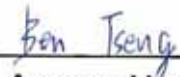




Antenna Composite Gain Test Report

Equipment	WiFi 7 Tri-radio concurrent indoor ceiling mount AP
Brand Name	Senao
Model Name	IAP2701A
Applicant	Senao Networks, Inc. 3F., No.529, Zhongzheng Rd., Xindian Dist., New Taipei City, Taiwan
Manufacturer	Senao Networks, Inc. 3F., No.529, Zhongzheng Rd., Xindian Dist., New Taipei City, Taiwan
Standard	KDB 662911 D03 v01
Sample Received	Mar. 01, 2024
Start Test Date	Mar. 11, 2024
Final Test Date	Mar. 11, 2024


Approved by: Ben Tseng

SPORTON INTERNATIONAL INC. Hsinhua Laboratory
No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)



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History of this test report

[illegible]



1. Operation Mode and Antenna Information

Antenna Position	RF Port	Brand Name	Model Name	Ant. Type	Connector	Modes of Operation
2G Ant1	1	Senao	5718A0751300	PIFA	I-Pex	2.4GHz
2G Ant2	2	Senao	5718A0750300	PIFA	I-Pex	2.4GHz
5G Ant1	3	Senao	5718A0753300	PIFA	I-Pex	5GHz
5G Ant2	4	Senao	5718A0752300	PIFA	I-Pex	5GHz
6G Ant1	5	AWAN	7102A0951000	Alford Loop	I-Pex	6GHz
6G Ant2	6	AWAN	7102A0952000	Alford Loop	I-Pex	6GHz
BLE	7	Senao	5718A0751300	PIFA	I-Pex	BT

Note:

2.4GHz Operation Mode (2TX/2RX)

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

5GHz Operation Mode (2TX/2RX)

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

6GHz Operation Mode (2TX/2RX)

6G Ant1, 6G Ant2 could transmit/receive simultaneously.

BT Operation Mode (1TX/1RX)

BLE could transmit/receive.

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
2400-2483.5	2450
2400-2483.5	2483.5
5150-5250	5200
5250-5350	5300
5470-5725	5600
5725-5850	5785

3. Testing Location

Test Lab. : Sporton International Inc. Hsinhua Laboratory				
☒ 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	Test Date
Radiated	05CH03-HY	Rofy Chen	23.5~24.5°C / 45~55%	11/Mar/2024

Note:

Testing Site Information

Brand Name: TDK

Dimension: 11m*6m*6m

Characteristic: Fully Anechoic Chamber

4. Test Facility and Configuration

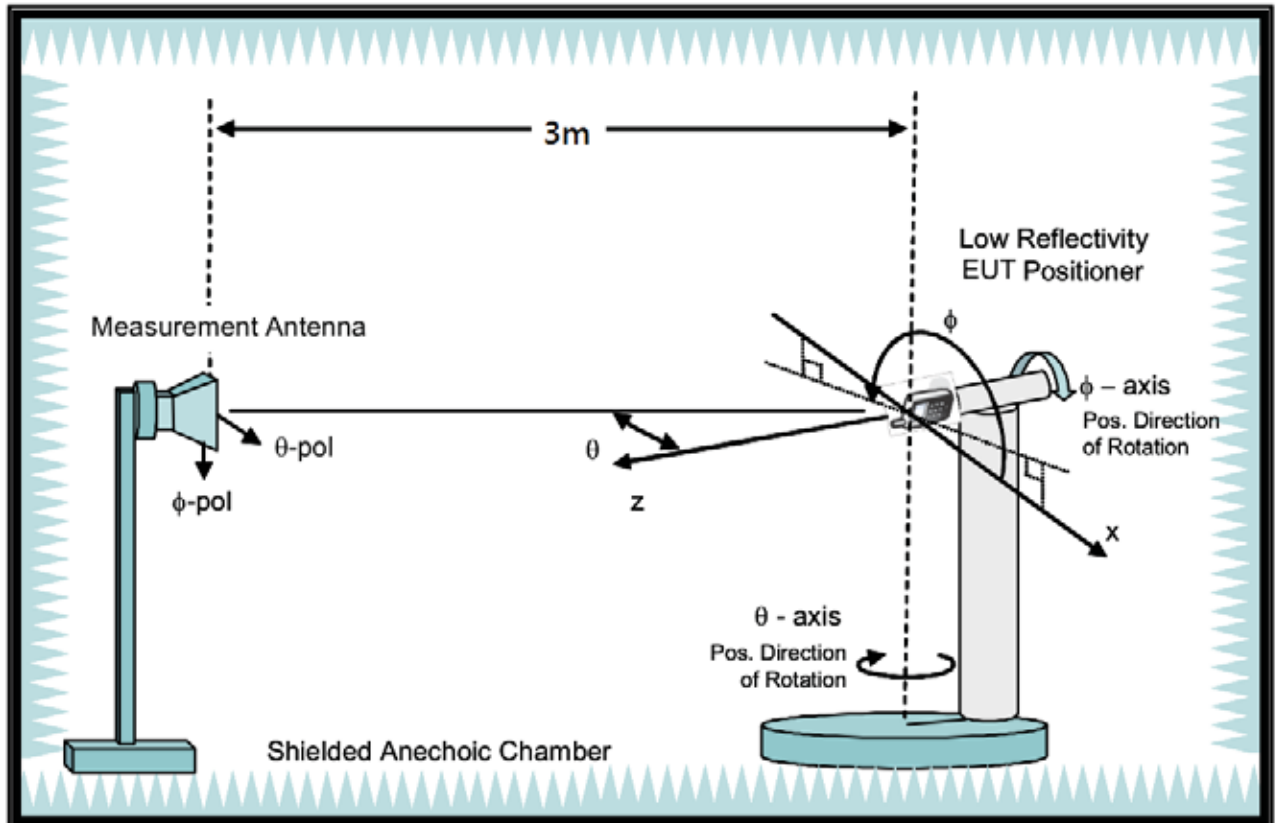
Test configuration: Reference to CITA OTA distributed-axes system configuration.

Chamber: Fully Anechoic Chamber.

Measurement antenna: Dual Polarization Horn antenna

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

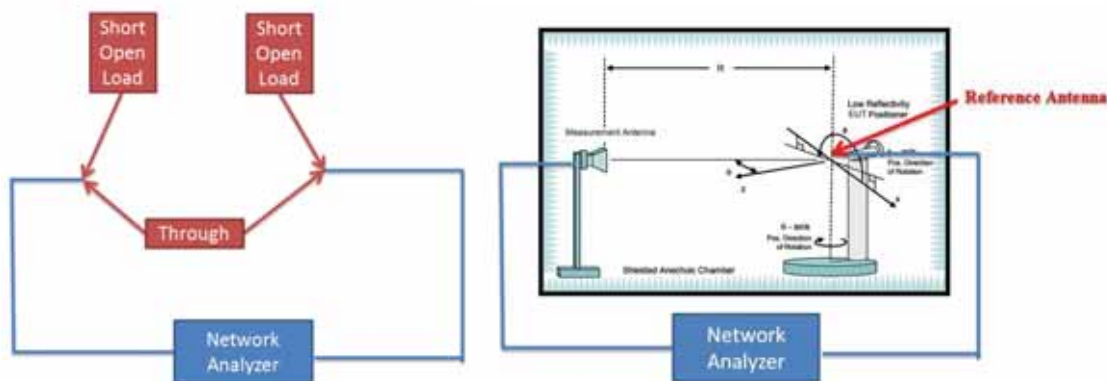
#Reference to CTIA "ctia-test-plan-for-wireless-device-over-the-air-performance-ver-3-7-1"



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:

$G \text{ reading (dB)} = 20 \cdot \log(V_2/V_1) = 10 \cdot \log(P_2/P_1)$

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.

Factor = gain factor + power gain conversion= (Reference antenna gain)-(G 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)	1.76	-0.07	1.02
Ant. 2 (dBi)	-1.4	1.79	1.98
DG [1SS] (dBi)	3.33	3.92	4.52
Polarization	Phi	Theta	Theta
$\Theta(^{\circ})$	22.5	60	60
$\Phi(^{\circ})$	15	60	240

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

DG_1SS Max Value Position

Frequency (Hz)	5.2G	5.3G	5.6G	5.785G
Ant. 1 (dBi)	5.55	2.29	5.74	5.37
Ant. 2 (dBi)	1.5	5.41	2.94	0.69
DG [1SS] (dBi)	6.77	7	7.46	6.35
Polarization	Theta	Theta	Theta	Theta
$\Theta(^{\circ})$	67.5	60	67.5	45
$\Phi(^{\circ})$	322.5	210	315	322.5

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

**DG_1SS Max Value Position Calculation**

Frequency (Hz)	2.4G	2.45G	2.4835G
Ant. 1 [10 ^{^(G/20)}]	10 ^{^(1.76/20)}	10 ^{^(-0.07/20)}	10 ^{^(1.02/20)}
Ant. 2 [10 ^{^(G/20)}]	10 ^{^(-1.4/20)}	10 ^{^(1.79/20)}	10 ^{^(1.98/20)}
Ant. 1 [10 ^{^(G/20)}] value	1.225	0.992	1.125
Ant. 2 [10 ^{^(G/20)}] value	0.851	1.229	1.256
Sum All Antenna [Amax]	2.076	2.221	2.381
DG [10*log(Amax ² /Nant)]	3.33	3.92	4.52

Note:

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

Directional gain (1SS) = 10*log(10^{^(Gant1/20)}+10^{^(Gant2/20)}+ +10^{^(Gant3/20)} +10^{^(Gant4/20)}+.....)²/Nant)

DG_1SS Max Value Position Calculation

Frequency (Hz)	5.2G	5.3G	5.6G	5.785G
Ant. 1 [10 ^{^(G/20)}]	10 ^{^(5.55/20)}	10 ^{^(2.29/20)}	10 ^{^(5.74/20)}	10 ^{^(5.37/20)}
Ant. 2 [10 ^{^(G/20)}]	10 ^{^(1.5/20)}	10 ^{^(5.41/20)}	10 ^{^(2.94/20)}	10 ^{^(0.69/20)}
Ant. 1 [10 ^{^(G/20)}] value	1.895	1.302	1.936	1.856
Ant. 2 [10 ^{^(G/20)}] value	1.189	1.864	1.403	1.083
Sum All Antenna [Amax]	3.083	3.166	3.339	2.938
DG [10*log(Amax ² /Nant)]	6.77	7	7.46	6.35

Note:

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

Directional gain (1SS) = 10*log(10^{^(Gant1/20)}+10^{^(Gant2/20)}+ +10^{^(Gant3/20)} +10^{^(Gant4/20)}+.....)²/Nant)



8. Summary of Test Result

Freq(Hz)	2.4G	2.45G	2.4835G
Ant. 1 Max Gain (dBi)	2.24	1.21	2.09
Ant. 2 Max Gain (dBi)	1.11	2.35	3.12
Ant. 1 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/52.5/22.5	Theta/82.5/60	Phi/30/22.5
Ant. 2 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/60/165	Theta/37.5/255	Theta/37.5/247.5
Max Gain (dBi)	2.24	2.35	3.12
DG [1SS] (dBi)	3.33	3.92	4.52
DG [2SS] (dBi)	2.24	2.35	3.12

Note:

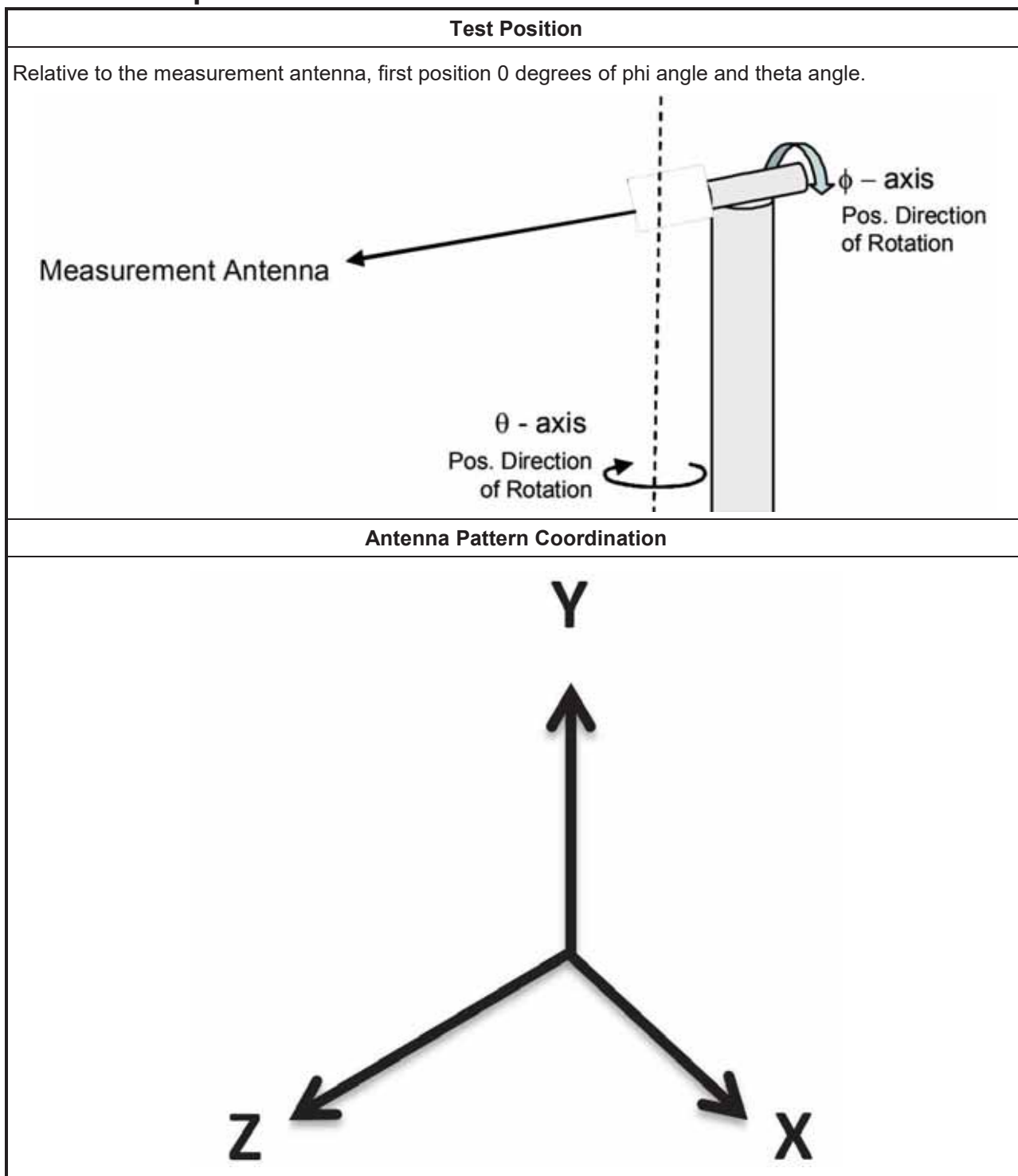
1. Antenna max gain is the max value of each individual antenna through all measurement angles.
2. The max gain is the max value of all antennas.
3. Directional Gain (2SS) = Directional Gain (1SS) – 3dB. If directional gain is less than max gain, use max gain as directional gain. Refer to KDB662911D01 (F) (2) (e) (ii)
4. Directional Gain (4SS) = Directional Gain (1SS) – 6dB. If directional gain is less than max gain, use max gain as directional gain. Refer to KDB662911D01 (F) (2) (e) (ii)

Freq(Hz)	5.2G	5.3G	5.6G	5.785G
Ant. 1 Max Gain (dBi)	5.55	5.98	5.87	5.49
Ant. 2 Max Gain (dBi)	5.48	5.41	4.88	4.65
Ant. 1 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/67.5/322.5	Theta/82.5/307.5	Theta/60/315	Theta/67.5/322.5
Ant. 2 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/60/210	Theta/60/210	Theta/60/202.5	Theta/45/232.5
Max Gain (dBi)	5.55	5.98	5.87	5.49
DG [1SS] (dBi)	6.77	7	7.46	6.35
DG [2SS] (dBi)	5.55	5.98	5.87	5.49

Note:

5. Antenna max gain is the max value of each individual antenna through all measurement angles.
6. The max gain is the max value of all antennas.
7. 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)
8. Directional Gain (4SS) = Directional Gain (1SS) – 6dB. 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.

NCR means Non-Calibration required.



11. Test Results

Please refer to the appendix.

Appendix A – Radiated Composite Gain of 2.4GHz.....	Page 14
Appendix B – Radiated Composite Gain of 5GHz.....	Page 20
Appendix C – Antenna Pattern of 2.4GHz.....	Page 27
Appendix D – Antenna Pattern of 5GHz.....	Page 30
Appendix E – Test Photos.....	Page 33

————THE END————



Radiated Composite Gain Data of 2.4GHz

Appendix A

Freq(Hz)	2.4G	2.45G	2.4835G
Ant. 1 Max Gain (dBi)	2.24	1.21	2.09
Ant. 2 Max Gain (dBi)	1.11	2.35	3.12
Ant. 1 Polarization/ $\theta(^{\circ})/\phi(^{\circ})$	Theta/52.5/22.5	Theta/82.5/60	Phi/30/22.5
Ant. 2 Polarization/ $\theta(^{\circ})/\phi(^{\circ})$	Theta/60/165	Theta/37.5/255	Theta/37.5/247.5
Max Gain (dBi)	2.24	2.35	3.12
DG [1SS] (dBi)	3.33	3.92	4.52
DG [2SS] (dBi)	2.24	2.35	3.12



Decade	2456/96	Thak	03/07/1922	03/07/1923	03/07/1924	03/07/1925	03/07/1926	03/07/1927	03/07/1928	03/07/1929	03/07/1930	03/07/1931	03/07/1932	03/07/1933	03/07/1934
03/07	4.8077-82	6.7651-84	5.5514-87	-3.322-08	-0.090-21	0.5511-11	1.3981-48	2.0900-94	0.0401-03	-1.710-28	-3.73-55	6.72-66	6.62-81	4.213-79	-3.892-56
04/07	5.34-39	5.41-84	4.55-41	-1.55-04	-1.55-04	0.1668-05	0.5931-09	0.9893-30	0.2662-03	-2.13-37	-5.95-83	-9.33-81	-8.80-82	0.5053-81	2.4711-34
05/07	-2.93-46	-2.83-42	-2.46-41	-1.29-40	-1.04-80	1.451-76	1.7717-52	1.8760-87	0.4481-17	0.0901-08	-0.7711-34	-2.271-36	-5.63-76	3.81-106	6.0911-74
06/07	-1.792-4	-1.792-4	1.3901-21	1.3202-33	2.9103-09	2.8802-37	1.6207-4	0.2605-55	0.0240-35	-2.36-32	-4.29-63	-6.611-79	-7.73-99	5.8803-81	-1.820-61
07/07	-3.34-89	-1.72-06	-1.54-10	1.4-26	1.25-34	3.0521-31	1.2901-19	-0.68-11	-1.261-13	-1.5-17	-2.02-26	-2.33-45	-2.79-35	-4.72-63	-6.16-17
08/07	1.1161-70	1.071-01	1.2552-01	1.2552-01	3.2203-35	2.8791-94	0.76-23	-0.7-08	-0.1-11	-1.37-17	-1.79-14	-0.88-04	-1.21-18	-2.19-04	0.50-67
09/07	4.691-65	1.30-87	0.64-86	1.65-78	3.48-58	3.0225-05	1.130-69	0.62-58	0.38-11	-0.24-01	-0.82-03	-0.21-10	0.22-07	-0.86-12	-2.51-12
10/07	1.3618-18	1.871-58	1.451-58	1.2632-22	3.9103-81	3.0425-05	1.421-39	1.561-51	1.23-95	0.770-62	0.54-68	0.39-23	0.07-02	4.71-14	-0.91-01
11/07	0.931-66	1.921-96	1.941-91	2.893-34	3.801-44	2.16-69	0.51-83	1.151-12	0.77-56	0.64-92	1.331-55	1.36-08	0.27-01	-0.53-04	-0.62-13
12/07	0.165-99	1.491-18	1.781-56	1.2701-37	3.88-18	1.56-16	0.10-41	0.57-07	0.66-10	0.051-23	1.16-07	0.26-13	0.34-16	0.56-17	0.24-16
01/08	-0.84-01	0.16-58	0.63-27	0.88-67	3.65-08	1.59-28	-0.07-23	0.261-36	-1.24-25	-2.19-18	-0.84-09	-0.17-75	-1.13-15	-1.11-12	-0.68-13
02/08	-1.01-05	-0.59-29	-0.07-26	0.07-26	3.51-89	1.46-14	-0.7-08	-0.56-14	-1.32-41	-3.21-19	-0.02-29	-0.75-16	-2.25-23	3.16-29	-1.6-07
03/08	-2.011-06	-1.06-07	-0.71-27	-1.51-23	2.74-23	1.08-12	-1.25-14	3.08-45	-5.81-76	-5.03-45	-2.69-18	-1.74-17	-2.371-19	-1.71-26	-2.33-15
04/08	-2.38-07	-2.48-08	-0.16-18	-0.39-15	1.41-35	0.381-14	2.99-381	3.34-39	-4.19-38	-2.42-35	-3.44-71	-4.90-35	-2.84-32	-2.811-4	-0.69-05
05/08	-3.18-13	-1.23-167	-1.43-27	-5.39-241	0.376-54	0.591-187	3.04-384	3.811-354	-3.78-048	-4.3-82	-2.571-7	2.68-494	6.471-538	4.5-49	-4.12-05
06/08	-2.04-37	-0.5-14	-0.27-23	-0.41-29	1.64-49	2.26-54	6.17-53	1.411-347	-3.99-59	-7.09-93	-4.19-49	6.241-74	8.23-624	5.82-65	-5.55-375
07/08	-3.361-19	1.68-74	3.86-67	-6.02-45	3.04-32	-4.617-48	9.42-783	5.75-155	-0.65-67	-0.25-72	-0.42-53	5.74-906	8.63-628	4.8-64	-4.64-93
08/08	-6.51-427	-6.71-425	-5.99-582	-6.46-118	1.29-601-37	5.871-867	0.800-184	1.29-601-37	5.871-867	0.800-184	1.29-601-37	5.871-867	0.800-184	1.29-601-37	5.871-867
09/08	-6.02-537	-4.84-148	-5.52-642	-7.32-756	11.22-939	-11.411-814	-11.76-107	-10.08-149	-12.261-131	-11.78-785	-5.99-663				



Radiated Composite Gain Data of 2.4GHz

Appendix A

φ(22.5°)	1.91257	3.14355	3.62338	2.67149	-0.01172	3.55149	-4.19335	-3.471374	-3.889335	2.21105	0.55139	1.89217	2.31236	2.32127	1.88131	0.36101	2.88146	-4.951473	-4.521441	-4.521474	-4.871432	3.891295	-1.781078	0.29124	
φ(30°)	1.3322	3.07369	3.93165	2.91154	-0.331269	-4.821494	-3.851287	-2.681307	-3.451299	-1.81154	0.54126	1.61176	1.85119	2.01207	2.20171	0.971024	2.07111	-4.61426	-4.771482	-5.521641	-6.481534	3.951273	-1.69179	-0.07088	
φ(37.5°)	-0.22085	2.19305	3.4703	2.47086	-1.591463	-6.261532	-3.821326	-3.211354	-3.911329	-1.971055	0.34097	1.25127	1.19121	1.43175	1.95181	1.131015	-2.091454	-5.461651	-4.961679	-7.411654	-7.251452	-3.191205	-1.31042	-0.62158	
φ(45°)	-0.321106	0.72102	2.76273	1.821007	-3.081696	-8.13164	5.5152	-4.791482	-4.751441	-3.411233	-1.461078	-0.331014	-0.241044	-0.271044	1.251157	1.081029	2.481601	-5.461622	-4.951617	-11.81164	-7.51527	3.851302	-2.51127	-2.411283	
φ(52.5°)	-1.521213	-0.451154	2.25246	1.67163	-3.331753	-9.57188	-8.081703	-5.81483	-4.56141	-3.361271	-2.211171	-1.211088	-1.151089	-2.021051	0.281033	0.381052	2.911489	-4.381044	-4.391638	-8.541066	-8.521686	5.831487	-4.02164	-3.631564	
φ(60°)	-5.32148	-3.351154	0.03617	0.061187	-4.711795	-9.491033	-10.961874	-7.31163	-6.041517	-3.891311	-2.571181	-0.78105	0.121079	-2.261217	-0.64131	0.31042	-2.431436	-4.44182	-6.131858	-8.841882	-6.781601	5.731497	-4.111387	-4.17164	
φ(67.5°)	-1.331318	-3.861339	-2.491188	-2.761564	-9.551939	-10.891001	-11.281986	-6.521615	-6.891642	-4.891442	-4.541033	-0.52126	1.51013	-1.581151	0.010191	0.831037	-2.991022	-7.111764	-7.351728	-6.041458	-4.2416	6.121588	-4.731426	-4.91181	
φ(75°)	-5.481	-4.321426	-3.511275	-3.35165	-8.01179	-6.951742	-10.75155	-10.87161	-8.84154	-3.63133	-4.891689	-4.19117	-0.431177	-4.231389	-1.45114	0.341098	-3.92173	-7.191692	-4.951494	-5.231536	-6.051786	8.251628	-4.55147	-4.811494	
φ(82.5°)	-5.341458	-4.671615	-4.191435	-5.21173	-9.91179	-7.921728	-9.121073	-9.291934	-11.13178	-4.161345	-5.131758	-4.77118	-1.51161	-6.431463	-1.6316	0.051137	-4.111689	-7.031624	-5.771675	-7.471732	-7.031799	8.231715	-8.18163	-8.72162	
φ(90°)	-5.791422	-4.06167	-7.631747	-7.841935	-10.41935	-8.08188	-11.551481	-10.521677	-11.771694	-4.51336	-5.891894	-7.971329	-2.291447	-9.561789	-3.361142	-1.431294	-6.571612	-8.071682	-5.671636	-7.141691	-7.181638	-10.391648	-7.731756	-8.091746	
φ(97.5°)	-9.121689	-4.611616	-8.151926	-10.32194	-12.071932	-7.321737	-10.271933	-11.071942	-13.319415	-3.991321	-5.171932	-4.16123	-2.321072	-12.511022	-5.713399	-4.021521	-7.141937	-8.391638	-6.031751	-8.391715	-8.471743	-8.691786	-10.111732	-7.991795	
φ(105°)	-10.92172	-5.76179	-8.121988	-10.32194	-10.861718	-5.99165	-9.611132	-12.031915	-4.441346	-4.981978	-6.641339	-3.961591	-10.991914	-5.601458	-5.52173	-8.031971	-7.151646	-5.011608	-6.031677	-6.116	7.241633	-6.991719	-8.911719	-7.991795	
φ(112.5°)	-10.891938	-7.181729	-6.651819	-8.4116	-8.051557	-4.771558	-8.591913	-9.431933	-14.531184	-6.72157	-6.41989	-7.991448	-5.16165	-13.391237	-4.171601	-4.811532	-6.311696	-5.87142	-5.221634	-6.691630	-6.711687	-5.621756	-5.511716	-10.331213	
φ(120°)	-10.711982	-8.471794	-7.861883	-9.921934	-8.761679	-6.381624	-11.341933	-8.821891	-12.151918	-7.47143	-5.821932	-7.71596	-6.061781	-11.851915	-10.291928	-8.661989	-7.071537	-3.8113	-3.831437	-6.411606	-4.871651	-7.551685	-4.761454	-8.57194	
φ(135°)	-11.911107	-9.741809	-7.171727	-8.141633	-7.11678	-6.421625	-7.821879	-8.241813	-10.591541	-11.621822	-8.711908	-8.431867	-8.97179	-8.531923	-6.571637	-4.851473	-4.141631	-3.391411	-5.391653	-4.961383	-3.871635	-8.16176	-7.74107	-8.71124	
φ(142.5°)	-14.821932	-9.211678	-3.961347	-3.811431	-4.211382	-4.041613	-6.891887	-8.831077	-14.181151	-12.161023	-11.091288	-12.21103	-10.2811	-11.561059	-8.681782	-7.72173	-6.251037	-5.011612	-5.24146	-3.96139	-4.791671	-10.821938	-14.961039	-12.841421	
φ(150°)	-10.341022	-8.441625	-4.521408	-4.611635	-7.571899	-10.111137	-11.571935	-11.321282	-16.051456	-14.631236	-11.641257	-13.451035	-11.911205	-12.351041	-8.731778	-6.821651	-4.341088	-4.146	-5.816	-7.241781	-8.86193	-8.831011	-10.481027	-10.561013	
φ(157.5°)	-10.481048	-10.451927	-9.251885	-8.71187	-13.151365	-11.551028	-9.581959	-10.521259	-15.691479	-15.111483	-14.551502	-14.741471	-13.941216	-10.461881	-7.41643	-5.321429	-3.721378	-4.261627	-6.751826	-9.471067	-12.13131	-12.691129	-12.441184	-11.731036	
φ(165°)	-13.161377	-13.321276	-12.621133	-13.131366	-12.911081	-9.231837	-8.281931	-10.111188	-13.781431	-14.311386	-13.981386	-13.641313	-12.61157	-11.491071	-9.561831	-7.07161	-5.81699	-6.691784	-9.091945	-9.651038	-11.811281	-13.721485	-15.181583	-15.311931	
φ(172.5°)	-14.751416	-14.281311	-12.891306	-13.011231	-11.381088	-10.531016	-10.061073	-11.941249	-13.341361	-12.981243	-12.191185	-12.051195	-12.621318	-13.411432	-13.121166	-10.561012	-10.111031	-10.511022	-9.531905	-8.271099	-11.321281	-14.621532	-15.751495	-15.771597	
φ(180°)	-14.811023	-15.521458	-15.121339	-12.681207	-11.141081	-10.931132	-11.541169	-11.561109	-11.031086	-10.611053	-10.181078	-11.281181	-12.851385	-15.351534	-14.581391	-13.731379	-13.561293	-12.07111	-10.481035	-10.591092	-12.221036	-13.351435	-13.951445	-15.221526	
Frequency	2.48352GHz																								
QdBS	φ(2°)/φ(2.5°)	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(137.5°)	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°)	
φ(1°)	9.31195	-11.8167	5.41318	-1.611651	0.31102	1.55188	2.07224	2.36232	2.66162	0.95109	-1.051246	-4.08169	-7.521671	-9.321665	-7.221516	-3.1115	-8.35148	1.11159	1.92208	2.13205	1.76128	6.51657	-1.771313	4.791715	
φ(1.5°)	5.61721	-8.781678	-7.211487	-2.781136	-0.40144	1.09149	1.86205	2.21217	1.89148	0.761026	-1.71386	-6.261625	-12.12173	-10.271784	-4.951281	-1.14012	6.99149	1.72119	2.0221	2.05194	1.73137	6.75109	-1.071196	-3.891424	
φ(1.9°)	-2.78141	-6.671699	-6.631359	-1.581019	0.79141	1.79206	2.17227	2.31236	1.99156	0.94105	-1.211284	-4.941783	-11.261537	-11.10169	-5.291247	-0.5919	1.6513	2.41232	2.18205	1.93175	1.95129	6.91162	-0.161072	-1.31139	
φ(2.5°)	-1.191227	-3.771477	-3.681168	-0.34108	2.55196	3.08196	2.75126	2.6913	2.07105	1.09129	-0.651177	-3.11179	-6.071828	-10.161881	-4.391345	-0.86107	1.91137	2.45227	2.182	1.71158	1.40114	2.79141	0.151011	-6.34168	
φ(3°)	-0.231619	-2.111325	-3.05112	0.03234	3.27191	3.88198	3.248	2.86125	1.951161	1.08162	0.991046	0.971175	2.19139	-4.931652	-6.371375	0.99102	1.99234	2.282	1.76173	1.91186	1.79147	0.961042	0.941098	-0.0101	
φ(3.75°)	0.9136	-0.23117	-1.841102	0.79243	3.43183	3.72128	2.77234	2.36179	1.51121	0.88157	0.43138	0.3392	-0.071074	-2.031376	-4.291221	0.37205	2.87191	2.4118	1.46148	1.73202	2.14196	1.5419	0.221016	-0.0307	
φ(4.5°)	0.63198	0.92148	-0.111	1.19203	3.57187	3.92195	2.37204	1.94182	1.201	0.60133	0.37158	0.74183	0.89183	-0.141428	-2.591142	0.94283	3.43138	2.76183	1.71188	1.01141	1.82198	1.76117	0.311037	-0.49104	
φ(5.25°)	0.13105	1.29125	0.83109	1.89321	4.02141	3.57184	2.39238	2.19185	1.48115	0.74043	0.47106	0.71076	0.8810	0.311645	-1.22107	2.18136	4.13198	3.18199	0.93129	0.13136	0.79113	1.111056	-0.421128	-1.531086	
φ(6°)	-0.37168	1.22148	1.3812	2.03138	4.012	3.87184	1.85138	1.65132	0.94083	0.74154	0.73101	0.95175	0.72101	0.161642	-0.221074	2.27198	4.5312	3.17178	0.74103	-0.19101	0.141048	0.43101	-1.081099	-2.27157	
φ(6.75°)	-0.89108	0.84138	1.03132	1.94329	3.72293	1.31107	-0.61108	0.311042	-0.791074	-0.711022	0.01109	0.88176	0.77104	0.411012	-0.141025	-0.341035	1.611058	2.83223	1.88131	0.511039	0.0910	0.551052	0.691007	-1.161022	-2.651033
φ(7.5°)	-2.36117	-0.721033	0.67102	1.102	3.01211	0.22114	-1.191039	-0.341101	-1.811229	-2.681284	-3.141094	-0.361039	-0.421023	-0.101025	-0.341035	1.611058	2.83223	1.88131	0.511039	0.0910	0.551052	0.691007	-1.161022	-2.651033	
φ(8.25°)	-2.12119	-2.151132	-0.61035	0.491024	2.81183	-0.23123	-2.161121	-1.181172	-2.211229	-3104	-2.421126	-1.071168	-2.11195	-1.581146	-1.11103	1.42222	2.31146	0.34101	0.40135	-0.38107	-0.131036	0.151072	-1.811524	-2.481023	
φ(9°)	-1.991189	-2.041196	-2.1214	-0.84156	2.57191	0.341155	-2.64127	-3.291452	-4.761449	-5.261624	-4.78127	-1.741811	-2.11182	-1.431166	-2111	0.35112	1.04103	-0.61065	0.11101	-0.681102	-0.40104	-0.321146	-2.961371	-3.151215	
φ(9.75°)	-2.291135	-1.111499	-1.21162	-4.151079	0.79104	-1.381303	-3.811377	-4.29147	-4.41124	-5.15152	-4.561423	-4.331432	-4.061287	-2.08124	-2.821163	-0.351013	-0.061065	-0.971084	-0.3106	-1.851198	-0.71108	-0.561206	-4.27149	-4.761303	
φ(10.5°)	-3.261177	-1.721208	-2.051403	-6.81287	-0.111005	-1.361287	-3.95144	-4.651449	-3.851325	-3.671149	-3.06124	-3.251457	-5.21145	-3.13134	-3.471178	-0.451004	-0.281086	-1.411138	-1.251212	-3.581279	-1.111046	-1.311332	-6.0417	-6.411619	
φ(112.5°)	-2.751078	-0.551141	2.281401	-7.451639	-3.02125	-3.621453	-4.931501																		

[illegible]



Radiated Composite Gain Data of 2.4GHz

Appendix A

(H22.5)	0.310.84	1.251.49	1.431.21	0.610.37	-1.55-26	-3.48-4	4.060.433	-5.777.44	-8.73-4.24	-5.763.18	-1.58-37.2	0.30.58	0.080.64	0.490.4	0.270.03	0.461.19	-2.19-3.4	4.916.15	-7.75-8.6	-8.43-10.22	-10.66-10.06	8.49.67	-4.58-3	-1.450.32
(H10.7)	0.911.46	1.872.26	1.971.56	0.8-0.39	-1.877.328	-3.837.37	3.83-4.19	-5.177.02	-8.867.98	-5.430.32	-1.450.48	-0.077.15	0.240.23	0.240.18	0.170.03	0.247.74	-1.54-25.1	-3.56-4.71	-5.827.15	-8.93-10.3	-10.96-9.24	-7.41-5.69	3.94-2.26	-0.840.3
(H07.5)	-0.040.75	1.417.71	1.641.15	0.19-1.31	-3.24-4.91	-4.887.37	3.86-4.16	-5.086.79	-8.617.91	-5.450.337	-2.121.153	-1.22-10.2	-0.780.51	-0.310.02	-0.12-0.2	0.56-1.21	-2.08-3.06	-3.88-4.48	-5.516.78	-8.72-9.78	-8.777.08	-6.08-5.32	-1.49-0.69	
(H04.3)	-2.651.11	0.140.87	1.886.03	-0.61-2.81	-5.41-8.2	-7.471.56	-4.78-5.47	-5.88-6.55	-7.373.51	-6.11-4.71	-4.04-3.31	-3.140.69	-3.172.26	-2.31-1.85	-1.32-1.03	-1.29-1.29	-1.33-1.31	-0.43-1.31	-0.061.52	-7.29-7.68	-6.95-6.51	-6.91-7	-6.91-7.24	-5.94-5.15
(H02.5)	-4.797.92	-1.26-0.01	0.688.54	-0.53-2.6	-5.41-8.2	-7.471.56	-4.78-5.47	-5.88-6.55	-7.373.51	-6.11-4.71	-4.04-3.31	-3.140.69	-3.172.26	-2.31-1.85	-1.32-1.03	-1.29-1.29	-1.33-1.31	-0.43-1.31	-0.061.52	-7.29-7.68	-6.95-6.51	-6.91-7	-6.91-7.24	-5.94-5.15
(H01.7)	-4.671.77	-5.93-3.4	2.3-1.7	2.36-4.05	-5.867.57	-8.99-9.9	-9.97-10.4	-8.48-8.52	-8.77-7.24	-5.12-4.08	-3.99-3.46	-4.49-3.94	-3.70-3.08	-3.35-3.83	-3.12-2.31	-1.651.32	-2.01-2.6	-2.73-3.12	-4.887.81	-6.36-7.49	-6.91-7.37	-6.39-7.08	-10.09-10.11	-10.46-10.3
(H00.5)	-4.99-7.4	-7.01-7.17	4.49-5.9	-6.99-9.25	-10.59-10.71	-10.83-11.28	-11.14-9.6	-8.29-8.47	-9.99-9.62	-7.34-6.22	-6.36-6.41	-5.22-5.34	-2.78-3.08	-4.04-4.35	-3.53-2.25	-1.29-1.35	-2.72-3.47	-6.94-6.44	-6.9-6.4	-5.39-4.17	-4.38-6.58	-10.74-12.55	-11.73-11.64	-12.28-11.02
(H00.3)	-3.22-6.89	-6.49-7.28	6.59-6.43	-7.65-10.7	-11.59-11.01	-11.01-11.01	-13.34-18.81	-14.89-10.83	-9.59-8.31	-6.94-6.67	-8.03-9.38	-7.85-6.53	-4.79-5.89	-6.88-3.84	-2.24-2.3	-4.03-6.12	-6.09-4.39	-3.68-4.26	-4.98-5.23	-6.09-6.44	-11.03-9.15	-7.81-6.83	-10.16-10.2	-10.16-82
(H02.5)	8.44-7.4	8.39-11.28	-12.73-11.38	-11.61-10.38	-11.59-11.51	-11.57-9.68	-12.10-10.71	-12.10-10.71	-7.69-7.32	-9.9-58	-7.08-4.48	-4.79-5.41	-6.98-5.98	-6.91-5.88	-2.42-2.52	-3.96-5.81	-5.67-4.8	-4.53-6.81	-6.79-6.28	-5.54-5.96	-8.51-8.37	-8.41-12.5	-12.10-10.2	-12.10-10.2
(H01.7)	7.49-5.75	6.22-6.51	-14.94-15.78	-14.91-15.35	-12.72-12.66	-13.83-14.89	-16.23-16.75	-12.69-11.74	-12.24-12.09	-9.41-8.99	-14.91-15.37	-6.89-6.16	-5.647.35	-11.91-15.12	-4.96-6.1	-4.68-4.8	-4.31-5.39	-7.02-6.45	-6.7-6.5	-9.94-9.54	-8.51-8.33	-11.19-10.96	-11.19-10.96	-11.19-10.96
(H00.5)	-12.89-8.37	7.52-10.11	-16.53-16.95	-16.49-15.75	-15.29-17.29	-11.45-10.98	-12.14-16.925	-16.29-16.83	-14.29-17.16	-8.95-9.38	-14.91-16.87	-7.39-8.08	-5.4-6.2	-16.10-17.46	-13.39-16.85	-7.23-6.05	-6.49-6	-7.53-6.15	-5.027.49	-6.7-6.15	-5.14-6.25	-6.03-7.31	-7.94-9.97	-14.59-17.94
(H00.3)	15.96-9.79	7.02-9.14	-17.59-16.96	-17.49-16.94	-17.11-11.52	-9.96-10.87	-8.99-9.36	-16.71-16.39	-13.49-17.38	-8.91-9.14	-11.3-12.16	-7.11-9.5	-16.47-17.4	-13.39-16.85	-6.77-6.08	-6.16-7.91	-5.77-6.36	-4.24-6.15	-6.49-6.25	-6.33-6.45	-6.29-6.52	-7.31-6.93	-10.53-16.19	-10.53-16.19
(H112.5)	17.98-16.77	11.88-12.56	-19.02-18.86	-18.47-19.84	-16.43-19.14	9.32-8.12	8.071.02	-15.071.08	-19.14-12.1	11.63-11.88	-13.44-11.86	8.19-8.64	-2.99-1.77	-16.67-17.56	-15.23-17.5	8.79-6.48	5.24-6.43	-4.58-3.92	-4.48-4.26	-6.33-6.47	-4.72-4.39	-4.79-4.39	-4.72-4.39	-4.72-4.39
(H110.7)	18.57-17.97	-12.71-11.99	-15.15-16.86	-16.21-16.56	-13.46-10.06	-13.31-11.78	-14.57-17.42	-17.98-17.54	-15.41-14.74	13.51-12.39	-11.43-11.88	-17.42-13.56	-14.93-17.43	-11.02-9.87	-8.8-8.64	-7.917.59	-3.16-3.46	-4.54-4.41	-4.46-5.25	-4.47-6.38	-5.2-6.21	-7.17-7.19	-7.17-7.19	-7.17-7.19
(H107.5)	17.65-16.33	-18.36-16.56	-17.69-17.69	-16.76-15.31	-13.48-11.42	-13.10-10.68	-12.75-15.32	-16.69-16.89	-15.91-14.56	-12.96-9.47	6.3-3.92	-10.54-11.1	-11.5-10.1	-12.71-13.32	-18.01-16.82	-14.26-16.46	6.013-8.34	3.11-12.2	-1.79-3.71	-5.96-6.67	-6.28-5.54	-6.72-6.82	-3.96-3.3	-4.61-3.02
(H104.3)	-17.12-13.1	-11.79-10.51	-10.58-11.21	-11.42-11.47	-10.89-17.48	-16.6-16.43	-17.08-18.77	-17.59-15.16	-14.86-18.77	-17.58-16.55	-12.07-10.35	-8.74-7.9	-10.72-13.36	-13.89-13.52	-11.4-8.54	-7.88-4.08	-4.66-3.78	-3.23-3.19	-3.96-6.3	-5.11-3.78	-3.69-4.86	-6.75-6.83	-8.13-7.5	-8.86-17.65
(H142.5)	-16.41-16.45	-11.31-8.98	-7.93-7.91	-8.75-10.35	-10.37-9.92	-10.18-11.47	-13.60-17.42	-19.7-17.8	-19.12-17.79	-16.81-14.56	-15-16.13	-17.14-17.98	-18.24-17.69	-18.14-15.69	-13.52-12.22	-10.98-9.15	-7.16-6.75	-4.58-3.67	-3.54-3.81	-3.96-4.43	-5.88-6.83	-13.02-18.52	-13.02-18.52	-13.02-18.52
(H140.7)	-13.86-10.65	-18.54-15.63	-12.23-10.63	-10.661.02	-13.37-14.36	-15.49-16.11	-19.26-17.88	-18.36-16.06	-18.66-17.68	-17.33-15.2	-14.71-15.56	-16.34-19.21	-17.34-17.66	-19.23-15.69	-12.89-10.44	-8.61-6.7	-6.04-6.02	-4.67-6.78	-6.97-6.84	-10.97-12.58	-11.64-10.48	-12.12-13.73	-12.12-13.73	-12.12-13.73
(H157.5)	-12.52-15	-18.02-17.63	-18.84-15.5	-14.061.37	-14.48-15.63	-16.49-17.29	-17.34-17.72	-17.38-17.83	-18.23-17.38	-17.79-16.86	-16.91-17.1	-17.07-16.15	-15.37-13.14	-11.36-8.81	-8.66-7.73	6.71-5.88	5.53-6.69	6.257.51	8.46-11.18	-12.45-14.13	-16.64-17.52	-15.56-13.81	-10.93-12.61	-11.84-11.28
(H164.5)	-16.49-15.45	-16.12-16.15	-15.77-15.44	-15.01-14.85	-15.56-15.81	-16.1-16.26	-16.91-17.98	-18.84-18.27	-17.08-16.83	-16.19-15.88	-15.58-15.16	-15.16-15.88	-16.91-17.98	-18.84-18.27	-17.08-16.83	-16.19-15.88	-15.58-15.16	-15.16-15.88	-16.91-17.98	-18.84-18.27	-17.08-16.83	-16.19-15.88	-15.58-15.16	-15.16-15.88
(H172.5)	-17.89-18.91	-16.06-15.01	-11.41-14.06	-14.24-14.68	-15.03-16.88	-16.39-17.84	-17.87-18.33	-18.94-16.36	-15.19-14.52	-13.74-13.15	-12.79-12.16	-12.52-12.81	-13.26-14.06	-15.21-16.21	-15.94-14.81	-14.14-14.15	-14.67-16.78	-17.77-16.47	-13.64-17.13	-11.29-11.98	-13.39-15.16	-12.07-17.61	-16.41-18.19	-16.72-18.69
(H180.5)	-18.01-18.2	-16.06-16.98	-15.15-14.43	-14.24-14.68	-15.03-16.88	-16.39-17.84	-17.87-18.33	-18.94-16.36	-15.19-14.52	-13.74-13.15	-12.79-12.16	-12.52-12.81	-13.26-14.06	-15.21-16.21	-15.94-14.81	-14.14-14.15	-14.67-16.78	-17.77-16.47	-13.64-17.13	-11.29-11.98	-13.39-15.16	-12.07-17.61	-16.41-18.19	-16.72-18.69
(H188.5)	-18.01-18.2	-16.06-16.98	-15.15-14.43	-14.24-14.68	-15.03-16.88	-16.39-17.84	-17.87-18.33	-18.94-16.36	-15.19-14.52	-13.74-13.15	-12.79-12.16	-12.52-12.81	-13.26-14.06	-15.21-16.21	-15.94-14.81	-14.14-14.15	-14.67-16.78	-17.77-16.47	-13.64-17.13	-11.29-11.98	-13.39-15.16	-12.07-17.61	-16.41-18.19	-16.72-18.69
FreeGain	2.455Phi.1	Theta.1	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Gain	(H07.5)(H10.7)	(H15.7)(H22.5)	(H04.3)(H02.5)	(H01.7)(H00.5)	(H00.3)(H02.5)	(H07.5)(H07.5)	(H10.7)(H10.7)	(H15.7)(H15.7)	(H22.5)(H22.5)	(H04.3)(H04.3)	(H02.5)(H02.5)	(H01.7)(H01.7)	(H00.5)(H00.5)	(H00.3)(H00.3)	(H02.5)(H02.5)	(H07.5)(H07.5)	(H10.7)(H10.7)	(H15.7)(H15.7)	(H22.5)(H22.5)	(H04.3)(H04.3)	(H02.5)(H02.5)	(H01.7)(H01.7)	(H00.5)(H00.5)	(H00.3)(H00.3)
(H07.5)	8.89-12.3	18.51-16.73	-17.73-8.97	-7.14-5.36	-4.931.38	2.98-2.34	-2.79-1.11	-1.01-87	-6.91-1.15	-1.53-2	2.76-3.33	5.21-6.36	8.98-11.56	-15.3-17.86	-16.88-15.21	11.39-8.48	4.513-4.1	4.88-3.07	2.25-1.89	-1.33-1.16	1.18-1.42	1.89-1.22	-3.36-4.19	5.16-6.81
(H10.7)	8.78-9.36	14.09-10.99	-17.92-13.99	-6.967.52	-4.99-3.37	2.98-2.34	-2.79-1.11	-1.01-87	-6.91-1.15	-1.53-2	2.76-3.33	5.21-6.36	8.98-11.56	-15.3-17.86	-16.88-15.21	11.39-8.48	4.513-4.1	4.88-3.07	2.25-1.89	-1.33-1.16	1.18-1.42	1.89-1.22	-3.36-4.19	5.16-6.81
(H15.7)	8.391.56	11.17-14.46	-13.43-9.75	-7.6-2.8	-4.29-3.41	2.98-2.34	-2.79-1.11	-1.01-87	-6.91-1.15	-1.53-2	2.76-3.33	5.21-6.36	8.98-11.56	-15.3-17.86	-16.88-15.21	11.39-8.48	4.513-4.1	4.88-3.07	2.25-1.89	-1.33-1.16	1.18-1.42	1.89-1.22	-3.36-4.19	5.16-6.81
(H22.5)	4.856-6.96	6.78-11.61	8.88-5.83	-3.54-2.56	-1.25-0.94	0.84-0.93	0.59-0.65	-0.760.9	0.17-0.03	0.51-1.43	2.57-1.40	4.58-5.17	-10.79-13.95	-18.31-12.92	-19.4-15.32	10.91-6.07	4.16-4.48	-0.59-0.28	2.51-1.99	-11.9-8.01	-12.5-10.13	-12.3-9.55	-9.93-1.61	2.49-5.04
(H04.3)	8.39-10.19	8.78-5.33	2.80-1.27	-0.48-0.5	0.890	0.00-0.3	0.729-0.96	0.890-0.57	0.29-0.92	3.42-2.87	-7.19-6.77	-10.79-13.95	-18.31-12.92	-19.4-15.32	10.91-6.07	4.16-4.48	-0.59-0.28	2.51-1.99	-11.9-8.01	-12.5-10.13	-12.3-9.55	-9.93-1.61	2.49-5.04	
(H07.5)	3.763-3.4	-4.575-8.69	8.56-5.23	-1.31-1.57	-0.610-1.6	0.020-0.6	0.270-0.7	1.031-0.8	0.840-3.4	4.20-1.41	2.45-3.45	-4.36-3.32	4.247-7.5	8.59-10.96	-10.79-14.92	2.704-5.69	5.02-5.26	5.9-5.94	4.893-3.1	-1.96-1.04	-0.53-0.39	0.59-0.86	-3.41-1.88	0.20-3.39
(H10.7)	-1.91-1.71	-2.12-2.58	-3.33-2.68	2.19-1.21	-0.55-0.28	0.34-0.25	0.040-0.49	0.150-0.63	0.10-0.43	-1.26-2.24	3.23-4.1	-4.36-3.79	4.58-7.32	8.59-10.96	-10.79-14.92	2.704-5.69	5.02-5.26	5.9-5.94	4.893-3.1	-1.96-1.04	-0.53-0.39	0.59-0.86	-3.41-1.88	0.20-3.39
(H15.7)	-1.501-1.26	-1.31-1.26	-1.31-1.35	-0.63-0.19	0.10-0.09	0.17-0.16	0.298-0.4	0.770-1.4	0.29-0.8	0.770-1.4	0.29-0.8	0.770-1.4	0.29-0.8	0.770-1.4	0.29-0.8	0.770-1.4	0.29-0.8	0.770-1.4	0.29-0.8	0.770-1.4	0.29-0.8	0.770-1.4	0.29-0.8	0.770-1.4
(H22.5)	-1.91-1.28	-1.21-0.95	-7.93-6.98	-0.43-0.38	0.47-0.21	0.89-0.91	0.45-0.57	0.610-0.25	-1.6-1.47	-2.76-3.14	3.68-4.33	-6.22-8.84	-7.91-7	-7.26-7.36	-1.34-0.23	1.020-0.6	0.12-1.18	-2.32-0.31	4.4-4.81	-4.56-3.87	-3.52-3.82	-4.68-4.18	-4.68-4.18	-4.68-4.18
(H04.3)	0.28-1.74	-1.58-1.16	-0.77-0.67	-0.380-7.6	-0.78-0.41	-0.2-31	-1.33-0.43	-0.53																



Radiated Composite Gain Data of 2.4GHz

Appendix A

(H10)	6.23-6.08	-7.31-6.64	5.25-4.09	-4.44-6.89	-6.28-9.19	8.76-10.37	-15.38-16.75	-10.86-9.16	-10.2-10.25	-7.92-6.79	7.29-8.27	-7.37-6.24	-4.26-4.73	-5.99-6.75	-4.13-13.1	-3.51-5.18	4.12-11.78	-15.38-18.58	-18.65-15.99	-14.71-15.68	-18.62-17.74	-14.71-11.35	9.14-21	8.83-8.41
(H82)	6.09-6.71	-7.2-7.13	6.071-49	-5.35-8.27	-12.03-11.23	-10.1-16.3	-19.34-18.87	-10.7-9.32	-12.85-15.82	8.94-7.85	7.76-8.91	4.43-6.69	-6.14-7.1	-9.85-8.58	-5.4-3.94	-4.12-5.51	4.12-11.93	-16.89-19.56	-18.62-17.07	-18.51-18.1	-18.47-19.34	-15.13-12.29	-10.45-8.64	9.84-10.04
(H105)	-10.89-8.92	-8.03-7.97	-7.38-6.64	-7.34-10.3	-13.12-11.05	-9.17-9.5	-13.32-19.03	-14.96-12.46	-18.32-17.41	4.87-6.39	6.71-8.86	-10.26-8.18	-11.94-13.08	-7.84-6.57	-5.51-4.82	-6.55-13.4	-16.68-17.78	-16.59-17.78	-16-17.33	-17.99-18.15	-18.34-15.87	-13.78-12.8	-12.92-12.77	
(H97)	-10.51-9.19	-8.71-9.08	8.77-14.14	-9.34-12.73	-14.81-12.44	-10.73-10.95	-14.27-16.63	-12.62-12.4	-17.82-14.58	-7.97-6.39	7.45-11.65	-12.75-8.05	-6.89-9.72	-11.72-14.21	-9.79-7.88	8.27-11.08	-13.3-17.44	-19.08-18.41	-18.99-16.28	-15.6-17.83	-18.4-17.45	-14.73-12.39	-11.56-11.1	-11.19-11.24
(H102)	-10.63-8.66	-7.46-6.83	6.06-5.6	-6.07-6.61	-6.98-7.22	-7.17-10.92	-18.31-14.67	-9.98-8.7	-13.44-18.14	-10.96-7.03	4.89-10.78	-17.27-13.72	-10.72-12.94	-18-13.26	-3.38-6.53	6.81-9.03	-13.17-17.12	-17.99-18.73	-17.34-14.82	-13.99-14.88	-17.27-17.13	-15.16-13.73	-12.22-13.1	-13.28-12.45
(H105)	-10.69-7.77	-5.96-5.34	-5.15-5.19	-5.93-5.53	-7.04-7.12	8.31-11.45	-19.33-15.46	-10.3-9.72	-14.14-18.85	-10.1-9.64	-6.83-11.15	-15.51-9.95	-8.32-9.54	-6.88-10.95	-10.46-17.72	-17.95-18.73	-17.15-13.28	-11.93-12.42	-14.21-19.19	-10.12-13.74	-11.41-12.21	-13.21-12.66	-11.62-11.1	-11.21-12.66
(H127)	-10.78-9.34	-7.84-7.19	-7.61-8.82	-10.26-11.08	-10.19-9.43	-11.05-17.36	-15.89-8.9	-6.39-6.79	-11.05-18.63	-10.53-7.2	6.81-19.16	-14.2-8.1	-7.79-8.26	-10.37-13.7	-12.78-11.1	-18.33-14.32	-13.87-17.17	-18.65-17.37	-12.88-12.08	-13.19-17.2	-18.29-13.71	-11.42-12.15	-11.25-11.93	-11.25-11.93
(H15)	-15.57-18.83	-16.15-10.44	7.96-7.19	4.87-6.2	5.22-4.7	5.3-7.36	8.58-8.32	4.73-6.96	-10.52-16.48	-13.59-9.84	-10.61-16.31	-18.54-14.08	-11.58-10.69	-11.41-12.03	8.91-8	4.15-9.48	8.92-8.1	6.27-11.68	-16.16-16.29	-12.52-11.37	-12.03-14.09	-16.38-14.33	-11.88-11.78	-12.79-13.7
(H142)	-15.44-13.12	4.19-5.5	3.93-4.5	-3.88-4.14	-4.54-5.05	6.22-6.33	-16.41-13.4	-9.73-10.8	-14.88-18.61	-13.91-11.06	-15.22-15.58	-17.21-14.9	-12.16-13.35	-12.26-13.25	-12.03-11.13	-11.77-12.84	-12.61-12.24	-13.67-19.58	-18.33-14.38	-11.19-16.78	6.88-10.46	-12.42-12.81	-11.81-17.1	-18.11-16.08
(H105)	10.36-8.3	4.62-5.04	4.29-4.41	-5.34-5.36	8.95-11.09	-13.52-15.12	-14.56-12.47	-12.28-16.98	17.17-17.65	-15.96-13.25	-13.11-14.61	-16.84-16.97	-15.99-14.34	-13.72-12.62	-11.65-11.17	-10.99-9.45	4.84-5.26	-19.14-18	-12.71-10.69	-10.71-10.69	-11.18-12.22	-14.5-14.5	-14.76-12.99	-14.76-12.99
(H157)	-14.98-12.94	-11.69-10.34	10.85-11.19	-14.98-17.62	-18.93-15.66	9.89-8.83	-10.89-11.61	16.78-15.11	18.95-15.43	-14.62-15.54	-17.76-18.65	-18.47-17	-18.95-15.47	-13.17-11.17	9.29-7.78	6.95-6.69	4.84-7.48	-5.84-9.44	-11.01-11.67	-12.72-12.23	-14.47-13.1	-13.67-14.08	-14.66-13.58	-14.66-13.58
(H15)	-18.29-18.82	-19.02-19.08	-18.83-18.17	-18.87-17.05	-13.18-10.67	9.49-7.9	7.52-7.74	3.71-5.15	-14.02-17.69	-18.82-17.38	-17.58-17.71	-17.45-17.77	-17.96-19.12	-17.31-19.16	-10.46-9	14.31-7.71	-7.64-8.03	8.50-10.16	-11.58-13.18	-14.82-16.26	-17.45-18.49	-16.47-18.92	-17.52-17.78	-17.52-17.78
(H172)	-17.39-16.38	-18.14-18.15	-18.72-18.16	-15.78-13.98	-11.53-10.25	9.49-4.91	8.75-9.14	-16.74-17.19	-14.73-19.23	-18.92-18.7	-16.38-19.88	-17.78-18.19	-18.44-19.13	-17.72-18.32	-15.83-13.71	-12.08-11.1	-10.16-10.33	-12.1-13.94	-16.19-18.32	-16.18-18.67	-18.47-18.94	-17.83-17.83	-16.04-18.97	-16.04-18.97
(H180)	-18.45-18.18	-17.91-17.15	-18.32-18.38	-17.17-15.5	-14.62-13.81	-13.62-13.58	-13.81-14.38	-15.38-16.8	-18.44-18.52	-16-17.73	-15.63-18.81	-17.94-18.18	-19.26-19.46	-17.95-16.72	-15.76-15.13	-14.72-15.03	-15.77-16.87	-18.21-16.76	-18.99-18.51	-18.02-18.47	-18.02-17.83	-18.49-18.85	-18.78-19	-18.59-19.32
FreeH0	2.455GHz	TherAnt 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gain	(H10)(H27)	(H15)(H202.5)	(H30)(H27.5)	(H45)(H262.5)	(H60)(H267.5)	(H75)(H2682.5)	(H90)(H267.5)	(H105)(H212.5)	(H120)(H212.5)	(H135)(H212.5)	(H150)(H212.5)	(H165)(H212.5)	(H180)(H212.5)	(H195)(H202.5)	(H210)(H212.5)	(H225)(H202.5)	(H240)(H247.5)	(H255)(H262.5)	(H270)(H277.5)	(H285)(H262.5)	(H300)(H307.5)	(H315)(H302.5)	(H330)(H337.5)	(H345)(H332.5)
(H1)	-19.13-13.93	-6.28-6.51	-4.59-5.19	-2.061-0.9	-0.30-1.6	0.510-0.7	0.580-37	0.04-0.4	-0.9-1.68	2.47-3.47	-4.87-6.85	-9.59-13.9	-1.64-14.2	-5.99-6.71	-4.51-2.87	-1.64-17.7	-0.55-0.46	0.760-87	0.760-5	0.15-0.36	-1.08-1.99	-3.15-4.55	-6.34-8.1	-11.82-17.28
(H7)	-15.84-12.41	-8.49-6.96	-4.99-3.46	-2.21-1.12	-0.37-0.21	0.550-7	0.620-43	0.06-0.45	-1.16-1.91	2.84-4.15	-6.02-8.87	-13.12-16.66	-18.86-12.21	-8.45-6.86	-3.59-2.51	-1.41-6.61	-0.01-0.44	0.730-8	0.680-43	0.07-0.42	-1.07-1.92	-2.95-4.19	-6.65-7.4	-11.99-12.52
(H15)	-7.88-8.22	-7.51-6.03	-4.36-2.85	-1.58-0.6	0.05-0.48	0.66-0.6	0.31-0.13	-0.73-1.43	-2.22-2.95	3.71-4.68	-5.73-7.53	-9.23-10.92	-11.62-10.15	-8.5-6.32	-4.31-2.58	-1.26-2.68	-0.04-0.83	0.960-83	0.510-0.6	-0.51-1.14	-1.79-2.44	-3.26-4.4	-4.86-5.56	-6.36-7.21
(H22)	-4.84-5.26	-5.28-4.52	-3.23-1.86	-0.71-0.13	0.57-0.73	0.55-0.12	-2.71-3.47	-2.49-3.5	-4.34-4.91	-5.29-5.56	-8.61-8.03	-4.19-4.49	-6.77-8.94	4.83-6	-4.47-2.74	-1.09-0.16	1.08-1.5	1.48-1.19	-1.62-1.92	-2.71-3.44	-4.08-4.59	-4.84-4.74	-4.91-4.59	-4.91-4.59
(H30)	-3.06-3.74	-3.76-3.59	-2.39-1.68	-0.90-0.08	0.98-0.82	1.01-0.87	0.25-1.04	-0.59-0.45	-4.75-6.81	-5.63-5.47	-3.89-3.41	-3.23-3.4	-4.54-4.88	-4.96-3.52	-1.44-0.35	-1.85-0.26	1.65-2.19	2.26-1.79	0.84-1.0	-0.86-1.12	-2.86-3.44	-4.08-4.42	-3.74-3.02	-3.34-3.82
(H37)	-2.63-2.77	-3.21-3.44	2.83-1.47	0.01-4	1.36-1	0.061-1.64	-3.37-4.74	-5.52-6.86	-6.01-5.98	-5.64-5.93	-3.95-2.85	-1.85-1.05	-0.88-0.76	-1.46-2.74	-3.39-3.69	-1.82-0.16	1.82-29	2.35-19	1.14-0.29	-0.52-1.19	-1.89-2.16	-1.77-1.31	-3.73-4.2	-3.34-3.82
(H45)	-2.79-2.68	-2.71-2.78	3.62-3.14	2.6-1.3	1.63-1	0.061-1.87	-3.31-3.69	3.47-3.25	-3.23-2.36	3.94-3.86	2.27-1.53	-0.78-0.03	0.55-0.76	0.46-0.4	-1.66-2.36	-1.51-0.41	1.32-1	2.11-72	1.4-0.3	0.3-0.67	-0.86-1.15	-2.55-2.34	-3.58-4.17	-4.4-3.43
(H52)	-3.17-3.72	-3.13-3.8	3.99-3.21	4.13-3.54	2.89-1.48	-0.14-2.2	-3.38-3.17	-2.57-1.27	-1.88-1.87	-1.52-1.25	-0.75-0.36	-0.55-0.8	0.45-0.5	0.63-0.5	0.83-0.52	4.81-1.15	5.33-9.56	1.54-0.55	2.03-0.7	0.83-2	-0.08-0.34	-0.57-0.88	-1.53-2.66	-4.94-5.01
(H57)	3.58-2.97	3.5-3.3	3.94-3.26	4.38-3.78	1.79-0.84	2.96-2.37	4.77-4.17	-1.24-0.98	0.09-0.9	0.66-0.42	0.29-0.4	0.66-0.42	0.29-0.4	0.71-1.22	4.9-0.82	1.14-1.96	1.41-0.87	0.03-0.02	-0.06-0.08	-0.23-0.93	-0.57-0.73	-4.11-4.52	-5.54-5.85	
(H67)	4.33-3.38	5.26-3.3	3.88-3.38	1.35-0.48	8.76-0.65	2.98-0.68	5.58-1.32	4.35-4.12	3.51-2.95	2.07-1.68	0.52-0.53	0.78-0.54	0.4-0.5	0.52-0.19	1.56-1.19	0.25-0.12	-0.03-0.46	-0.34-0.36	0.88-0.29	0.16-0.35	-0.16-0.35	-0.58-0.45	-0.58-0.45	
(H75)	5.59-4.37	3.84-4.14	4.79-4.65	2.57-0.42	0.11-1.1	3.21-4.53	-4.37-4.12	-4.51-5.31	-5.14-4.36	-3.9-3.78	2.55-1.09	-4.7-1	-3.19-0.97	0.59-0.29	-0.37-0.77	-1.37-0.1	1.32-1.11	3.1-3.83	-2.24-2.23	-1.76-1.12	-0.98-1.4	2.34-3.88	5.32-5.61	-5.71-5.78
(H82)	6.4-5	4.26-4.36	4.94-4.64	2.69-0.68	0.28-1.53	3.48-4.41	-4.28-4.34	6.33-6.06	5.37-4.32	4.14-4.25	2.82-1.53	-0.60-1.22	-2.79-2.92	-2.63-2.16	-1.76-1.1	-1.61-1.66	-1.77-1.98	2.37-1.12	2.36-2.32	-2.32-2.32	2.40-3.46	4.47-1.0	7.34-0.3	8.33-7.78
(H87)	8.81-8.79	-3.89-3.34	4.19-4.5	3.28-1.42	-0.86-1.93	3.89-5.44	4.87-3.18	9.58-11.51	6.93-6.91	6.83-6.85	4.54-2.97	2.54-2.76	2.98-3.06	3.02-3.26	-2.94-2.31	-2.23-2.5	3.03-3.42	-4.04-4.87	-5.16-4.44	-3.38-2.46	-2.17-2.87	-4.25-6.1	8.91-8.12	9.04-8.64
(H97)	8.81-8.79	-3.33-3.55	-4.26-4.56	4.38-2.38	-1.62-2.33	5.14-7.19	6.28-6.57	-10.89-9.33	6.71-6.22	-5.69-6.37	4.83-3.83	4.87-6	-4.22-5.66	-4.79-3.85	-2.96-2.19	-1.91-2.41	-3.23-3.72	-5.54-5.72	4.45-5.76	-4.39-2.84	-1.97-2.43	-4.68-6.73	8.97-8.18	-10.59-8.64
(H105)	8.81-8.79	-4.02-4.46	-5.89-7.97	4.81-3.39	2.07-2.1	-4.28-2.97	-7.68-6.88	8.83-8.95	4.98-4.96	-4.13-5.52	-5.11-5.43	-3.78-5.76	-7.48-6.03	-7.81-7.33	-6.74-6.32	2.38-2.34	-2.93-3.54	-5.48-6.03	-7.15-7.08	-6.08-4.49	-3.19-3.43	-5.49-6.13	9.49-8.95	8.95-8.45
(H112)	4.99-4.46	-5.10-4.66	6.74-10.95	8.07-8.01	-2.63-3.35	-5.55-8.7	-10.61-10.09	-7.89-6.52	-4.58-5	3.76-5.64	6.78-5.01	5.61-7.18	-8.03-8.27	-8.84-10.21	-8.80-7.08	-4.81-3.91	-3.84-13	-4.89-6.07	-7.63-7.74	9.12-8.5	-6.09-6.47	-7.30-7.95	-10.49-9.47	-7.89-8.21
(H120)	4.75-5.16	6.77-6.45	-12.86-18.48	-11.57-16.89	-4.48-4.59	6.51-9.3	-10.94-17.97	-5.84-4.5	-4.08-4.99	-7.48-7.81	5.13-4.41	6.85-8.14	8.75-9.13	-7.47-7.36	-8.42-9.44	4.76-7.78	-7.03-6.64	6.34-6.48	-7.15-7.77	-4.19-6.62	-4.86-7	6.33-6.68	-7.71-7.18	6.5-5.04
(H127)	6.01-6.62	-10.14-14.51	-18.21-17.28	-11.57-11.26	-10.52-5.63	8.04-12.46	-14.48-10.87	-6.52-7.82	-8.31-9.81	-10.99-7.9	6.75-10.63	-8.56-11.47	-11.63	-7.57-7.38	-10.10-11.75	-10.13-9.48	-5.77-7.08	-7.02-7.72	-9.13-10.36	-11.37-12.71	-13.15-12.19	-10.32-9.66	-11.21-12.12	-11.62-12.1
(H13)	4.52-6.06	9.28-12.68	-16.24-17.45	-16.54-14.08	-12.06-13.09	-18.14-18.33	-17.26-12.74	-11.22-11.76	-13.33-14.3	-12.48-9.73	8.46-9.36	-11.88-14.4	-12.02-6.42	-9.56-8.62	-10.06-16.38	-18.44-11.08	-8.							



Radiated Composite Gain Data of 5GHz

Appendix B

Freq(Hz)	5.2G	5.3G	5.6G	5.785G
Ant. 1 Max Gain (dBi)	5.55	5.98	5.87	5.49
Ant. 2 Max Gain (dBi)	5.48	5.41	4.88	4.65
Ant. 1 Polarization/ $\theta(^{\circ})/\phi(^{\circ})$	Theta/67.5/322.5	Theta/82.5/307.5	Theta/60/315	Theta/67.5/322.5
Ant. 2 Polarization/ $\theta(^{\circ})/\phi(^{\circ})$	Theta/60/210	Theta/60/210	Theta/60/202.5	Theta/45/232.5
Max Gain (dBi)	5.55	5.98	5.87	5.49
DG [1SS] (dBi)	6.77	7	7.46	6.35
DG [2SS] (dBi)	5.55	5.98	5.87	5.49



Radiated Composite Gain Data of 5GHz

Appendix B

(H22.5)	-1.67(-2.22)	-1.29(-0.87)	0.59(0.74)	4.8(-3.0)	0.38(-0.29)	1.97(-3.2)	-3.69(-1.93)	-1.27(-1.88)	-2.56(-2.47)	-2.03(-1.99)	3.81(-1.46)	-5.49(-7.27)	-8.94(-9.7)	-10.38(-10.06)	-8.28(-6.57)	6.31(-6.37)	6.22(-3.25)	-2.18(-1.78)	-2.18(-3.33)	-5.05(-5.87)	-4.87(-3.84)	2.69(-1.48)	4.39(0.34)	0.42(-0.24)
(H30°)	-1.63(-2.61)	-2.57(-0.88)	0.24(-1.6)	-2.32(-4.6)	0.50(0.2)	-1.38(-2.3)	-1.45(-0.03)	-0.26(-1.9)	-3.84(-7.38)	-2.9(-3.4)	4.55(-4.3)	-3.97(-0.8)	-6.15(-6.78)	-6.58(-9)	-11.45(-9.74)	4.14(-5.8)	6.63(-4.8)	-3.31(-3.6)	-1.24(-3.1)	-6.4(-8.8)	-4.34(-6.8)	5.55(-3.6)	2.58(-2.34)	-1.89(-1.7)
(H37.5)	-0.4(-1.6)	-2.32(-2.16)	-0.68(-0.76)	-1.5(-1.91)	-1.86(-1.67)	-0.68(-0.32)	-0.89(-1.5)	-1.15(-2.48)	-3.07(-0.72)	-0.3(-2.4)	-3.45(-3.81)	-2.91(-6.36)	-13.4(-14.8)	-8.82(-6.54)	-7.84(-7.9)	-4.78(-5.6)	-4.82(-5.5)	-2.86(-4.4)	-3.72(-2.22)	-1.36(-1.9)	-3.42(-2.56)	4.52(-2.05)	0.03(-0.45)	
(H45°)	-0.75(-2.93)	-4.18(-4.72)	2.24(-1.28)	-2.67(-2.75)	-3.59(-3.5)	-1.27(-0.34)	-1.35(-1.26)	-2.10(-4)	0.51(-0.02)	-0.2(-0.8)	-1.02(-0.45)	-1.08(-3.8)	-5.19(-5.17)	-4.97(-4.53)	5.99(-10.16)	-11.29(-8.7)	7.38(-6.87)	-6.55(-4.3)	-4.01(-4.2)	-2.82(-1.4)	-1.35(-2.3)	-3.89(-7.38)	-3.03(-1.78)	-4.20(-1.3)
(H52.5)	-0.79(-0.84)	-2.65(-5.62)	-3.07(-2.39)	-3.84(-3.95)	-5.41(-6.2)	-4.61(-5.3)	-1.84(-1.2)	-0.35(-0.2)	-1.62(-1.9)	-1.18(-1.08)	8.16(-27)	-2.52(-5.8)	-8.9(-8.5)	-8.26(-4.8)	6.36(-10.28)	-11.62(-12.3)	-10.32(-10.19)	-5.46(-4.75)	-6.93(-5.17)	-3.71(-2.85)	-3.83(-4.04)	6.25(-5.05)	-2.48(-1.82)	
(H60°)	-1.20(-0.6)	-1.65(-6.4)	-4.99(-3.75)	-6.63(-6.22)	-6.73(-7.58)	-7.19(-8.48)	-2.24(-1.36)	-1.67(-1.73)	-4.48(-4.39)	-3.81(-4.5)	-3.07(-1.9)	-3.72(-6.4)	4.36(-4)	-3.43(-4.77)	-6.49(-7.36)	-7.07(-10.77)	-12.73(-11.52)	-7.45(-6.71)	-6.93(-6.27)	-3.85(-3.24)	-4.46(-4.36)	-4.48(-4.1)	-1.46(-2.04)	-4.43(-2.8)
(H67.5)	-0.84(-1.6)	-2.26(-7.32)	-17.15(-4.75)	-8.57(-8.59)	-10.22(-9.19)	-4.41(-1.34)	-14.14(-14)	-4.89(-3.49)	-2.59(-2.11)	-3.19(-3.47)	-4.46(-4.05)	-5.42(-6.52)	-5.72(-7.1)	-5.28(-10.58)	-5.58(-10.12)	-12.73(-12.7)	-6.02(-6.83)	-2.23(-1.91)	-5.92(-5.86)	3.11(-3.96)	-3.25(-4.83)	-5.92(-6.09)	-4.25(-4.03)	
(H75°)	-0.95(-2.47)	-4.23(-9.23)	-8.55(-6.24)	-11.93(-11.47)	-11.93(-9.69)	-6.78(-15.32)	-7.95(-6.85)	-7.79(-5.42)	-2.87(-2.12)	3.54(-5.38)	-6.51(-5.2)	6(-6.67)	-5.89(-3.68)	-2.98(-5.87)	-3.44(-8.87)	5.24(-8.54)	-11.03(-13.87)	-10.89(-9.34)	5.76(-6.97)	-1.13(-1.44)	-7.09(-5.1)	-2.53(-4.2)	-8.37(-6.98)	
(H82.5)	-0.5(-1.7)	-7.41(-14.18)	-8.42(-8.85)	-10.52(-12.68)	-13.71(-9.64)	-8.81(-15.32)	-9.69(-9.21)	-8.94(-9.51)	-3.57(-3.75)	-6.01(-5.59)	-7.27(-12.28)	-7.14(-6.81)	-7.41(-6.27)	-3.65(-7.68)	-4.16(-7.52)	5.14(-8.89)	-15.13(-12.39)	-15.13(-12.39)	-7.16(-6.49)	-1.48(-2.19)	-9.82(-6.59)	-3.79(-5.58)	-4.18(-4.74)	-7.19(-5.56)
(H90°)	-4.19(-8.58)	-10.34(-14.17)	-17.79(-9.34)	-14.85(-16.89)	-13.95(-11.83)	-10.44(-14.94)	-13.85(-13.84)	-10.57(-7.51)	-5.63(-5.55)	-7.88(-7.57)	-7.77(-12.29)	-7.77(-12.29)	-10.4(-8.76)	5.15(-8.12)	5.23(-8.14)	5.98(-6.88)	-12.51(-13.73)	-13.91(-13.1)	-9.94(-9.24)	-4.01(-4.1)	-7.93(-6.43)	-4.93(-6.62)	-6.89(-6.54)	-6.34(-7.21)
(H97.5)	-5.69(-7.5)	-12.71(-13.82)	-10.54(-10.05)	-15.19(-11.29)	-15.03(-10.35)	-15.39(-14.58)	-10.77(-7.4)	-6.33(-6.22)	-11.0(-9.91)	-9.89(-12.33)	7.76(-5.5)	-13.59(-8.48)	6.46(-10.21)	5.72(-10.28)	-7.42(-10.21)	-14.84(-16.07)	-11.6(-9.38)	-7.75(-7.67)	-7.19(-7.4)	-7.34(-7.24)	-7.59(-7.16)	-7.41(-7.24)	-7.59(-7.16)	-7.41(-7.24)
(H105°)	-6.89(-8.48)	-14.51(-11.03)	-5.54(-10.6)	-12.55(-11.42)	-14.14(-14.68)	-17.41(-14.33)	-14.74(-15.27)	-12.93(-9.2)	-9.2(-9.17)	-10.75(-10.79)	3.54(-6.5)	-14.69(-12.37)	8.34(-10.74)	4.59(-8.91)	-11.76(-15.28)	-11.76(-15.28)	-11.76(-15.28)	-11.76(-15.28)	-11.76(-15.28)	-11.76(-15.28)	-11.76(-15.28)	-11.76(-15.28)	-11.76(-15.28)	-11.76(-15.28)
(H112.5)	-10.48(-8.62)	-15.19(-9.3)	9.79(-11.79)	-12.25(-12.92)	-13.84(-13.1)	-14.96(-15.63)	-15.19(-14.85)	-12.31(-11)	-10.33(-9.35)	-12.77(-11.81)	-11.77(-9.18)	-10.93(-13.05)	-12.23(-12.96)	-13.54(-12.46)	8.89(-10.89)	6.78(-9.82)	8.39(-10.81)	10.6(-8.5)	-10.89(-12.22)	6.24(-11.06)	8.89(-10.48)	9.37(-14.4)	-11.49(-11.91)	-11.99(-12.2)
(H119°)	-11.95(-14.28)	-11.95(-14.28)	-11.95(-14.28)	-11.95(-14.28)	-11.95(-14.28)	-11.95(-14.28)	-11.95(-14.28)	-11.95(-14.28)	-11.95(-14.28)	-11.95(-14.28)	-11.95(-14.28)	-11.95(-14.28)	-11.95(-14.28)	-11.95(-14.28)	-11.95(-14.28)	-11.95(-14.28)	-11.95(-14.28)	-11.95(-14.28)	-11.95(-14.28)	-11.95(-14.28)	-11.95(-14.28)	-11.95(-14.28)	-11.95(-14.28)	-11.95(-14.28)
(H127°)	-12.92(-14.82)	-10.73(-7.31)	-14.81(-11.83)	-8.9(-8.49)	-10.24(-11.65)	-8.98(-11.96)	-11.28(-11.1)	-13.02(-13.88)	-10.46(-12.41)	-13.16(-13.68)	-14.96(-14.3)	-10.93(-12.45)	-11.76(-12.47)	-15.07(-13.83)	-16.17(-12.99)	5.89(-10.89)	-11.73(-10.87)	8.2(-8.2)	-3.88(-9.59)	9.19(-9.17)	-13.02(-9.4)	8.55(-10.24)	-12.16(-9.81)	-8.64(-10.28)
(H135°)	-10.61(-13.58)	-10.65(-12.52)	-15.33(-11)	-11.25(-9.37)	-10.82(-11.08)	7.35(-8.54)	-15.66(-10.08)	-12.43(-14.54)	-13.75(-14.82)	-15.64(-13.81)	-13.81(-14.88)	-11.73(-11.1)	-12.16(-13.48)	-15.02(-9.17)	-12.64(-10.08)	-12.7(-8.2)	-14.48(-9.76)	-7.41(-7.17)	-6.87(-8.89)	-11.77(-11.77)	-11.85(-15.19)	-10.65(-12.82)	-10.57(-9.71)	-7.43(-12.82)
(H142°)	-12.65(-16.19)	-14.24(-14.29)	-10.96(-8.58)	-15.9(-8.61)	-8.47(-8.62)	8.19(-19)	-10.14(-10.68)	-15.57(-10.85)	-7.18(-9.15)	-8.69(-12.28)	-15.12(-12.78)	-14.15(-13.68)	-14.95(-11.25)	-14.86(-10.74)	8.71(-10.82)	-7.77(-8.18)	-14.31(-12.84)	-10.10(-9.06)	-6.76(-6.83)	-3.86(-10.22)	-6.67(-11.9)	-11.55(-14.49)	-10.65(-8.63)	-8.36(-11.3)
(H149°)	-10.49(-12.17)	-14.03(-15.78)	-12.11(-9.07)	-10.04(-10.62)	-8.44(-8.06)	8.2(-10.48)	-10.10(-10.35)	-11.19(-10.97)	-10.61(-10.55)	-8.44(-12.52)	-8.79(-11.12)	-10.87(-16.39)	-15.02(-13.39)	-12.97(-11.51)	-12.31(-15.07)	-15.76(-15.38)	-10.69(-8.35)	-8.10(-10.27)	-10.91(-9.37)	-10.43(-12.35)	-11.23(-12.06)	-10.11(-12.4)	-13.04(-14.3)	-13.04(-14.3)
(H157°)	-15.67(-14.48)	-16.33(-14.36)	-14.16(-14.28)	-15.75(-15.33)	-14.26(-10.3)	0.17(-8.69)	-10.94(-13.7)	-11.43(-12.79)	-14.81(-15.21)	-15.06(-13.89)	-10.91(-8.52)	-10.79(-11.73)	-12.84(-15.13)	-14.24(-15.45)	-13.85(-14.5)	-14.51(-10.83)	-16.16(-8.85)	-11.65(-11.82)	-10.88(-11.68)	-12.86(-15.08)	-13.93(-14.28)	-15.31(-15.99)	-15.31(-15.99)	-15.31(-15.99)
(H165°)	-13.78(-14.21)	-13.97(-13.57)	-13.13(-13.88)	-11.61(-13.68)	-11.61(-13.68)	-11.61(-13.68)	-11.61(-13.68)	-11.61(-13.68)	-11.61(-13.68)	-11.61(-13.68)	-11.61(-13.68)	-11.61(-13.68)	-11.61(-13.68)	-11.61(-13.68)	-11.61(-13.68)	-11.61(-13.68)	-11.61(-13.68)	-11.61(-13.68)	-11.61(-13.68)	-11.61(-13.68)	-11.61(-13.68)	-11.61(-13.68)	-11.61(-13.68)	-11.61(-13.68)
(H172°)	-14.18(-14.53)	-14.18(-14.53)	-14.18(-14.53)	-12.13(-13.19)	-8.43(-9.41)	8.21(-9.68)	-11.53(-13.5)	-15.03(-15.45)	-15.03(-15.45)	-14.11(-12.58)	-11.42(-11.58)	-11.55(-11.65)	-12.93(-13.52)	-10.57(-15.4)	-11.23(-15.11)	-14.94(-14.1)	-10.53(-9.78)	-9.71(-9.49)	-11.12(-12.34)	-12.26(-12.01)	-14.31(-15.01)	-15.35(-14.34)	-15.11(-15.35)	-15.11(-15.35)
(H179°)	-11.99(-11.36)	-11.15(-11.59)	-8.65(-7.3)	-7.67(-9.27)	-7.11(-9.25)	-10.86(-12.03)	-12.92(-12.49)	-14.86(-14.47)	-13.11(-13.78)	-9.59(-8.82)	-10.86(-11.82)	-11.59(-11.57)	-12.23(-12.92)	-12.91(-15.15)	-11.23(-15.11)	-11.78(-11.55)	-10.08(-9.87)	-10.14(-9.93)	-10.33(-10.82)	-10.10(-10.59)	-10.29(-10.26)	-9.55(-9.44)	-9.55(-9.44)	-9.55(-9.44)
FreeBW	5.65(FW)	Thermal																						
DoBW	(H7)(H27.5)	(H7)(H27.5)	(H7)(H27.5)	(H7)(H27.5)	(H7)(H27.5)	(H7)(H27.5)	(H7)(H27.5)	(H7)(H27.5)	(H7)(H27.5)	(H7)(H27.5)	(H7)(H27.5)	(H7)(H27.5)	(H7)(H27.5)	(H7)(H27.5)	(H7)(H27.5)	(H7)(H27.5)	(H7)(H27.5)	(H7)(H27.5)	(H7)(H27.5)	(H7)(H27.5)	(H7)(H27.5)	(H7)(H27.5)	(H7)(H27.5)	(H7)(H27.5)
(H7)	3.28(-2.85)	3.64(-3.1)	5.1(-5.51)	5.52(-5.32)	5.26(-5.48)	5.34(-7.42)	4.62(-4.51)	4.31(-4.26)	4.10(-3.71)	3.71(-3.36)	3.88(-3.3)	3.19(-3.3)	3.41(-3.77)	4.4(-4.67)	5.02(-5.61)	4.59(-7.3)	7.33(-7.14)	6.84(-6.19)	5.68(-5.86)	5.39(-3.43)	3.96(-3.29)	2.6(-2.28)	2.86(-2.54)	2.74(-2.54)
(H7.5)	3.29(-3.84)	4.48(-4.5)	5.34(-5.56)	5.91(-6.05)	4.95(-7.2)	7.16(-7.42)	5.96(-5.21)	4.75(-4.51)	3.97(-3.27)	2.91(-2.69)	3.52(-3.68)	3.28(-3.28)	3.43(-2.48)	4.27(-4.16)	4.47(-4.22)	4.04(-4.23)	4.36(-4.08)	4.1(-4.21)	3.98(-3.85)	4.19(-3.88)	3.11(-3.12)	3.17(-3.27)	3.56(-3.79)	3.98(-3.53)
(H8)	1.87(-2.42)	2.89(-3.2)	3.77(-4.12)	3.71(-3.55)	3.38(-3.54)	4.51(-5.67)	6.59(-6.12)	7.93(-6.03)	5.24(-5.48)	4.54(-4.78)	4.69(-4.11)	4.27(-4.1)	4.30(-5)	4.07(-3.8)	2.22(-2.55)	2.19(-1.89)	1.69(-1.34)	1.65(-1.34)	1.69(-1.34)	1.69(-1.34)	1.69(-1.34)	1.69(-1.34)	1.69(-1.34)	1.69(-1.34)
(H82.5)	0.56(-1.07)	1.61(-1.95)	2.93(-3.08)	3.72(-3.98)	2.16(-1.81)	1.71(-1.77)	1.19(-1.22)	1.59(-1.5)	0.92(-0.22)	1.49(-0.44)	1.94(-1.35)	3.2(-1.9)	1.89(-1.4)	2.77(-3.1)	4.29(-4.83)	4.29(-4.83)	3.69(-3.2)	2.14(-2.55)	2.73(-3.35)	4.19(-3.75)	4.77(-3.35)	3.69(-3.35)	1.46(-2.2)	
(H90°)	0.14(-0.32)	2.88(-3.09)	3.24(-3.12)	3.2(-3.12)	-1.02(-1.86)	1.51(-1.31)	0.28(-0.27)	0.29(-0.77)	0.17(-0.67)	0.96(-0.64)	1.77(-1.09)	1.96(-2.4)	2.51(-2.2)	3.73(-4.4)	4.74(-4.87)	4.91(-4.98)	3.21(-3.9)	1.97(-2.7)	2.97(-2.4)	2.69(-3.84)	4.02(-3.92)	2.1(-1.4)	6.32(-3.99)	
(H97.5)	1.34(-1.1)	1.02(-1.36)	2.27(-1.91)	0.94(-0.94)	0.6(-0.75)	1.88(-0.03)	1.96(-0.92)	1.35(-1.63)	2.44(-2.9)	3.71(-4.69)	4.94(-5.16)	2.78(-2.9)	2.52(-4.1)	8.5(-7.2)	4.86(-3.9)	4.95(-3.6)	4.25(-2.79)	3.94(-3.6)	3.67(-4.87)	6.96(-4.7)	6.19(-5.13)	3.88(-2.91)	1.54(-3.6)	
(H105°)	2.24(-2.01)	0.25(-0.83)	2.26(-0.92)	1.27(-0.98)	3.76(-1.4)	0.17(-0.82)	1.73(-2.1)	2.94(-3.5)	4.12(-3.63)	4.12(-3.63)	4.12(-3.63)	4.12(-3.63)	4.12(-3.63)	4.12(-3.63)	4.12(-3.63)	4.12(-3.63)	4.12(-3.63)	4.12(-3.63)	4.12(-3.63)	4.12(-3.63)	4.12(-3.63)	4.12(-3.63)	4.12(-3.63)	4.12(-3.63)
(H112.5)	3.19(-2.75)	2.36(-2.69)	2.06(-2.12)	1.17(-2.83)	2.97(-2.4)	1.17(-0.01)	0.94(-0.98)	2.72(-3.58)	3.98(-2.35)	3.35(-3.36)	3.82(-3.22)	2.83(-2.03)	1.87(-2.81)	4.32(-4.1)	5.93(-5.7)	4.33(-3.88)	6.24(-1.3)	3.51(-2.83)	2.87(-2.85)	3.04(-3.36)	5.65(-4.6)	7.48(-5.13)	7.32(-5.08)	1.62(-2.7)
(H119°)	0.33(-0.54)	0.51(-1.59)	0.43(-0.02)	1.35(-1.24)	1.97(-1.65)	0.72(-1.17)	0.64(-0.94)	2.01(-1.8)	4.53(-2.82)	4.68(-3.82)	1.92(-3.1)	1.57(-3.87)	4.81(-4.8)	6.84(-7.1)	3.48(-6.3)	3.02(-2.71)	1.19(-1.49)	1.22(-2.02)	1.42(-1.51)	7.37(-7.1)	4.44(-4.49)	1.89(-1.62)		
(H127°)	1.23(-0.5)	1.76(-1.85)	1.71(-0.3)	1.83(-1.6)	0.6(-2.2)	0.1(-0.6)	-0.25(-0.94)	1.87(-1.7)	4.62(-4.9)	4.4(-4.97)	5.99(-5.1)	2.08(-4.97)	5.84(-5.1)	6.01(-6.2)	3.58(-5.6)	6.48(-6.85)	2.50(-2.41)	0.16(-0.54)	-1.02(-1.45)	-4.85(-7.7)	7.49(-7.2)	8.62(-5.33)	4.81(-5.3)	
(H135°)	0.93(-0.92)	1.79(-2.39)	1.18(-1.08)	1.26(-1.21)	-1.19(-1.08)	-1.08(-0.64)	1.50(-1.69)	1.50(-1.69)	3.43(-4.4)	1.68(-3.8)	4.55(-3.99)	1.43(-3.7)	5.74(-6.1)	3.12(-4.1)	3.99(-3.6)	4.39(-3.67)	2.58(-2.05)	0.98(-1.7)	-0.36(-0.86)	5.89(-5.7)	6.48(-6.96)	6.16(-6.97)	4.81(-6.97)	
(H142°)	0.43(-1.66)	0.86(-2.35)	-0.12(-2.03)	0.3(-2.04)	-2.47(-2.86)	-2.07(-2.54)	-0.31(-0.87)	0.83(-0.68)	2.45(-1															

[illegible]



Radiated Composite Gain Data of 5GHz

Appendix B

(H22)	4.30±6.88	-4.9±3.58	-3.91±4.63	-5.6±5.05	-3.59±3.32	-3.14±2.86	-2.95±3.43	-3.91±4.76	-5.6±5.26	-4.64±3.88	-4.21±4.98	-4.19±8.4	-11.3±12.7	-14.86±15.85	-12.37±9.43	-8.07±9.67	-7.02±8.38	-1.99±10.8	-1.3±2.55	-4.23±4.97	-5.03±5.14	-4.89±4.1	-2.61±1.54	-1.51±1.84
(H30)	-4.2±3.8	-13.59±8.62	-6.4±6.13	-6.14±3.3	-3.22±2.75	2.89±3.25	-1.56±1.79	-3.49±6.33	-7.89±4.3	-6.04±2.7	-3.06±2.1	-3.4±6.95	-11.07±17.2	-13.74±14.29	-16.86±10.27	-9.99±11.2	-8.74±5.7	-4.02±1.92	-1.4±2.78	-3.96±3.19	-2.66±4.39	-7.57±5.59	-3.68±3.22	-2.27±2.44
(H37)	-8.18±1.7	-17.34±16.12	-6.57±7.71	-6.54±3.81	-3.19±3.61	2.26±3.53	-4.49±2.27	-5.53±7.08	-6.8±6.76	-4.86±5.94	-4.55±3.62	-3.07±4.15	-10.16±82	-17.96±17.89	-16.06±17.96	-13.96±11.69	-10.99±12.74	-4.45±2.64	-1.9±6.57	-3.61±2.26	-6.66±2.44	-6.61±11.28	-4.97±2.42	-1.72±1.41
(H42)	-4.56±1.73	-18.12±18.66	-7.76±1.5	-6.14±86	-4.61±4.88	-2.21±0.4	-0.87±1.64	-2.63±5	-5.59±8.62	-7.99±5.64	-5.14±6.19	-8.07±1.29	-8.79±1.67	-13.27±2.9	-8.63±12.31	-17.61±1.17	-16.17±12.91	-5.49±2.83	-3.51±4.7	-13.9±2.2	-2.81±5.02	-6.2±7.62	-7.12±5.11	-2.55±1.71
(H52)	-4.54±5.51	-12.67±4.63	-6.22±5.57	-4.97±7.39	-7.23±6.53	-5.29±3.69	-2.33±1.74	-1.64±3.02	-7.70±5.5	-6.46±3.92	-3.46±1.69	-10.62±19.18	-11.19±1.84	-17.96±1.86	-14.55±12.44	-15.81±15.84	-12.48±13.38	-5.49±2.86	-5.52±4.92	-7.03±11.83	-13.17±10.75	-5.67±3.71	-3.54±1.6	
(H67)	-2.57±6.57	-11.13±16.4	-6.87±5.81	-9.32±8.97	-9.96±8.87	-8.88±7.6	-3.54±2.16	-2.13±3.43	-7.36±10.36	-7.89±5.3	-4.53±5.27	-7.78±14.13	-16.63±7.51	-6.84±15.21	-19.15±10.94	-11.03±16.74	-14.33±11.74	-4.37±3.72	-6.63±6.26	-6.83±7.86	-5.84±12.01	-6.82±4.45	-6.07±3.38	
(H75)	-2.46±5.97	-9.96±12.66	-4.68±7.5	-13.31±19.19	-13.28±11.44	-14.18±11.46	-4.87±5.4	-4.59±4.2	-6.52±10.46	-9.86±7.46	-6.27±5.85	-7.47±17.33	-18.86±5.97	-5.64±12.84	-12.41±17.55	-11.99±18.08	-17.73±13.85	-9.32±10.55	-6.38±7.07	-4.37±3.72	-7.08±6.36	-5.72±9.72	-4.59±8.66	-7.67±1.67
(H75)	-2.59±8.1	-10.78±12.24	-12.5±10.1	-17.58±15.44	-17.08±13.67	-17.54±18.59	-11.42±9.52	-6.91±5.24	-5.96±12.24	-13.16±10.46	-10.20±15.6	-6.73±10.11	-19.23±11.3	-5.49±12.32	-7.88±18.74	-12.38±15.78	-11.14±17.37	-7.47±7.76	-2.92±2.75	-10.87±8.23	-3.66±5.1	-10.88±11.71	-13.18±6.66	
(H82)	-3.4±8.8	-14.61±17.7	-14.22±10.55	-18.12±15.3	-18.49±13.57	-18.47±19.94	-11.73±11.72	-8.04±	-7.18±14.23	-16.29±10.42	-16.1±12.42	-8±1.85	-18.91±6.5	-6.06±15.1	-7.16±15.96	-10.06±14.5	-17.74±17.38	-12.28±13.96	-5.96±7.47	-3.34±3.96	-16.87±10.57	-4.71±12.59	-10.64±3.6	-12.69±8.1
(H87)	-5.59±10.2	-18.44±16.3	-18.43±14.51	-17.48±1.81	-19.24±15	-17.11±7.4	-18.76±19.18	-16.57±14.98	-16.14±98	-19.33±12.22	-16.58±12.68	-17.72±17.71	-7.48±11.47	-8.12±13.12	-16.44±11.08	-16.95±16.51	-17.11±16.3	-15.48±14.34	-6.83±4.88	-17.75±16.76	-5.97±12	-13.72±10.88	-8.86±10.5	
(H87)	-5.61±10.9	-18.15±15.7	-18.21±15.5	-18.21±15.5	-18.21±15.5	-17.21±17.37	-17.21±17.37	-17.21±17.37	-17.21±17.37	-17.21±17.37	-17.21±17.37	-17.21±17.37	-17.21±17.37	-17.21±17.37	-17.21±17.37	-17.21±17.37	-17.21±17.37	-17.21±17.37	-17.21±17.37	-17.21±17.37	-17.21±17.37	-17.21±17.37	-17.21±17.37	
(H92)	-12.26±11.92	-17.14±12	-16.75±16.02	-16.75±16.02	-16.75±16.02	-17.81±17.02	-17.81±17.02	-17.81±17.02	-17.81±17.02	-17.81±17.02	-17.81±17.02	-17.81±17.02	-17.81±17.02	-17.81±17.02	-17.81±17.02	-17.81±17.02	-17.81±17.02	-17.81±17.02	-17.81±17.02	-17.81±17.02	-17.81±17.02	-17.81±17.02	-17.81±17.02	
(H112)	-15.12±12.41	-18.66±13.1	-17.49±12.34	-19.07±18.41	-19.02±18.1	-19.07±18.1	-17.76±18.46	-12.59±10.77	-11.84±16	-17.89±10.82	-17.65±12.16	-10.74±13.85	-18.89±13.61	-10.17±12.01	-7.25±9.35	-7.71±9.58	-5.99±13.95	-14.07±15.95	-15.98±16.15	-6.93±14.85	-11.84±8.0	-16.99±15.15	-12.76±11.72	
(H127)	-17.85±16.94	-13.49±14.65	-17.13±16.9	-18.21±14	-18.14±15.17	-18.67±16.9	-17.76±15.95	-14.06±10.78	-13.57±15.1	-15.10±16.3	-17.89±17.25	-10.95±18.37	-10.13±15.96	-18.44±12.87	-8.96±11.82	-8.15±11.41	-6.89±10.32	-12.75±15.98	-12.39±14.12	-13.71±11.55	-8.11±17.3	-13.76±10.87	-17.76±12.71	
(H127)	-14.36±17.19	-13.59±10.16	-18.27±15.55	-18.12±14.7	-17.17±75	-11.94±15.73	-17.36±16.38	-17.53±15.13	-12.27±14.06	-15.36±16.7	-15.26±16.75	-15.26±16.75	-15.26±16.75	-15.26±16.75	-15.26±16.75	-15.26±16.75	-15.26±16.75	-15.26±16.75	-15.26±16.75	-15.26±16.75	-15.26±16.75	-15.26±16.75	-15.26±16.75	
(H142)	-15.42±16.25	-15.62±12.98	-18.98±15.44	-19.16±122	-15.69±17.4	-14.16±13.19	-14.82±17.65	-19.02±16.16	-17.36±16.98	-16.89±16.94	-17.25±17.71	-18.91±13.3	-12.48±16.11	-16.74±12.94	-16.91±11.82	-16.74±12.94	-16.91±11.82	-16.74±12.94	-16.91±11.82	-16.74±12.94	-16.91±11.82	-16.74±12.94	-16.91±11.82	
(H142)	-13.46±16.66	-18.91±18.88	-15.25±13.98	-18.44±14.06	-12.14±13.05	-15.22±15.55	-15.85±17.17	-18.52±14.67	-12.61±13.76	-14.86±16.1	-17.82±13.55	-17.44±15.67	-18.13±16.36	-16.79±10.58	-10.15±55	-10.95±10.88	-17.49±15.83	-11.25±17.71	-10.89±44	-12.13±13.68	-14.06±18.63	-13.05±16.4	-11.6±5	-6.05±1.7
(H157)	-15.70±13.88	-16.09±16.4	-18.42±14.29	-18.42±14.29	-18.42±14.29	-12.07±11.86	-13.34±16.23	-18.22±17.48	-18.91±16.84	-15.83±13.76	-16.08±9.31	-6.68±13.05	-14.63±18.24	-16.64±19.49	-19.14±18.76	-16.64±19.49	-19.14±18.76	-16.64±19.49	-19.14±18.76	-16.64±19.49	-19.14±18.76	-16.64±19.49	-19.14±18.76	
(H157)	-15.70±13.88	-16.09±16.4	-18.42±14.29	-18.42±14.29	-18.42±14.29	-12.07±11.86	-13.34±16.23	-18.22±17.48	-18.91±16.84	-15.83±13.76	-16.08±9.31	-6.68±13.05	-14.63±18.24	-16.64±19.49	-19.14±18.76	-16.64±19.49	-19.14±18.76	-16.64±19.49	-19.14±18.76	-16.64±19.49	-19.14±18.76	-16.64±19.49	-19.14±18.76	
(H157)	-15.70±13.88	-16.09±16.4	-18.42±14.29	-18.42±14.29	-18.42±14.29	-12.07±11.86	-13.34±16.23	-18.22±17.48	-18.91±16.84	-15.83±13.76	-16.08±9.31	-6.68±13.05	-14.63±18.24	-16.64±19.49	-19.14±18.76	-16.64±19.49	-19.14±18.76	-16.64±19.49	-19.14±18.76	-16.64±19.49	-19.14±18.76	-16.64±19.49	-19.14±18.76	
(H157)	-15.70±13.88	-16.09±16.4	-18.42±14.29	-18.42±14.29	-18.42±14.29	-12.07±11.86	-13.34±16.23	-18.22±17.48	-18.91±16.84	-15.83±13.76	-16.08±9.31	-6.68±13.05	-14.63±18.24	-16.64±19.49	-19.14±18.76	-16.64±19.49	-19.14±18.76	-16.64±19.49	-19.14±18.76	-16.64±19.49	-19.14±18.76	-16.64±19.49	-19.14±18.76	
(H172)	-18.16±17.3	-16.02±15.78	-14.24±13.1	-12.83±12.3	-10.03±10.69	-6.85±14.04	-12.25±14.62	-17.16±17.33	-18.36±17.39	-11.10±14.46	-12.31±15.22	-12.24±11.98	-13.47±16.37	-17.16±18.91	-19.09±15.15	-16.29±18.12	-13.05±11.18	-11.24±11.94	-13.26±15.67	-18.01±18.81	-17.54±15.18	-16.16±18.17	-16.16±18.17	
(H172)	-18.16±17.3	-16.02±15.78	-14.24±13.1	-12.83±12.3	-10.03±10.69	-6.85±14.04	-12.25±14.62	-17.16±17.33	-18.36±17.39	-11.10±14.46	-12.31±15.22	-12.24±11.98	-13.47±16.37	-17.16±18.91	-19.09±15.15	-16.29±18.12	-13.05±11.18	-11.24±11.94	-13.26±15.67	-18.01±18.81	-17.54±15.18	-16.16±18.17	-16.16±18.17	
(H172)	-18.16±17.3	-16.02±15.78	-14.24±13.1	-12.83±12.3	-10.03±10.69	-6.85±14.04	-12.25±14.62	-17.16±17.33	-18.36±17.39	-11.10±14.46	-12.31±15.22	-12.24±11.98	-13.47±16.37	-17.16±18.91	-19.09±15.15	-16.29±18.12	-13.05±11.18	-11.24±11.94	-13.26±15.67	-18.01±18.81	-17.54±15.18	-16.16±18.17	-16.16±18.17	
(H172)	-18.16±17.3	-16.02±15.78	-14.24±13.1	-12.83±12.3	-10.03±10.69	-6.85±14.04	-12.25±14.62	-17.16±17.33	-18.36±17.39	-11.10±14.46	-12.31±15.22	-12.24±11.98	-13.47±16.37	-17.16±18.91	-19.09±15.15	-16.29±18.12	-13.05±11.18	-11.24±11.94	-13.26±15.67	-18.01±18.81	-17.54±15.18	-16.16±18.17	-16.16±18.17	
(H172)	-18.16±17.3	-16.02±15.78	-14.24±13.1	-12.83±12.3	-10.03±10.69	-6.85±14.04	-12.25±14.62	-17.16±17.33	-18.36±17.39	-11.10±14.46	-12.31±15.22	-12.24±11.98	-13.47±16.37	-17.16±18.91	-19.09±15.15	-16.29±18.12	-13.05±11.18	-11.24±11.94	-13.26±15.67	-18.01±18.81	-17.54±15.18	-16.16±18.17	-16.16±18.17	
(H172)	-18.16±17.3	-16.02±15.78	-14.24±13.1	-12.83±12.3	-10.03±10.69	-6.85±14.04	-12.25±14.62	-17.16±17.33	-18.36±17.39	-11.10±14.46	-12.31±15.22	-12.24±11.98	-13.47±16.37	-17.16±18.91	-19.09±15.15	-16.29±18.12	-13.05±11.18	-11.24±11.94	-13.26±15.67	-18.01±18.81	-17.54±15.18	-16.16±18.17	-16.16±18.17	
(H172)	-18.16±17.3	-16.02±15.78	-14.24±13.1	-12.83±12.3	-10.03±10.69	-6.85±14.04	-12.25±14.62	-17.16±17.33	-18.36±17.39	-11.10±14.46	-12.31±15.22	-12.24±11.98	-13.47±16.37	-17.16±18.91	-19.09±15.15	-16.29±18.12	-13.05±11.18	-11.24±11.94	-13.26±15.67	-18.01±18.81	-17.54±15.18	-16.16±18.17	-16.16±18.17	
(H172)	-18.16±17.3	-16.02±15.78	-14.24±13.1	-12.83±12.3	-10.03±10.69	-6.85±14.04	-12.25±14.62	-17.16±17.33	-18.36±17.39	-11.10±14.46	-12.31±15.22	-12.24±11.98	-13.47±16.37	-17.16±18.91	-19.09±15.15	-16.29±18.12	-13.05±11.18	-11.24±11.94	-13.26±15.67	-18.01±18.81	-17.54±15.18	-16.16±18.17	-16.16±18.17	
(H172)	-18.16±17.3	-16.02±15.78	-14.24±13.1	-12.83±12.3	-10.03±10.69	-6.85±14.04	-12.25±14.62	-17.16±17.33	-18.36±17.39	-11.10±14.46	-12.31±15.22	-12.24±11.98	-13.47±16.37	-17.16±18.91	-19.09±15.15	-16.29±18.12	-13.05±11.18	-11.24±11.94	-13.26±15.67	-18.01±18.81	-17.54±15.18	-16.16±18.17	-16.16±18.17	
(H172)	-18.16±17.3	-16.02±15.78	-14.24±13.1	-12.83±12.3	-10.03±10.69	-6.85±14.04	-12.25±14.62	-17.16±17.33	-18.36±17.39	-11.10±14.46	-12.31±15.22	-12.24±11.98	-13.47±16.37	-17.16±18.91	-19.09±15.15	-16.29±18.12	-13.05±11.18	-11.24±11.94	-13.26±15.67	-18.01±18.81	-17.54±15.18	-16.16±18.17	-16.16±18.17	
(H172)	-18.16±17.3	-16.02±15.78	-14.24±13.1	-12.83±12.3	-10.03±10.69	-6.85±14.04	-12.25±14.62	-17.16±17.33	-18.36±17.39	-11.10±14.46	-12.31±15.22	-12.24±11.98	-13.47±16.37	-17.16±18.91	-19.09±15.15	-16.29±18.12	-13.05±11.18	-11.24±11.94	-13.26±15.67	-18.01±18.81	-17.54±15.18	-16.16±18.17	-16.16±18.17	
(H172)	-18.16±17.3	-16.02±15.78	-14.24±13.1	-12.83±12.3	-10.03±10.69	-6.85±14.04	-12.25±14.62	-17.16±17.33	-18.36±17.39	-11.10±14.46	-12.31±15.22	-12.24±11.98	-13.47±16.37	-17.16±18.91	-19.09±15.15	-16.29±18.12	-13.05±11.18	-11.24±11.94	-13.26±15.67	-18.01±18.81	-17.54±15.18	-16.16±18.17	-16.16±18.17	
(H172)	-18.16±17.3	-16.02±15.78	-14.24±13.1	-12.83																				



Radiated Composite Gain Data of 5GHz

Appendix B

(H17)	-16.88-11.74	-16.36-18.88	-12.58-12.11	-13.03-18.87	-14.5-12.24	-14.48-13.76	-13.88-18.36	-18.49-8.45	-2.38-0.84	-1.64-3.51	-6.44-12.27	-10.55-6.28	-7.11-5.48	-6.75-6.41	-4.32-0.05	-11.58-13.71	-15.51-13.51	-11.21-14.78	-18.84-12.68	-14.56-7.84	-4.33-4.48	-6.22-7.71	-6.78-11.41	-7.89-7.78
(H82)	6.81-10.68	-18.62-17.85	-13.13-13.58	-14.76-14.54	-14.71-15.87	-18.74-17.78	-16.56-18.72	-18.29-8.88	-2.41-1.47	-2.38-3.27	-10.46-13.43	-6.59-8.93	-10.32-7.24	-8.49-5.88	-5.99-12.22	-17.11-19.23	-18.78-13.77	-13.63-18.65	-18.71-15.15	-14.36-7.16	-6.62-7.79	-8.88-1.18	-11.04-15.35	-6.41-6.71
(H97)	-12.51-13.2	-16.68-17.56	-14.61-17.65	-15.06-14.42	-13.06-14.7	-18.78-17.64	-19.07-18.13	-18.79-10.75	-4.39-2.7	-3.79-5.3	-10.2-14.63	-11.07-9.92	-14.93-11.12	-7.79-11.62	-7.99-13.92	-14.5-18.59	-17.41-17.4	-13.86-19.1	-16.66-10.87	-11.4-7.77	-10.11-12.39	-8.03-8.88	-11.06-12.48	-11.91-11.67
(H97.5)	-12.34-15.61	-17.58-13.82	-13.89-18.38	-14.17-17.22	-13.21-17.87	-18.71-17.76	-19.38-18	-18.07-14.11	-6.08-3.68	-6.31-7.08	-11.25-13.55	-12.41-11.49	-17.88-10.48	-9.26-15.33	-11.48-18.3	-13.79-18.01	-13.79-18.59	-16.79-17.65	-18.07-12.55	-14.41-11	-11.43-10.46	-7.53-13.37	-14.34-16.37	-13.37-11.45
(H105)	-11.88-11.7	-15.57-12.54	-15.65-15.99	-12.77-12.01	-12.55-18.71	-17.76-17.76	-19.38-18.14	-17.85-18.57	-10.52-6.08	-7.71-8.24	-11.93-14.15	-16.48-17.7	-18.51-15.1	-10.55-17.38	-14.85-18.28	-14.49-18.24	-17.17-18.95	-18.01-19.26	-12.49-16.78	-15.01-11.47	-9.41-12.95	-6.58-9.66	-18.01-17.48	-14.88-11.78
(H122.5)	-17.39-16.25	-15.16-13.57	-15.61-19.97	-10.59-9.24	-11.57-16.8	-16.87-18.47	-19.06-17.8	-13.45-9.81	-6.54-7.95	-8.82-13.48	-16.45-18.26	-17.81-15.45	-12.71-15.59	-15.19-14.78	-11.36-17.56	-18.47-18	-12.94-18.18	-13.92-13.39	-16.46-11.76	-11.81-13.07	-10.49-15.07	-17.81-19.37	-13.76-13.98	-14.78-13.96
(H127)	-10.68-18.6	-16.59-13.9	-13.71-11.12	-7.84-7.15	-12.41-11.75	-10.67-17.88	-18.21-18.43	-16.06-15.12	-12.69-10.9	-11.87-10.27	-12.12-14.86	-10.69-14.95	-13.88-10.68	-16.59-18.31	-18.26-14.21	-10.96-16.76	-15.86-18.63	-15.51-17.32	-12.99-11.11	-15.92-16.42	-8.53-8.33	-15.52-13.53	-14.78-13.16	-14.78-13.16
(H127.5)	-19.08-15.34	-19.42-19.22	-18.13-13.11	-8.89-8.3	-12.61-12.68	-8.57-11.1	-11.47-12.35	-17.62-15.1	-17.65-18.34	-16.06-13.01	-13.12-14.54	-11.85-13.88	-18.79-16.86	-18.84-18.69	-18.79-10.67	-15-16.89	-18.59-17.78	-12.84-11.61	-11.38-15.1	-11.57-13.39	-12.78-19.79	-11.04-14	-13.34-17.78	-14.76-17.95
(H15)	-19.08-17.21	-18.96-15.42	-15.23-11.93	-8.81-8.21	-9.19-11.17	-16.88-16.57	-9.23-8.61	-11.07-16.23	-13.61-16.34	-13.09-11.85	-14.57-14.24	-13.56-13.11	-17.17-13.2	-18.08-18.78	-18.84-14.7	-16.19-8.35	-18.12-16.26	-12.86-11.95	-11.37-8.51	-11.51-11.01	-11.52-11.18	-18.54-17.77	-18.01-18.07	-16.72-17.48
(H162.5)	-18.89-16.77	-19.35-18.68	-19.58-13.68	-16.75-13.18	-12.51-8.97	-7.97-10.17	-8.89-8.95	-10.96-8.9	-13.57-11.26	-9.85-12.41	-16.71-13.7	-11.68-13.53	-17.36-16.53	-17.28-16.42	-17.08-15.31	-13.51-10.26	-14.01-19.57	-12.91-12.16	-11.63-7.48	-12.98-13.82	-18.83-13.56	-17.87-16.18	-18.71-18.36	-15.56-17.54
(H197)	-16.59-8.08	-17.02-17.17	-16.51-14.25	-13.35-13.86	-13.56-11.17	-10.38-12.8	-10.46-13.32	-9.29-12.77	-14.15-8.3	-14.46-17.19	-16.46-13.51	-13.39-17.61	-17.53-16.56	-14.33-11.85	-10.73-13.52	-17.66-17.17	-12.62-10.89	-11.89-14.4	-18.33-18.94	-16.23-19.02	-18.94-16.77	-15.59-15.15	-13.89-14.91	-15.59-15.15
(H197.5)	-17.32-19.27	-18.44-18.13	-16.41-17.19	-18.56-18.11	-11.01-11.7	-8.23-9.86	-13.31-14.88	-14.09-16.46	-19.35-16.17	-19.35-16.17	-6.31-14.24	-16.07-15.68	-12.11-15.61	-17.68-18.81	-17.17-18.51	-17.71-18.51	-10.65-15.31	-16.86-15.31	-17.84-16.57	-11.16-10.31	-10.34-12.51	-18.63-18.39	-18.77-18.87	-17.45-17.73
(H197.5)	-17.89-19.96	-16.71-15.15	-15.89-16.74	-18.08-13.98	-10.18-12.62	-8.53-10.12	-12.28-16.84	-18.24-16.78	-17.24-17.14	-17.18-17.86	-13.86-18.69	-18.26-17.87	-16.56-19.51	-17.21-17.87	-18.37-19	-17.49-18.53	-17.41-8.39	-8.51-13.1	-16.59-18.02	-14.07-11.41	-10.11-10.55	-13.99-18.83	-18.12-17.93	-16.19-19.94
(H127.5)	-14.91-17.21	-17.46-18.84	-18.24-16.82	-12.76-10.94	-10.37-10.12	-10.10-10.37	-11.11-13.33	-13.73-11.11	-16.98-14.9	-14.59-16.15	-15.29-16.15	-17.19-18.46	-15.27-18.2	-16.54-17.67	-15.73-14.14	-13.51-14.4	-17.36-16.71	-17.59-19.18	-17.36-16.71	-12.94-11.05	-10.27-11.11	-11.78-17.18	-13.62-13.07	-13.57-13.78
(H197)	-17.07-17.65	-18.93-18.25	-18.85-17.07	-14.34-13.97	-13.35-14.89	-15.29-15.94	-15.57-16.47	-16.14-18.72	-18.28-17.81	-17.46-18.71	-18.57-18.92	-17.76-18.95	-18.25-18.98	-18.94-18.45	-18.16-16.75	-14.70-13.51	-12.86-13.2	-13.47-13.83	-13.54-13.2	-12.23-11.41	-11.79-12.07	-12.73-13.73	-15.72-16.35	-15.33-15.73
FreeNo	5.20Pn	TherAnt 2																						
Gain	(H17)(H97.5)	(H15)(H197.5)	(H17)(H97.5)	(H15)(H197.5)	(H17)(H97.5)	(H15)(H197.5)	(H17)(H97.5)	(H15)(H197.5)	(H17)(H97.5)	(H15)(H197.5)	(H17)(H97.5)	(H15)(H197.5)	(H17)(H97.5)	(H15)(H197.5)	(H17)(H97.5)	(H15)(H197.5)	(H17)(H97.5)	(H15)(H197.5)	(H17)(H97.5)	(H15)(H197.5)	(H17)(H97.5)	(H15)(H197.5)	(H17)(H97.5)	(H15)(H197.5)
(H17)	-18.83-16.72	-12.69-3.2	-7.43-6.26	-5.25-3.35	-3.65-2.89	-2.28-1.89	-1.46-1.53	-1.51-1.18	-2.14-2.61	-3.01-3.61	-4.67-5.96	-7.81-9.77	-11.21-11.78	-11.31-10.41	-8.91-7.77	-7.04-6.51	-5.98-4.93	-4.03-4.27	-3.86-3.89	-4.09-4.25	-4.86-5.54	-6.51-6.29	-10.75-13.17	-15.45-17.5
(H17.5)	-10.26-13.22	-12.26-11.08	-10.41-10.58	-8.79-7.78	-6.95-6.52	-5.54-5.46	-4.24-4.07	-4.14-7.2	-5.17-5.73	-6.69-6.83	-11.15-10.69	-13.69-13.73	-15.69-13.69	-14.47-13.7	-6.34-4.07	-3.36-2.83	-2.08-1.53	-1.22-0.95	-0.71-0.81	-1.06-1.46	-1.95-2.32	-2.71-3.59	-4.85-6.64	-6.58-6.81
(H15)	-11.48-12.35	-12.11-11.54	-10.83-11.28	-11.41-10.28	-11.54-11.01	-9.51-7.44	-7.57-7.77	-4.07-7.48	-4.97-7.48	-5.79-6.68	-7.09-7.72	-8.91-6.64	-6.81-7.44	-5.91-4.57	-3.71-7.2	-1.21-1.6	-0.24-0.74	1.27-1.62	1.72-1.56	0.02-0.64	-1.39-1.59	-1.8-2.15	-2.71-3.2	-4.99-5.85
(H22.5)	-4.04-1.4	-4.23-4.3	-4.44-4.83	-6.17-7.88	-8.76-8.59	8.77-7.22	-5.84-4.41	-3.22-2.34	-2.29-2.7	-3.17-3.13	-3.13-3.43	-4.46-5.69	-7.04-7.07	-4.62-4.62	-3.88-3.16	-2.59-1.69	-0.89-0.35	0.14-0.52	0.76-0.44	0.02-0.61	-1.38-1.59	-1.8-2.15	-2.71-3.2	-4.99-5.85
(H17.5)	-2.94-3.32	-3.42-3.48	-3.13-2.83	-3.11-3.31	-3.31-3.61	3.37-3.61	-4.48-4.13	-3.09-2.49	-2.73-2.78	-2.35-2.27	-2.85-2.67	-4.98-4.84	-1.97-1.91	0.79-1.49	0.99-0.18	-0.86-0.86	-0.35-0.22	-0.54-1.16	-1.52-1.11	-1.3-0.22	-2.95-1.43	0.048	0.219-0.22	-3.78-4.01
(H37)	-3.99-2.58	-1.86-2.5	-3.61-3.81	-3.21-2.5	-1.59-1.72	-1.86-2.3	-3.52-3.02	-1.95-1.38	-1.11-1.47	-0.01-0.41	2.21-1.7	-2.47-1.9	0.17-0.25	3.69-3.94	3.31-3.21	1.79-1.19	0.84-0.42	-0.37-1.17	-0.96-0.58	-0.61-0.68	-0.61-0.68	1.79-1.64	0.21-1.88	-2.83-3.2
(H37)	-2.77-6.99	-6.23-0.03	-4.58-1.55	-2.01-2	-0.98-1.23	-3.34-3.41	-2.18-1.07	-0.59-1.3	1.69-1.81	2.19-2.38	6.71-7.13	-0.01-1.47	4.91-5.22	2.45-3.42	4.47-6.1	2.89-2.7	2.06-1.46	-0.44-1.51	-0.7-0.47	0.19-0.51	-0.26-0.7	0.79-0.8	1.11-1.87	-0.59-1.08
(H52)	-4.79-3.96	-1.98-0.85	-6.95-3.35	-6.86-0.74	-15.23-3	-4.19-3.47	-1.03-0.2	0.12-1.35	2.92-3.8	2.92-3.8	1.12-1.24	2.41-1.78	1.14-1.44	-0.24-0.33	1.89-5.7	5.84-2.3	1.81-1.3	1.33-0.9	-0.26-2.39	-0.77-0.39	0.3-0.7	-0.73-0.42	-0.89-0.42	-6.72-8.13
(H162.5)	-11.67-9.61	-3.41-0.77	-6.02-0.76	-6.33-0.67	-1.23-0.76	-9.21-6.3	-1.95-1.92	-1.06-0.28	4.68-4.48	5.45-5.09	1.99-1.77	0.84-0.65	1.49-0.23	5.49-5.35	1.69-1.32	1.21-0.33	-3.36-1.22	1.77-0.16	-1.09-0.49	-0.69-0.69	-0.69-0.69	-0.69-0.69	-0.69-0.69	-0.69-0.69
(H97.5)	-1.81-1.1	-6.83-1.97	-3.39-1.42	-1.87-1.34	-1.63-1.16	-1.08-0.84	-0.51-0.16	-1.36-0.83	5.44-4.16	5.44-4.16	3.37-1.96	1.47-1.55	3.58-1.1	2.16-0.5	4.51-0.98	1.31-1.36	1.82-1.19	7.2-0.4	1.91-0.35	-2.92-2.68	0.27-0.4	0.88-1.4	3.98-1.4	-3.98-1.4
(H15)	-4.69-6.52	-5.23-2.16	-1.21-2.34	-3.32-1.7	-2.41-6.87	-17.79-11.57	-5.34-5.05	-3.81-8.3	4.04-2.37	4.32-3.94	3.75-0.88	0.44-0.43	2.13-0.48	0.87-0.52	2.17-0.2	1.72-0.8	1.72-0.8	1.72-0.8	1.72-0.8	1.72-0.8	1.72-0.8	1.72-0.8	1.72-0.8	1.72-0.8
(H82.5)	-4.34-0.24	-4.01-0.27	2.67-0.41	-5.26-2.59	-2.86-1.07	-17.77-12.88	-7.25-7.18	-3.99-6.1	2.81-2.25	3.07-1.86	-7.22-0.13	-1.04-0.27	-1.24-0.27	-0.38-1	0.91-1.5	2.47-0.94	-6.1-31	-1.62-3.26	-5.94-5.08	-1.02-0.08	0.87-1.14	-1.28-0.94	-5.97-3	
(H17.5)	-3.75-4.41	-4.31-1	2.76-4.59	-6.37-3.77	-4.83-6.81	-3.82-12.08	-8.53-9.58	-7.98-9.49	-3.35-12.2	0.16-75	-6.69-5.73	-6.69-5.73	-6.69-5.73	-6.69-5.73	-6.69-5.73	-6.69-5.73	-6.69-5.73	-6.69-5.73	-6.69-5.73	-6.69-5.73	-6.69-5.73	-6.69-5.73	-6.69-5.73	-6.69-5.73
(H97.5)	-8.59-6.31	-4.62-3.22	-6.32-3.46	-6.21-3.39	-4.88-6.11	-19.27-10.54	-6.72-10.57	-3.93-6.27	4.41-3	-6.87-1.35	-3.99-6.37	-2.94-3.33	-2.74-3.52	-5.81-4.11	-1.51-1.52	-1.43-1.59	-0.41-0.42	-0.53-0.46	-0.89-0.83	-2.89-3.4	-2.29-3.52	-5.11-7.02	-4.97-6.15	
(H15)	-6.36-6.68	-4.91-3.01	-4.72-4.81	-5.74-5.84	-7.38-10.15	-17.99-11.42	-6.96-14.22	-12.4-4.87	-6.74-6.53	-3.95-4.49	-6.52-7.78	-0.89-6.57	-4.63-4.77	-3.71-5.64	-3.54-11.54	-6.51-6.52	-1.72-0.88	-8.97-43	-10.47-8.9	-7.89-11.44	-6.18-5.21	-5.21-5.75	-5.86-7.56	-4.16-9.82
(H122.5)	-5.92-6.27	-5.56-5.34	-5.56-5.34	-5.56-5.34	-5.56-5.34	-5.56-5.34	-5.56-5.34	-5.56-5.34	-5.56-5.34	-5.56-5.34	-5.56-5.34	-5.56-5.34	-5.56-5.34	-5.56-5.34	-5.56-5.34	-5.56-5.34	-5.56-5.34	-5.56-5.34	-5.56-5.34	-5.56-5.34	-5.56-5.34	-5.56-5.34	-5.56-5.34	-5.56-5.34
(H17.5)	-6.53-6.56	-6.61-6.41	-7.76-6.68	-6.25-11.28	-11.52-11.77	-18.95-17.69	-15.64-17.68	-14.42-17.16	-9.45-6.87	-6.06-6.13	-11.36-11.43	-12.35-16.48	-7.53-11.1	-12.23-8.67	-11.29-6.86	-6.96-11.8	-11.04-0.41	-11.75-8.44	-10.45-7.26	-10.35-10.28	-4.29-4.51	-6.96-10.82	-6.55-6.89	
(H127)	-6.17-6.91	-6.76-6.89	-7.71-7.13	-																				

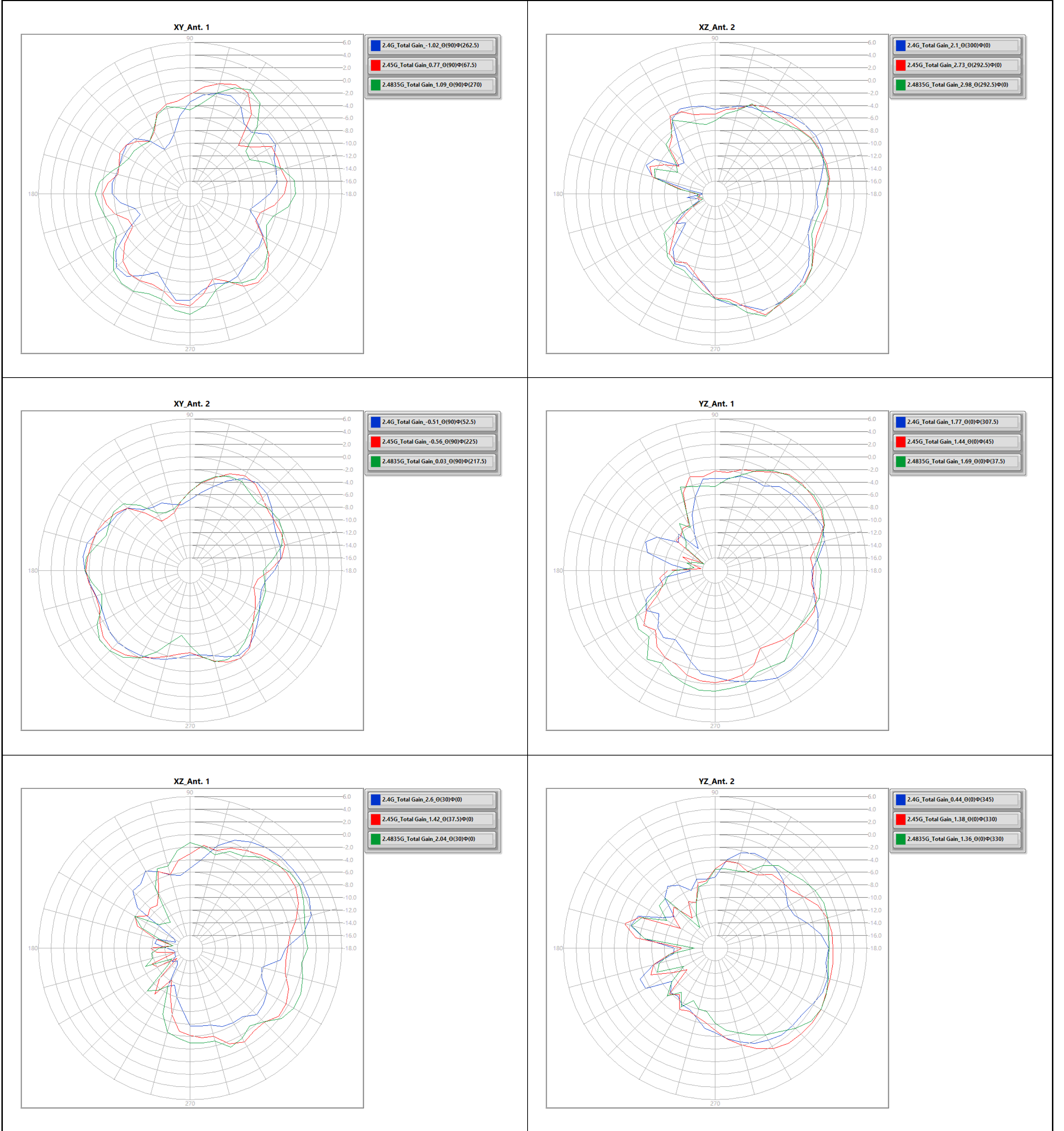


Antenna Pattern of 2.4GHz

Appendix C

θ(22.5°)	0.0206	0.08092	1.211140	1.461143	1.281104	0.63017	-0.350184	-1.261152	-1.661170	-1.671161	-1.501131	-1.071080	-0.611048	-0.401034	-0.200109	0.520199	1.421165	1.611138	1.000157	0.061042	-0.791104	-1.171118	-1.031080	-0.531023
θ(30°)	0.386101	0.480199	1.401170	1.831180	1.520199	0.251080	-1.801280	-3.121324	-3.011262	-2.211172	-1.221075	-0.280101	0.110109	-0.091029	-0.381013	0.441122	1.962135	2.321194	1.380172	0.011067	-1.271174	-2.001203	-1.891165	-1.241081
θ(37.5°)	-1.101058	-0.010109	1.141159	1.912102	1.791114	0.021143	-2.891389	-4.171390	-3.371277	-2.071132	-0.480131	0.821299	1.331116	0.740122	-0.201025	0.241110	1.912135	2.381196	1.360165	-0.091069	-1.141141	-1.561170	-1.821194	-1.831150
θ(45°)	-1.621108	-0.801008	0.521118	1.762114	2.091141	0.171157	-3.111351	-3.201262	-2.191189	-1.541100	-0.220161	1.311180	2.011139	1.591116	0.680131	0.521106	1.680109	2.151177	1.190151	-0.111055	-0.791086	-0.991134	-1.841238	-2.451215
θ(52.5°)	-1.851126	-1.091077	-0.181069	1.632134	2.431168	0.101196	-3.261306	-2.131136	-0.871060	-0.411033	0.691132	1.761157	2.001183	1.471103	0.691064	0.911137	1.842111	2.071162	1.011043	-0.021028	-0.591066	-0.981158	-2.301287	-3.021254
θ(60°)	-2.121157	-1.471149	-1.181037	0.611081	1.920195	-1.001349	-4.611399	-2.811203	-1.421089	-0.581023	0.891164	2.202139	2.302102	1.541106	0.501029	0.480194	1.431164	1.460192	0.380109	0.011000	-0.981045	-0.891151	-2.131269	-2.941256
θ(67.5°)	-2.701197	-1.591155	-1.451031	0.050167	1.050103	-1.801391	-4.821413	-3.441310	-2.661193	-1.391101	0.011128	2.142163	2.732150	2.201163	1.300191	0.491025	0.290131	0.071038	-0.771088	-0.541011	0.001033	0.971169	-2.341298	-3.821370
θ(75°)	-4.531283	-2.231220	-2.001135	-0.390150	0.571046	-2.141352	-4.941389	-3.891381	-3.961336	-2.451202	-1.291033	0.150139	0.540156	0.530179	1.181122	0.701033	0.501075	-1.131174	-2.141205	-1.541105	-0.911130	-2.191316	-3.801247	-4.831489
θ(82.5°)	-5.531310	-2.541252	-2.291188	-0.780102	0.001109	-2.611366	-4.131419	-4.221439	-4.651422	-3.101262	-1.611080	0.681089	-1.141160	-1.881127	-0.200140	0.821116	-0.821147	-2.221300	-3.461327	-2.681221	-2.231250	-4.111519	-5.591575	-6.811574
θ(90°)	-5.571537	-2.451242	-2.491243	-1.851089	-0.831143	-2.761400	-5.631491	-4.471495	-6.991654	-4.011310	-2.481197	-1.861186	-1.531185	-2.501247	-1.491033	0.591113	-2.161033	-3.891486	-4.971424	-3.161232	-1.991235	-4.941540	-6.101605	-7.941722
θ(97.5°)	-5.271110	-2.221248	-2.971339	-3.141230	-1.671247	-4.081566	-7.311479	-6.901759	-6.441174	-3.291295	-2.901316	-4.041389	-3.441330	-3.991367	-2.711115	1.001174	-2.801354	-4.391549	-6.151539	-4.621271	-1.871230	-4.071599	-6.461716	-7.871736
θ(105°)	-4.971350	-3.101351	-4.941472	-4.441256	-1.481170	-3.261547	-7.371148	-6.901611	-4.601367	-2.821275	-2.521352	-3.631491	-5.161500	-6.391617	-4.141234	1.481198	-2.791335	-4.591177	-6.881344	-5.241039	-3.051320	-5.221644	-7.241144	-7.981685
θ(112.5°)	-3.991306	-3.121373	-4.191449	-3.821311	-1.181196	-3.271666	-10.231479	-9.291389	-4.991470	-5.791510	-3.811399	-5.321633	-6.161700	-8.431646	-6.031370	2.691275	-3.231392	-4.691584	-7.191716	-7.901760	-6.591606	-7.091781	-8.261791	-8.791528
θ(120°)	-3.791326	-3.941382	-4.471496	-4.981370	-2.571286	-4.221723	-9.521726	-8.511336	-3.691482	-5.591404	-2.891365	-5.401584	-5.521677	-8.691705	-7.441657	-5.961402	-6.451631	-8.021424	-8.741672	-6.691711	-7.141675	-6.951695	-5.161635	-5.161635
θ(127.5°)	-6.801636	-5.831645	-7.321824	-7.981672	-4.101412	-6.261138	-11.981676	-4.321426	-6.461936	-7.741453	-3.981633	-7.511711	-6.991656	-8.691479	-8.181641	-8.301163	-7.201633	-8.201725	-8.891957	-9.091937	-10.331100	-9.691840	-7.721081	-8.261734
θ(135°)	-7.741717	-6.531840	-7.651860	-6.581634	-4.411411	-6.081702	-8.711698	-5.411572	-8.381122	-10.131677	-6.391648	-11.031113	-8.791646	-9.311568	-8.921762	-7.761720	-6.081627	-5.331639	-7.711877	-7.171876	-7.211773	-7.351642	-6.301731	-6.281605
θ(142.5°)	-10.771695	-7.881530	-3.751326	-3.381082	-4.291487	-6.941788	-9.571825	-8.841109	-12.771156	-12.221877	-9.791180	-14.691138	-10.341730	-8.111620	-7.221834	-10.901188	-11.601095	-11.671342	-12.351058	-8.421723	-8.861497	-7.171730	-7.771866	-10.411100
θ(150°)	-8.741682	-6.231414	-3.571374	-1.631612	-8.061025	-12.211283	-10.861043	-10.061066	-11.151159	-11.601054	-10.161030	-13.881282	-11.881089	-10.471040	-9.931811	-7.781566	-8.141628	-10.341042	-8.521852	-7.841780	-6.681017	-12.021331	-13.011125	-13.011125
θ(157.5°)	-6.801640	-6.031637	-7.131480	-10.261236	-12.821053	-8.151434	-5.141347	-4.001394	-4.221478	-6.001175	-8.491046	-13.311549	-15.711438	-15.411377	-12.021045	-8.861727	-6.421617	-6.201651	-6.961738	-7.471717	-8.761770	-7.151006	-6.791833	-8.201730
θ(165°)	-7.731776	-8.271901	-10.051069	-11.101032	-6.221365	-5.671424	-3.131240	-1.991188	-2.101266	-3.651496	-6.731699	-11.271142	-14.961156	-15.041163	-13.691175	-9.761811	-7.891733	-7.361745	-7.941658	-6.041619	-9.091604	-6.301668	-6.811743	-8.401793
θ(172.5°)	-12.681192	-13.471146	-14.401140	-12.651103	-8.991837	-7.341621	-5.331474	-4.431444	-4.771456	-6.261742	-8.941087	-12.521438	-15.981542	-14.391140	-13.871120	-11.201108	-8.911977	-9.821009	-10.721152	-12.121236	-11.931187	-12.191127	-12.421235	-12.611245
θ(180°)	-16.001587	-14.771163	-15.491149	-14.791145	-12.971245	-12.381233	-12.771121	-12.971131	-13.951133	-15.151125	-15.461132	-15.331141	-15.881133	-15.441161	-13.631134	-12.931109	-14.141149	-15.211158	-15.241133	-15.601150	-15.641167	-15.681150	-15.481155	-15.821156
Frequency	2.48350GHz		TotalAnt. 2	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ
Gain	φ(7°)/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(7°)	-0.471083	-0.671057	-0.451033	-0.191005	0.030108	0.080104	0.020109	0.190122	0.250124	0.131004	-0.191033	-0.491067	-0.891091	-0.901096	-0.921082	-0.601036	-0.211009	0.030108	0.011012	-0.191022	-0.271033	-0.421045	-0.361022	-0.181026
θ(7.5°)	0.110104	0.020104	0.090112	0.160121	0.240122	0.200112	0.150117	0.120105	0.030100	-0.091020	-0.311045	-0.611073	-0.961112	-1.191115	-1.061084	-0.531023	-0.040100	0.040109	0.060103	-0.041008	-0.191024	-0.321038	-0.311013	-0.010105
θ(15°)	0.050120	0.290142	0.550162	0.701078	0.820162	0.730159	0.450133	0.111011	-0.321046	-0.591068	-0.801046	-1.121130	-1.451155	-1.541135	-0.971048	0.171069	1.061113	1.000181	0.550129	0.031026	-0.521075	-0.941104	-1.001078	-0.451012
θ(22.5°)	-0.150121	0.480176	0.991116	1.291140	1.441136	1.140186	0.620133	0.011028	-0.581077	-0.931103	-1.101115	-1.231132	-1.401146	-1.441123	-0.731080	0.101080	2.232130	2.071180	1.030147	-0.141073	-1.301180	-2.151229	-2.161180	-1.241082
θ(30°)	-0.520101	0.510191	1.211144	1.651180	1.851168	1.300181	0.301022	-0.641091	-1.061116	-1.571101	-2.101107	-0.791045	-0.221013	-0.161039	-0.741095	-0.580139	1.570151	3.030110	2.771213	1.360160	-0.081073	-1.311188	-2.291429	-2.461205
θ(37.5°)	-1.132103	0.070164	1.031134	1.651194	2.061190	1.420155	-0.421143	-2.051221	-2.061179	-1.391078	0.030176	1.231139	1.260165	0.211031	-0.240161	1.810173	3.200116	2.701193	1.070125	-0.371073	-0.981053	-0.991112	-1.391174	-1.911177
θ(45°)	-2.331141	-0.501112	0.550139	1.351184	2.142102	1.370123	-1.211246	-3.021256	-2.621231	-1.991135	-0.270186	1.882112	2.211150	1.370179	0.520193	1.751242	2.86141	1.820188	-0.081066	-1.221102	-0.661024	0.091026	-0.801158	-2.391275
θ(52.5°)	-3.121191	-0.801015	0.310167	1.201186	2.312116	1.341093	-1.561455	-2.491202	-1.561141	-1.481117	-0.190193	1.722114	2.201194	1.401108	1.071148	2.061242	2.321176	0.911027	-1.311195	-1.951153	-1.011044	0.231045	-1.081197	-3.011566
θ(60°)	-3.161212	-1.071044	-0.090114	0.551130	1.821162	0.491129	-2.871370	-3.361260	-1.741116	-1.131105	-0.181100	1.822121	2.191180	1.150172	0.781124	1.881229	2.181145	0.261118	-2.111228	-1.991161	-1.271036	0.831090	-1.171167	-2.441305
θ(67.5°)	-2.571219	-1.221054	-0.261013	-0.010141	0.770137	0.991313	-4.951535	-4.701381	-2.831185	-1.521158	-0.770182	2.202199	2.982130	1.451114	1.311149	1.631158	1.650102	-1.441280	-3.091265	-1.841119	-0.901030	0.981100	-0.981120	-1.261126
θ(75°)	-4.291374	-2.381152	-1.161105	-1.041068	-0.371082	-2.021379	-6.341596	-5.781516	-4.411313	-2.211225	-2.281133	0.071118	1.481108	0.830193	1.471161	1.370178	0.161156	-3.291644	-4.191306	-2.111140	-1.111135	-1.731190	-1.901153	-2.411439
θ(82.5°)	-5.181429	-2.981211	-1.711171	-1.861147	-1.141165	-2.791417	-5.301571	-6.601545	-5.111350	-2.911290	-2.201222	-1.211052	-0.751169	-1.891068	0.681130	1.130138	-0.761238	-4.371569	-4.871565	-2.731227	-2.241260	-3.461387	-3.921739	-3.901461
θ(90°)	-6.411481	-3.061209	-1.761214	-2.821247	-1.701184	-2.841385	-6.511692	-7.901612	-7.471497	-3.071277	-2.271057	-2.711145	-1.371239	-3.571286	-1.040103	0.011070	2.941400	-6.251788	-8.141426	-3.171289	-2.991076	-4.691518	-6.591551	-6.991611
θ(97.5°)	-6.911437	-2.511180	-1.651266																					

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

Total Gain Data

Frequency	5.25GHz	TotalGain.1	φ0°/φ0°(27.5°)	φ0°/φ0°(27.5°)	φ45°/φ0°(27.5°)	φ60°/φ0°(27.5°)	φ75°/φ0°(27.5°)	φ90°/φ0°(27.5°)	φ105°/φ0°(27.5°)	φ120°/φ0°(27.5°)	φ135°/φ0°(27.5°)	φ150°/φ0°(27.5°)	φ165°/φ0°(27.5°)	φ180°/φ0°(27.5°)	φ195°/φ0°(27.5°)	φ210°/φ0°(27.5°)	φ225°/φ0°(27.5°)	φ240°/φ0°(27.5°)	φ255°/φ0°(27.5°)	φ270°/φ0°(27.5°)	φ285°/φ0°(27.5°)	φ300°/φ0°(27.5°)	φ315°/φ0°(27.5°)	φ330°/φ0°(27.5°)	φ345°/φ0°(27.5°)
φ0°	1.250E-07	5.50E-28	0.440E-04	0.380E-29	0.450E-32	0.580E-35	0.450E-34	0.410E-06	1.251E-26	1.401E-38	1.580E-14	1.700E-17	1.880E-24	2.16E-18	2.40E-23	2.70E-24	2.84E-29	2.68E-37	2.80E-37	2.50E-29	1.58E-17	1.58E-14	1.58E-14	1.35E-15	1.35E-15
φ15°	0.330E-35	2.90E-21	0.390E-30	0.340E-38	0.340E-38	0.390E-45	0.290E-28	2.40E-33	2.70E-18	1.390E-08	4.990E-09	8.010E-03	4.240E-08	4.100E-09	0.170E-18	0.20E-02	0.120E-03	0.120E-01	0.110E-13	0.08E-14	0.21E-11	0.12E-11	0.12E-11	0.12E-11	0.12E-11
φ30°	0.270E-35	0.30E-32	0.290E-38	0.430E-38	0.290E-45	0.430E-35	0.310E-28	2.10E-16	2.20E-02	0.770E-11	1.570E-11	0.450E-05	0.070E-07	0.060E-26	0.010E-02	0.000E-01	1.10E-10	1.61E-12	1.49E-14	1.20E-15	0.540E-01	0.780E-05	0.210E-12	0.290E-05	0.290E-05
φ45°	0.460E-04	0.26E-37	0.320E-28	0.291E-38	0.400E-21	0.49E-38	0.49E-38	0.264E-18	0.380E-03	0.260E-00	0.330E-52	0.861E-17	1.21E-14	1.681E-09	0.15E-18	1.50E-07	0.280E-36	0.820E-11	1.08E-16	1.59E-17	0.85E-25	0.280E-25	0.280E-25	0.280E-25	0.280E-25
φ60°	0.480E-04	0.25E-33	0.41E-34	0.230E-30	0.0770E-51	0.76E-09	0.180E-75	0.110E-57	1.14E-54	1.90E-37	2.47E-20	0.300E-26	2.37E-07	1.79E-14	0.61E-57	1.15E-107	0.11E-57	1.84E-79	0.70E-41	0.99E-89	1.50E-11	0.70E-33	0.26E-40	0.50E-24	0.50E-24
φ75°	0.450E-05	0.38E-36	0.457E-30	0.140E-02	0.01E-69	1.58E-34	2.10E-22	1.94E-42	0.890E-95	1.02E-22	1.94E-42	0.890E-95	1.02E-22	1.94E-42	0.890E-95	1.02E-22	1.94E-42	0.890E-95	1.02E-22	1.94E-42	0.890E-95	1.02E-22	1.94E-42	0.890E-95	1.02E-22
φ90°	0.31E-15	0.92E-46	0.31E-80	0.171E-02	0.040E-22	0.240E-13	2.140E-48	0.370E-81	0.41E-10	1.63E-13	0.26E-17	0.77E-17	1.51E-16	0.88E-27	1.16E-01	0.34E-54	0.58E-34	0.30E-09	0.27E-32	0.37E-44	0.36E-59	0.36E-59	0.36E-59	0.36E-59	0.36E-59
φ105°	0.06E-16	0.43E-47	0.52E-37	0.01E-25	0.09E-46	0.80E-103	0.20E-146	0.03E-24	0.19E-39	0.03E-24	0.19E-39	0.03E-24	0.19E-39	0.03E-24	0.19E-39	0.03E-24	0.19E-39	0.03E-24	0.19E-39	0.03E-24	0.19E-39	0.03E-24	0.19E-39	0.03E-24	0.19E-39
φ120°	0.45E-16	0.23E-45	0.66E-31	0.01E-25	0.09E-46	0.80E-103	0.20E-146	0.03E-24	0.19E-39	0.03E-24	0.19E-39	0.03E-24	0.19E-39	0.03E-24	0.19E-39	0.03E-24	0.19E-39	0.03E-24	0.19E-39	0.03E-24	0.19E-39	0.03E-24	0.19E-39	0.03E-24	0.19E-39
φ135°	0.25E-10	0.17E-54	0.15E-19	0.14E-31	0.24E-51	0.79E-19	0.29E-25	0.83E-29	0.28E-39	0.49E-47	0.79E-61	0.23E-48	0.70E-61	0.23E-48	0.70E-61	0.23E-48	0.70E-61	0.23E-48	0.70E-61	0.23E-48	0.70E-61	0.23E-48	0.70E-61	0.23E-48	0.70E-61
φ150°	0.27E-12	0.17E-64	0.12E-27	0.13E-41	0.21E-54	0.73E-43	0.28E-59	0.08E-79	0.18E-106	0.08E-67	0.21E-138	0.33E-158	0.10E-168	0.20E-168	0.33E-178	0.10E-188	0.20E-188	0.33E-198	0.10E-208	0.20E-208	0.33E-218	0.10E-228	0.20E-228	0.33E-238	0.10E-248
φ165°	0.88E-14	0.36E-47	0.39E-72	0.13E-64	0.22E-75	0.38E-64	0.50E-79	0.43E-91	0.47E-104	0.43E-117	0.47E-130	0.43E-143	0.47E-156	0.43E-169	0.47E-182	0.43E-195	0.47E-208	0.43E-221	0.47E-234	0.43E-247	0.47E-260	0.43E-273	0.47E-286	0.43E-299	0.47E-312
φ180°	0.38E-16	0.51E-63	0.15E-63	0.48E-61	0.61E-62	0.31E-62	0.38E-60	0.44E-51	0.42E-46	0.31E-58	0.42E-58	0.31E-68	0.42E-68	0.31E-78	0.42E-78	0.31E-88	0.42E-88	0.31E-98	0.42E-98	0.31E-108	0.42E-108	0.31E-118	0.42E-118	0.31E-128	0.42E-128
φ195°	0.25E-37	0.73E-12	0.13E-86	0.34E-89	0.62E-72	0.73E-56	0.66E-37	0.78E-17	0.89E-12	0.89E-12	0.89E-12	0.89E-12	0.89E-12	0.89E-12	0.89E-12	0.89E-12	0.89E-12	0.89E-12	0.89E-12	0.89E-12	0.89E-12	0.89E-12	0.89E-12	0.89E-12	0.89E-12
φ210°	0.43E-86	0.14E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12
φ225°	0.43E-86	0.14E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12
φ240°	0.43E-86	0.14E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12
φ255°	0.43E-86	0.14E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12
φ270°	0.43E-86	0.14E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12
φ285°	0.43E-86	0.14E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12
φ300°	0.43E-86	0.14E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12
φ315°	0.43E-86	0.14E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12
φ330°	0.43E-86	0.14E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12
φ345°	0.43E-86	0.14E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12	0.22E-12

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Antenna Pattern of 5GHz

Appendix D

(H22.5)	0.71/-1.44	-1.72/-1.93	-2.11/-2.38	-3.20/-4.28	-5.14/-5.34	-4.81/-3.77	-2.85/-2.29	-2.04/-1.88	-2.04/-2.20	-2.41/-2.37	-2.29/-2.21	-2.53/-3.00	-3.37/-3.48	-3.29/-3.92	-2.43/-1.83	-1.01/-0.33	0.160/-37	0.680/-79	0.990/93	0.29/-0.62	-1.32/-1.48	-1.35/-0.89	-0.430/-08	0.110/-20
(H30°)	0.691/-86	-2.22/-127	-1.60/-499	-0.850/-73	-0.530/-80	-1.65/-2.18	-2.01/-157	-1.20/-403	-0.910/-99	-1.06/-1.06	-0.660/-02	0.010/-52	-0.710/-24	1.481/93	1.390/-45	0.150/-27	0.880/-99	0.310/-88	-1.210/-43	-0.63/-191	-2.83/-129	0.511/50	1.831/-48	0.710/-16
(H37.5)	-0.292/-12	-1.32/-159	-2.13/-183	-4.930/-15	0.860/-69	-0.41/-132	-1.730/-64	1.051/94	2.192/-21	1.591/61	1.581/96	1.310/-04	0.382/-49	3.894/-4	3.602/-99	2.001/77	1.671/-16	-0.03/-107	-0.89/-42	-0.350/-49	-0.161/-10	2.192/-24	1.430/-11	-0.97/-32
(H45°)	-1.89/-0.33	0.170/-75	0.670/-15	0.070/-11	-0.09/-0.36	-1.04/-1.77	1.330/-49	2.820/-92	3.993/-4	3.430/-48	2.602/-68	2.130/-16	-0.691/-10	2.463/-80	4.844/-48	3.152/-42	2.401/-86	0.351/-38	-0.630/-53	0.330/-40	-0.050/-65	1.001/-22	-0.017/-67	-0.23/-1.60
(H52.5)	-4.48/-3.33	-0.741/-34	1.810/-91	0.290/-12	-0.32/-11	-2.48/-2.33	0.441/-10	2.263/-35	3.744/-28	4.444/-48	3.423/-23	2.320/-77	0.730/-37	2.075/-10	6.064/-63	1.931/-43	1.650/-66	-1.51/-197	-0.100/-51	0.50/-0.07	0.011/-28	-0.150/-48	0.406/-82	0.21/-0.86
(H60°)	-7.30/-0.32	-3.27/-0.98	0.540/-11	1.160/-26	0.61/-247	-6.16/-4.27	-1.210/-74	-0.052/-85	4.035/-16	5.825/-34	4.110/-52	2.221/-99	2.131/-16	1.994/-94	6.164/-75	2.001/-48	1.480/-13	-2.712/-95	-0.700/-08	0.94/-1.27	-2.260/-45	0.331/-13	0.841/-05	-0.93/-0.39
(H67.5)	-5.37/-6.57	-5.15/-7.19	-0.010/-76	-1.341/-14	-1.273/-39	-2.86/-2.78	-1.622/-36	5.425/-16	6.115/-13	3.441/-38	1.882/-52	2.841/-62	2.684/-61	5.203/-36	1.781/-53	-2.942/-18	-1.620/-20	-0.62/-20	-1.69/-2.04	-0.131/-04	1.222/-16	1.991/-70	-1.724/-06	-1.724/-06
(H75°)	-3.71/-4.59	-4.91/-2.07	0.901/-90	2.880/-28	2.15/-497	-12.82/-9.52	-4.771/-45	-3.472/-14	4.934/-69	5.304/-66	0.811/-61	2.620/-97	1.382/-17	3.053/-14	1.901/-99	2.150/-83	-0.821/-18	-3.86/-3.66	-0.021/-23	1.391/-70	0.881/-59	1.371/-04	-0.881/-59	-1.71/-06
(H82.5)	-3.01/-3.35	-3.86/-2.83	2.304/-40	-4.82/-3.2	2.59/-6.54	-15.22/-11.66	-6.771/-25	-3.831/-91	3.340/-82	4.110/-77	0.861/-13	-1.050/-64	0.510/-92	-4.48/-19	0.671/-97	1.581/-63	2.550/-72	-4.44/-123	-1.54/-267	5.330/-3.29	-0.270/-65	0.150/-49	-0.841/-81	-4.30/-5.35
(H90°)	-3.210/-87	-3.85/-2.68	2.304/-40	-5.620/-41	-4.660/-87	-15.22/-11.66	-6.771/-25	-3.831/-91	3.340/-82	4.110/-77	0.861/-13	-1.050/-64	0.510/-92	-4.48/-19	0.671/-97	1.581/-63	2.550/-72	-4.44/-123	-1.54/-267	5.330/-3.29	-0.270/-65	0.150/-49	-0.841/-81	-4.30/-5.35
(H97.5)	-5.691/-49	-4.052/-2.08	2.304/-40	-5.620/-41	-4.660/-87	-15.22/-11.66	-6.771/-25	-3.831/-91	3.340/-82	4.110/-77	0.861/-13	-1.050/-64	0.510/-92	-4.48/-19	0.671/-97	1.581/-63	2.550/-72	-4.44/-123	-1.54/-267	5.330/-3.29	-0.270/-65	0.150/-49	-0.841/-81	-4.30/-5.35
(H105°)	5.691/-49	4.761/-2.55	4.360/-40	-5.620/-41	-4.660/-87	-15.22/-11.66	-6.771/-25	-3.831/-91	3.340/-82	4.110/-77	0.861/-13	-1.050/-64	0.510/-92	-4.48/-19	0.671/-97	1.581/-63	2.550/-72	-4.44/-123	-1.54/-267	5.330/-3.29	-0.270/-65	0.150/-49	-0.841/-81	-4.30/-5.35
(H112.5)	7.750/-58	-4.503/-13	6.520/-42	-4.850/-59	7.780/-11	15.480/-11	11.250/-16	-10.860/-02	6.264/-59	3.720/-61	6.167/-40	10.800/-19	7.290/-56	5.367/-25	-8.327/-25	-7.717/-10	0.950/-10	0.550/-16	-1.304/-45	-7.380/-40	-7.380/-40	-4.215/-15	5.215/-14	-2.715/-48
(H120°)	7.671/-16	5.264/-83	7.460/-36	-3.947/-44	-0.834/-75	-10.071/-42	-13.720/-31	-12.154/-52	-5.964/-31	-1.236/-56	7.998/-67	9.914/-97	7.820/-134	-11.267/-16	-7.020/-49	-6.960/-108	0.790/-14	0.394/-49	-0.964/-76	-0.814/-12	-2.860/-33	1.220/-12	5.860/-39	-1.220/-12
(H127.5)	8.376/-33	4.531/-81	-7.250/-45	-4.120/-58	-8.650/-69	-9.870/-102	-10.680/-118	-15.220/-871	-8.540/-89	-8.910/-53	-6.830/-45	-7.627/-41	-11.594/-16	-5.591/-42	-8.64/-58	-7.871/-61	-8.250/-144	-9.980/-534	-4.477/-68	-9.310/-88	-11.40/-593	-5.29/-72	-4.680/-97	-10.290/-08
(H135°)	3.886/-29	-8.114/-77	-7.320/-64	-4.930/-66	-6.680/-30	-14.69/-14.03	-8.720/-56	-10.260/-14.47	-10.380/-14.16	-11.260/-4.28	-10.730/-10.05	-7.807/-90	-12.060/-6.54	-5.190/-78	-11.271/-159	-11.310/-61	-14.250/-138	-11.270/-80	-9.004/-80	-8.260/-96	-15.560/-69	-8.880/-74	-7.550/-60	-6.480/-76
(H142.5)	-7.607/-75	-1.816/-127	-1.260/-67	-7.050/-62	-6.747/-31	-7.550/-64	-6.190/-66	-6.580/-63	-11.980/-66	-9.860/-10.79	-12.010/-6.26	-7.664/-89	-10.010/-82	-10.44/-13.29	-15.04/-13.68	-10.03/-7.43	-10.19/-14.94	-10.010/-10.53	-10.830/-5.56	-7.860/-11.73	-10.47/-6.92	-0.011/-41	-11.860/-13.74	-9.890/-10.04
(H150°)	-1.321/-15.19	-14.80/-15.27	-12.380/-10.92	-10.210/-85	-10.130/-58	-8.831/-172	-13.520/-14.37	-8.011/-98	-1.771/-139	-1.771/-139	-1.780/-7.70	-8.217/-67	-7.310/-67	-11.360/-10.28	-9.480/-12.45	-14.840/-14.57	-10.410/-8.83	-10.050/-11.61	-15.270/-10.31	-9.861/-11.92	-12.980/-12.38	-10.450/-10.94	-11.740/-13.19	-10.760/-8.62
(H157.5°)	-1.171/-10.84	-10.130/-0.03	-8.740/-10.31	-12.420/-14.31	-10.860/-38	-7.630/-14	-6.750/-15.58	-11.280/-14.38	-14.660/-15.52	-15.840/-13.97	-11.671/-12.7	-12.561/-152	-10.680/-11.75	-15.030/-10.60	-15.11/-14.89	-14.610/-15.68	-11.880/-8.35	-6.450/-12.17	-14.831/-13.02	-10.520/-4.66	-8.680/-11.68	-14.900/-14.05	-11.450/-15.02	-12.730/-11.63
(H165°)	-0.609/-6.80	-6.960/-10.87	-11.830/-15.03	-14.860/-11.88	-9.530/-16	-8.160/-60	-11.150/-15.86	-14.760/-14.87	-17.010/-11.83	-17.010/-11.83	-17.010/-11.83	-10.830/-10.59	-10.830/-10.59	-13.241/-13.95	-13.241/-13.95	-10.650/-8.78	-6.110/-11.8	-14.225/-13.02	-12.710/-9.80	-6.680/-6.88	-14.900/-14.05	-11.450/-15.02	-12.730/-11.63	-10.760/-8.62
(H172.5°)	-0.320/-11.94	-12.071/-12.66	-11.530/-13.04	-11.160/-10.31	-9.540/-57	-8.410/-75	-10.420/-12.61	-14.710/-15.66	-14.680/-13.27	-12.330/-11.47	-11.450/-11.71	-11.861/-11.6	-11.911/-12.1	-11.220/-10.3	-10.800/-10.78	-10.780/-12.20	-14.230/-14.30	-14.121/-13.77	-10.651/-12.26	-11.510/-12.22	-8.019/-8.33	-9.24/-8.87	-10.69/-8.47	-10.260/-8.1
(H180°)	-4.762/-6.18	-9.150/-5.99	6.601/-11	-8.661/-18	-10.510/-11.8	-10.330/-13.26	-14.730/-13.65	-14.730/-13.65	-15.750/-14.82	-14.660/-15.71	-15.710/-16.09	-15.160/-14.62	-13.510/-13.57	-13.510/-13.57	-13.341/-13.10	-12.770/-12.08	-11.700/-12.13	-12.121/-13.12	-12.081/-9.10	-10.710/-9.67	-10.180/-10.63	-10.871/-9.78	-10.680/-9.78	-10.680/-9.78
Freq(Hz)	5.350Pa	TotalAnt.2																						
Gain	0°(H)/90°(V)	0°(H)/90°(V)	0°(H)/90°(V)	0°(H)/90°(V)	0°(H)/90°(V)	0°(H)/90°(V)	0°(H)/90°(V)	0°(H)/90°(V)	0°(H)/90°(V)	0°(H)/90°(V)	0°(H)/90°(V)	0°(H)/90°(V)	0°(H)/90°(V)	0°(H)/90°(V)	0°(H)/90°(V)	0°(H)/90°(V)	0°(H)/90°(V)	0°(H)/90°(V)	0°(H)/90°(V)	0°(H)/90°(V)	0°(H)/90°(V)	0°(H)/90°(V)	0°(H)/90°(V)	0°(H)/90°(V)
(H0°)	5.691/-5.34	-5.461/-5.38	5.220/-4.76	-4.250/-37	-3.290/-2.83	-2.750/-2.81	-2.580/-2.34	-2.120/-1.80	-1.701/-1.85	-2.180/-2.42	-2.650/-2.83	-2.970/-3.36	-3.840/-41	-5.100/-5.36	-6.910/-5.99	-6.301/-7.41	-7.890/-8.29	-8.161/-7.9	-7.830/-7.25	-6.820/-6.21	-6.690/-5.66	-6.420/-5.37	-6.430/-5.37	-6.210/-4.89
(H7.5°)	5.691/-5.34	-5.461/-5.38	5.220/-4.76	-4.250/-37	-3.290/-2.83	-2.750/-2.81	-2.580/-2.34	-2.120/-1.80	-1.701/-1.85	-2.180/-2.42	-2.650/-2.83	-2.970/-3.36	-3.840/-41	-5.100/-5.36	-6.910/-5.99	-6.301/-7.41	-7.890/-8.29	-8.161/-7.9	-7.830/-7.25	-6.820/-6.21	-6.690/-5.66	-6.420/-5.37	-6.430/-5.37	-6.210/-4.89
(H15°)	5.691/-5.34	-5.461/-5.38	5.220/-4.76	-4.250/-37	-3.290/-2.83	-2.750/-2.81	-2.580/-2.34	-2.120/-1.80	-1.701/-1.85	-2.180/-2.42	-2.650/-2.83	-2.970/-3.36	-3.840/-41	-5.100/-5.36	-6.910/-5.99	-6.301/-7.41	-7.890/-8.29	-8.161/-7.9	-7.830/-7.25	-6.820/-6.21	-6.690/-5.66	-6.420/-5.37	-6.430/-5.37	-6.210/-4.89
(H22.5°)	5.691/-5.34	-5.461/-5.38	5.220/-4.76	-4.250/-37	-3.290/-2.83	-2.750/-2.81	-2.580/-2.34	-2.120/-1.80	-1.701/-1.85	-2.180/-2.42	-2.650/-2.83	-2.970/-3.36	-3.840/-41	-5.100/-5.36	-6.910/-5.99	-6.301/-7.41	-7.890/-8.29	-8.161/-7.9	-7.830/-7.25	-6.820/-6.21	-6.690/-5.66	-6.420/-5.37	-6.430/-5.37	-6.210/-4.89
(H30°)	5.691/-5.34	-5.461/-5.38	5.220/-4.76	-4.250/-37	-3.290/-2.83	-2.750/-2.81	-2.580/-2.34	-2.120/-1.80	-1.701/-1.85	-2.180/-2.42	-2.650/-2.83	-2.970/-3.36	-3.840/-41	-5.100/-5.36	-6.910/-5.99	-6.301/-7.41	-7.890/-8.29	-8.161/-7.9	-7.830/-7.25	-6.820/-6.21	-6.690/-5.66	-6.420/-5.37	-6.430/-5.37	-6.210/-4.89
(H37.5°)	5.691/-5.34	-5.461/-5.38	5.220/-4.76	-4.250/-37	-3.290/-2.83	-2.750/-2.81	-2.580/-2.34	-2.120/-1.80	-1.701/-1.85	-2.180/-2.42	-2.650/-2.83	-2.970/-3.36	-3.840/-41	-5.100/-5.36	-6.910/-5.99	-6.301/-7.41	-7.890/-8.29	-8.161/-7.9	-7.830/-7.25	-6.820/-6.21	-6.690/-5.66	-6.420/-5.37	-6.430/-5.37	-6.210/-4.89
(H45°)	5.691/-5.34	-5.461/-5.38	5.220/-4.76	-4.250/-37	-3.290/-2.83	-2.750/-2.81	-2.580/-2.34	-2.120/-1.80	-1.701/-1.85	-2.180/-2.42	-2.650/-2.83	-2.970/-3.36	-3.840/-41	-5.100/-5.36	-6.910/-5.99	-6.301/-7.41	-7.890/-8.29	-8.161/-7.9	-7.830/-7.25	-6.820/-6.21	-6.690/-5.66	-6.420/-5.37	-6.430/-5.37	-6.210/-4.89
(H52.5°)	5.691/-5.34	-5.461/-5.38	5.220/-4.76	-4.250/-37	-3.290/-2.83	-2.750/-2.81	-2.580/-2.34	-2.120/-1.80	-1.701/-1.85	-2.180/-2.42	-2.650/-2.83	-2.970/-3.36	-3.840/-41	-5.100/-5.36	-6.910/-5.99	-6.301/-7.41	-7.890/-8.29	-8.161/-7.9	-7.830/-7.25	-6.820/-6.21	-6.690/-5.66	-6.420/-5.37	-6.430/-5.37	-6.210/-4.89
(H60°)	5.691/-5.34	-5.461/-5.38	5.220/-4.76	-4.250/-37	-3.290/-2.83	-2.750/-2.81	-2.580/-2.34	-2.120/-1.80	-1.701/-1.85	-2.180/-2.42	-2.650/-2.83	-2.970/-3.36	-3.840/-41	-5.100/-5.36	-6.910/-5.99	-6.301/-7.41	-7.890/-8.29	-8.161/-7.9	-7.830/-7.25	-6.820/-6.21	-6.690/-5.66	-6.420/-5.37	-6.430/-5.37	-6.210/-4.89
(H67.5°)	5.691/-5.34	-5.461/-5.38	5.220/-4.76	-4.250/-37	-3.290/-2.83	-2.750/-2.81	-2.580/-2.34	-2.120/-1.80	-1.701/-1.85	-2.180/-2.42	-2.650/-2.83	-2.970/-3.36	-3.840/-41	-5.100/-5.36	-6.910/-5.99	-6.301/-7.41	-7.890/-8.29	-8.161/-7.9	-7.830/-7.25	-6.820/-6.21	-6.690/-5.66	-6.420/-5.37	-6.430/-5.37	-6.210/-4.89
(H75°)	5.691/-5.34	-5.461/-5.38	5.220/-4.76	-4.250/-37	-3.290/-2.83	-2.750/-2.81	-2.580/-2.34	-2.120/-1.80	-1.701/-1.85	-2.180/-2.42	-2.650/-2.83	-2.970/-3.36	-3.840/-41	-5.100/-5.36	-6.910/-5.99	-6.301/-7.41	-7.890/-8.29	-8.161/-7.9	-7.830/-7.25	-6.820/-6.21	-6.690/-5.66	-6.420/-5.37	-6.430/-5.37	-6.210/-4.89

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

