



Antenna Composite Gain Test Report

FCC ID	2AHKM-CODA5370
Equipment	Cable AP Gateway(WiFi)
Brand Name	HITRON
Model Name	CODA5370
Applicant	Hitron Technologies Inc. No. 1-8, Li-Hsin 1st Rd. Hsinchu Science Park, Hsinchu 30078, Taiwan
Manufacturer	Hitron Technologies Inc. No. 1-8, Li-Hsin 1st Rd. Hsinchu Science Park, Hsinchu 30078, Taiwan
Standard	KDB662911 D03 v01
Sample Received	Jul. 08, 2024
Start Test Date	Jul. 13, 2024
Final Test Date	Jul. 13, 2024

Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory

No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)



Table of Contents

History of this test report.....	3
1. Operation Mode and Antenna Information	4
2. Test Frequency	4
3. Testing Location.....	5
4. Test Facility and Configuration.....	6
5. Reference Calibration	7
6. Test Method	8
7. Measured Values and Calculation of Maximum Gain Positions.....	9
8. Summary of Test Result	11
9. Test Setup	12
10. Test Equipment and Calibration Data	13
11. Test Results	14



1. Operation Mode and Antenna Information

Antenna Position	RF Port	Brand Name	Model Name	Ant. Type	Connector	Modes of Operation
2G Ant1	1	SPEED	F-0Q-YF-6001-001-00	PCB	I-Pex	2.4GHz
2G Ant2	2	SPEED	F-0Q-YF-6001-002-00	PCB	I-Pex	2.4GHz
5G Ant1	1	SPEED	F-0Q-YF-6001-003-00	PCB	I-Pex	5GHZ
5G Ant2	2	SPEED	F-0Q-YF-6001-004-00	PCB	I-Pex	5GHZ

Note:

2.4GHz Operation Mode

For IEEE 802.11 b (1TX/1RX)

2G Ant1 can be used as transmitting/receiving antenna.

2G Ant1 could transmit/receive simultaneously.

For IEEE 802.11 g/n/VHT/ax (2TX/2RX)

2G Ant1~2 can be used as transmitting/receiving antenna.

2G Ant1~2 could transmit/receive simultaneously.

5GHz Operation Mode (2TX/2RX)

5G Ant1~2 can be used as transmitting/receiving antenna.

5G Ant1~2 could transmit/receive simultaneously.

2. Test Frequency

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

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



3. Testing Location

Testing Location		
Sporton International Inc. Hsinhua Laboratory		
<input checked="" type="checkbox"/>	HWA YA	ADD : No.13-1 & 14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333, Taiwan R.O.C.

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
Radiated	05CH03-HY	Vivi Jiang	23.5~24.5 / 45~55	Jul. 13, 2024

Note:

Testing Site Information

Brand Name: TDK

Dimension: 11m*6m*6m

Characteristic: Fully Anechoic Chamber

4. Test Facility and Configuration

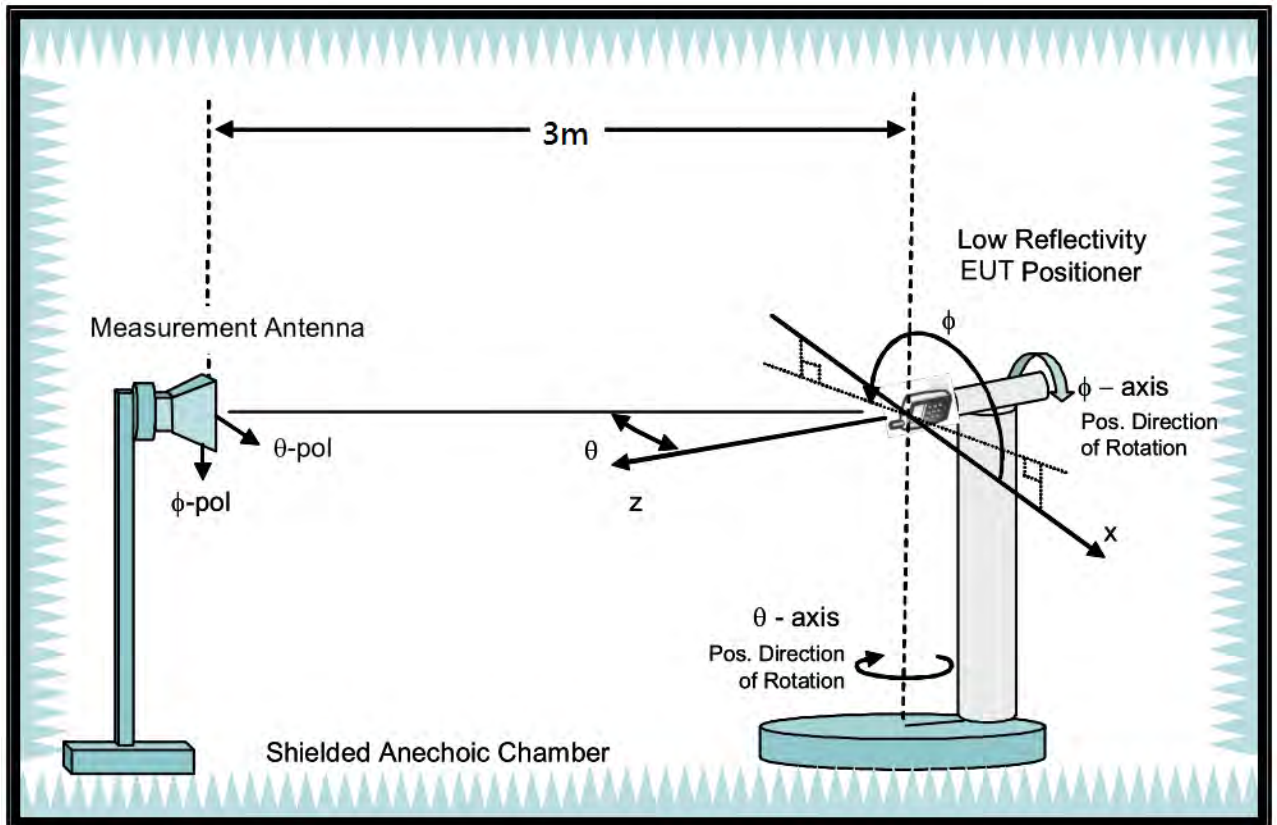
Test configuration: Reference to CITA OTA distributed-axes system configuration.

Chamber: Fully Anechoic Chamber.

Measurement antenna: Dual Polarization Horn antenna

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

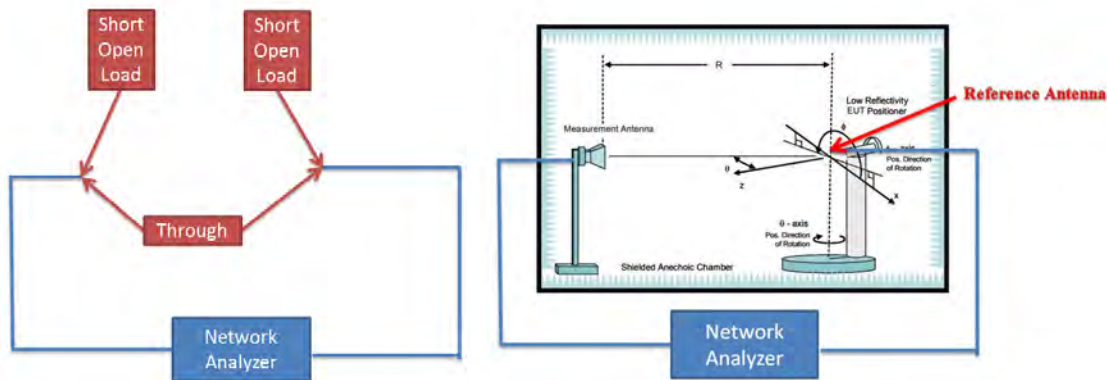
#Reference to CTIA “ctia-test-plan-for-wireless-device-over-the-air-performance-ver-3-7-1”



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

Note:

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

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

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

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



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)	-2.42	-1.46	-8.18
Ant. 2 (dBi)	3.32	2.3	4.57
DG [1SS] (dBi)	3.93	3.63	3.36
Polarization	Phi	Phi	Phi
Θ (°)	105	112.5	97.5
Φ (°)	292.5	300	255

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 [$10^{(G/20)}$]	$10^{(-2.42/20)}$	$10^{(-1.46/20)}$	$10^{(-8.18/20)}$
Ant. 2 [$10^{(G/20)}$]	$10^{(3.32/20)}$	$10^{(2.3/20)}$	$10^{(4.57/20)}$
Ant. 1 [$10^{(G/20)}$] value	0.757	0.845	0.39
Ant. 2 [$10^{(G/20)}$] value	1.466	1.303	1.692
Sum All Antenna [Amax]	2.222	2.148	2.082
DG [$10 \cdot \log(A_{max}^2/N_{ant})$]	3.93	3.63	3.36

Note:

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

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



DG_1SS max value position

Frequency (Hz)	5.2G	5.3G	5.6G	5.785G
Ant. 1 (dBi)	5.14	0.93	4.5	4.76
Ant. 2 (dBi)	-8.49	1.12	-1.74	-2.51
DG [1SS] (dBi)	3.77	4.04	4.94	4.87
Polarization	Phi	Phi	Phi	Phi
Θ (°)	135	105	112.5	112.5
Φ (°)	67.5	45	60	60

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)	5.2G	5.3G	5.6G	5.785G
Ant. 1 [10^(G/20)]	10^(5.14/20)	10^(0.93/20)	10^(4.5/20)	10^(4.76/20)
Ant. 2 [10^(G/20)]	10^(-8.49/20)	10^(1.12/20)	10^(-1.74/20)	10^(-2.51/20)
Ant. 1 [10^(G/20)] value	1.807	1.113	1.679	1.73
Ant. 2 [10^(G/20)] value	0.376	1.138	0.818	0.749
Sum All Antenna [Amax]	2.183	2.251	2.497	2.479
DG [10*log(Amax^2/Nant)]	3.77	4.04	4.94	4.87

Note:

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

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



8. Summary of Test Result

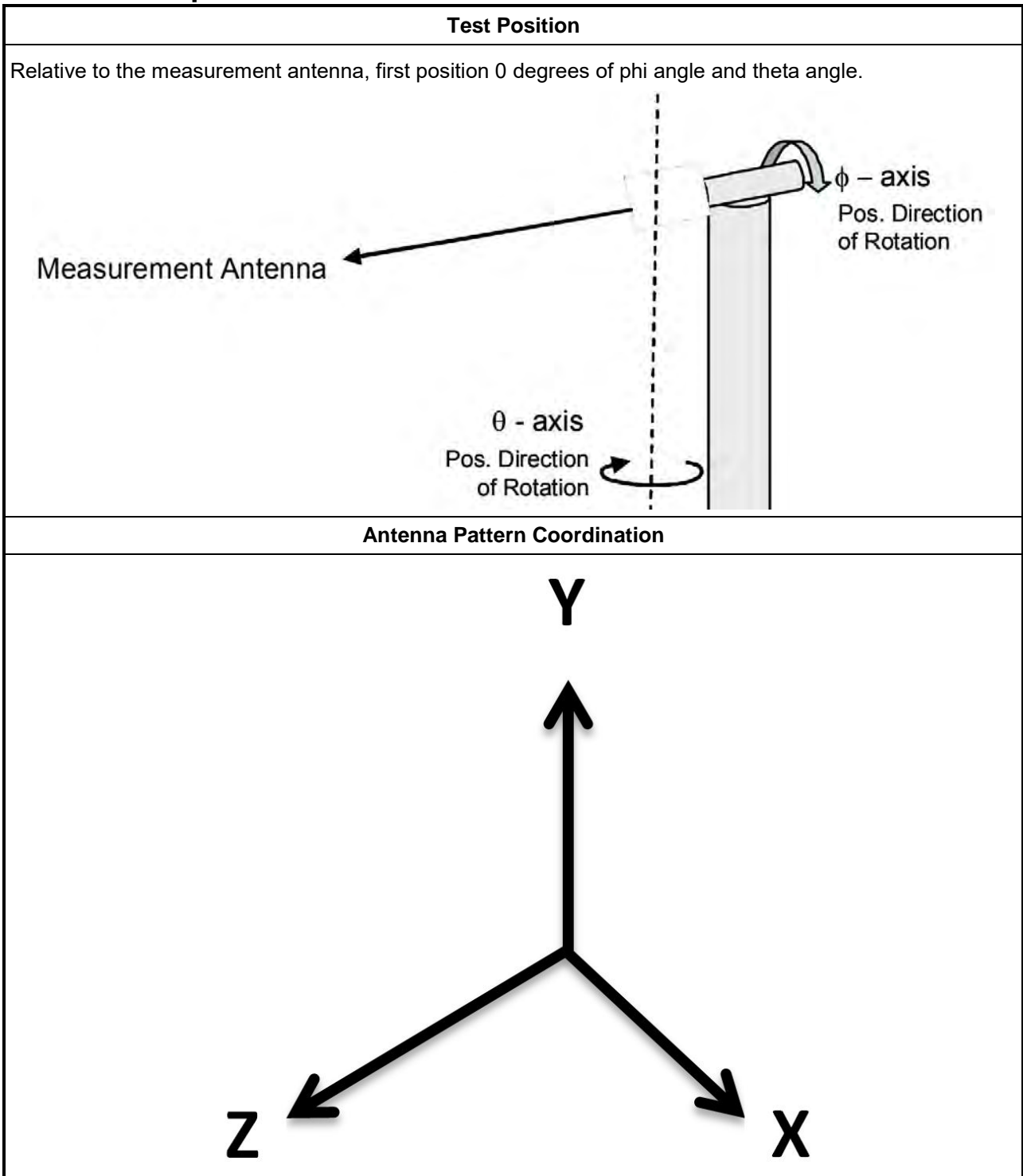
Table with 4 columns: Frequency (Hz), 2.4G, 2.45G, 2.4835G. Rows include Ant. 1 Max Gain, Ant. 2 Max Gain, Ant. 1 Polarization, Ant. 2 Polarization, Max Gain, DG [1SS], DG [1SS] Revised, and DG [2SS].

Table with 5 columns: Frequency (Hz), 5.2G, 5.3G, 5.6G, 5.785G. Rows include Ant. 1 Max Gain, Ant. 2 Max Gain, Ant. 1 Polarization, Ant. 2 Polarization, Max Gain, DG [1SS], DG [1SS] Revised, and DG [2SS].

Note:

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

9. Test Setup



Note:

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



10. Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA 9120D-1531	1GHz~18GHz	Dec. 20, 2023	Dec. 19, 2024
Dual Polarization Horn Antenna	Sporton	S0209DP	S0209DP-001	2GHz~9GHz	N.C.R.	N.C.R.
ENA Series Network Analyzer	AGILENT	E5071C	MY46419477	100kHz~8.5GHz	Jul. 28, 2023	Jul. 27, 2024
VNA Calibration Kit	TS RF	TS85033E-F	-	DC~9GHz	N.C.R.	N.C.R.
Multi-axis positioner	Sporton	MAPS01	MAPS01-001	Theta / Phi axis	N.C.R.	N.C.R.
Test Software	SPORTON	SENSE-RDG	V1.0.8	-	N.C.R.	N.C.R.

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

NCR means Non-Calibration required.



11. Test Results

Please refer to the appendix.

Appendix A – Radiated Composite Gain of 2.4GHz.....	Page 15
Appendix B – Radiated Composite Gain of 5GHz UNII 1~UNII 3.....	Page 21
Appendix C – Antenna Pattern of 2.4GHz.....	Page 28
Appendix D – Antenna Pattern of 5GHz UNII 1~UNII 3.....	Page 31
Appendix E – Test Photos.....	Page 34



Freq(Hz)	2.4G	2.45G	2.4835G
Ant. 1 Max Gain (dBi)	2.69	2.86	2.85
Ant. 2 Max Gain (dBi)	5.84	5.16	4.64
Ant. 1 Polarization/ θ (°)/ ϕ (°)	Phi/7.5/337.5	Phi/135/337.5	Phi/135/337.5
Ant. 2 Polarization/ θ (°)/ ϕ (°)	Phi/97.5/270	Phi/97.5/270	Phi/97.5/262.5
Max Gain (dBi)	5.84	5.16	4.64
DG [1SS] (dBi)	3.93	3.63	3.36
DG [1SS] (dBi) Revised	5.84	5.16	4.64
DG [2SS] (dBi)	5.84	5.16	4.64



Radiated Composite Gain Data of 2.4GHz

Appendix A

DG 1SS Result

Freq(Hz)	2.4GPol	Phi	Phi(7.5)	Phi(22.5)	Phi(37.5)	Phi(52.5)	Phi(67.5)	Phi(82.5)	Phi(97.5)	Phi(112.5)	Phi(127.5)	Phi(142.5)	Phi(157.5)	Phi(172.5)	Phi(187.5)	Phi(202.5)	Phi(217.5)	Phi(232.5)	Phi(247.5)	Phi(262.5)	Phi(277.5)	Phi(292.5)	Phi(307.5)	Phi(322.5)	Phi(337.5)	Phi(352.5)
DG(dB)	Phi(7.5)	Phi(22.5)	Phi(37.5)	Phi(52.5)	Phi(67.5)	Phi(82.5)	Phi(97.5)	Phi(112.5)	Phi(127.5)	Phi(142.5)	Phi(157.5)	Phi(172.5)	Phi(187.5)	Phi(202.5)	Phi(217.5)	Phi(232.5)	Phi(247.5)	Phi(262.5)	Phi(277.5)	Phi(292.5)	Phi(307.5)	Phi(322.5)	Phi(337.5)	Phi(352.5)		
Theta(°)	0.80605	1.5151	1.7183	1.8719	1.9814	2.0524	2.0912	2.1037	2.1119	2.1168	2.1194	2.1197	2.1188	2.1165	2.1129	2.1083	2.1028	2.0965	2.0897	2.0825	2.075	2.0674	2.0597	2.0519	2.0441	2.0363
Theta(7.5°)	0.8136	1.89224	2.35237	2.22199	1.6101	0.37308	1.03179	2.32268	2.92297	2.82499	2.04141	0.62026	-0.3052	1.2172	2.1238	2.47237	1.97096	0.9114	2.16255	2.85317	3.32343	3.31509	2.77212	1.25066		
Theta(15°)	0.2109	1.542	2.23216	1.92153	1.16061	-0.16404	0.28101	1.572	2.33243	2.33197	1.35048	-0.46131	-1.42045	0.39115	1.732	2.44241	2.16178	1.4916	2.16283	3.13343	3.61361	3.34307	2.68204	1.11022		
Theta(22.5°)	-0.31041	1.2183	2.25234	2.17192	1.43086	0.25029	-0.104	0.85132	1.68192	1.93168	1.12021	-0.87134	-1.21048	0.25097	1.621	2.4524	2.3169	1.35159	2.19262	3.35337	2.86259	2.15153	0.53056			
Theta(30°)	0.25128	1.87225	2.49267	2.78271	2.54204	1.46078	0.79073	0.7073	1.02114	1.53165	1.33052	-0.47117	-0.88026	0.33089	1.39191	2.35259	2.55221	1.6217	2.15261	2.72258	2.5125	2.6256	2.4194	0.76009		
Theta(37.5°)	0.27153	2.2238	2.5269	2.79281	2.79211	1.45088	0.7065	0.43013	-0.59052	-0.0105	0.64033	-0.33106	-0.17034	0.67101	1.38182	2.19231	2.16175	1.22128	2.03251	2.69245	2.64277	2.79275	2.28164	0.43046		
Theta(45°)	-1.11007	0.69113	1.4517	2.05254	2.55257	2.53155	0.92047	0.08025	-1.36191	-1.65098	-0.53049	-0.71072	-0.02049	0.79095	1.12145	1.81196	1.9517	1.24116	1.76218	2.19227	2.53252	2.47213	1.48066	-0.89119		
Theta(52.5°)	-1.62118	-0.48008	0.42089	1.35192	2.31243	2.16118	0.35014	-0.16032	-0.85168	-2.1158	-1.22111	-1.04078	-0.22021	0.45056	0.67092	1.02093	0.9807	0.52062	1.64195	2.11208	2.02197	1.76164	1.15072	0.03119		
Theta(60°)	-3.57277	-2.42248	-2.39176	-0.51067	1.29099	0.49101	-2.35227	-1.23025	-0.09043	-1.26168	-1.97227	-2.48199	-1.08033	0.22061	0.76072	0.59074	1.3718	1.54086	1.5192	1.97161	1.57153	1.44128	1.1405	0.99296		
Theta(67.5°)	-3.07143	-1.32257	-3.83138	-1.33035	1.58168	0.97026	-1.17092	0.03079	-0.85012	-0.67087	-0.91137	-1.79164	-0.89004	0.86134	1.31091	1.63179	2.7427	1.9312	1.63179	1.9312	1.46158	1.44074	-0.6224	-4.12478		
Theta(75°)	-0.97063	-1.16189	-2.18231	-2.49163	0.51018	-0.12086	-1.41133	-0.61029	0.68028	-0.63096	-0.43007	-0.09009	0.28066	1.1415	1.58156	1.76211	2.55262	2.15171	2.66212	1.41232	2.87291	2.3814	0.05114	-2.13187		
Theta(82.5°)	-0.36022	0.53033	-0.041	-1.04171	-2.24226	-2.28277	-3.81462	-3.81229	-0.94048	-0.69099	-0.79037	-0.60060	-0.23058	1.06156	1.9221	2.15214	2.32241	1.81216	2.35227	2.48298	3.06247	1.29014	-0.9138	-1.25074		
Theta(90°)	0.91018	0.02004	0.04011	-0.11068	-1.71265	-2.78323	-4.64533	-4.22351	-2.78323	-1.09111	-1.09111	-1.24102	-0.64039	0.26099	1.58201	2.15253	3.24352	3.3226	3.3226	2.55267	2.57193	1.12062	0.29054	-1.87173		
Theta(97.5°)	0.15015	-0.61122	-1.35139	-1.6205	-2.58311	-3.75418	-4.7157	-4.22293	-2.14143	-0.58027	-0.61102	-1.28115	-1.31091	-0.17052	1.23194	2.29287	3.11288	2.72318	3.7529	2.78328	3.39305	2.29132	-0.04105	-1.31047		
Theta(105°)	-0.18048	-1.55247	-2.96244	-2.01121	-2.9348	-6.39322	-5.35304	-4.54317	-2.11156	-1.01094	-1.27139	-1.2612	-1.37154	-1.2307	0.15123	2.1426	2.64233	1.96227	2.82262	3.47093	3.67251	1.10135	-0.11046	0.62026		
Theta(112.5°)	-2.2724	-2.71308	-2.62159	-0.36031	0.71113	-3.39093	-5.154	-3.79127	-1.75125	-0.55003	0.13002	-0.38005	-1.3905	-1.07146	-1.38055	0.61018	0.86031	2.02216	3.26258	1.9812	2.02216	1.9812	0.68186	-2.2324		
Theta(120°)	4.86503	4.02306	-3.75159	4.66335	-3.415	-6.71979	-8.28639	-5.95542	-4.65369	-1.81041	0.06060	-0.17031	-0.54037	-0.11016	0.49118	2.23274	2.31113	0.21065	1.15105	2.29292	3.12248	1.01115	-3.46327	-3.35397		
Theta(127.5°)	-2.45265	-1.71093	-1.764	-6.64779	-8.23498	-9.64859	-6.44156	-6.31091	-7.55339	-0.91029	-0.78145	-1.511	-0.63036	-0.17046	-0.51004	1.09153	1.2081	0.89096	0.88084	1.36152	1.04042	-0.23068	-0.68015	-0.19108		
Theta(135°)	-1.91236	-2.52145	-1.59264	-4.22567	-6.97829	-8.78761	-7.1567	-7.57118	-11.53082	-2.88188	-1.73133	-0.69041	0.71151	-2.04188	0.62067	1.33143	1.41138	1.21072	0.61043	0.51123	1.52158	1.42119	1.12085	0.06114		
Theta(142.5°)	-4.11478	-4.57409	-4.17521	-1.76899	-9.83107	-12.15136	-11.391123	-12.081308	-11.2208	-6.55577	-4.92374	-2.5421	-2.48294	-2.31078	0.4062	0.43001	0.06002	0.19007	-0.58069	0.52139	1.58128	0.54032	-1.14203	-2.37158		
Theta(150°)	-7.19144	-5.41457	-4.24179	-6.11183	-8.36688	-9.1297	-9.55496	-8.5758	-6.71567	-5.09522	-5.82266	-6.22167	-6.35635	-5.71666	-4.02394	-4.03268	-2.93237	-2.44336	-3.61285	-1.48072	-0.71127	-2.41248	-6.4128	-8.98175		
Theta(157.5°)	-4.67372	-3.09266	-2.5729	-3.2104	-5.036	-6.5175	-7.91795	-7.04576	-4.75199	-3.25127	-2.05155	-1.25107	-1.11147	-2.08271	-2.92244	-1.95164	-1.6822	-3.48456	-4.93245	-3.85183	-4.67169	-8.52102	-10.6993	-6.96576		
Theta(165°)	-2.5322	-1.97191	-2.1128	-3.45418	-5.08611	-7.78095	-9.61027	-9.91852	-7.18092	-4.73263	-2.43162	-0.92031	0.1022	0.18160	0.09003	0.36102	-2.03321	-4.64576	-6.57169	-6.84725	-8.62713	-6.16533	-4.6442	-3.5331		
Theta(172.5°)	-2.94275	-2.84323	-3.75468	-6.09713	-8.3894	-11.171304	-14.291538	-15.11316	-11.841022	-8.19657	-5.33149	-3.4528	-2.5122	-2.07205	-2.21257	-3.41472	-6.36082	-9.911023	-9.77183	-9.64837	-6.95578	-4.94429	-3.96374	-3.37285		
Theta(180°)	-6.64684	-7.11179	-8.8710	-11.511267	-13.111373	-15.441555	-15.511545	-14.521278	-11.411083	-10.571961	-8.85184	-8.11802	-8.321852	-8.88199	-9.311011	-11.62138	-14.191371	-13.811343	-13.931292	-11.31928	-7.711653	-5.981585	-5.65158	-5.51593		
Phi(7.5°)	0.78021	0.15042	0.5049	0.44044	0.44028	0.24015	2.04126	1.28092	0.52023	-0.07015	0.2011	0.19022	0.04062	1.01122	1.2813	1.3117	0.92041	-1.32102	-1.07107	0.67058	0.61061	0.73107	-1.38129			
Phi(15°)	-0.5029	0.64095	1.1111	0.97081	0.66041	0.01068	-1.33144	-0.08066	-0.45039	-0.46051	-0.55064	-0.93071	-0.51031	0.84108	1.08093	0.7066	0.46033	-0.98162	-1.7113	-0.87049	-0.24005	-0.01005	-0.14049	-0.02098		
Phi(22.5°)	-0.48007	0.38066	0.91015	1.01082	0.51021	-0.16075	-1.16106	-0.65055	-0.45045	-0.65092	-1.13139	-1.64145	-1.22058	0.05035	0.38028	0.17007	-0.14038	-0.91158	-1.65124	-0.74032	-0.02014	0.06008	-0.01026	-0.7408		
Phi(30°)	-0.96096	-0.72039	-0.05015	0.180	-0.21051	-0.82128	-1.41084	-0.38022	-0.25056	-0.91119	-1.55195	-2.35204	-1.71081	-0.32013	-0.16034	0.53074	-0.6912	-1.63205	-1.92133	-0.78046	-0.33026	-0.31033	-0.33036	-0.48091		
Phi(37.5°)	-1.67184	-1.7113	-1.02067	-0.51063	-1.12161	-2.04231	-2.32144	-1.01068	-0.77009	-1.33177	-2.25288	-3.26137	-2.23119	-0.64029	-0.22042	-0.72097	-1.08108	-1.36177	-1.82177	-1.55133	-1.0809	-0.72057	-0.36035	-0.64119		
Phi(45°)	-2.19235	-2.12196	-1.69124	-0.91086	-1.15194	-2.59323	-3.36251	-1.71133	-1.46183	-2.28267	-3.19104	-4.36149	-2.81172	-1.04064	-0.49057	-0.84121	-1.5187	-2.19259	-2.5924	-2.14173	-1.3114	-1.22126	-1.57163	-1.76121		
Phi(52.5°)	-2.88298	-3.31365	-3.6139	-2.7129	-2.5129	-3.2147	-4.1329	-3.46129	-3.44167	-4.1329	-3.46129	-4.84167	-4.11306	-2.25164	-1.24107	-1.22168	-2.28275	-3.18358	-3.65133	-2.39183	-1.44166	-2.12128	-3.39343	-3.24302		
Phi(60°)	-4.34142	-4.97605	-5.49477	-4.37435	-4.63547	-6.17647	-6.47422	-3.28317	-3.65444	-4.8546	-4.5443	-4.84503	-5.13465	-3.91322	-2.72251	-4.74489	-4.54408	-3.57316	-2.71266	-2.88334	-3.57316	-3.95448	-4.82469	-4.34426		
Phi(67.5°)	-4.92566	-6.55199	-6.22493	-4.17398	-4.12512	-6.95889	-9.05376	-5.82511	-5.25551	-5.85443	-5.25199	-5.3958	-6.15631	-5.94527	-4.67449	-4.92583	-6.24549	-4.57393	-3.71435	-4.94529	-5.81663	-4.42492	-5.42548	-5.12478		
Phi(75°)																										



Radiated Composite Gain Data of 2.4GHz

Appendix A

θ(22.5°)	0.36/0.22	0.47/0.69	0.78/0.66	0.49/0.35	0.16/0.03	-0.09/0.35	-0.36/0.05	0.43/0.68	0.57/0.27	-0.2/0.52	-0.77/-1.28	-2.13/-2.97	-2.9/-1.63	-0.68/0.05	0.60/0.97	1.18/1.26	1.51/1.32	0.98/0.75	0.34/0.83	1.91/2.28	2.35/2.47	2.25/1.91	1.39/0.88	0.66/0.36
θ(30°)	0.36/0.06	0.34/1.08	1.62/1.83	1.82/1.56	1.51/1.33	1.05/0.19	-0.02/0.05	0.91/2.4	1.54/1.05	0.66/0.19	-0.34/0.96	-1.78/-2.54	-2.42/-1.22	-0.28/0.39	0.78/0.97	1.14/1.31	1.53/1.57	1.28/0.73	0.15/0.96	1.58/1.92	2/1.87	1.82/1.71	1.59/1.47	1.23/0.82
θ(37.5°)	0.11/0.37	0.27/1.1	2.11/2.55	2.43/1.89	1.40/0.57	0.15/0.1	-0.7/0.86	-0.33/0.54	1.11/1.2	0.94/0.58	0.27/0.06	-0.52/-1.02	-1.01/0.1	0.59/1.03	1.24/1.38	1.56/1.87	1.78/1.49	0.92/0.36	0.41/1.3	1.81/1.9	2.16/2.27	2.48/2.65	2.58/2.37	1.91/0.97
θ(45°)	-2.8/-2.8	-1.84/-0.97	0.16/1.18	1.71/1.68	0.87/0.05	-0.17/0.08	0.01/0.52	-1.34/-1.33	-0.79/0.84	-0.69/0.51	-0.32/0.17	-0.22/0.08	0.09/0.74	1.32/1.72	1.86/2.01	2.22/2.41	2.42/0.7	1.41/0.54	0.31/0.97	1.31/1.78	2.61/2.76	3.12/2.98	2.39/1.5	0.26/-1.74
θ(52.5°)	-2.42/-2.29	-1.45/-2.61	0.03/0.75	1.32/1.67	1.68/1.53	0.83/0.27	-0.92/-1.53	-2.43/-3.29	-3.76/-4.14	-4.17/-3.38	-2.29/-1.5	-0.50/0.1	0.30/7.9	1.21/4.9	1.74/2.01	2.05/1.74	1.39/0.72	-0.07/0.09	0.60/9.1	1.34/1.89	2.22/2.45	2.14/1.26	-0.4/-1.68	-2.14/-2.27
θ(60°)	-1.53/-2.53	-2.89/-2.18	-1.48/-0.64	0.42/1.23	1.44/0.7	-0.19/-1.81	-3.53/-4.08	-3.9/-3.27	-2.87/-2.84	-3.81/-4.5	-4.27/-3.23	-2.04/-1.35	-0.82/0.42	-0.10/2.8	0.78/1.29	1.53/1.48	1.09/0.44	-0.22/-0.35	0.07/0.19	0.66/1.04	1.51/1.59	1.32/0.77	0.33/0.13	0.05/-0.26
θ(67.5°)	-4.53/-5.39	-5.73/-5.03	-4.32/-3.54	-1.89/-0.12	1/0.81	-0.53/-2.67	-3.46/-3.71	-4.06/-4.51	-3.73/-3.15	-3.03/-3.12	-3.05/-2.52	-1.79/-1.28	-1.19/-1.02	-0.56/0.17	1.01/1.61	1.45/1.4	1.14/0.58	0.66/0.89	0.35/0.32	1.29/2.03	2.59/2.59	1.91/0.62	-1.1/-2.92	-3.56/-4.08
θ(75°)	-2.03/-2.12	-1.64/-1.28	-1.4/-2.01	-2.71/1.82	-0.43/0.03	0.05/-1.02	-2.13/-2.67	-2.81/-3.26	-4.24/-5.17	-5.62/-4.37	-3.3/-2.28	-1.84/-1.1	-0.77/0.58	-0.20/4.4	1.06/1.51	1.85/2.09	2.26/2.24	1.93/0.34	0.59/1.06	1.37/2.19	2.62/2.1	0.72/-1.05	-1.97/-1.67	-1.27/1.32
θ(82.5°)	-1.02/-1.18	-1.08/-0.78	-0.9/-1.53	-2.38/-2.54	-2.03/-1.76	-2.55/-4.23	-5.37/6.48	-7.04/-7.02	-6.36/-5.62	-5.63/-4.87	-3.71/-2.08	-1.17/0.96	-1.01/0.8	-0.30/2.5	0.67/0.99	1.56/2.05	2.28/2.11	1.15/0.68	0.99/1.24	2.04/2.95	3.16/2.34	0.79/0.4	-0.74/0.63	-0.61/0.98
θ(90°)	-1.22/-1.29	0.55/0.09	-0.38/1.23	-2.33/2.7	-2.11/1.52	-1.7/3.53	-5.86/-5.79	5.04/6.26	-10.08/10.31	-6.78/4.68	-3.72/2.23	-1.16/0.7	0.93/-1.21	-1.07/0.57	0.21/2.2	1.92/2.42	2.85/2.94	2.29/0.96	1.11/1.68	2.67/3.12	2.56/0.52	-1.54/-1.75	-1.01/0.38	0.3/-0.42
θ(97.5°)	-1.69/-1.07	-0.44/0.49	-1.11/2.14	-3.13/3.88	-3.44/-2.43	-2.17/-3.1	-4.59/5.08	-4.11/4.49	-7.66/-10.83	-6.29/3.75	-2.88/-1.96	-0.82/0.32	-0.42/0.58	-0.52/0.22	0.44/1.12	1.26/2.04	3.02/3.32	3.36/2.31	2.23/2.38	2.54/2.1	1.17/0.67	0.57/0.61	0.34/0.31	0.01/0.98
θ(105°)	-0.75/0.54	-0.4/0.83	-1.47/1.97	-2.69/3.9	-5.41/7.06	-5.98/5.94	-6.72/7.92	-7.66/6.96	-7.72/8.29	-6.25/4.83	-4.5/3.95	-2.81/1.76	-1.51/1.68	-1.51/1.08	-0.51/0.29	1.21/2.09	2.88/3.08	2.65/1.86	2.19/2.26	2.03/1.98	2.15/2.05	1.67/1.21	0.81/0.47	-0.27/0.76
θ(112.5°)	-1.49/1.22	-0.88/1.92	-2.71/2.16	-1.28/1.02	1.4/2.52	-4.76/-7.2	-7.59/-7.05	-6.89/6.38	-7.23/7.67	-5.5/3.42	-2.48/2.29	-1.88/1.28	-1.18/1.5	-1.79/1.55	-0.86/0.11	0.99/2.18	2.96/2.86	2.14/1.18	2.05/2.62	2.37/2.39	2.62/4.6	1.99/1.63	1.07/0.55	-0.22/1.34
θ(120°)	-4.68/3.61	-3.36/4.15	-6.2/7.12	-5.57/3.94	-3.43/4	-5.59/8.13	-8.17/6.96	-7.01/7.1	-8.2/7.12	-1.46/1.21	-1.38/1.02	-0.83/1.04	-1.1/0.96	-0.7/0.44	0.43/1.61	2.02/1.31	2.02/1.31	-0.43/0.4	1.41/1.59	2.82/8.1	2.11/0.98	-0.09/1.44	-3.64/5.03	
θ(127.5°)	-2.26/1.98	-1.07/0.89	-1.82/4.23	-6.4/7.61	-7.54/7.91	-8.86/9.91	-8.17/8.5	-9.16/13.06	-10.56/4.78	-2.55/2.11	-2.47/3.02	-3.26/2.5	-1.35/0.69	-0.91/1.83	-0.21/1.23	1.22/2.22	2.00/2.22	0.73/0.78	0.06/0.22	0.36/1.32	1.38/1.16	0.96/0.86	0.58/0.1	-0.6/1.55
θ(135°)	-1.63/1.68	-1.26/1.16	-2.16/3.95	-5.52/6.27	-6.92/7.59	-7.21/7.52	-8.62/8.61	-9.88/11.9	-8.97/5.04	-3.17/2.9	-3.39/3.48	-3.29/2.83	-3.01/3.63	-4.48/5.38	-4.15/1.49	0.13/0.62	0.44/0.13	-0.79/0.61	-0.26/0.52	-0.84/0.02	0.74/1.22	1.71/2.11	2.1/1.54	0.33/-1.04
θ(142.5°)	-4.14/4.67	-4.9/5.16	-5.76/7.08	-8.12/9.63	-10.31/10.33	-10.03/9.58	-10.54/10.44	-12.38/12.76	-9.46/6.53	5/4.56	-4.39/3.61	-2.42/1.88	-2.35/3.41	-3.85/2.67	-0.99/0.01	0.30/2.3	-0.03/0.35	-0.26/0.12	-0.52/-1.05	-0.01/1.15	1.56/1.61	1.21/0.62	-0.4/1.74	-2.5/3.57
θ(150°)	6.48/6.22	-5.54/4.93	4.83/5.5	6.12/7.53	8.96/10.23	11.31/10.17	9.02/8.76	9/8.75	8.04/6.93	5.7/5.28	5.89/6.65	6.24/6.3	6.13/6.14	5.88/5.37	4.91/5.15	5.36/5.79	5.68/4.48	3.19/3.06	3.51/3.05	-1.45/0.33	-0.65/0.92	2.17/3.93	5.33/6.52	-7.32/7.02
θ(157.5°)	4.19/3.44	-2.69/2.28	-2.25/2.78	-3.96/5.36	-6.66/7.09	-7.39/8.01	-8.41/8.24	-7.92/6.69	-5.62/4.76	-3.83/3.11	-2.92/2.95	-2.76/2.85	-2.92/3.1	-3.73/4.18	-4.81/5.06	-4.85/4.01	-3.27/3.19	-3.71/4.23	-4.92/4.73	-3.9/3.6	-3.97/5.22	6.91/7.76	-7.8/6.88	-5.6/4.72
θ(165°)	-1.98/1.69	-1.49/1.35	-1.65/2.33	-3.47/4.9	-5.98/7.02	-8.12/9.31	-10.61/10.55	-9.97/8.08	-6.52/5.18	-4.13/3.11	-2.31/1.74	-1.17/0.77	-0.6/0.33	-0.51/0.64	-0.77/0.96	-1.24/1.42	-1.91/2.85	-4.05/5.3	-6.04/6.66	-6.25/5.72	-5.94/5.1	-4.32/4.06	-3.63/2.99	-2.74/2.31
θ(172.5°)	-2.32/2.38	-2.37/2.73	-3.22/4.04	-5.32/7.32	-8.97/10.47	-11.96/14.07	-14.95/15.93	-15.15/13.67	-10.47/8.41	-6.74/5.42	-4.36/3.51	-2.89/2.49	-2.27/2.2	-2.46/2.55	-2.95/3.32	-3.9/4.43	-5.31/6.48	-7.58/8.67	-9.5/9.08	-8.81/7.77	-7.11/6.13	-5.12/4.29	-3.65/3.24	-2.91/2.92
θ(180°)	-6.22/6.63	-7/7.67	-8.55/9.21	-10.24/11.55	-12.56/13.62	-14.68/15.36	-15.24/14.63	-14.78/15.31	-13.8/12.34	-10.94/9.59	-8.74/7.78	-7.37/7.4	-7.63/8.32	-9.28/9.78	-11.01/11.82	-12.98/13.77	-13.46/12.35	-11.94/12.52	-12.36/13.57	-12.48/11.1	-10.04/8.23	-7.62/7.1	-6.88/6.65	-6.59/6.4
Freq(Hz)	2.4835GPol.	Theta	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ
DG(dB)	φ(0°)/φ(7.5°)	φ(15°)/φ(22.5°)	φ(30°)/φ(37.5°)	φ(45°)/φ(52.5°)	φ(60°)/φ(67.5°)	φ(75°)/φ(82.5°)	φ(90°)/φ(97.5°)	φ(105°)/φ(112.5°)	φ(120°)/φ(127.5°)	φ(135°)/φ(142.5°)	φ(150°)/φ(157.5°)	φ(165°)/φ(172.5°)	φ(180°)/φ(187.5°)	φ(195°)/φ(202.5°)	φ(210°)/φ(217.5°)	φ(225°)/φ(232.5°)	φ(240°)/φ(247.5°)	φ(255°)/φ(262.5°)	φ(270°)/φ(277.5°)	φ(285°)/φ(292.5°)	φ(300°)/φ(307.5°)	φ(315°)/φ(322.5°)	φ(330°)/φ(337.5°)	φ(345°)/φ(352.5°)
θ(0°)	0.54/0.32	0.07/0.35	0.55/0.67	0.61/0.28	-0.33/-1.11	-2.16/-3.42	-4.8/4.74	-3.31/-2.22	-1.27/0.56	-0.11/0.09	-0.11/0.64	-0.98/-1.01	-1.24/0.61	0.02/0.58	0.97/1.02	0.69/0.12	0.57/1.14	-1.68/-2.26	-2.87/-2.7	-2.31/-1.81	-1.48/-1.31	-1.39/-1.38	-1.42/-1.33	-1.4/-1.03
θ(7.5°)	-0.78/0.43	0.96/1.28	1.39/1.29	1.07/0.59	-0.12/-1.05	-2.17/3.44	-4.88/5.01	-3.92/2.81	-1.92/-1.2	-0.8/0.59	-0.65/0.96	-1.48/-1.34	-1.32/-1.13	-0.57/0.09	0.27/0.4	0.16/0.2	-0.88/2	-2.61/3.08	-3.15/2.5	-1.66/-1	-0.65/0.52	-0.71/0.99	-1.46/-1.68	-1.44/-1.1
θ(15°)	-0.40/6	1.11/1.32	1.32/1.19	0.99/0.69	0.14/0.5	-1.28/2.37	-3.72/4.41	-4.25/3.8	-3.2/2.59	-2.16/1.98	-1.81/1.79	-2.04/1.9	-1.7/1.59	-0.98/0.49	-0.11/0.1	0.01/0.49	-1.22/1.81	-2.36/2.88	-2.88/2.09	-1.15/0.41	-0.05/0.4	-0.32/0.66	-1.1/1.36	-1.52/1.18
θ(22.5°)	0.74/0.22	0.21/0.36	0.33/0.21	0.22/0.19	0.25/0.02	-0.55/-1.36	-2.48/3.49	-3.82/3.83	-3.53/3.37	-3.27/3.09	-2.85/2.64	-2.09/1.85	-1.9/1.34	-0.91/0.53	-0.19/0	0.12/0.82	-1.67/2.86	-3.61/3.85	-2.97/1.63	-0.61/0.02	0.26/0.33	0.08/0.34	-0.84/-1.13	-1.16/-1.11
θ(30°)	-2.36/1.87	-1.41/1.06	-0.86/0.79	-0.65/0.32	-0.09/0.09	-0.25/0.62	-1.51/2.55	-3.13/3.07	-3/2.89	-3.11/3.31	-3.25/3.04	-2.28/2.04	-1.81/1.42	-1.17/0.87	-0.59/0.47	-0.62/1.15	-1.97/2.76	-3.35/3.34	-2.62/1.49	-0.54/0.05	0.44/0.58	0.53/0.13	-0.5/-1.2	-1.96/2.31
θ(37.5°)	-3.82/3.43	-2.79/2.29	-1.99/1.91	-1.97/1.82	-1.41/1.35	-1.35/-1.6	-2.51/3.18	-3.22/2.69	-2.33/2.35	-2.68/3.09	-3.3/3.43	-3.16/2.59	-2.29/1.75	-1.38/1.08	0.9/0.83	0.93/1.23	-1.74/2.47	-3.06/3.27	-2.8/1.88	-0.98/0.34	0.05/0.18	0.05/0.26	-1.14/2.06	-3.18/3.73
θ(45°)	-4.58/4.07	-3.41/2.99	-2.72/2.76	-2.94/3.16	-3.2/2.92	-2.75/3.07	-3.76/4.32	-4.4/3.92	-3.5/3.41	-3.6/4.11	-4.53/4.93	-5.38/4.96	-4.13/3	-2.22/1.65	-1.37/1.14	-0.98/0.95	-1.05/1.55	-2.62/3.84	-4.3/3.54	-2.27/1.55	-1.07/1.12	-1.23/1.68	-2.27/3.17	-4.25/4.84
θ(52.5°)	-4.63/4.23	-4.21/3.94	-3.79/3.78	-3.87/4.18	-4.3/4.51	-4.57/4.69	-5.38/5.22	-5.15/5.02	-5.09/5.26	-5.6/5.75	-5.74/5.97	-6.74/7.02	-6.33/4.91	-3.88/3.18	-2.69/2.22	-1.92/1.89	-2.11/2.86	-4.51/6.03	-5.58/4.11	-2.57/1.83	-1.7/2.15	-2.6/2.9	-3.7/4.51	-4.94/5.02
θ(60°)	-5.07/5.02	-4.9/4.83	-4.78/4.69	-4.75/4.97	-5.43/6.44	-7.35/7.5	-7.77/6.84	-6.88/6	-5.69/5.85	-6.94/7.89	-7.7/7.04	-7.01/7.19	-7.01/6.7	-5.88/5.34	-4.79/4.19	-3.74/3.55	-3.7/4.4	-5.42/5.88	-4.76/3.23	-2.29/2.13	-2.66/3.32	-3.67/3.97	-4.15/4.26	-4.44/4.88
θ(67.5°)	-6.13/5.38	-4.97/5.06	-5.32/5.43	-5.41/5.15	-5.13/5.72	-6.72/8.13	-9.78/10.87	-12.13/10.24	-7.69/6.58	-7.37/8.96	-10.06/9.82	-9.18/7.93	-7.14/6.68	-6.59/6.58	-6.31/5.98	-5.27/4.62	-4.16/4.48	-5.16/5.48	-5.29/4.82	-4.79/4.81	-4.97/4.98	-4.79/4.77	-5.06/5.7	-6.5/6.7
θ(75°)	-5.2/5.19	-5.82/6.86	-7.79/8.17	-7.72/6.36	-5.37/5.19	-5.79/6.58	-6.81/8.11	-9.8/12.38	-12.05/10.07	-9.58/9.89	-10.93/12.79	-13.02/10.91	-8.13/6.84	-6.35/6.31	-5.89/5.8	-5.84/5.82	-5.56/5.61	-6.61/7.46	-7.81/7.22	-6.73/6.19	-5.89/6.11	-6.87/7.72	-7.83/7.41	-6.47/5.8
θ(82.5°)	-8.49/8.93	-8.46/8.43	-9.45/11.24	-11.83/9.85	-7.86/7.24	-7																		



Radiated Composite Gain Data of 2.4GHz

Appendix A

Gain Result

Freq(Hz)	2.4GPol	PhiAnt.1	PhiAnt.2	PhiAnt.3	PhiAnt.4	PhiAnt.5	PhiAnt.6	PhiAnt.7	PhiAnt.8	PhiAnt.9	PhiAnt.10	PhiAnt.11	PhiAnt.12	PhiAnt.13	PhiAnt.14	PhiAnt.15	PhiAnt.16	PhiAnt.17	PhiAnt.18	PhiAnt.19	PhiAnt.20	PhiAnt.21	PhiAnt.22	PhiAnt.23	PhiAnt.24	PhiAnt.25	PhiAnt.26	PhiAnt.27	PhiAnt.28	PhiAnt.29	PhiAnt.30	PhiAnt.31	PhiAnt.32	PhiAnt.33	PhiAnt.34	PhiAnt.35																																																																																																																																																																									
Gain	Phi(7.5)	Phi(15)	Phi(22.5)	Phi(30)	Phi(37.5)	Phi(45)	Phi(52.5)	Phi(60)	Phi(67.5)	Phi(75)	Phi(82.5)	Phi(90)	Phi(97.5)	Phi(105)	Phi(112.5)	Phi(120)	Phi(127.5)	Phi(135)	Phi(142.5)	Phi(150)	Phi(157.5)	Phi(165)	Phi(172.5)	Phi(180)	Phi(187.5)	Phi(195)	Phi(202.5)	Phi(210)	Phi(217.5)	Phi(225)	Phi(232.5)	Phi(240)	Phi(247.5)	Phi(255)	Phi(262.5)	Phi(270)	Phi(277.5)	Phi(285)	Phi(292.5)	Phi(300)	Phi(307.5)	Phi(315)	Phi(322.5)	Phi(330)	Phi(337.5)	Phi(345)	Phi(352.5)																																																																																																																																																														
0.0	1.77155	1.14047	0.53171	-0.31658	-0.71207	-1.18788	-1.71207	-2.28788	-2.91207	-3.58788	-4.31207	-5.08788	-5.91207	-6.78788	-7.71207	-8.68788	-9.71207	-10.78788	-11.91207	-13.08788	-14.31207	-15.58788	-16.91207	-18.31207	-19.71207	-21.11207	-22.51207	-23.91207	-25.31207	-26.71207	-28.11207	-29.51207	-30.91207	-32.31207	-33.71207	-35.11207	-36.51207	-37.91207	-39.31207	-40.71207	-42.11207	-43.51207	-44.91207	-46.31207	-47.71207	-49.11207	-50.51207																																																																																																																																																														
0.75	2.44029	1.98145	0.58949	-1.84366	-5.89955	-15.68180	-33.03847	-5.68363	-1.99078	0.06073	1.27157	1.74181	1.73175	1.09045	0.41445	-2.83182	-7.99154	-18.37156	-33.91664	-43.25274	-46.00876	-42.14088	-28.37482	-9.91164	4.37252	-14.00876	1.06784	2.52269	2.65259	2.31214	1.75179	1.09102	0.36102	-0.41102	-1.09102	-1.75179	-2.31214	-2.83182	-3.29259	-3.58182	-3.71214	-3.68182	-3.51214	-3.21214	-2.71214	-2.11214	-1.41214	-0.61214	0.21214	0.91214	1.51214	2.01214	2.41214	2.71214	2.91214	3.01214	2.91214	2.61214	2.11214	1.51214	0.81214	0.11214	-0.61214	-1.31214	-2.01214	-2.71214	-3.41214	-4.11214	-4.81214	-5.51214	-6.21214	-6.91214	-7.61214	-8.31214	-9.01214	-9.71214	-10.41214	-11.11214	-11.81214	-12.51214	-13.21214	-13.91214	-14.61214	-15.31214	-16.01214	-16.71214	-17.41214	-18.11214	-18.81214	-19.51214	-20.21214	-20.91214	-21.61214	-22.31214	-23.01214	-23.71214	-24.41214	-25.11214	-25.81214	-26.51214	-27.21214	-27.91214	-28.61214	-29.31214	-30.01214	-30.71214	-31.41214	-32.11214	-32.81214	-33.51214	-34.21214	-34.91214	-35.61214	-36.31214	-37.01214	-37.71214	-38.41214	-39.11214	-39.81214	-40.51214	-41.21214	-41.91214	-42.61214	-43.31214	-44.01214	-44.71214	-45.41214	-46.11214	-46.81214	-47.51214	-48.21214	-48.91214	-49.61214	-50.31214	-51.01214	-51.71214	-52.41214	-53.11214	-53.81214	-54.51214	-55.21214	-55.91214	-56.61214	-57.31214	-58.01214	-58.71214	-59.41214	-60.11214	-60.81214	-61.51214	-62.21214	-62.91214	-63.61214	-64.31214	-65.01214	-65.71214	-66.41214	-67.11214	-67.81214	-68.51214	-69.21214	-69.91214	-70.61214	-71.31214	-72.01214	-72.71214	-73.41214	-74.11214	-74.81214	-75.51214	-76.21214	-76.91214	-77.61214	-78.31214	-79.01214	-79.71214	-80.41214	-81.11214	-81.81214	-82.51214	-83.21214	-83.91214	-84.61214	-85.31214	-86.01214	-86.71214	-87.41214	-88.11214	-88.81214	-89.51214	-90.21214	-90.91214	-91.61214	-92.31214	-93.01214	-93.71214	-94.41214	-95.11214	-95.81214	-96.51214	-97.21214	-97.91214	-98.61214	-99.31214	-100.01214



Radiated Composite Gain Data of 2.4GHz

Appendix A

Theta (°)	1.39141	1.12038	0.63193	3.24445	5.94786	9.41133	11.38193	6.75148	3.77130	2.44222	1.69136	1.12101	1.08137	1.88256	3.39458	6.11177	9.08111	14.62189	18.61115	6.84139	2.13085	0.053	0.54038	0.55089
Theta (30°)	1.75182	1.81177	1.47072	0.48128	3.51258	7.41852	9.24193	5.51398	2.41228	1.71124	0.93178	0.68107	0.64198	1.52134	3.43149	6.42163	8.47199	13.07189	19.51110	6.89143	2.87169	0.69101	0.76121	1.34156
Theta (37.5°)	1.98164	1.64164	1.68134	0.16166	3.46166	9.13106	13.27135	10.6128	3.84143	1.51108	0.17075	1.06112	0.87032	0.47153	2.79149	5.04163	6.43129	13.24187	18.05127	8.28157	3.55162	0.01134	2.13162	2.62126
Theta (45°)	0.87125	1.53120	2.06192	2.27130	5.72192	13.22150	13.58142	16.05129	7.24158	3.17144	0.07124	1.88228	2.31192	1.27032	0.92126	3.11378	4.87172	11.61179	19.05199	8.39149	2.11006	1.26185	2.01177	0.54104
Theta (52.5°)	0.71164	0.54105	1.21138	1.51186	2.95147	8.61153	17.88178	17.95162	12.04184	6.32136	1.14061	1.72225	1.25191	1.34045	0.63117	2.75197	5.91968	15.81174	14.09196	6.66138	1.67108	0.15105	1.87125	1.54103
Theta (60°)	0.21058	1.41222	2.93105	2.67125	2.54193	6.82116	18.03178	15.81148	8.45168	6.21547	3.71145	0.08084	1.02068	0.02109	1.56128	7.92116	18.14184	14.49138	8.93163	4.28182	1.91133	0.32055	0.89081	
Theta (67.5°)	4.14132	4.42156	7.4419	7.85154	4.49152	8.82168	19.18181	18.55166	8.92156	3.32151	1.61059	0.25075	0.84049	0.08106	1.01184	3.26146	6.66193	11.16174	17.94196	9.83157	2.75112	0.63106	1.63135	4.57177
Theta (75°)	0.27104	0.43113	3.02182	8.85187	5.63102	5.92104	12.69135	11.51129	8.86165	4.28128	1.37102	0.34103	1.36136	1.19087	0.14125	3.07146	5.81177	9.18193	18.16123	9.09154	2.31128	1.95134	3.49124	1.31055
Theta (82.5°)	1.07101	0.55143	1.93145	7.26197	10.15144	1311857	18.75188	18.92159	10.48167	4.29137	1.92105	0.36108	0.96108	1.03062	0.41162	2.91146	5.41171	11.15186	17.49159	8.29133	1.17137	2.95147	2.17109	0.44175
Theta (90°)	0.52041	0.12136	1.41137	6.05185	7.72145	6.97144	14.08139	12.35137	16.85196	5.49135	2.21075	0.08044	0.75078	0.74036	0.28107	2.42125	5.67169	10.56198	18.85136	6.41336	3.28156	6.51136	1.15105	0.17053
Theta (97.5°)	0.05004	0.01022	0.72105	4.74193	2.49156	11.48194	7.65187	10.93125	10.03106	10.92113	7.06105	2.41106	1.11076	1.05126	1.31096	0.27106	3.41188	4.0815	8.18173	18.12192	9.24172	6.39144	2.22103	0.49002
Theta (105°)	1.48142	1.05049	0.05108	2.19151	10.56175	14.22102	10.74133	12.61193	18.04127	6.94109	3.96130	2.08111	0.51105	0.17099	0.57115	3.18124	4.86164	11.14188	16.11142	11.65174	4.22129	1.32105	0.34107	1.14137
Theta (112.5°)	0.58096	0.93014	0.69108	1.08124	4.59173	12.72174	18.21886	18.46123	9.45182	6.21382	2.19133	0.50129	0.70154	0.03103	1.37127	3.41138	2.87139	8.23183	15.87125	10.99164	3.69188	0.68021	0.43059	0.58038
Theta (120°)	3.03186	1.38123	4.74165	5.96159	5.56159	9.04137	17.71185	19.02129	8.62169	1.45105	0.30139	0.8909	0.540	1.04127	3.76133	3.08159	5.79121	13.99169	9.74121	18.98172	2.78102	0.44123	0.21074	2.25132
Theta (127.5°)	0.51016	1.1114	0.26128	5.27165	7.25185	10.84173	17.97199	18.59163	10.68163	4.72135	2.91237	1.74106	0.62134	1.56140	2.81102	2.75104	2.84127	13.72132	13.76184	16.61182	5.19102	2.81121	0.0407	0.62006
Theta (135°)	0.43034	0.73065	0.39125	4.06146	5.57165	8.01115	18.33191	14.88124	11.77198	7.59169	4.84135	2.85128	1.81196	2.99143	4.59124	1.55127	4.47189	13.57124	11.06148	18.56103	5.14127	0.09145	2.59185	2.14113
Theta (142.5°)	2.57137	3.31136	4.4106	8.19161	9.87133	11.32135	18.58173	17.31139	11.61042	8.92108	4.75154	1.07164	1.16120	2.19121	0.03104	0.22169	4.01195	9.21198	11.22135	8.74138	1.34003	0.67093	0.7018	0.59181
Theta (150°)	5.76147	3.96141	3.36104	5.61193	10.12126	17.46182	18.12186	10.89169	6.97158	5.51124	5.18192	4.92146	4.41136	3.52142	5.85197	12.21131	12.51111	19.21158	17.91158	7.7415	3.09128	3.39138	5.46158	7.61686
Theta (157.5°)	2.74155	0.77133	0.32109	2.16133	5.9102	10.57145	18.39196	17.33183	11.45166	3.7128	1.42106	0.98198	1.06113	1.79128	3.25165	3.62136	3.17125	6.82105	13.94134	11.73106	10.91135	17.63183	14.51102	6.79129
Theta (165°)	0.20136	0.66107	0.44103	1.62147	5.33137	9.97133	17.36174	16.63114	8.36154	3.83121	0.73034	0.97139	1.66179	1.75159	1.39122	0.91029	0.88182	5.71194	14.52181	19.31192	18.78126	8.82143	4.65125	2.09101
Theta (172.5°)	0.51105	0.09109	1.29127	4.03164	8.40104	12.89156	17.38197	18.48178	10.72108	5.92142	0.89144	0.28109	0.46107	0.97136	2.07132	5.1177	11.39154	19.36194	18.14112	10.45161	5.57127	3.14123	1.52103	
Theta (180°)	5.09156	6.03167	7.69187	10.21173	13.14158	17.15153	18.31179	17.62188	15.52154	10.71109	7.83168	6.27157	6.75159	8.64191	10.85132	14.16168	18.96184	16.13123	9.53171	6.64167	5.78156	5.17107		
Freq (Hz)	2.4835GPa	ThetaAnt. 2	ThetaAnt. 2	ThetaAnt. 2	ThetaAnt. 2	ThetaAnt. 2	ThetaAnt. 2	ThetaAnt. 2	ThetaAnt. 2	ThetaAnt. 2	ThetaAnt. 2	ThetaAnt. 2	ThetaAnt. 2	ThetaAnt. 2	ThetaAnt. 2	ThetaAnt. 2	ThetaAnt. 2	ThetaAnt. 2	ThetaAnt. 2	ThetaAnt. 2	ThetaAnt. 2	ThetaAnt. 2	ThetaAnt. 2	ThetaAnt. 2
Gain	Phi(0°)Phi(7.5°)	Phi(15°)Phi(22.5°)	Phi(30°)Phi(37.5°)	Phi(45°)Phi(52.5°)	Phi(60°)Phi(67.5°)	Phi(75°)Phi(82.5°)	Phi(90°)Phi(97.5°)	Phi(105°)Phi(112.5°)	Phi(120°)Phi(127.5°)	Phi(135°)Phi(142.5°)	Phi(150°)Phi(157.5°)	Phi(165°)Phi(172.5°)	Phi(180°)Phi(187.5°)	Phi(195°)Phi(202.5°)	Phi(210°)Phi(217.5°)	Phi(225°)Phi(232.5°)	Phi(240°)Phi(247.5°)	Phi(255°)Phi(262.5°)	Phi(270°)Phi(277.5°)	Phi(285°)Phi(292.5°)	Phi(300°)Phi(307.5°)	Phi(315°)Phi(322.5°)	Phi(330°)Phi(337.5°)	Phi(345°)Phi(352.5°)
Theta (0°)	-18.111721	13.591079	8.311628	4.821393	3.541326	3.391363	4.24112	3.591377	4.151478	5.95166	10.59153	18.261731	18.761325	9.551669	4.69135	2.991272	2.431204	1.58113	1.38117	2.371298	3.751477	6.031764	9.841275	17.341801
Theta (7.5°)	-16.781168	8.581449	4.911385	3.2157	2.521273	3.161537	4.191246	4.111047	4.341485	6.071755	10.281359	18.541759	17.691598	11.951904	4.461377	2.361311	2.41196	1.84196	2.151252	3.211249	5.781765	9.101507	14.791449	17.941719
Theta (15°)	-13.731999	7.321655	4.391337	2.471178	1.56149	1.631202	2.731331	3.88144	5.09178	6.921883	11.271404	18.43188	17.471508	12.681976	6.89154	4.911332	4.031329	2.41175	1.451159	1.71202	2.811399	5.561743	9.991330	17.371555
Theta (22.5°)	-13.681159	9.271745	5.921464	3.1612	0.981054	0.441058	1.141193	2.861401	5.061643	8.211054	13.921825	17.921771	18.46138	10.961872	6.821526	4.231384	3.811397	3.221242	1.71127	1.31172	2.491363	4.841602	7.58193	11.46135
Theta (30°)	-17.031629	13.61108	8.631671	4.911299	1.59159	0.0903	0.09052	1.571272	4.121541	7.471140	14.481978	18.661929	17.031439	11.081883	6.861531	4.29136	3.93173	3.251229	1.41102	0.95129	1.881263	3.431436	5.76177	10.881145
Theta (37.5°)	-19.171576	14.581123	10.21871	7.16104	4.091286	1.721095	0.92125	1.961263	3.511472	6.351851	11.51168	18.621733	16.261279	10.291806	6.291486	3.871332	2.951297	2.791239	1.82114	1.21131	1.74124	3.261439	6.691943	13.191172
Theta (45°)	-19.731853	15.631104	11.04185	9.081831	7.341566	3.921099	2.41255	3.311428	5.041582	6.59176	9.391209	16.191885	16.821246	9.71758	6.11466	3.361239	1.721164	3.23129	2.081193	2.23193	4.1916	8.451147	15.391846	
Theta (52.5°)	-18.15165	14.321206	10.32134	8.92149	8.811066	6.411467	3.841373	4.511606	7.63185	9.9115	9.61127	16.491921	17.191127	9.49177	6.38148	3.321228	1.83125	3.53194	4.62134	1.981167	2.121347	5.53127	12.481146	18.961192
Theta (60°)	-14.711542	14.19133	11.471039	10.28111	12.191321	11.241869	6.941585	5.751499	7.381066	9.77115	12.121249	15.111847	18.451628	13.11117	9.4719	5.36143	3.541381	4.681452	3.171187	1.451195	3.541615	9.471131	14.941947	13.541912
Theta (67.5°)	-16.611699	15.341185	10.61885	7.9175	7.561825	8.791887	6.911082	12.85127	9.71187	8.31001	12.161477	18.471833	17.511652	15.891456	11.881926	6.961499	3.571335	3.621385	3.651339	3.791522	7.351944	16.731118	11.751251	13.451506
Theta (75°)	-13.131334	13.21128	12.261119	9.93129	6.941265	5.741531	5.481701	10.741798	17.751234	10.181982	10.621634	18.891908	14.291128	11.93113	9.851834	6.65104	4.05142	5.28164	6.99139	5.99105	6.841843	10.641284	12.93121	11.881827
Theta (82.5°)	-18.911862	18.911784	19.071888	17.111319	10.291915	8.02172	7.221817	9.811148	12.841107	14.851134	11.741196</													



Radiated Composite Gain Data of 2.4GHz

Appendix A

Theta	-17.6/15.04	-10.58/8.87	-7.34/5.45	-3.83/2.26	-1.28/0.92	0.24/0.68	-1.14/-1.58	-2.1/2.97	-4.88/8.09	-11.87/14.95	-17.86/17.98	-17.8/15.34	-13.83/12.7	-11.41/9.15	5.83/2.73	0.44/1.08	2.17/2.88	3.49/3.26	3.63/3.23	2.59/2.22	1.08/0.29	2.27/3.77	-5/6.69	9.82/15.69
Phi(75°)	-18.61/17.39	-11.39/8.35	-6.52/5.13	-3.71/2.41	-1.69/1.59	-2.24/3.43	-4.72/5.48	-5.53/5.84	-7.55/10.75	-13.78/14.23	-13.79/12.94	-12.05/11.91	-12.31/12.28	-11.2/9.91	-5.95/3.18	-0.72/1.14	2.3/3	3.21/3.86	3.98/3.7	3.02/2.27	1.41/0.17	-1.36/3.15	-5.42/8.27	-12.3/18.83
Phi(90°)	-17.99/13.71	-9.41/7.69	-7/6.14	-4.91/3.67	-2.88/2.76	-2.47/3.46	-4.01/3.76	-3.42/4.11	-6.57/10.34	-11.46/11.3	-12.94/14.73	-13.81/12.6	-12.51/12.74	-11.71/9.59	-6.76/3.56	-0.63/1.54	3/3.83	4.34/5	4.26/4.07	3.42/2.72	1.82/0.2	-2.11/4.26	-5.72/7	-9.32/14.49
Phi(97.5°)	-16.03/11.58	9.86/10.01	-10.27/9.24	6.96/4.69	-3.37/3	-3.48/4.3	-4.75/4.5	-4.17/4.86	-7.15/9.2	8.24/7.81	9.42/11.84	-12.91/12.88	-13.42/14.14	-12.87/10.08	6.83/3.43	-1.06/1.12	2.68/3.71	4.79/5.09	5.16/4.59	3.95/2.78	1.54/0.29	-1.07/2.41	-4.21/6.71	-10.52/16.72
Phi(105°)	-19.19/14.86	-13.11/13.89	-16.54/16.13	-12.7/9.2	-7.07/6.23	-5.75/6.68	-7.16/6.94	-6.94/7.89	-9.82/10.86	-9.92/9.9	-11.65/13.99	-14.47/13.05	-12.94/14.18	-12.81/9.29	-6.06/3.12	0.54/1.4	2.84/3.72	4.39/4.42	4.59/4.38	3.71/2.81	1.96/0.55	-1.21/3	-5.38/8.86	-14.6/18.57
Phi(112.5°)	-18.44/15.08	-16.04/18.46	-18.28/11.45	-7.93/5.38	-3.88/3.5	-4.06/4.73	-4.46/3.56	-3.41/4.56	-7.23/10.07	-10.24/9.56	-10.17/12.27	-15.08/15.73	-16.03/17.17	-13.46/8.8	-5.45/2.91	-0.78/0.88	1.92/4.2	2.99/3.51	4.19/4.41	3.96/3.22	2.30/86	-1.04/2.84	-4.9/7.75	-14.63/19.34
Phi(120°)	-16.05/16.14	-18.11/18.1	-13.69/11.42	-10.11/8.38	-7.36/7.6	-8.31/8.15	-6.09/4.38	-4.27/6.21	-11.69/18.45	-12.92/9.95	-10.03/11.86	-14.29/15.7	-16.42/18.31	-16.46/11.25	-6.67/3.33	-1.02/0.31	0.93/1.27	1.57/1.86	2.62/3.16	2.94/2.26	1.62/0.27	-1.82/5.19	-10.24/18.64	-17.37/18.09
Phi(127.5°)	-17.96/17.57	-17.84/15.85	-13.51/14.66	-17.67/17.8	-17.53/18.27	-13.46/8.52	-5.66/4.74	-6.12/11.14	-17.45/9.17	-16.87/7.35	-10.12/13.9	-17.38/17.96	-18.87/17.84	-19.18/12.75	-7.37/5.03	-2.68/1.32	-0.51/1.19	1.18/1.67	2.22/2.76	2.53/1.94	0.72/0.05	-1.96/4.18	-7.86/12.9	-18.41/18.08
Phi(135°)	-18.3/18.45	-18.56/19.1	-15.8/14.16	-14.42/16.54	-18.07/18.04	-12.87/8.59	6.45/6.22	8.44/13.82	-11.51/6.61	-5.07/6.05	-9.1/12.69	-14.13/14.62	-16.15/18.73	-16.96/12.22	8.24/5.25	-3.11/1.62	-0.44/0.47	1.04/1.06	1.28/1.61	1.66/1	0.2/1.7	-3.3/5.21	-8.58/13.42	-17.87/17.84
Phi(142.5°)	-18.39/17.43	-18.73/17.82	-16.69/13.39	-13.2/15.22	-18.8/17.45	-17.54/14.84	-12.63/13.07	-17.9/18.95	-12.82/8.56	7.41/8.4	11.54/15.22	-15.57/14.76	-15.11/16.94	-17.86/14.23	-10.24/7.83	5.52/3.52	-1.87/0.67	0.24/0.7	0.80/0.9	1.04/0.48	0.82/2.48	-4.74/7.5	-11.03/14.82	-16.93/17.43
Phi(150°)	-18.23/18.15	-17.59/18.53	-17.24/16.58	-16.36/13.97	-13.25/11.9	-10.81/9.56	8.77/8.41	-8.58/9.47	-10.63/11.48	-12/12.62	-14.9/18.8	-17.27/18.31	-17.46/18.94	-18.72/18.94	-17.34/13.38	-10.28/7.79	-5.53/3.84	-2.65/2.39	-2.22/2.09	-2.23/2.42	-3.65/5.16	-7.19/10.02	-11.62/12.78	-14.33/16.49
Phi(157.5°)	-16.36/19.06	-17.44/18.4	-17.05/17.7	-18.56/15.93	-12.35/9.93	-8.23/7	-6.22/5.84	-6/6.83	-8.42/10.7	-13.52/15.86	-18.57/19.36	-18.59/18.5	-18.72/17.89	-18.88/18.95	-18.69/14.3	-11.82/10.04	-7.83/6.07	-4.58/3.96	-3.71/3.71	-3.85/4.15	-4.62/5.3	-7.12/7.16	-8.35/9.74	-11.63/13.79
Phi(165°)	-15.23/17.39	-17.87/18.87	-18.17/19.04	-18.19/14.57	-12.26/10.77	-9.61/8.82	-8.53/8.49	-8.72/9.31	-10.26/11.82	-13.96/16.42	-19.51/17.71	-18.4/18.78	-18.42/17.22	-17.58/18.37	-16.26/14.45	-12.78/11.19	-9.48/8.03	-6.61/5.71	-4.87/4.69	-4.6/4.64	5.21/6.1	-7.13/8.21	-9.09/9.83	-11.33/12.77
Phi(172.5°)	-18.66/17.77	-17.54/17.99	-17.66/18.53	-18.92/18.72	-15.6/13.97	-13.52/14.17	-15.63/17.74	-19.05/17.7	-18.41/18.22	-18.8/18.69	-17.75/18.34	-17.84/18.55	-19.08/18.76	-17.91/18.32	-16.7/16.51	-15/14.05	-10.12/9.32	-8.66/8.27	-8.37/8.93	-10.16/11.44	-12.38/12.67	-12.93/13.56	-14.78/17.56	
Phi(180°)	-18.43/17.89	-18.95/17.86	-18.13/17.66	-18.88/18.27	-18.83/17.77	-17.75/17.78	-18.47/18.11	-18.11/18.45	-18.83/18.55	-19.41/17.48	-18.44/19.37	-19.01/17.25	-17.94/17.56	-18.24/19.13	-17.97/18.23	-18.08/17.31	-17/16.85	-16.43/15.72	-15.17/15.54	-16.3/18.79	-18.51/17.93	-18.9/17.92	-18.72/18.84	-19.24/18.35
Freq(Hz)	2.45GPol	ThetaAnt.2	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Gain	Phi(0°)	Phi(15°)	Phi(22.5°)	Phi(30°)	Phi(37.5°)	Phi(45°)	Phi(52.5°)	Phi(60°)	Phi(67.5°)	Phi(75°)	Phi(82.5°)	Phi(90°)	Phi(97.5°)	Phi(105°)	Phi(112.5°)	Phi(120°)	Phi(127.5°)	Phi(135°)	Phi(142.5°)	Phi(150°)	Phi(157.5°)	Phi(165°)	Phi(172.5°)	Phi(180°)
Gain	1.68/1.72	1.56/1.27	0.76/0.09	-0.79/1.95	-3.39/5.46	8.14/11.62	-14.99/13.87	-10.03/6.88	-4.47/2.66	-1.18/0.05	0.97/1.56	1.87/1.95	1.85/1.61	1.27/0.79	0.15/0.76	-1.87/3.25	-4.99/7.1	-10.03/13.74	-15.24/11.62	-8.34/5.95	-4.39/3.17	-2.25/1.19	-0.34/0.46	0.94/1.24
Phi(7.5°)	1.63/2.07	1.77/1.28	0.59/0.29	-1.28/2.55	-4.09/6.11	8.64/11.9	-15.51/14.9	-10.69/7.6	-5.28/3.54	-2/0.71	0.34/1.1	1.55/1.74	1.74/1.55	1.25/0.79	0.19/0.65	-1.84/3.26	-5.22/8.16	-11.65/15.17	-14.62/10.68	-7.67/5.51	-4.01/2.79	-1.91/1.06	-0.16/0.65	1.29/1.54
Phi(15°)	1.56/1.76	1.33/0.7	0.11/0.99	-2.03/3.2	-4.74/6.76	9.14/12.54	-16.95/16.14	-11.96/7.84	-6.45/4.68	-3.16/1.88	0.98/1.39	1.54/1.46	1.16/0.7	0.12/0.67	-1.78/3.35	-5.3/7.67	-11.06/15.07	-14.93/10.44	-7.23/5	-3.44/2.32	-1.84/1.09	-0.32/0.38	1/1.36	
Phi(22.5°)	1.53/1.3	0.77/0.01	-0.84/1.73	-2.67/3.8	-5.22/7.21	-9.87/13.85	-16.85/16.6	-11.83/8.69	-6.38/2.35	-3.28/2.35	-1.26/0.22	0.61/1.13	1.32/1.23	0.88/0.35	-0.32/1.21	-2.41/4.31	-6.26/8.94	-13.01/16.65	-14.25/9.94	-6.93/4.85	-3.52/2.02	-2.01/1.66	-1.04/0.21	0.73/1.22
Phi(30°)	0.59/0.61	0.13/0.38	0.96/1.64	-2.53/3.7	-5.27/7.49	-10.34/13.46	-17.48/15.95	-12.05/9.05	-6.77/5.17	-4.06/3.26	-2.39/1.31	-0.32/0.39	0.75/0.76	0.45/0.11	-0.85/1.77	-2.92/4.29	-6.09/8.42	-11.62/15.62	-14.85/10.41	-7.29/5.25	-3.95/3.19	-2.74/2.51	-2.09/1.35	-0.35/0.37
Phi(37.5°)	-0.71/0.65	-0.74/1.1	-1.45/1.98	-2.69/3.63	-4.83/6.5	-8.82/11.98	-12.56/9.45	-7.14/6.02	-4.31/3.23	-2.26/1.45	-0.92/0.76	-0.92/1.31	-1.88/2.62	-3.67/4.91	-6.78/9.04	-12.12/15.58	-15.05/10.92	-7.82/5.72	-4.39/3.6	-3.17/2.86	-2.72/2.34	-1.65/1.92		
Phi(45°)	-1.63/1.35	-1.44/1.78	-2.24/2.8	-3.99/4.17	-6.99/6.21	-13.34/11.56	-17.02/18.66	-14.24/10.13	-9.74/6.87	-6.38/6.27	-3.16/5.73	-1.47/4.47	-3.83/3.37	-3.19/3.21	-3.41/3.82	-4.56/5.73	-7.29/9.21	-11.91/15.55	-17.11/13.48	-10.22/9.99	-5.85/5.17	-4.01/3.53	-3.28/3.08	-2.74/2.19
Phi(52.5°)	-2.02/2.02	-2.71/3.3	-3.95/4.47	-6.71/4.96	-5.59/6.9	-9.11/13.12	-18/17.9	-13.84/10.3	-8.37/7.52	-7.24/7.04	-6.6/6.16	-5.95/5.77	-5.58/5.45	-5.48/5.62	-5.78/6.09	-6.89/8.4	-10.15/12.18	-15.25/18.51	-19.06/15.94	-12.09/9.43	-7.63/6.16	-4.91/4.02	-3.75/3.62	-3.35/2.65
Phi(60°)	-2.95/2.82	-3.47/4.63	-5.89/6.47	-6.36/5.89	-5.68/6.53	-9.25/13.92	-18.51/18.28	-15.07/11.79	-10.06/9.29	9.03/8.87	-8.59/8.32	-9.27/7.27	-6.54/6.08	-6.09/5.55	-7.12/7.73	-8.59/5.55	-11.09/13.06	-15.55/18.07	-17.54/17.71	-12.87/9.76	-7.72/5.92	-4.53/4.11	-4.58/4.86	-4.41/3.42
Phi(67.5°)	-4.14/0.9	-5.03/6.96	-8.74/9.99	-8.73/7.59	-5.94/6.63	-11.36/16.9	-17.96/18.68	-13.63/11.63	-8.47/10.73	-6.16/10.65	-11.14/12.05	-12.71/10.69	-8.17/7.41	-7.12/7.65	-8.68/10.02	-10.68/11.54	-13.24/15.85	-19.27/17.59	-18.99/18.11	-15.07/10.96	-8.57/6.06	-7.67/6.78	-7.67/7.92	-6.65/5.94
Phi(75°)	-5.29/5.84	-7.64/9.27	-9.6/9.42	-9.69/9.49	-9.51/10.55	-13.67/18.8	-18.52/16.07	-13.38/12.28	-13.03/14.76	-15.96/16.02	-15.71/16.34	-14/16.2	-13.6/11.45	-10.4/10.49	-10.99/12.06	-13.74/15.92	-18.33/18.8	-18.36/17.94	-19.12/18.19	-17.04/14.66	-12.46/11.12	-10.29/9.85	-9.45/8.71	-7.26/6.02
Phi(82.5°)	-7.85/8.88	-8.71/9.51	-10.34/11.12	-11.19/10.82	-10.69/11.62	-14.2/18.28	-18.11/16.76	-14.19/14.11	-15.64/18.21	-18.94/18.01	-18.15/19.34	-18.86/17.74	-18.18/16.61	-15.56/14.97	-15.32/16.55	-18.77/18.04	-19.06/18.88	-18.4/18.69	-18.75/18.65	-17.65/17.56	-15.86/13.31	-10.72/9.37	-8.6/8.34	-8.25/8.22
Phi(90°)	-10.14/10.37	-11.74/13.52	-13.73/14.02	-14.42/14.67	-14.89/15.18	-18.2/18.41	-18.96/16.59	-16/17.61	-17.65/18.12	-17.06/14.48	-13.88/15.1	-11.71/18.91	-17.99/16.21	-14.9/14.22	-15.45/17.84	-19.1/18.77	-19.07/19.14	-18.37/18.27	-19.05/17.62	-19.04/18.52	-17.92/15.94	-15.8/15.05	-13.81/12.43	-11.28/10.81
Phi(97.5°)	-13.27/15.46	-18.88/17.64	-15.57/14.62	-14.16/13.97	-14.29/15.79	-18.08/19.3	-17.86/16.98	-18.41/19.34	-18.77/18.92	-18.34/17.47	-12.61/11.99	-12.06/12.4	-13.02/13.93	-14.89/15.91	-16.85/17.98	-16.08/16.48	-14.76/18.42	-19.45/19.23	-18.24/18.39	-18.1/19.14	-18.85/17.59	-17.36/15.17	-13.27/12.6	
Phi(105°)	-18.44/18.82	-16.72/15.87	-15.77/15.66	-15.96/16.71	-18.53/18.19	-18.3/18.34	-19.21/17.85	-19.01/17.35	-18.37/18.56	-17.8/18.24	-15.15/13	-12/11.73	-12.28/12.61	-12.26/12.47	-13.41/16.92	-19.09/15.74	-12.64/11.58	-12/11.56	-18.98/18.74	-18.46/18.05	-17.54/17.52	-1		



Freq(Hz)	5.2G	5.3G	5.6G	5.785G
Ant. 1 Max Gain (dBi)	5.14	5.1	5.64	5.76
Ant. 2 Max Gain (dBi)	3.9	4.14	3.81	4.14
Ant. 1 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Phi/135/67.5	Phi/135/67.5	Phi/142.5/90	Phi/142.5/82.5
Ant. 2 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Phi/90/345	Phi/90/352.5	Phi/172.5/352.5	Phi/120/0
Max Gain (dBi)	5.14	5.1	5.64	5.76
DG [1SS] (dBi)	3.77	4.04	4.94	4.87
DG [1SS] (dBi) Revised	5.14	5.1	5.64	5.76
DG [2SS] (dBi)	5.14	5.1	5.64	5.76

