Theta/82.5/345	Theta/90/345	Theta/90/345	Theta/97.5/255
Ant. 2 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Phi/142.5/150	Theta/97.5/225	Theta/97.5/232.5	Theta/105/307.5	Theta/97.5/75
Max Gain (dBi)	2.35	2.51	2.46	3.44	3.72
DG [1SS] (dBi)	2.69	4.1	4.57	5.27	4.74
DG [2SS] (dBi)	2.35	2.51	2.46	3.44	3.72

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).

10. Test Setup



Note:

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



11. Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA 9120D-1531	1GHz~18GHz	Dec. 20, 2023	Dec. 19, 2024
Dual Polarization Horn Antenna	Sporton	S0209DP	S0209DP-001	2GHz~9GHz	NCR.	NCR..
ENA Series Network Analyzer	AGILENT	E5071C	MY46419477	100kHz~8.5GHz	Jul. 30, 2024	Jul. 29, 2025
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.



12. Test Results

Please refer to the appendix.

Appendix A – Radiated Composite Gain of 2.4GHz/5GHz.....Page 13

Appendix B – Antenna Pattern of 2.4GHz/5GHz.....Page 22

Appendix C – Test Photos..... Page 26

————THE END————



Freq(Hz)	2.45G	5.2G	5.3G	5.6G	5.785G
Ant. 1 Max Gain (dBi)	2.35	2.35	2.46	3.44	3.72
Ant. 2 Max Gain (dBi)	2.33	2.51	2.18	3.35	3.43
Ant. 1 Polarization/ θ (°)/ ϕ (°)	Phi/157.5/315	Theta/82.5/345	Theta/90/345	Theta/90/345	Theta/97.5/255
Ant. 2 Polarization/ θ (°)/ ϕ (°)	Phi/142.5/150	Theta/97.5/225	Theta/97.5/232.5	Theta/105/307.5	Theta/97.5/75
Max Gain (dBi)	2.35	2.51	2.46	3.44	3.72
DG [1SS] (dBi)	2.69	4.1	4.57	5.27	4.74
DG [2SS] (dBi)	2.35	2.51	2.46	3.44	3.72



Radiated Composite Gain Data of 2.4GHz/5GHz

Appendix A

Theta (°)	-3.6/-3.79	-2.18/-0.83	-0.18/-1.46	-4.81/-8.88	-9.04/-10.92	-10.08/-6.71	-6.54/-9.09	-12.92/-10.03	-7.63/-6.35	-8.17/-7.21	-3.51/-1.29	-1.65/-3.34	-3.96/-3.41	-3.03/-3.51	-5.1/-7.8	-14.13/-14.69	-11.77/-7.85	-6.99/-8.17	-12.57/-13.42	-9.38/-7.08	-5.34/-4.63	-5.32/-5.84	-6.06/-6.28	-5.14/-3.89									
Phi (°)	75	82.5	90	97.5	105	112.5	120	127.5	135	142.5	150	157.5	165	172.5	180	187.5	195	202.5	210	217.5	225	232.5	240	247.5									
Phi (°)	7.5	15	22.5	30	37.5	45	52.5	60	67.5	75	82.5	90	97.5	105	112.5	120	127.5	135	142.5	150	157.5	165	172.5	180	187.5	195	202.5	210	217.5	225	232.5	240	247.5
Theta (75°)	-2.1/-1.27	-1.47/-2.29	-4.23/-6.72	-9.08/-6.92	-6.85/-10.58	-13.86/-7.6	-4.35/-5.2	-11.55/-12.18	-7.43/-5.58	-5.83/-5.82	-4.54/-3.73	-3.08/-3.26	-3.62/-2.95	-2.18/-3.87	-5.47/-6.76	-11.49/-14.69	-11.05/-7.37	-7.3/-9.33	-12.03/-13.24	-13.66/-10.15	-6.99/-5.42	-4.83/-5.01	-4.6/-5.17	-4.38/-3.01									
Theta (82.5°)	-2.66/-2.45	-3.92/-6.44	-9.01/-12	-13.52/-14.72	-13.08/-13.39	-13.61/-10.18	-7.71/-7.19	-8.51/-10.47	-11.41/-10.52	-9.11/-7.35	-4.25/-3.46	-4.93/-5.34	-4.59/-3.14	-3.61/-5.09	-7.38/-9.47	-10.21/-14.4	-13.68/-9.76	-9.63/-8.8	-10.54/-13.8	-14.89/-12.82	-9.15/-5.43	-4/-3.5	-2.9/-4.37	-6.17/-3.89									
Theta (90°)	-5.91/-5.81	-5.5/-6.68	-8.11/-9.9	-10.96/-10.55	-9.81/-11.12	-12.95/-10.33	-9.41/-8.33	-7.39/-6.74	-9.09/-10.05	-6.02/-5.02	-6.61/-6.41	-5.13/-4.27	-5.11/-5.6	-5.25/-4.16	-4.42/-7.31	-8.49/-9.77	-9.08/-10.32	-7.84/-7.75	-9.5/-12.45	-12.8/-8.3	-6.58/-6	-4.01/-3.95	-3.68/-5.05	-7.34/-8.3									
Theta (97.5°)	-6.23/-5.08	-4.47/-3.79	-4.07/-4.43	-5.33/-5.88	-8.99/-12.7	-12.83/-8.56	-6.15/-6.84	-6.42/-6.56	-8.3/-9.99	-11.17/-6.79	-5.92/-4.56	-1.27/-1.69	-3.8/-7.33	-6.57/-6.77	-6.89/-8.34	-6.57/-6.9	-8.1/-8.81	-10.32/-8.49	-10.14/-10.61	-9.37/-9.28	-7.74/-5.71	-3.67/-3.99	-5.58/-7.44	-7.74/-8.03									
Theta (105°)	-11.43/-7.6	-4.01/-2.05	-1.25/-0.87	-1.54/-2.59	-4.87/-8.18	-9.42/-7.67	-8.75/-7.06	-4.64/-7.13	-9.41/-9.92	-8.36/-6.39	-7.23/-6.14	-3.43/-2.17	-4.35/-7.11	-12.62/-14.47	-9.17/-8.94	-8.88/-7.32	-9.53/-8.5	-7.03/-8.45	-9.92/-10.35	-12.41/-9.95	-8.12/-5.38	-5.75/-6.44	-8.74/-9.81	-8.85/-10.06									
Theta (112.5°)	-6.19/-5.33	-4.01/-1.64	-0.88/-0.3	-0.3/-2.49	-4.1/-4.57	-4.07/-5.07	-5.44/-5.66	-5.53/-6.3	-7.57/-9.94	-6.45/-6.12	-7.04/-7.07	-4.81/-3.07	-3.41/-5.93	-6.52/-10	-12.03/-9.4	-5.77/-5.92	-8.55/-8.36	-7.18/-9.26	-9.88/-8.97	-9.41/-7.65	-6.64/-7.52	-8.89/-12.03	-15.51/-8.43	-4.49/-3.98									
Theta (120°)	-4.27/-6.48	-4.22/-3.22	-2.71/-1.45	-1.78/-5.14	-6.12/-4.69	-4.86/-4.99	-5.57/-6.05	-8.17/-10.22	-10.27/-10.44	-8.93/-8.56	-7.51/-6.85	-4.49/-7.75	-6.2/-6.17	-1.77/-4.58	-7.82/-9.29	-6.23/-7	-8.9/-8.29	-10.3/-12.78	-10.48/-7.63	-8.51/-9.75	-10/-10.89	-14.59/-14.61	-11.46/-5.17	-3.33/-3.8									
Theta (127.5°)	-5.98/-4.66	-5.42/-6.72	-6.97/-6.73	-4.96/-4.37	-6.41/-7.93	-11.78/-9.57	-4.66/-3.96	-6.31/-11.88	-15.88/-14.24	-11.31/-8.6	-5.49/-4.15	-7.34/-7.27	-15.57/-4.93	-2.63/-2.09	-2.86/-5.26	-6.12/-7.09	-5.98/-8.01	-7.55/-13.38	-8.98/-4.82	-7.77/-10.61	-8.06/-10.99	-8.77/-6.84	-9.3/-15.7	-9.84/-7.68									
Theta (135°)	-7.95/-6.96	-6.54/-8.83	-9.15/-10.21	-8.63/-9.82	-12.8/-14.8	-13.92/-9.94	-7.34/-4.71	-4.6/-6.75	-9.89/-8.03	-8.03/-10.33	-10.75/-8	-5.43/-4.71	-8.86/-14.03	-8.89/-5.68	-2.86/-3.26	-7.59/-6.63	-7.86/-4.53	-5/-7.42	-8.21/-6.72	-7.23/-7.24	-8.13/-12.8	-14.71/-10.48	-5.23/-6.67	-5.21/-4.36									
Theta (142.5°)	-3.89/-2.93	-2.92/-5.48	-4.88/-2.13	-2.44/-4.03	-5.22/-7	-8.16/-7.65	-8.02/-7.29	-7.02/-9.45	-12.83/-8.88	-7.88/-7.83	-5.44/-3.35	-5.11/-6.82	-5.3/-3.17	-3.67/-3.9	-4.86/-8.69	-11.05/-12.12	-11.83/-6.64	-5.6/-5.69	-5.24/-5.08	-5.07/-5.41	-6.62/-5.12	-8.63/-9.73	-10.8/-11.48	-11.14/-5.37									
Theta (150°)	-8.72/-7.68	-8.15/-8.13	-11.75/-12.53	-10.98/-10.46	-11.51/-10.43	-8.91/-8.39	-9.17/-10.68	-12.44/-14.83	-13.03/-11.07	-10.6/-10.57	-12.41/-14.48	-9.22/-6.39	-9.17/-13.1	-11.08/-8.5	-11.15/-13.32	-10.63/-9.21	-7.05/-4.97	-5.62/-8.31	-11.84/-12.57	-10.97/-11.02	-8.66/-4.64	-2.91/-2.6	-3.13/-5.31	-9.48/-11.35									
Theta (157.5°)	-4.52/-4.84	-4.67/-3.74	-3.51/-3.61	-3.86/-4.49	-5.87/-6.63	-6.3/-6.15	-6.41/-6.71	-7.64/-10.44	-13.86/-10.51	-7.78/-5.2	-3.63/-3.56	-4.26/-4.57	4.2/-4.04	-4.09/-5.42	-7.76/-11.19	-14.44/-13.82	-13.5/-13.79	-14.45/-11.76	-8.67/-7.34	-6.36/-4.94	-3.33/-2.57	-2.72/-2.54	-2.08/-3.69	-6.15/-5.11									
Theta (165°)	-1.59/-1.12	-0.77/-0.79	-1.22/-1.8	-2.8/-4.12	-5.4/-6.47	-7.92/-10.1	-12.17/-14	-14.86/-14.75	-14.49/-12.56	-9.69/-7.53	-6.56/-5.89	-5.19/-4.26	-3.46/-2.68	-2.56/-3.22	-3.47/-3.1	-3.79/-5.66	-7.91/-8.82	-9.5/-10.35	-12.35/-12.99	-11.36/-7.54	-5.37/-3.96	-2.92/-2.24	-1.92/-2.21	-2.07/-2.11									
Theta (172.5°)	-5.84/-6.3	-7.18/-7.33	-7.15/-7.21	-7.24/-7.73	-7.76/-8.54	-9.63/-11.25	-12.54/-11.27	-10.84/-10.21	-9.64/-9.03	-7.16/-4.89	-3.61/-3.05	-3.19/-3.66	-3.8/-3.9	-4.01/-4.67	-5.32/-5.69	-6.3/-7.42	-8.78/-10.95	-13.43/-15.41	-15.48/-15.33	-12.99/-10.16	-8.85/-8.58	-8.25/-8.29	-8.11/-6.78	-6.04/-5.79									
Theta (180°)	-12.76/-12.11	-10.3/-9.46	-9.03/-8.51	-8.06/-8.33	-9.45/-10.49	-11.04/-11.75	-12.05/-12.52	-13.29/-13.37	-13.92/-12.15	-10.99/-9.97	-8.37/-7.52	-6.62/-6.61	-6.84/-6.74	-6.91/-7.42	-8.12/-9.3	-9.39/-9.27	-9.71/-10.46	-11.61/-11.47	-11.34/-12.57	-13.35/-13.17	-14.52/-15.06	-13.73/-13.03	-13.08/-12.77	-13.04/-14.99									
Phi (75°)	5.785/5.785	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 (0°)	-9.3/-7.7	-4.97/-3.17	-1.83/-0.76	0.31/1.3	2.11/2.59	2.95/2.88	2.84/2.69	2.47/2.19	1.66/0.75	-0.33/-1.59	-3.41/-5.41	-7.73/-9.8	-10.09/-7.78	-5.39/-3.35	-2.03/-0.87	0.36/1.48	2.16/2.46	2.62/3	2.62/2.56	2.36/2.08	1.34/0.34	-0.61/-1.98	-3.41/-4.78	-6.83/-8.75									
Phi (7.5°)	-9.25/-7.52	-4.91/-3.07	-1.94/-1.29	-0.94/-0.15	0.74/1.61	2.06/2.55	2.64/2.61	2.41/2.37	2.03/1.31	0.16/-1.42	-3.6/-5.8	-8.52/-11.81	-12.33/-8.38	-5.35/-3.21	-1.99/-0.77	0.15/0.99	1.43/1.91	2.08/1.98	2.03/1.87	1.26/0.71	-0.11/-1.29	-2.7/-4.47	-6.55/-7.9	-8.84/-9.25									
Phi (15°)	-6.94/-5.84	-4.93/-3.89	-2.75/-1.67	-0.81/-0.38	-0.03/0.41	0.99/1.32	1.46/1.63	1.39/1.1	0.50/0.15	-0.84/-2.34	-4.5/-7.16	-11.84/-15.69	-15.34/-9.77	-6.64/-4.17	-3.03/-1.79	-1.07/-0.14	0.39/0.66	0.71/0.91	0.77/0.53	-0.03/-1.09	-4.76/-5.37	-5.67/-6.54	-7.65/-7.93										
Phi (22.5°)	-4.71/-5.01	-4.36/-3.08	-2.29/-0.89	0.26/0.67	1.07/1.16	0.95/0.73	0.59/0.73	0.62/0.55	0.49/-0.02	-1.38/-3.69	-7.64/-14.04	-14.69/-11.19	-8.56/-6.7	-5.3/-4.44	-3.33/-2.51	-1.13/-0.29	0.01/0.11	-0.26/-0.56	-0.81/-1.2	-1.48/-1.69	-2.13/-2.59	-2.42/-2.68	-3.1/-3.68	-4.32/-4.42									
Phi (30°)	-4.92/-4.08	-2.35/-0.86	0.33/1.1	1.1/0.6	0.45/0.61	0.97/1.02	0.53/-0.18	-0.88/-1.16	-1.61/-1.66	-3.06/-5.52	-7.96/-8.48	-6.1/-4.35	-4.15/-3.96	-3.78/-4.17	-5.33/-5.79	-4.91/-3.32	-2.17/-1.31	-0.96/-0.87	-1.13/-1.52	-2.31/-3.16	-3.43/-3.2	-2.71/-2.22	-1.78/-1.74	-2.73/-3.74									
Phi (37.5°)	-4.73/-2.32	-0.68/-0.12	-0.5/-1.08	-1.26/-1.31	-1.61/-1.81	-2.03/-1.94	-3.44/-6.55	-10.16/-8.35	-6.46/-5.81	-6.69/-6.64	-6.01/-3.61	-2.19/-2	-2.21/-3.56	-4.79/-4.76	-3.65/-2.61	-2.01/-1.94	-2.85/-3.5	-3.79/-4.65	-6.24/-7.27	-7.82/-4.98	-3.5/-2.51	-1.57/-1.03	-1.62/-2.99	-4.71/-6									
Phi (45°)	-1.59/-1.07	-1.13/-0.62	0.06/0.51	0.2/-0.87	-2.29/-3.78	-4.71/-4.81	-4.71/-5.32	-6.03/-7.86	-6.97/-4.14	-3.42/-2.72	-2.79/-0.91	-0.54/-1.09	-1.73/-2.24	-2.44/-2.46	-3.37/-4.91	-4.63/-4.27	-4.65/-5.2	-7.72/-6.71	-5.8/-7.01	-7.46/-8.41	-7.31/-6.81	-5.82/-4.36	-2.89/-2.36	-2.25/-2.45									
Phi (52.5°)	0.64/1.07	1.28/0.98	0.83/0.48	0.29/-1.14	-3.05/-5.51	-5.92/-2.71	-0.91/-1.19	-2.8/-5.09	-7.79/-9.44	-8.67/-6.01	-3.16/-1.3	-1.71/-1.3	-0.50/0.52	0.61/-0.97	-3.95/-5.6	-3.62/-1.98	-1.35/-2.23	-3.34/-3.91	-3.39/-3.62	-4.63/-5.22	-6.91/-6.37	-4.61/-3.37	-1.95/-0.74	0.13/0.46									
Phi (60°)	0.90/0.98	1.21/0.88	0.34/0.96	-1.08/-1.05	-2.55/-6.21	-6.33/-1.44	0.82/1.46	1.04/0.34	-1.51/-4.69	-8.31/-5.83	-3.22/-1.67	-0.9/-0.03	1.01/1.81	0.77/1.61	-3.52/-3.8	-0.66/-0.53	-0.88/-1.43	-2.81/-3.4	-2.28/-1.22	-1.84/-1.97	-1.67/-1.18	-0.39/0.09	0.77/1.2										
Phi (67.5°)	1.02/1.75	1.51/-0.18	-1.59/-1.35	-1.23/-0.86	-1.22/-1.95	-2.52/-2.4	-0.06/1.5	1.65/1.2	-0.02/-2.58	-4.85/-3	-1.24/-1.1	-1.42/-0.98	0.91/0.3	-0.2/-1.63	-2.57/-2.85	-2.1/-2.56	-1.49/-1.06	-1.58/-3.22	-3.98/-3.91	-2.72/-1.43	-2.15/-2.11	-1.72/-0.17	0.66/0.3	-0.20/0.85									
Phi (75°)	1.82/2.74	1.24/-0.04	-2.45/-0.98	-0.96/0.58	1.81/1.92	1.57/1.18	2.04/2.27	1.29/0.57	-0.3/-1.05	-1.54/-0.25	0.11/-0.82	-0.56/-0.41	1.57/2.22	2.36/0.05	-1.83/-2.87	-3.16/-1.54	-0.73/-2.55	-1.83/-0.28	-0.99/-2.59	-2.57/-0.98	-1.07/-2.53	-0.22/0.54	1.72/1.15	0.27/2.14									
Phi (82.5°)	1.93/2.86	0.82/-1.14	-3.13/-2.92	-3.05/-1.15	0.91/1.44	0.88/1.32	3.24/4.18	3.83/3.47	2.64/1.33	0.22/0.17	1.07/0.1	-0.58/0.93	1.57/2.82	2.24/0.79	-1.16/-2.41	-3.10/0.4	0.64/1.16	1.58/0.05	0.27/0.48	0.43/-1.04	1.51/2.19	1.75/0.81	1.25/1.1										
Phi (90°)	2.33/2.9	2.52/1.1	-1.41/-3.07	-4.69/-1.9	0.99/2.33	1.59/-0.17	0.17/2.14	3/2.76	2.49/1.58	0.64/-0.67	-1.97/-2.59	-2.92/-1.22	-0.62/2.05	2.51/0.91	-0.41/-1.53	-2.33/0.73	0.45/1.66	2.19/2.62	1.71/1.83	1.91/1.84	1.36/1.17	2.13/1.89	0.75/0.75	0.85/2.28									
Phi (97.5°)	2.56/3.6	2.46/1.1	-0.43/0.58	0.36/2.3	3.16/3.32	2.87/2.43	2.62/2.64	1.90/8.88	1.42/7.5	3.06/2.47	1.19/-1.94	-0.74/-0.45	0.97/2.15	1.36/0.21	-1.58/-0.84	-0.41/2.37	2.89/3.73	4.74/4.58	4.63/9.2	3.78/1.82	1.12/2.26												



Radiated Composite Gain Data of 2.4GHz/5GHz

Appendix A

Theta (°)	0.990/76	-0.11/-1.37	-2.84/-3.89	-5.46/-8.08	-10.81/-13.34	-15.11/-15.52	-13.28/-11.89	-9.64/-7.2	-4.53/-2.52	-1.08/-0.58	-0.050/45	0.841/5	1.380/78	-0.19/-1.57	-3/4.5	-6.8/-10.15	-17.72/-18.08	-14.34/-9.7	-7.36/-4.87	-3.28/-1.92	-1.27/-1.39	-1.49/-1.16	-0.57/-0.52	0.130/83
Theta (30°)	-0.2/-0.32	-0.59/-1.37	-3.09/-4.69	-6.95/-9.91	-13.25/-16.32	-17.24/-16.65	-14.9/-11.34	-7.87/-5.59	-3.61/-2.16	-0.92/-0.13	0.35/1.04	1.37/1.31	1.140/88	0.3/-0.55	-2.02/-3.69	-5.96/-8.93	-13.8/-18.3	-17.72/-10.95	-6.81/-4.07	-3.32/-2.52	-2.13/-2.57	-3.33/-3.21	-2.25/-1.55	-1.17/-0.42
Theta (45°)	-0.30/-0.43	-0.41/-1.55	-3.84/-6.45	-10.45/-17.27	-18.28/-18.47	-18.21/-14.3	-14.72/-11.34	-9.01/-6.18	-3.69/-2.46	-1.88/-2.27	-2.48/-1.98	-1.81/-1.45	-1.52/-0.79	-0.64/-0.86	-1.16/-2.58	-5.2/-8.59	-12.22/-17.06	-17.56/-18.09	-11.81/-6.35	-2.95/-1.12	-2.40/-0.02	-0.62/-1.12	-1.81/-1.6	-1.25/-0.2
Theta (60°)	-0.30/-0.52	-1.13/-2.77	-3.6/-5.25	-9.09/-17.24	-18.97/-13.37	-10.49/-11.17	-12.74/-15.34	-14.65/-11.86	-9.63/-9.19	-10.32/-15.51	-17.97/-7.33	-5.22/-4.21	-2.66/-2.53	-2.5/-2.46	-3.94/-6.03	-9.35/-13.01	-12.33/-12.81	-14.03/-18.17	-15.27/-8.34	-4.55/-3.41	-2.78/-2.86	-3.89/-4.54	-4.59/-4.1	-1.2/-0.91
Theta (75°)	-0.81/-0.8	-1.07/-2.76	-4.81/-8.2	-11.09/-16.54	-18.16/-13.32	-10.02/-9.45	-10.94/-15.3	-18.39/-18.96	-13.41/-11.75	-13.53/-12.97	-7.84/-6.04	-5.45/-5.39	-5.84/-7.8	-3.98/-3.9	-3.95/-5.13	-8.93/-17.26	-18.1/-12.2	-14.19/-17.17	-14.38/-10.77	-7.96/-5.77	-4.15/-3.66	-4.25/-5.6	-9.17/-3.9	-4.21/-12.9
Theta (90°)	-2.43/-3.15	-2.95/-3.34	-4.06/-6.74	-11.39/-18.26	-17.72/-16.01	-12.14/-11.06	-12.99/-17.39	-17.71/-14.33	-10.41/-7.96	-6.33/-6.28	-5.6/-5.26	-4.96/-4.9	-3.64/-2.93	-2.96/-3.81	-5.53/-7.27	-10.72/-18.41	-15.51/-13.1	-12.87/-18.86	-16.71/-14.43	-10.41/-7.82	-5.2/-4.11	-4.98/-6.55	-7.71/-5.74	-3.55/-2.27
Theta (105°)	-7.91/-6.63	-9.69/-9.04	-7.62/-7.68	-11.48/-16.59	-15.69/-13.24	-13.56/-15.69	-18.19/-16.6	-14.81/-15.69	-17.29/-15.18	-8.86/-5.12	-2.23/-1.92	-2.52/-2.52	-3.69/-4.12	-5.11/-4.99	-4.9/-6.18	-10.61/-12.87	-13.14/-10.99	-13.53/-17.61	-19.78/-11.02	-9.98/-7.77	-8.37/-6.24	-5.98/-5.74	-6.63/-7.46	-10.29/-9.33
Theta (120°)	-10.01/-12.74	-16.54/-18.85	-14.32/-9.87	-9.58/-9.23	-8.28/-8.08	-9.03/-12.36	-13.74/-12.23	-11.61/-10.88	-12.45/-9.77	-2.99/-2.07	-2.73/-4.27	-5.15/-5.34	-4.42/-3.97	-4.92/-4.47	-5.28/-6.63	-12.18/-11.36	-10.81/-11.49	-15.9/-17.72	-14.44/-13.08	-12.64/-12.03	-9.06/-6.78	-5.85/-6.33	-6.11/-6.98	-8.37/-10.01
Theta (135°)	-6.33/-7.61	-10.96/-15.09	-11.25/-8.68	-9.23/-11.39	-14.26/-12.68	-8.97/-6.4	-6.24/-7.66	-10.01/-12.79	-14.06/-10.23	-6.06/-3.8	-2.88/-3.43	-3.18/-3.95	-3.87/-4.81	-5.16/-5.53	-5.66/-7.1	-8.88/-12.17	-11.99/-11.1	-14.83/-18.77	-15.35/-12.43	-13.14/-14.92	-11.12/-8.13	-6.41/-6.04	-6.81/-8.02	-7.47/-7.33
Theta (150°)	-11.42/-9.27	-8.6/-7.91	-6.72/-5.7	-7.63/-12.41	-15.26/-10.47	-7.5/-8.56	-12.24/-13.38	-13.94/-10.75	-5.3/-8.4	-3.67/-5.65	-6.9/-6.82	-7.15/-5.44	-4.62/-5.58	-9.88/-9.7	-13.12/-13.23	-15.7/-17.03	-19.2/-17.78	-19.09/-16.62	-16.24/-12.06	-11.19/-12.05	-11.19/-12.05	-14.61/-14.02	-14.5/-12.2	-11.25/-11.66
Theta (165°)	-11.98/-10.05	-7.98/-5.44	-4.6/-4.07	-4.95/-9.3	-15.26/-8.12	-6.28/-6.12	-7.68/-10.38	-13.15/-15.29	-17.87/-15.94	-10.13/-6.65	-3.95/-4.4	-3.94/-4.27	-4.78/-6	-7.45/-8.62	-11.13/-9.1	-13.12/-11.57	-12.11/-17.96	-14.48/-12.61	-13.62/-18.78	-15.51/-14.96	-11.66/-18.41	-14.61/-19.41	-14.35/-9.72	-10.36/-10.6
Theta (180°)	-18.04/-13.53	-11.97/-9.2	-4.87/-3.89	-3.55/-4.8	-5.68/-5.63	-7.1/-9.49	-12.27/-12.2	-10.53/-9.52	-11.22/-9.7	-9.02/-8.23	-9.28/-9.76	-7.06/-5.92	-5.27/-8.64	-13.21/-15.07	-11.45/-13.69	-9.75/-9.71	-12.58/-17.87	-11.59/-11.85	-13.17/-17.73	-17.21/-15.31	-17.98/-18.17	-11.62/-9.83	-12.51/-15.72	-17.97/-18.91
Theta (202.5°)	-11.64/-12.42	-15.21/-17.54	-12.82/-8.25	-7.14/-5.96	-5.69/-5.65	-6.25/-9.18	-17.41/-19.06	-17.43/-14.68	-15.74/-16.71	-19.11/-13.65	-19.11/-13.65	-10.1/-11.74	-7.06/-12.21	-9.36/-7.12	-8.14/-10.15	-18.34/-11.65	-7.22/-9.87	-13.23/-18.44	-13.61/-15.13	-13.55/-16.77	-12.63/-19.17	-16.77/-9.56	-8.49/-10.2	-8.49/-10.2
Theta (225°)	-10.148/79	-10.52/-12.48	-15.11/-18.05	-10.8/33	-8.04/-8.69	-8.77/-7.2	-6.04/-7.4	-13.65/-18.25	-18.19/-14.63	-12.02/-11.12	-11.17/-9.98	-7.55/-5.51	-7.43/-4.24	-2.83/-4.7	-9.84/-8.52	-10.82/-16.62	-12.45/-14.05	-18.06/-16.63	-14.12/-10.06	-15.19/-18.29	-15.38/-8.57	-9.06/-15.38	-17.13/-10.15	
Theta (247.5°)	-4.51/-3.88	-2.87/-5.63	-9.21/-9.63	-10.8/-12.59	-15.62/-16.14	-12.97/-11.73	-11.51/-10.95	-10.88/-12.26	-15.23/-14.25	-14.59/-17.84	-18.35/-14.39	-18.64/-17.9	-18.31/-8.15	-8.13/-8.95	-6.71/-8.8	-15/-19.29	-18.24/-16.2	-13.36/-13.38	-15.54/-10.88	-9.69/-7.75	-6.36/-8.57	-13.34/-15.72	-10.24/-9.32	-9.35/-4.96
Theta (270°)	-9.53/-10.75	-8.6/-6.3	-8.11/-11.23	-10.77/-9.33	-8.2/-5.2	-8.42/-11.45	-17.06/-13.43	-19.01/-17.3	-13.75/-26.2	-6.68/-5.91	-5.47/-7.08	-12.29/-11.45	-11.75/-5.85	-5.31/-4.54	-7.46/-11.99	-9.24/-12.53	-17.89/-15.45	-14.51/-17.95	-13.88/-9.99	-7.37/-6.04	-4.24/-3.06	-3.75/-4.04	-4.48/-12.2	-13.71/-1.55
Theta (300°)	-15.22/-17.1	-18.24/-17.3	-19.12/-19.03	-18.1/-17.73	-17.72/-15.71	-15.09/-13.85	-13.31/-13.45	-15.24/-16.35	-16.34/-15.66	-13.91/-15.24	-19.05/-16.48	-13.11/-12.08	-8.12/-10.3	-8.13/-6.27	-8.02/-11.6	-12.12/-10.7	-10.81/-14.67	-15.86/-17.52	-15.12/-11.49	-8.62/-7.23	-3.92/-9.01	-7.09/-6.98	-7.32/-9.71	-15.38/-19.05
Theta (322.5°)	-2.68/-2.63	-2.25/-2.76	-3.18/-3.68	-4.47/-5.38	-6.18/-7.17	-8.29/-9.28	-10.41/-11.42	-12.64/-14.55	-18.34/-18.16	-14.56/-12.3	-11.71/-10.29	-7.24/-6.23	-5.14/-5.51	-7.65/-9.6	-9.43/-8.98	-10/-13.91	-17.97/-19.31	-18.63/-13.96	-9.51/-7.07	-5.92/-4.98	-3.52/-2.53	-2.33/-2.49	-2.64/-2.53	
Theta (345°)	-3.63/-3.15	-3.17/-3.65	-3.87/-3.75	-4.06/-4.94	-6.14/-7.73	-8.71/-11.73	-14.1/-15.57	-16.94/-17.21	-17.54/-17.47	-15.35/-12.39	-10.91/-10.61	-11.27/-10.62	-10.62/-10.5	-11.11/-13.06	-15.38/-14.94	-14.26/-16.02	-17.71/-15.09	-18.29/-17.71	-18.44/-18.75	-17.33/-18.81	-19.34/-17.51	-17.75/-12.76	-9.03/-9.61	-5.62/-5.14
Theta (360°)	-6.22/-6.06	-6.27/-6.39	-6.4/-6.84	-7.21/-7.85	-10.53/-12.33	-12.33/-14.41	-16.86/-18.78	-19.12/-18.46	-16.97/-15.91	-15.1/-13.57	-12.36/-11.89	-12.24/-12.77	-13.36/-13.96	-15.09/-16.43	-17.33/-17.85	-17.71/-16.87	-15.77/-15.09	-14.84/-15.59	-17.08/-17.51	-18.62/-19.14	-17.85/-16.2	-13.58/-11.14	-9.13/-7.44	-7.15/-6.17
Theta (382.5°)	-15.68/-14.52	-13.53/-11.07	-9.46/-8.48	-8.49/-8.82	-9.05/-9.04	-10.21/-10.45	-11.44/-12.23	-12.63/-13.7	-15.35/-17.39	-18.53/-18.49	-18.33/-18.3	-17.61/-15.97	-14.31/-12.62	-11.61/-11.68	-11.01/-10.52	-10.27/-10.05	-9.74/-9.52	-10.21/-11.01	-12.23/-13.32	-15.65/-17.37	-18.51/-17.93	-19.29/-18.63	-18.03/-17.65	
Theta (405°)	5.63/Pol	Theta/Ant. 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°)	-16.53/-11.75	-8.69/-6.61	-4.71/-3.4	-2.45/-1.5	-0.74/-0.21	0.180/49	0.380/21	-0.19/-0.74	-1.62/-2.67	-3.49/-4.85	-6.79/-9.31	-11.63/-15.67	-16.89/-12.89	-22.62/-6.73	-4.93/-5.33	-2.11/-1.03	-0.36/-0.22	0.270/49	0.320/17	-0.18/-0.57	-1.27/-2.5	-4.17/-6.46	-9.12/-12.8	-18.69/-18.12
Theta (7.5°)	-11.76/-10.15	-8.33/-6.48	-4.63/-3.32	-2.24/-1.46	-0.93/-0.38	-0.070	-0.220/29	-0.57/-0.75	-1.53/-2.11	-3.43/-5.39	-8.29/-11.88	-17.66/-17.61	-17.3/-12.32	-8.67/-6.21	-4.74/-2.88	-1.77/-1.07	-0.53/-0.14	-0.090/15	0.210/19	-0.15/-0.95	-1.42/-2.35	-3.79/-5.53	-7.9/-10.04	-12.18/-12.22
Theta (15°)	-8.65/-8.3	-7.01/-5.44	-3.74/-2.55	-2.08/-1.99	-1.94/-2.03	-2.47/-2.86	-3.1/-3.02	-3.41/-3.86	-4.28/-4.88	-5.28/-6.3	-7.8/-8.8	-10.86/-14.79	-17.33/-12.06	-18.15/-5.45	-4.19/-2.59	-1.03/-0.99	-1.02/-1.23	-1.51/-1.38	-1.57/-1.41	-1.72/-1.6	-2.92/-3.64	-4.19/-4.52	-5.54/-6.9	-8.39/-8.97
Theta (22.5°)	-7.68/-6.95	-5.51/-3.91	-2.62/-1.73	-1.6/-2.19	-2.85/-3.82	-5.83/-7.23	-7.71/-7.23	-6.28/-5.36	-4.71/-4.3	-4.48/-5.64	-6.98/-8.73	-10.91/-8.88	-13.53/-9.83	-6.31/-4.48	-3.21/-2.19	-1.07/-0.33	-0.39/-1.13	-1.75/-2.12	-3.24/-2.73	-3.54/-7.3	-5.17/-5.03	-6.09/-6.17	-6.72/-7.2	
Theta (30°)	-4.73/-4.23	-3.31/-2.77	-2.21/-1.61	-1.24/-1.45	-2.15/-3.1	-4.76/-5.17	-5.39/-5.29	-4.91/-4.55	-4.38/-4.83	-5.29/-6.35	-7.88/-9.91	-10.69/-12.83	-12.85/-11.22	-9.11/-7.21	-5.53/-3.21	-1.82/-1.04	-0.550/33	0.520/13	-0.61/-1.46	-2.73/-3.58	-4.58/-6.13	-7.52/-6.81	-5.3/-4.39	-4.05/-4.29
Theta (37.5°)	-3.72/-3.99	-3.49/-2.89	-2.85/-2.06	-1.35/-1.93	-3.8/-6.26	-7.66/-8.1	-7.84/-6.54	-4.72/-3.64	-3.42/-4.29	-5.96/-9.3	-10.33/-9.71	-8.92/-7.32	-7.07/-7.17	-6.25/-4.42	-4.12/-3.1	-2.33/-0.98	0.401/81	-0.31/-2.04	-3.55/-4.12	-3.96/-4.64	-5.99/-6.16	-6.61/-6.35	-5.87/-5.47	-4.27/-2.99
Theta (45°)	-2.72/-2.88	-2.63/-1.73	-1.47/-0.92	-0.79/-1.21	-2.36/-5.06	-7.84/-10.01	-8.59/-6.47	-4.87/-4.26	-4.53/-5.28	-6.11/-7.58	-7.01/-6.07	-6.13/-6.61	-7.18/-8.15	-8.76/-9.32	-8.35/-5.1	-2.86/-2.5	-2.58/-2.72	-4.21/-3.1	-5.02/-4.81	-5.91/-6.08	-6.86/-6.84	-5.11/-5.51	-4.67/-5.28	-3.21/-2.88
Theta (52.5°)	-2.27/-2.49	-2.17/-1.32	-1.41/-1.29	-1.56/-3.73	-6.22/-9	-10.31/-7.42	-5.67/-4.51	-4.28/-4.68	-5.53/-6.74	-6.35/-6.74	-5.37/-4.74	-5.38/-5.82	-7.16/-9.98	-11.77/-11.93	-8.93/-6.23	-5.37/-3.94	-2.49/-2.86	-2.84/-2.71	-4.92/-4.64	-4.98/-5.68	-4.71/-4.36	-4.82/-4.04	-2.58/-2.16	-2.21/-2.16
Theta (60°)	-1.87/-3.03	-3.57/-3.24	-1.51/-1.74	-0.27/-1.85	-5.86/-3.96	-3.63/-3.86	-3.67/-3.8	-5.27/-3.13	-7.98/-9.8	-7.15/-7.47	-7.78/-8.5	-12.35/-11.99	-12.63/-11.93											



Radiated Composite Gain Data of 2.4GHz/5GHz

Appendix A

Theta (°)	Phi (°)	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 (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 (7.5°)	Phi (7.5°)	-6.48/-8.5	-8.04/-6.73	-5.11/-5.41	-8.16/-12.62	-14.65/-15.28	-13.71/-11.12	-10.47/-11.44	-18.75/-14.75	-9.53/-7.4	-7.99/-11.43	-10.11/-5.48	-4.21/-5.47	-6.88/-7.21	-7.44/-7.21	-8.04/-11.57	-19.54/-18.23	-15.67/-11.36	-10.32/-11.21	-14.89/-15.89	-12.67/-9.45	-6.29/-13.3	-4.68/-4.4	-5.82/-6.95	-6.48/-5.5	-8.04/-6.73	-5.11/-5.41	-8.16/-12.62	-14.65/-15.28	-13.71/-11.12	-10.47/-11.44	-18.75/-14.75	-9.53/-7.4	-7.99/-11.43	-10.11/-5.48	-4.21/-5.47	-6.88/-7.21	-7.44/-7.21	-8.04/-11.57	-19.54/-18.23	-15.67/-11.36	-10.32/-11.21	-14.89/-15.89	-12.67/-9.45	-6.29/-13.3	-4.68/-4.4	-5.82/-6.95	-6.48/-5.5	
Theta (7.5°)	Phi (15°)	-5.4/-9.2	-6.06/-6.45	-7.32/-7.7	-8.59/-8.89	-9.81/-11.78	-16.41/-13.85	-9.38/-9.3	-15.93/-12.6	-8.14/-9.3	-4.29/-4.98	-5.82/-5.45	-3.49/-3.49	-4.77/-5	-4.52/-6.6	-7.21/-7.56	-13.58/-18.07	-11.59/-9.21	-8.88/-10.66	-12.31/-15.37	-16.68/-10.09	-6.48/-4.64	-4.57/-5.12	-5.71/-6.4	-6.59/-5.2	-8.04/-6.73	-5.11/-5.41	-8.16/-12.62	-14.65/-15.28	-13.71/-11.12	-10.47/-11.44	-18.75/-14.75	-9.53/-7.4	-7.99/-11.43	-10.11/-5.48	-4.21/-5.47	-6.88/-7.21	-7.44/-7.21	-8.04/-11.57	-19.54/-18.23	-15.67/-11.36	-10.32/-11.21	-14.89/-15.89	-12.67/-9.45	-6.29/-13.3	-4.68/-4.4	-5.82/-6.95	-6.48/-5.5	
Theta (7.5°)	Phi (22.5°)	-5.49/-5.27	-7.27/-9.19	-10.77/-12.79	-15.53/-17.19	-17.37/-18.7	-18.43/-17.03	-14.31/-14.92	-18.14/-16.71	-11.91/-10.62	-8.86/-6.17	-4.27/-3.16	-3.57/-3.62	-5.4/-6.26	-8.24/-8.83	-10.11/-10.3	-13.79/-18.07	-19.13/-12.05	-11.06/-11.29	-17.48/-19.03	-18.22/-14.42	-9.22/-5.39	-4.65/-5.49	-6.03/-6.42	-7.99/-5.9	-8.04/-6.73	-5.11/-5.41	-8.16/-12.62	-14.65/-15.28	-13.71/-11.12	-10.47/-11.44	-18.75/-14.75	-9.53/-7.4	-7.99/-11.43	-10.11/-5.48	-4.21/-5.47	-6.88/-7.21	-7.44/-7.21	-8.04/-11.57	-19.54/-18.23	-15.67/-11.36	-10.32/-11.21	-14.89/-15.89	-12.67/-9.45	-6.29/-13.3	-4.68/-4.4	-5.82/-6.95	-6.48/-5.5	
Theta (7.5°)	Phi (30°)	-10.54/-10.66	-7.29/-8.84	-10.77/-14.64	-17.48/-15.41	-10.62/-12.08	-18.36/-18.88	-18.96/-13.56	-12.81/-12.72	-11.61/-10	-5.88/-4.42	-5.31/-5.16	-4.95/-3.85	-3.95/-4.36	-7.33/-6.63	-7.57/-9.3	-12.71/-14.78	-14.91/-17.32	-16.92/-14.49	-15.05/-17.05	-13.92/-12.41	-10.16/-8.04	-6.22/-6.13	-5.79/-6.39	-10.96/-13.57	-8.04/-6.73	-5.11/-5.41	-8.16/-12.62	-14.65/-15.28	-13.71/-11.12	-10.47/-11.44	-18.75/-14.75	-9.53/-7.4	-7.99/-11.43	-10.11/-5.48	-4.21/-5.47	-6.88/-7.21	-7.44/-7.21	-8.04/-11.57	-19.54/-18.23	-15.67/-11.36	-10.32/-11.21	-14.89/-15.89	-12.67/-9.45	-6.29/-13.3	-4.68/-4.4	-5.82/-6.95	-6.48/-5.5	
Theta (7.5°)	Phi (37.5°)	-10.07/-9.46	-7.74/-8.24	-8.8/-9.73	-9.83/-8.33	-8.88/-14.02	-17.91/-13.47	-9.17/-9.01	-9.5/-1.97	-13.04/-13.76	-13.02/-7.88	-5.05/-3.69	-2.12/-2.09	-2.5/-6.74	-8.24/-11.23	-9.81/-11.46	-10.44/-13.37	-15.67/-18.27	-18.64/-14.9	-16.86/-14.78	-12.66/-12.01	-9.77/-8.72	-7.64/-7.97	-8.41/-7.74	-10.11/-10.3	-8.04/-6.73	-5.11/-5.41	-8.16/-12.62	-14.65/-15.28	-13.71/-11.12	-10.47/-11.44	-18.75/-14.75	-9.53/-7.4	-7.99/-11.43	-10.11/-5.48	-4.21/-5.47	-6.88/-7.21	-7.44/-7.21	-8.04/-11.57	-19.54/-18.23	-15.67/-11.36	-10.32/-11.21	-14.89/-15.89	-12.67/-9.45	-6.29/-13.3	-4.68/-4.4	-5.82/-6.95	-6.48/-5.5	
Theta (7.5°)	Phi (45°)	-17.98/-11.39	-7.3/-5.24	-5.02/-9.24	-2.75/-3.1	-6.26/-8.91	-8.97/-10.41	-9.17/-10.41	-17.53/-15.34	-14.14/-9.36	-7.23/-6	-3.96/-3.24	-5.55/-8.14	-13.45/-16.46	-15.61/-11.85	-10.99/-14.31	-17.97/-17.61	-19.11/-11.71	-15.17/-16.63	-18.51/-12.51	-11.73/-10.85	-11.73/-10.85	-11.73/-10.85	-11.73/-10.85	-11.73/-10.85	-11.73/-10.85	-8.04/-6.73	-5.11/-5.41	-8.16/-12.62	-14.65/-15.28	-13.71/-11.12	-10.47/-11.44	-18.75/-14.75	-9.53/-7.4	-7.99/-11.43	-10.11/-5.48	-4.21/-5.47	-6.88/-7.21	-7.44/-7.21	-8.04/-11.57	-19.54/-18.23	-15.67/-11.36	-10.32/-11.21	-14.89/-15.89	-12.67/-9.45	-6.29/-13.3	-4.68/-4.4	-5.82/-6.95	-6.48/-5.5
Theta (7.5°)	Phi (52.5°)	-15.31/-11.25	-7.82/-3.45	-2.93/-1.31	-1.37/-1.78	-3.21/-4.12	-3.11/-3.39	-5.27/-6.77	-7.91/-8.25	-9.13/-11.93	-9.04/-9.85	-7.82/-5.8	-4.56/-3.78	-4.03/-7.67	-7.5/-12.83	-12.83/-11.29	-7.5/-9.23	-15.44/-13.7	-14.75/-16.04	-18.92/-13.94	-9.01/-9.72	-10.41/-11.01	-16.16/-15.37	-17.99/-10.57	-9.78/-10.53	-8.04/-6.73	-5.11/-5.41	-8.16/-12.62	-14.65/-15.28	-13.71/-11.12	-10.47/-11.44	-18.75/-14.75	-9.53/-7.4	-7.99/-11.43	-10.11/-5.48	-4.21/-5.47	-6.88/-7.21	-7.44/-7.21	-8.04/-11.57	-19.54/-18.23	-15.67/-11.36	-10.32/-11.21	-14.89/-15.89	-12.67/-9.45	-6.29/-13.3	-4.68/-4.4	-5.82/-6.95	-6.48/-5.5	
Theta (7.5°)	Phi (60°)	-8.17/-14.61	-10.05/-6.45	-4.18/-3.2	-2.49/-5.74	-6.56/-6.06	-4.63/-3.27	-4.21/-6.95	-9.28/-9.97	-10.09/-11.58	-10.98/-13.11	-12.33/-11.43	-5.01/-6.82	-7.51/-12.37	-5.42/-12.52	-14.14/-13.3	-8.23/-7.49	-9.58/-11.13	-13.76/-18.3	-12.75/-8.68	-8.39/-12.35	-10.06/-11.01	-19.34/-17.97	-11.66/-6.16	-11.73/-10.85	-11.73/-10.85	-8.04/-6.73	-5.11/-5.41	-8.16/-12.62	-14.65/-15.28	-13.71/-11.12	-10.47/-11.44	-18.75/-14.75	-9.53/-7.4	-7.99/-11.43	-10.11/-5.48	-4.21/-5.47	-6.88/-7.21	-7.44/-7.21	-8.04/-11.57	-19.54/-18.23	-15.67/-11.36	-10.32/-11.21	-14.89/-15.89	-12.67/-9.45	-6.29/-13.3	-4.68/-4.4	-5.82/-6.95	-6.48/-5.5
Theta (7.5°)	Phi (67.5°)	-11.72/-14.28	-17.61/-18.7	-9.84/-8.44	-6.64/-4.12	-5.23/-8.1	-12.45/-10.99	-8.23/-7.43	-8.14/-12.09	-18.82/-17.46	-11.96/-10.15	-10.92/-11.89	-16.75/-8.8	-18.9/-5.18	-5.15/-4.26	-6.67/-8.02	-9.97/-9.7	-14.33/-11.27	-10.31/-15.07	-9.14/-7.27	-7.06/-10.97	-10.08/-11.24	-19.37/-8.6	-11.73/-10.85	-11.73/-10.85	-8.04/-6.73	-5.11/-5.41	-8.16/-12.62	-14.65/-15.28	-13.71/-11.12	-10.47/-11.44	-18.75/-14.75	-9.53/-7.4	-7.99/-11.43	-10.11/-5.48	-4.21/-5.47	-6.88/-7.21	-7.44/-7.21	-8.04/-11.57	-19.54/-18.23	-15.67/-11.36	-10.32/-11.21	-14.89/-15.89	-12.67/-9.45	-6.29/-13.3	-4.68/-4.4	-5.82/-6.95	-6.48/-5.5	
Theta (7.5°)	Phi (75°)	-8.27/-5.74	-5.79/-9.27	-10.74/-18.53	-18.45/-17.66	-16.21/-8.3	-17.72/-13.14	-10.07/-9.77	-7.85/-7.78	-9.24/-11.31	-13.89/-14.16	-12.54/-17.41	-15.87/-11.32	-16.21/-8.03	-14.03/-17.25	-7.28/-8.95	-19.11/-13.33	-10.74/-6.48	-8.95/-13.47	-7.51/-5.42	-6.33/-6.5	-9.26/-17.17	-17.58/-10.99	-8.48/-14.65	-11.25/-7.04	-8.04/-6.73	-5.11/-5.41	-8.16/-12.62	-14.65/-15.28	-13.71/-11.12	-10.47/-11.44	-18.75/-14.75	-9.53/-7.4	-7.99/-11.43	-10.11/-5.48	-4.21/-5.47	-6.88/-7.21	-7.44/-7.21	-8.04/-11.57	-19.54/-18.23	-15.67/-11.36	-10.32/-11.21	-14.89/-15.89	-12.67/-9.45	-6.29/-13.3	-4.68/-4.4	-5.82/-6.95	-6.48/-5.5	
Theta (7.5°)	Phi (82.5°)	-5.56/-5.18	-2.96/-4.1	-5.42/-5.35	-9.24/-12.79	-10.97/-9.68	-9.13/-10.85	-16.16/-15.48	-17.93/-16.22	-17.99/-10.89	-9.77/-10.95	-8.57/-7.43	-16.1/-8.58	-8.19/-3.23	-4.73/-6.32	-9.75/-14.31	-12.93/-16.82	-16.41/-11.7	-8.62/-7.58	-4.57/-3.51	-4.83/-6.13	-5.91/-6.79	-10.56/-10.08	-10.81/-11.54	-11.73/-10.85	-8.04/-6.73	-5.11/-5.41	-8.16/-12.62	-14.65/-15.28	-13.71/-11.12	-10.47/-11.44	-18.75/-14.75	-9.53/-7.4	-7.99/-11.43	-10.11/-5.48	-4.21/-5.47	-6.88/-7.21	-7.44/-7.21	-8.04/-11.57	-19.54/-18.23	-15.67/-11.36	-10.32/-11.21	-14.89/-15.89	-12.67/-9.45	-6.29/-13.3	-4.68/-4.4	-5.82/-6.95	-6.48/-5.5	
Theta (7.5°)	Phi (90°)	-10.89/-11.45	-11.13/-9.69	-13.02/-16.27	-14.85/-12.98	-12.49/-10.94	-10.99/-12.23	-14.69/-16.41	-15.55/-18.35	-18.47/-18.67	-17.54/-13.61	-14.57/-16.2	-9.64/-8.87	-16.01/-8.05	-13.62/-8.55	-11.36/-17.58	-19.14/-16.95	-17.39/-12.88	-11.25/-14.69	-8.62/-14.52	-11.11/-13.3	-7.66/-4.39	-3.04/-2.39	-3.76/-6.91	-9.46/-11.51	-9.46/-11.51	-8.04/-6.73	-5.11/-5.41	-8.16/-12.62	-14.65/-15.28	-13.71/-11.12	-10.47/-11.44	-18.75/-14.75	-9.53/-7.4	-7.99/-11.43	-10.11/-5.48	-4.21/-5.47	-6.88/-7.21	-7.44/-7.21	-8.04/-11.57	-19.54/-18.23	-15.67/-11.36	-10.32/-11.21	-14.89/-15.89	-12.67/-9.45	-6.29/-13.3	-4.68/-4.4	-5.82/-6.95	-6.48/-5.5
Theta (7.5°)	Phi (97.5°)	-8.01/-8.9	-7.85/-5.99	-4.97/-4.7	-4.88/-4.66	-4.95/-5.75	-6.54/-7.32	-8.73/-10.19	-11.87/-14.7	-19.41/-17.66	-17.71/-14.01	-11.29/-10.68	-9.95/-9.33	-10.05/-11.55	-10.47/-9.85	-12.06/-15.65	-17.44/-15.8	-14.85/-16.98	-17.87/-14.46	-9.33/-6.4	-4.96/-4.85	-4.49/-4.16	-4.25/-4.45	-4.66/-6.81	-9.31/-8.15	-8.04/-6.73	-5.11/-5.41	-8.16/-12.62	-14.65/-15.28	-13.71/-11.12	-10.47/-11.44	-18.75/-14.75	-9.53/-7.4	-7.99/-11.43	-10.11/-5.48	-4.21/-5.47	-6.88/-7.21	-7.44/-7.21	-8.04/-11.57	-19.54/-18.23	-15.67/-11.36	-10.32/-11.21	-14.89/-15.89	-12.67/-9.45	-6.29/-13.3	-4.68/-4.4	-5.82/-6.95	-6.48/-5.5	
Theta (7.5°)	Phi (105°)	-2.41/-2.05	-1.85/-2.2	-2.58/-3.27	-2.61/-3.19	-3.94/-5.04	-7.19/-10.02	-12.79/-16.26	-18.94/-18.51	-18.81/-18.99	-16.61/-14.47	-14.37/-14.88	-15.02/-13.75	-12.15/-10.5	-11.22/-15.3	-16.61/-12.87	-11.93/-14.51	-18.69/-14.04	-18.98/-18.78	-16.21/-14.19	-12.61/-11.33	-10.61/-9.46	-7.91/-7.44	-4.91/-6.3	-4.88/-3.35	-8.04/-6.73	-5.11/-5.41	-8.16/-12.62	-14.65/-15.28	-13.71/-11.12	-10.47/-11.44	-18.75/-14.75	-9.53/-7.4	-7.99/-11.43	-10.11/-5.48	-4.21/-5.47	-6.88/-7.21	-7.44/-7.21	-8.04/-11.57	-19.54/-18.23	-15.67/-11.36	-10.32/-11.21	-14.89/-15.89	-12.67/-9.45	-6.29/-13.3	-4.68/-4.4	-5.82/-6.95	-6.48/-5.5	
Theta (7.5°)	Phi (112.5°)	-6.99/-6.13	-6.67/-7.54	-7.39/-6.35	-6.25/-6.78	-6.92/-8.14	-10.12/-13.23	-17.62/-17.33	-18.44/-18.48	-17.87/-17.95	-13.91/-10.53	-9.08/-8.88	-10.26/-12.92	-13.64/-12.98	-13.34/-14.91	-16.98/-17.96	-18.35/-18.35	-18.18/-18.23	-17.15/-17.72	-19.03/-19.24	-17.91/-17.29	-16.74/-18.34	-16.87/-18.64	-18.05/-11.84	-9.46/-6.62	-8.04/-6.73	-5.11/-5.41	-8.16/-12.62	-14.65/-15.28	-13.71/-11.12	-10.47/-11.44	-18.75/-14.75	-9.53/-7.4	-7.99/-11.43	-10.11/-5.48	-4.21/-5.47	-6.88/-7.21	-7.44/-7.21	-8.04/-11.57	-19.54/-18.23	-15.67/-11.36	-10.32/-11.21	-14.89/-15.89	-12.67					



Radiated Composite Gain Data of 2.4GHz/5GHz

Appendix A

Theta (°)	Phi (°)	Phi(15°)	Phi(22.5°)	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°)
Theta (0°)	Phi(0°)	-16.51/13.84	-11.92/9.65	-7.96/6.75	-5.95/5.66	-5.24/5.5	-5.5/5.62	-6.09/6.65	-7.37/8.06	-8.89/9.6	-10.98/13.07	-15.81/18.05	-17.39/19.27	-17.68/14.26	-11.68/10.38	-8.96/7.9	-6.72/6.14	-5.33/5.44	-3.55/3.82	-5.82/6.18	-6.61/7.27	-8.4/10.27	-12.71/16.82	-19.03/18.22	-18.04/19.25
Theta (7.5°)	Phi(7.5°)	-19.44/19.1	-15.67/11.56	-10.79/6.77	-6.54/4.74	-4.59/5.26	-6.41/6.97	-7.39/8.02	-8.67/9.52	-9.31/10.11	-11.18/11.84	-12.12/12.82	-13.49/13.67	-12.45/10.52	-9.04/7.32	-5.99/4.94	-3.96/3.58	-2.39/3.76	-4.29/4.99	-5.83/5.96	-6.02/6.51	-6.87/7.41	-8.28/11.19	-10.31/11.27	-15.17/18.62
Theta (15°)	Phi(15°)	-18.25/17.49	-11.72/8.45	-6.25/4.87	-3.33/2.07	-1.21/1.31	-1.81/2.86	4.45/6.82	9.35/10.64	9.92/9.23	8.59/8.06	7.69/7.94	7.55/7.81	7.67/7.17	6.04/4.36	-3.39/2.36	-1.79/1.67	-1.62/2.28	-3.05/4.05	-5.08/5.55	-5.29/4.86	-4.27/3.95	-4.16/4.67	-5.9/6.75	-9.49/15.49
Theta (22.5°)	Phi(22.5°)	-17.75/16.43	-10.41/7.84	-6.14/5.48	-4.77/3.22	-1.78/1.05	-0.41/0.4	-1.39/2.82	-4.84/6.61	-7.42/7.26	-6.58/6.22	-5.71/5.82	-6.25/6.75	-6.45/6.85	-4.54/3.59	-3.16/2.49	-2.17/1.99	-1.84/2.38	-2.76/3.65	-4.65/4.82	-4.33/4.71	-3.12/2.46	-2.42/3.14	-4.9/5.72	-10.96/17.89
Theta (30°)	Phi(30°)	-19.11/14.41	-10.78/8.83	-6.11/4.68	-4.67/2.61	-1.61/1.25	-1.26/1.6	-1.67/2.64	-6.83/7.35	-6.76/8.37	-5.92/6.87	-4.87/5.37	-4.63/5.12	-4.74/4.84	-4.06/3.44	-2.17/1.92	-1.42/1.76	-2.58/5.96	-5.06/4.13	-2.61/1.76	-1.77/2.69	-3.28/3.92	-4.57/5.67	-8.41/11.54	-16.12/19.08
Theta (37.5°)	Phi(37.5°)	-17.31/13.57	-11.44/10.17	-8.74/8.74	-8.09/7.12	-4.89/3.71	-3.11/2.95	-2.4/1.89	-1.81/3.01	-4.86/7.51	-10.19/12.73	-13.25/13.4	-12.36/10.66	-9.17/7.46	-5.56/3.54	-2.79/2.43	-3.37/5.22	-7.86/7.36	-5.05/3.67	-3.54/3.75	-4.01/5.1	-6.37/6.18	-6.39/7.62	-11.33/15.42	-18.12/18.48
Theta (45°)	Phi(45°)	-12.07/9.86	-7.09/6.88	-8.41/8.68	-8.71/9.6	-10.06/7.16	-5.22/3.66	-3.19/2.68	-1.56/1.38	-1.86/4.32	-8.71/16.46	-14.77/12.01	-7.79/6.62	-6.35/6.5	-6.05/5	-4.57/5.38	-3.65/3.53	-2.86/2.91	-2.34/3.74	-7.71/10.65	-10.21/8.65	-8.45/9.7	-9.66/9.7	-14.48/12.49	
Theta (52.5°)	Phi(52.5°)	-7.89/7.04	-6.71/7.93	-13.11/17.56	-18.89/17.96	-18.15/10.14	-6.72/5.18	-4.01/2.97	-1.70/1.68	-1.03/1.35	-1.85/1.16	-1.57/1.08	-1.03/1.35	-0.51/0.92	-0.56/1.47	-0.91/1.99	-1.46/3.09	-6.3/6.68	-4.41/4.66	-5.41/7.16	-10.38/14.42	-13.79/13.93	-15.17/18.62		
Theta (60°)	Phi(60°)	-7.19/6.25	-7.77/12.59	-19.21/11.22	-5.96/5.88	-7.49/9.89	-9.68/8.16	-7.44/8.24	-5.61/2.73	-1.34/2.52	-5.72/12.51	-11.76/7.48	-4.67/2.96	-2.3/2.98	-4.44/4.49	-4.22/3.06	-3.33/5.84	-9.54/9.75	-5.05/2.19	-2.03/4.47	-6.99/4.34	-3.7/5.02	-5.06/3.61	-4.89/7.93	-9.8/8.89
Theta (67.5°)	Phi(67.5°)	-7.15/15.33	-9.26/15.12	-11.47/16.69	-3.1/3.46	-4.37/5.86	-5.98/5.21	-5.41/5.59	-7.36/3.18	-1.33/2.5	-5.54/13.53	-10.25/6.69	-3.93/3.46	-2.6/3.28	-4.16/6.39	-3.28/1.77	-3.33/3.98	-6.27/6.86	-4.67/3.37	-4.39/7.1	-5.47/3.64	-3.07/3.77	-4.14/4.63	-6.53/7.4	-9.41/8.78
Theta (75°)	Phi(75°)	6.28/7.77	-14.77/13.28	-6.76/4.26	-2.53/3.05	-1.88/2.11	-3.37/4.25	-4.33/4.54	-4.02/3.43	-2.65/2.59	-4.41/9.95	-15.27/7.22	-3.84/3.69	-3.43/4.96	-6.05/4.66	-2.87/1.07	-1.42/2.72	-3.27/7.7	-6.11/3.34	-2.89/4.82	-5.79/4.68	-3.47/3.28	-2.64/2.8	-5.46/8.25	-6.7/6.07
Theta (82.5°)	Phi(82.5°)	-6.15/9.87	-14.71/13.86	-6.58/3.06	-2.23/3.82	-2.12/0.78	-0.38/2.3	-5.23/5.14	-3.66/2.76	-2.46/3.6	-4.72/5.95	-5.3/6.8	-6.31/6.91	-7.99/4.28	-2.08/1.11	-0.49/0.59	-4.86/6.74	-2.74/1.28	-3.45/5.3	-4.02/2.02	-2.53/2.31	-1.81/2.83	-4.39/7.81	-10.88/8.27	
Theta (90°)	Phi(90°)	-10.37/10.48	-12.67/17.93	-10.11/4.46	-1.9/2.71	-1.88/0.58	0.53/0.59	-1.04/4.35	-5.82/6.26	-4.15/3.39	-5.53/5.21	-5.41/4.18	-5.78/9.37	-6.87/4.73	-7.34/3.85	-2.31/3.2	0.82/0.61	-1.99/4.81	-2.86/1.7	-3.53/4.64	0.32/0.18	-2.41/1.48	-0.79/3.84	-11.03/10.08	-13.23/15.69
Theta (97.5°)	Phi(97.5°)	-11.91/13.59	-17.78/17.48	-7.4/7.03	-3.63/3.8	-0.52/0.15	0.28/0.37	-0.64/0.71	-2.63/6.6	-7.7/4.68	-2.96/3.15	-6.15/4.75	-7.1/7.83	-8.16/12.72	-7.1/2.95	-0.76/1.34	2.51/2.23	-3.34/6.3	-2.53/0.54	-2.42/1.13	0.77/1.4	-2.01/1.26	-3.32/3.92	-12.43/8.06	-6.11/10.6
Theta (105°)	Phi(105°)	-19.22/14.66	-14.48/13.3	-5.78/7.32	-3.93/6.07	-3.06/2.62	1.01/0.7	-3.35/2.79	-0.76/1.72	-9.73/10.14	-6.08/1.02	-3.41/4.44	-9.09/8.86	-6.53/9.28	-3.73/1.98	-2.62/1.27	-1.03/4.61	-5.4/5.13	-1.17/0.76	-2.57/0.77	0.67/0.34	-0.82/0.84	-2.36/3.31	-16.62/16.58	-11.66/12.57
Theta (112.5°)	Phi(112.5°)	-16.29/8.86	-13.65/15.19	-6.63/8.51	-7.53/12.62	-3.64/0.18	0.77/0.33	-3.72/6.71	-2.67/1.28	-5.13/1.3	-8.07/2.87	-2.85/3.57	-7.7/7.52	-12.62/11.04	-7.14/5.89	-3.68/3.64	-3.53/4.32	-5.57/2.82	-0.45/0.44	-2.29/0.36	0.78/2.97	-2.39/0.11	-4.65/1.1	-16.36/18.66	-9.97/10.1
Theta (120°)	Phi(120°)	-18.52/15.21	-18.59/14.5	-14.12/11.82	-15.07/8.81	-6.19/2.26	-1.48/1.87	-3.91/5.09	-3.38/2.47	-3.59/5.98	-11.37/10.57	-5.35/4.21	-5.76/6.09	-8.22/14.39	-9.95/4.84	-5.08/7.24	-4.82/4.32	-4.97/6.88	-3.64/4.17	-7.51/7.53	-6.04/7.46	-4.69/6.24	-8.59/15.98	-15.01/8.87	-7.11/10.6
Theta (127.5°)	Phi(127.5°)	-14.51/12.32	-18.46/19.08	-12.38/12.73	-8.98/5.08	-2.26/0.72	-4.75/8.81	-12.45/11.46	-5.65/12.34	-4.11/3.17	-5.13/13.37	-11.55/4	-2.73/4.11	-5.89/6.66	-8.26/8.12	-5.22/3.52	-3.64/6.94	-8.22/10.53	-13.16/14.37	-9.99/16.55	-8.4/9.64	-13.18/10.81	-9.74/14.93	-18.82/12.09	-10.57/11.42
Theta (135°)	Phi(135°)	-10.13/19.02	-16.21/14.36	-13.21/9.53	-8.33/5.06	-2.13/0.92	-0.85/1.82	-4.77/10.57	-10.64/6.3	-5.49/8.08	-18.76/7.18	-3.21/2.78	-4.9/9.58	-18.27/18.56	-10.8/7.17	-12.85/16.92	-17.11/10.32	-11.11/11.87	-10.34/10.12	-7.9/6.55	-7.73/16.61	-17.89/15.62	-14.48/11.66	-8.69/9.87	-9.93/9.68
Theta (142.5°)	Phi(142.5°)	-12.02/16.58	-19.77/14.73	-12.68/18.79	-10.03/5.88	-3/1.49	-1.01/1.85	-4.46/9.75	-12.99/8.04	-5.54/6.71	-12/11.97	-15.67/10.22	-8.72/15.24	-16.53/18.36	-12.27/7.45	-5.98/6.6	-7.58/7.67	-14.51/10.82	-16.92/17.61	-18.43/12.87	-11.74/10.91	-17.42/16.48	-18.51/15.98	-10.73/12.66	-16.02/11.57
Theta (150°)	Phi(150°)	-9.64/11.81	-10.48/9.91	-12.38/12.73	-8.98/5.08	-2.26/0.72	-4.75/8.81	-12.45/11.46	-5.65/12.34	-4.11/3.17	-5.13/13.37	-11.55/4	-2.73/4.11	-5.89/6.66	-8.26/8.12	-5.22/3.52	-3.64/6.94	-8.22/10.53	-13.16/14.37	-9.99/16.55	-8.4/9.64	-13.18/10.81	-9.74/14.93	-18.82/12.09	-10.57/11.42
Theta (157.5°)	Phi(157.5°)	-17.11/12.96	-9.23/7.48	-8.09/9.34	-10.41/11.14	-10.17/6.85	-5.52/5.5	-7.08/9.98	-13.73/13.29	-11.02/10.27	-11.07/13.67	-18.77/17.89	-12.78/11.8	-12.81/13.71	-13.59/14.39	-16.22/17.46	-18.57/17.4	-14.43/11.09	-9.48/9.6	-9.13/7.86	-5.72/3.88	-3.61/6.13	-13.2/16.17	-15.54/18.91	-14.98/15.12
Theta (165°)	Phi(165°)	-17.99/15.86	-13.43/12.92	-12.87/12.13	-9.78/8.61	-8.21/7.17	-6.51/5.97	-6.68/8.23	-10.19/11.27	-11.05/10.29	-10.05/10.46	-11.3/13.45	-17.86/18.65	-17.57/17.22	-10.24/9.24	-8.78/8.84	-7.98/7.77	-6.99/6.66	-5.95/5.33	-4.78/4.7	-2.93/2.4	-2.33/3.51	-6.16/8.6	-8.71/10.42	-13.74/15.75
Theta (172.5°)	Phi(172.5°)	-13.4/14.39	-16.26/17.98	-17.47/18.42	-16.36/14.57	-11.13/10.86	-9.03/7.35	-6.47/6.28	-5.68/7.1	-7.5/8	-8.86/10.3	-12.78/17.68	-18.79/12.88	-15.81/13.45	-12.09/11.08	-11.12/10.93	-10.42/9.57	-8.57/11.86	-7.55/7.27	-7.3/4.77	-7.54/5.88	-11.29/14.84	-14.95/14.48	-14.58/14.58	
Theta (180°)	Phi(180°)	-17.26/14.86	-15.25/16.43	-16.13/14.54	-13.48/11.72	-11.12/10.54	-10.54/10.31	-9.88/9.49	-9.49/9.7	-9.89/10.01	-10.44/11.44	-12.23/13.15	-14.29/16.22	-18.92/19.12	-17.42/18.64	-17.84/17.46	-18.07/18.05	-17.64/18.07	-18.63/18.67	-18.14/18.99	-16.88/16.18	-15.73/15.39	-14.96/15.41	-18.04/17.96	-17.74/18.01
Phi(0°)	Phi(0°)	-3.25/3.38	-3.01/3.75	-5.77/8.94	-11.74/14.38	-18.69/18.87	-19.45/13.48	-10.31/7.93	-5.94/4.64	-3.69/2.67	-2.19/1.82	-1.52/1.85	-1.87/2.53	-3.21/4.37	-3.68/4.27	-5.31/5.54	-10.65/14.5	-19.28/18.09	-17.57/15.36	-10.87/8.49	-6.75/5.25	-4.01/3.66	-3.31/3.11	-2.89/2.77	-2.83/2.47
Phi(7.5°)	Phi(7.5°)	-1.11/1.48	-1.91/2.84	-4.36/3.33	-8.81/11.8	-14.54/18.6	-18.52/15.44	-11.61/9.43	-7.77/6.17	-5.29/4.06	-3.29/2.64	-2.21/2.23	-2.49/2.51	-2.55/2.75	-3.38/4.22	-5/6.4	-8.77/12.52	-18.11/18.28	-15.66/12.39	-9.74/7.98	-6.84/5.36	-4.17/3.62	-2.79/3.22	-1.8/1.85	-1.5/0.71
Phi(15°)	Phi(15°)	1.84/1.85	1.31/4.05	-0.83/2.73	-5.13/8.02	-11.78/18.38	-17.47/15.63	-12.76/11.29	-10.64/9.78	-9.58/10.2	-2.61/1.98	-1.14/0.79	-0.66/0.82	-1.41/2.34	-3.01/3.78	-5.62/7.55	-9.56/10.22	-9.78/9.86	-7.29/6.61	-4.41/2.24	-3.59/3.15	-2.92/1.91	-1.02/0.21	0.96/1.65	
Phi(22.5°)	Phi(22.5°)	0.84/0.92	0.06/1.52	-3.09/5.74	-8.81/12.26	-18.04/18.26	-16.76/11.46	-9.49/8.77	-9.16/9.22	-8.78/7.48	-1.23/0.18	1.13/1.62	1.58/0.82	0.06/1.22	-2.49/3.95	-6.02/8.63	-11.38/11.88	-11.04/9.31	-8.73/7.95	-6.82/5.63	-4.46/3.69	-3.03/2.37	-1.53/2.07	0.69/1.05	
Phi(30°)	Phi(30°)	-0.84/0.93	-0.44/0.97	-2.02/3.09	-4.32/6.81	-9.55/11.95	-11.11/1.84	-6.14/5.37	-5.66/6.04	-5.43/4.44	-1.06/0.29	1.12/1.38	0.96/0.19	-1.31/3.92	-4.54/5.84	-7.68/10.36	-13.96/16.56	-19.08/17.2	-11.9/8.44	-6.62/6.67	-7.18/6.24				



Antenna Pattern of 2.4GHz/5GHz

Appendix B

θ (75°)	0.25/0.68	-0.20/-2.11	-2.77/-3.41	-6.42/-2.85	-0.74/0.46	-0.00/-0.84	-1.10/-0.36	0.63/1.14	-0.19/-2.70	-5.15/-4.71	-1.87/-0.35	0.13/-0.11	-0.13/0.22	1.08/0.44	-0.09/0.34	0.09/0.24	-1.27/-3.10	-2.76/-3.99	-4.93/-4.55	-2.88/-1.28	-1.36/-2.45	-1.89/-2.05	-3.48/-4.61	-4.10/-1.81
θ (82.5°)	-0.83/-0.12	-2.60/-6.30	-6.06/-4.45	-6.39/-2.85	-0.98/0.10	-0.56/-0.84	-0.30/-0.58	0.16/1.37	1.57/-0.34	-5.63/-5.35	-2.63/-1.90	-1.10/-0.32	0.96/1.49	1.53/-0.09	-0.36/0.09	0.06/1.18	-1.03/-1.73	-3.51/-2.57	-1.62/-1.74	-1.97/-1.82	-2.22/-1.61	-0.77/-1.48	-3.53/-6.85	-6.42/-1.94
θ (90°)	-0.24/-0.30	-2.52/-6.26	-5.87/-3.42	-5.44/-2.10	0.64/2.34	1.45/-0.04	-0.90/-0.39	-0.22/-0.15	0.93/0.20	-1.78/-3.96	-3.61/-2.81	-1.89/-1.65	-1.90/-1.15	-0.96/-0.76	-0.84/-1.01	0.66/2.00	-0.04/-0.26	1.50/1.23	-0.67/-1.67	-0.35/0.61	-0.00/1.53	2.28/0.08	-4.20/-8.69	-5.57/-2.34
θ (97.5°)	-2.53/-1.33	-4.37/-6.95	-4.95/-1.18	-2.96/-1.05	0.21/2.33	3.12/2.60	1.56/0.40	-0.42/-0.18	-0.11/-0.15	-1.34/-1.46	-0.20/-1.21	0.13/-0.78	0.48/-0.29	-1.04/-0.41	-2.55/-2.70	0.18/1.69	2.05/1.71	1.37/0.89	-0.10/0.22	-0.83/-1.16	1.18/2.99	2.46/1.33	-6.06/-8.22	-4.60/-2.84
θ (105°)	-2.33/-2.16	-6.28/-5.35	-1.39/-0.51	-1.63/-0.88	0.05/2.17	1.82/1.75	1.60/1.27	0.18/-1.32	-1.15/-0.36	-2.32/-2.68	-1.87/-2.35	-0.37/-1.24	0.91/-0.65	-1.58/-1.02	-2.87/-4.58	-0.61/1.49	1.00/0.31	-0.72/1.27	-0.87/-2.12	-2.99/-0.91	2.41/4.09	2.79/-2.03	-8.25/-8.08	-2.36/-2.42
θ (112.5°)	-3.80/-4.08	-8.57/-6.81	-3.02/-2.21	-2.06/-1.29	-0.19/0.91	0.24/-0.28	0.26/2.07	1.71/-1.93	-4.16/-0.80	-0.67/-0.55	-2.85/-2.62	-2.05/-1.83	1.20/-1.17	0.40/0.39	-2.40/-7.74	-5.46/-1.22	-1.59/-0.94	-1.22/-0.75	-2.74/-1.28	-2.11/-5.36	-0.06/1.52	-0.62/-6.82	-7.74/-4.48	-0.02/-0.91
θ (120°)	-5.53/-5.12	-5.79/-6.72	-3.56/-1.83	-1.18/-4.15	-3.26/-1.57	0.24/-0.14	-1.00/-1.07	-0.26/-1.11	-4.95/-8.86	-3.33/-0.24	-2.46/-2.47	-4.08/-2.72	-1.84/-1.03	0.24/-0.10	-1.21/-4.04	-8.13/-3.91	-3.08/-3.95	-3.83/-4.39	-12.21/-6.69	-6.11/-10.52	-4.97/-1.75	-6.47/-12.90	-7.29/-4.37	-2.96/-3.80
θ (127.5°)	-3.70/-1.58	-1.68/-2.68	-4.94/-6.32	-3.96/-3.71	-2.76/-2.77	-2.57/-1.59	-0.85/-1.09	-2.19/-6.32	-9.52/-5.28	-3.27/-3.38	-2.52/-2.28	-2.63/-3.11	-2.01/-2.89	-4.74/-3.02	-3.23/-6.42	-6.68/-6.83	-6.59/-5.92	-7.04/-9.36	-15.64/-13.13	-10.76/-12.25	-5.03/-10.57	-12.31/-7.91	-7.35/-8.68	-5.67/-5.69
θ (135°)	-13.20/-9.26	-11.41/-10.03	-8.55/-5.30	-3.72/-3.40	-3.53/-2.63	-2.01/-2.58	-2.66/-1.69	-1.81/-3.31	-9.27/-8.04	-3.12/-1.26	-1.67/-2.41	-2.05/-0.88	-0.40/-1.61	-2.36/-1.78	-3.09/-4.25	-7.04/-5.35	-6.13/-6.73	-4.08/-5.56	-12.33/-11.94	-13.35/-8.83	-7.92/-11.80	-9.91/-9.65	-5.71/-7.11	-7.19/-8.91
θ (142.5°)	-9.18/-6.32	-7.21/-10.71	-9.19/-3.84	-1.17/0.65	0.87/0.06	-0.80/-2.08	-2.85/-1.84	-0.54/-1.41	-6.23/-15.37	-8.30/-3.12	-1.29/-1.31	-2.73/-4.02	-3.79/-5.37	-6.45/-3.64	-3.81/-6.52	-10.63/-8.21	-7.81/-6.27	-7.09/-8.14	-11.04/-15.65	-11.54/-8.29	-9.19/-8.77	-12.01/-7.45	-10.49/-15.33	-11.04/-8.96
θ (150°)	-5.80/-7.02	-6.40/-7.23	-7.85/-6.87	-6.63/-6.15	-4.75/-4.49	-4.21/-4.43	-4.84/-4.75	-4.15/-3.84	-4.31/-5.55	-7.39/-6.63	-5.35/-6.34	-7.84/-9.78	-15.32/-14.36	-9.73/-7.01	-4.06/-2.35	-2.27/-2.33	-1.79/-3.05	-5.26/-6.13	-6.13/-5.81	-4.70/-4.83	-6.46/-6.29	-5.43/-6.31	-5.82/-5.05	-5.01/-4.29
θ (157.5°)	-3.85/-2.87	-2.80/-3.94	-5.82/-7.21	-6.72/-4.90	-3.90/-4.13	-5.04/-6.41	-6.79/-6.86	-6.45/-8.82	-5.06/-4.87	-4.84/-4.43	-2.17/-1.75	-1.89/-1.66	-1.37/-1.31	-1.93/-3.14	-4.56/-5.96	-6.38/-6.14	-6.01/-7.29	-8.85/-9.44	-8.88/-7.10	-4.05/-2.24	-1.42/-2.44	-4.57/-6.19	-5.37/-5.50	-7.38/-6.02
θ (165°)	-2.59/-2.18	-2.67/-3.26	-4.80/-6.47	-8.66/-10.69	-12.18/-11.29	-10.06/-8.74	-8.49/-7.78	-7.22/-7.03	-6.28/-5.53	-4.88/-4.93	-4.74/-4.73	-4.40/-3.70	-3.32/-2.75	-2.13/-1.89	-2.45/-3.42	-4.33/-5.13	-5.62/-6.06	-5.56/-4.36	-3.10/-1.22	-0.17/0.73	0.76/0.23	-1.10/-2.93	-3.99/-5.07	-4.51/-3.92
θ (172.5°)	-6.09/-6.69	-8.13/-8.97	-9.72/-11.78	-14.51/-12.12	-9.18/-7.82	-7.48/-7.53	-8.06/-7.94	-7.71/-7.96	-7.98/-7.95	-6.67/-5.58	-4.96/-4.52	-4.09/-3.88	-3.78/-3.90	-3.51/-3.64	-3.79/-3.67	-3.75/-4.17	-4.36/-4.83	-5.17/-4.97	-4.60/-5.01	-5.05/-4.87	-5.04/-6.31	-8.42/-6.94	-5.97/-5.44	
θ (180°)	-15.50/-15.12	-13.45/-11.20	-10.46/-9.65	-8.80/-7.88	-7.13/-6.64	-6.87/-7.03	-7.45/-7.48	-7.30/-7.91	-8.13/-8.12	-7.44/-6.98	-6.24/-6.04	-5.63/-5.74	-6.35/-7.02	-7.44/-7.86	-7.74/-8.17	-9.67/-11.48	-11.77/-11.85	-12.24/-12.14	-13.24/-12.78	-11.88/-10.81	-9.12/-8.31	-7.43/-7.71	-9.90/-12.43	-15.11/-15.75
Freq(Hz)	5.785GPol.	TotalAnt 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gain	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°)	0.78/0.68	0.29/-0.13	-0.54/-0.94	-0.64/-0.10	0.30/0.38	0.38/0.01	-0.16/-0.23	-0.30/0.08	0.07/0.11	0.24/0.35	0.16/0.01	-0.20/-0.33	-0.70/-1.04	-1.31/-0.97	-0.84/-0.97	-0.97/-0.65	-0.41/-0.30	-0.56/-0.24	-0.21/-0.06	-0.38/-0.40	0.12/0.06	0.18/0.19	-0.12/0.14	
θ (7.5°)	-2.32/-2.48	-2.34/-2.04	-2.02/-2.15	-2.59/-2.42	-2.22/-1.72	-1.44/-1.24	-1.12/-1.00	-0.77/-0.33	-0.05/0.23	0.33/0.55	0.71/0.79	0.63/0.52	0.22/0.07	-0.21/-0.34	-0.27/-0.61	-0.97/-0.90	-0.93/-0.57	-0.65/-0.92	-0.81/-0.69	-0.72/-0.68	-0.81/-0.78	-0.97/-1.38	-1.44/-1.37	-1.59/-1.84
θ (15°)	-1.69/-2.55	-2.96/-3.37	-3.31/-3.07	-2.98/-3.50	-4.01/-3.84	-3.51/-3.07	-2.98/-2.65	-2.42/-2.00	-1.60/-0.88	-0.78/-0.55	-0.26/0.31	0.49/0.57	-0.04/-0.58	-1.38/-1.67	-2.16/-1.94	-2.04/-1.59	-1.89/-2.36	-2.71/-2.69	-2.31/-2.41	-2.19/-2.59	-2.49/-3.08	-3.03/-2.96	-2.25/-1.92	-1.72/-1.43
θ (22.5°)	-1.35/-1.55	-1.99/-1.61	-1.45/-1.71	-1.73/-1.93	-2.01/-2.20	-2.64/-2.83	-2.65/-2.57	-2.70/-2.32	-1.79/-1.25	-0.84/-0.08	0.45/0.85	0.96/0.55	0.13/-0.61	-1.06/-1.92	-2.62/-2.75	-2.71/-2.75	-3.28/-3.86	-4.40/-4.84	-5.27/-5.13	-4.18/-3.34	-2.57/-2.19	-1.72/-1.20	-0.79/-0.91	-1.65/-1.35
θ (30°)	1.58/1.77	1.34/0.86	0.65/0.49	-0.35/-1.57	-2.68/-2.76	-2.12/-1.35	-1.21/-1.57	-2.57/-3.27	-3.92/-2.82	-1.29/0.25	0.89/1.18	1.05/0.82	0.05/-0.73	-1.26/-1.80	-2.93/-3.60	-4.21/-4.40	-4.94/-6.08	-6.97/-7.58	-6.40/-4.96	-4.16/-3.43	-2.98/-2.59	-1.44/-1.16	-0.75/0.08	0.19/0.98
θ (37.5°)	0.01/-0.05	-1.15/-2.97	-5.02/-5.56	-5.96/-5.95	-5.85/-5.57	-5.67/-4.76	-4.37/-4.15	-4.21/-4.99	-7.74/-8.97	-4.60/-0.97	0.73/1.03	0.77/0.01	-0.05/-0.63	-1.02/-1.05	-0.93/-0.72	-1.32/-2.53	-4.05/-4.98	-6.60/-9.33	-11.95/-11.18	-8.20/-4.79	-2.51/-1.71	-1.83/-2.09	-2.15/-1.32	-0.67/0.13
θ (45°)	-2.25/-1.98	-2.69/-2.80	-3.06/-3.78	-4.60/-5.39	-5.55/-6.18	-4.68/-3.14	-2.31/-1.69	-1.79/-2.65	-4.91/-6.90	-6.01/-1.94	0.60/1.70	1.46/0.63	-0.08/-0.25	-0.73/-1.52	-3.01/-4.30	-4.09/-3.38	-4.22/-6.14	-9.25/-9.98	-10.91/-14.11	-11.40/-7.19	-5.90/-4.69	-3.31/-3.44	-4.15/-4.07	-2.54/-2.16
θ (52.5°)	-2.26/-1.03	-0.13/0.02	-0.46/-1.53	-2.59/-3.55	-4.87/-5.50	-4.15/-0.95	0.57/0.44	-0.54/-1.60	-3.47/-8.05	-9.18/-1.90	0.91/1.77	1.37/1.17	1.84/1.77	1.32/-0.20	-1.87/-3.50	-2.63/-2.72	-4.28/-6.65	-9.73/-10.34	-9.70/-10.17	-9.97/-8.04	-6.15/-4.65	-4.18/-4.94	-4.51/-4.78	-4.90/-3.58
θ (60°)	-1.90/-0.23	0.69/0.32	-1.00/-3.22	-5.81/-4.85	-4.68/-6.13	-5.78/-2.42	-0.59/0.16	-0.09/-0.90	-2.24/-4.29	-8.42/-4.78	-0.66/1.18	1.49/1.24	1.29/1.90	2.08/1.23	-0.07/-1.18	-0.71/-2.22	-3.08/-4.20	-4.66/-5.54	-8.33/-11.18	-8.79/-4.45	-3.21/-3.41	-3.55/-6.03	-8.49/-8.05	-4.95/-2.92
θ (67.5°)	-2.66/-1.98	-1.17/-1.20	-1.54/-3.28	-4.86/-3.58	-2.32/-3.09	-4.87/-5.21	-2.23/-1.08	-0.34/0.02	-1.01/-3.35	-6.55/-3.85	-0.25/0.61	0.16/-0.18	0.95/1.20	1.23/0.52	-0.21/-0.91	-1.26/-5.53	-1.67/-2.57	-4.77/-6.53	-5.98/-6.36	-6.26/-4.37	-3.26/-3.60	-4.81/-5.42	-5.55/-7.09	-6.82/-3.80
θ (75°)	-1.84/-0.68	-1.31/-3.64	-6.80/-7.25	-5.59/-1.83	0.30/0.72	0.27/-0.50	-0.20/-0.26	-0.84/-0.63	-1.24/-2.89	-4.56/-3.15	-1.45/-1.02	0.12/0.20	1.09/0.87	1.88/1.35	0.54/-0.80	-1.61/-2.21	-2.23/-4.48	-4.46/-3.44	-4.11/-6.90	-6.58/-3.60	-3.01/-3.32	-2.40/-2.74	-3.48/-6.55	-8.28/-3.71
θ (82.5°)	-2.73/-2.17	-4.67/-8.46	-11.04/-8.94	-6.83/-2.52	-0.01/0.79	-0.07/-0.52	0.73/2.01	2.28/1.56	0.26/1.64	-4.35/-4.78	-1.21/0.04	0.66/0.11	1.72/2.37	3.03/2.28	0.50/-1.66	-2.62/-1.09	-2.08/-3.21	-3.02/-3.95	-3.67/-4.32	-3.58/-2.65	-2.89/-2.11	-0.39/-1.11	-2.94/-7.34	-7.52/-2.94
θ (90°)	-2.51/-1.21	-3.75/-7.92	-8.62/-6.45	-6.02/-2.51	0.34/1.51	1.03/-1.35	-2.06/-0.19	1.31/1.53	1.52/0.79	-0.88/-4.52	-5.31/-2.66	-0.93/-0.40	-0.04/-0.31	0.39/0.55	0.65/-0.79	-1.18/0.50	-2.17/-2.34	-1.83/-0.59	-0.95/-1.80	-2.08/-0.31	-0.89/0.29	1.01/-0.69	-4.59/-8.52	-7.27/-3.43
θ (97.5°)	-2.60/-1.26	-3.99/-4.43	-4.47/-2.20	-3.16/-0.45	1.67/3.02	3.50/2.22	0.24/-1.07	-0.57/-0.21	0.82/1.68	1.01/-0.87	-1.29/-2.00	-0.12/-0.18	0.30/-0.18	0.15/1.33	0.49/-1.06	-0.89/0.71	-0.47/-1.42	-0.36/0.78	0.80/0.06	-0.12/-1.66	-0.77/1.89	2.40/-1.33	-8.04/-9.60	-4.80/-2.62
θ (105°)	-4.75/-2.98	-5.17/-3.53	-1.82/-0.26	-3.01/-0.39	1.33/2.90	2.93/2.53	2.39/1.67	1.24/-0.14	-1.45/-0.58	0.12/-0.72	-1.75/-3.13	-0.52/-1.02	0.01/-1.27	-1.30/0.20	-0.36/-1.71	-3.68/-2.07	-1.98/-1.23	-1.45/-0.47	-0.78/0.12	-0.46/-3.02	-0.08/2.74	1.73/-3.51	-12.29/-7.78	-3.01/-3.06
θ (112.5°)	-2.84/-2.24	-5.46/-4.61	-3.15/-3.57	-4.49/-1.73	-0.26/1.73	1.21/0.06	-0.21/1.35	1.42/-1.11	-2.90/0.59	1.55/-0.45	-3.78/-4.57	-0.54/-1.40	0.76/-1.29	-0.88/-0.41	-2.49/-6.55	-6.41/-3.81	-3.90/-4.38	-2.01/0.11	-0.76/-1.26	-3.41/-7.79	-0.94/1.61	0.26/-7.81	-15.96/-6.97	-0.56/-0.19
θ (120°)	-5.10/-4.05	-4.95/-5.71	-4.70/-3.68	-3.32/-4.30	-2.73/0.09	0.03/-1.78	-3.05/-0.97	0.10/-2.87	-6.39/-1.43	0.68/1.93	-1.05/-2.65	-4.31/-3.21	-0.44/-0.36	0.55/0.03	-1.49/-3.46	-8.24/-8.64	-7.07/-5.70	-6.54/-4.20	-8.41/-4.55	-5.28/-11.50	-5.85/-1.19	-5.40/-13.14	-12.18/-8.09	-3.24/-3.28
θ (127.5°)	-6.55/-3.75	-3.90/-4.71	-5.32/-5.30	-4.38/-4.90	-2.59/-1.57	-0.68/-0.88	-1.38/-1.88	-3.53/-6.82	-7.26/-3.07	-1.38/-1.82	-1.96/-1.91	-3.43/-4.10	-4.41/-3.66	-3.23/-2.39	-2.96/-5.78	-8.01/-8.81	-8.73/-7.61	-10						

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 $\Theta(0-180)\Phi(270)$

