



Antenna Composite Gain Test Report

Equipment	Wireless Access Point
Brand Name	Arista
Model Name	C-330
Applicant	Arista Networks, Inc. 5453 Great America Parkway, Santa Clara, CA 95054 USA
Manufacturer	Arista Networks, Inc. 5453 Great America Parkway, Santa Clara, CA 95054 USA
Sample Received	Dec. 16, 2022
Start Test Date	Dec. 22, 2022
Final Test Date	Dec. 22, 2022


Approved by: Jackson Tsai

SPORTON INTERNATIONAL INC. Hsinhua Laboratory

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



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History of this test report

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1. Operation Mode and Antenna Information

Antenna Position	Brand Name	Model Name	Ant. Type	Connector	Modes of Operation
2G5G Ant1	WHAYU	C393-510223-A	PIFA	I-PEX	Radio 1_2.4G+Radio 0_5G
2G5G Ant2	WHAYU	C393-510223-A	PIFA	I-PEX	Radio 1_2.4G+ Radio 0_5G
6G Ant1	WHAYU	C393-510223-A	PIFA	I-PEX	Radio 2_6G
6G Ant2	WHAYU	C393-510223-A	PIFA	I-PEX	Radio 2_6G

For 2.4GHz function:

For IEEE 802.11 b/g/n/ax mode (2TX/2RX) (Radio 1)

2G5G Ant1 and 2G5G Ant2 could transmit/receive simultaneously.

For 5GHz function:

For IEEE 802.11 a/n/ac/ax mode (2TX/2RX) (Radio 0)

2G5G Ant1 and 2G5G Ant2 could transmit/receive simultaneously.

For 6GHz function:

For IEEE 802.11 ax mode (2TX/2RX) (Radio 2)

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

2. Test Frequency

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

Band [MHz]	Test Frequency [MHz]
2400-2483.5	2450
5150-5250	5200
5250-5350	5300
5470-5725	5600
5725-5850	5785
5925-6425	6175
6425-6525	6475
6525-6875	6695
6875-7125	6995

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	Rex Liao	23~24°C / 50~55%	22/Dec/2022

Note:

Testing Site Information

Brand Name: TDK

Dimension: 11m*6m*6m

Characteristic: Fully Anechoic Chamber

4. Test Facility and Configuration

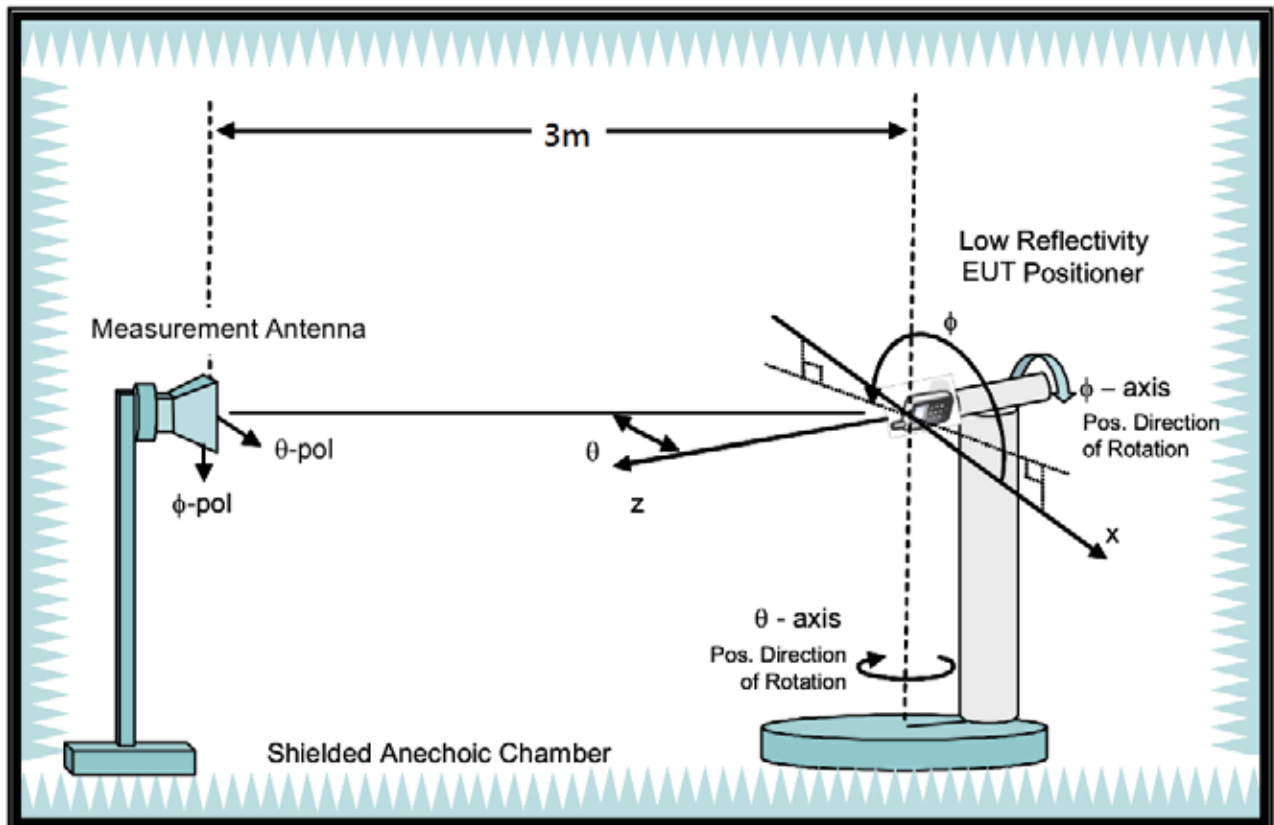
Test configuration: Reference to CITA OTA distributed-axes system configuration.

Chamber: Fully Anechoic Chamber.

Measurement antenna: Dual Polarization Horn antenna

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

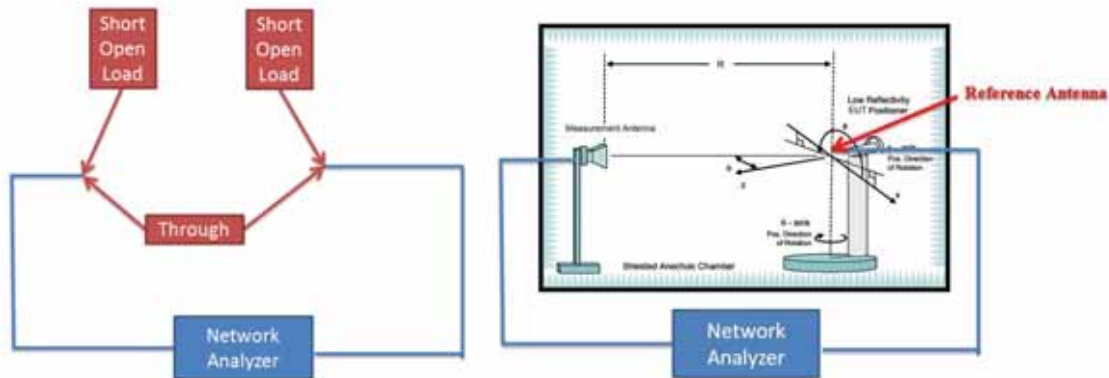
#Reference to CTIA "ctia-test-plan-for-wireless-device-over-the-air-performance-ver-3-7-1"



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	-33.27	-32.92	-32.91	-32.73	-32.02	-32.67	-32.82	-32.98	-33.18	-32.8	-33.92	-34.62	-35.57
G(phi) reading (dB)	-33.15	-32.7	-32.41	-32.61	-32.43	-31.72	-32.37	-32.51	-32.52	-32.66	-32.5	-33.62	-34.32	-35.48
Reference gain (dBi)	10.1	10.4	10.7	12.5	12.7	13.5	13.4	13.3	13.3	13.2	13.4	12.5	12.1	11.4
Factor(theta) (dB)	43.65	43.67	43.62	45.41	45.43	45.52	46.07	46.12	46.28	46.38	46.2	46.42	46.72	46.97
Factor(phi) (dB)	43.25	43.1	43.11	45.11	45.13	45.22	45.77	45.81	45.82	45.86	45.9	46.12	46.42	46.88

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)	2.45G	5.2G	5.3G	5.6G	5.785G
Ant. 1 (dBi)	-0.55	0.35	-1.32	-0.22	0.44
Ant. 2 (dBi)	-0.61	2.5	2.65	1.73	2.82
DG [1SS] (dBi)	2.43	4.5	3.9	3.82	4.72
Polarization	Phi	Theta	Theta	Theta	Theta
$\Theta(^{\circ})$	7.5	52.5	67.5	37.5	60
$\Phi(^{\circ})$	97.5	52.5	210	60	225

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)	2.45G	5.2G	5.3G	5.6G	5.785G
Ant. 1 [$10^{(G/20)}$]	$10^{(-0.55/20)}$	$10^{(0.35/20)}$	$10^{(-1.32/20)}$	$10^{(-0.22/20)}$	$10^{(0.44/20)}$
Ant. 2 [$10^{(G/20)}$]	$10^{(-0.61/20)}$	$10^{(2.5/20)}$	$10^{(2.65/20)}$	$10^{(1.73/20)}$	$10^{(2.82/20)}$
Ant. 1 [$10^{(G/20)}$] value	0.939	1.041	0.859	0.975	1.052
Ant. 2 [$10^{(G/20)}$] value	0.932	1.334	1.357	1.22	1.384
Sum All Antenna [Amax]	1.871	2.375	2.216	2.195	2.436
DG [$10 \cdot \log(A_{max}^2/N_{ant})$]	2.43	4.5	3.9	3.82	4.72

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

**DG_1SS max value position**

Frequency (Hz)	6.175G	6.475G	6.695G	6.995G
Ant. 1 (dBi)	4.91	-1.25	4.85	4.94
Ant. 2 (dBi)	0.69	4.91	2.06	0.95
DG [1SS] (dBi)	6.06	5.38	6.58	6.18
Polarization	Theta	Theta	Theta	Theta
$\Theta(^{\circ})$	60	52.5	37.5	37.5
$\Phi(^{\circ})$	202.5	37.5	292.5	292.5

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)	6.175G	6.475G	6.695G	6.995G
Ant. 1 [$10^{(G/20)}$]	$10^{(4.91/20)}$	$10^{(-1.25/20)}$	$10^{(4.85/20)}$	$10^{(4.94/20)}$
Ant. 2 [$10^{(G/20)}$]	$10^{(0.69/20)}$	$10^{(4.91/20)}$	$10^{(2.06/20)}$	$10^{(0.95/20)}$
Ant. 1 [$10^{(G/20)}$] value	1.76	0.866	1.748	1.766
Ant. 2 [$10^{(G/20)}$] value	1.083	1.76	1.268	1.116
Sum All Antenna [Amax]	2.843	2.626	3.015	2.882
DG [$10 \cdot \log(A_{max}^2/N_{ant})$]	6.06	5.38	6.58	6.18

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

**8. Summary of Test Result**

Frequency (Hz)	2.45G
Ant. 1 Max Gain (dBi)	1.31
Ant. 2 Max Gain (dBi)	1.14
Max Gain (dBi)	1.31
DG [1SS] (dBi)	2.43
DG [2SS] (dBi)	1.31

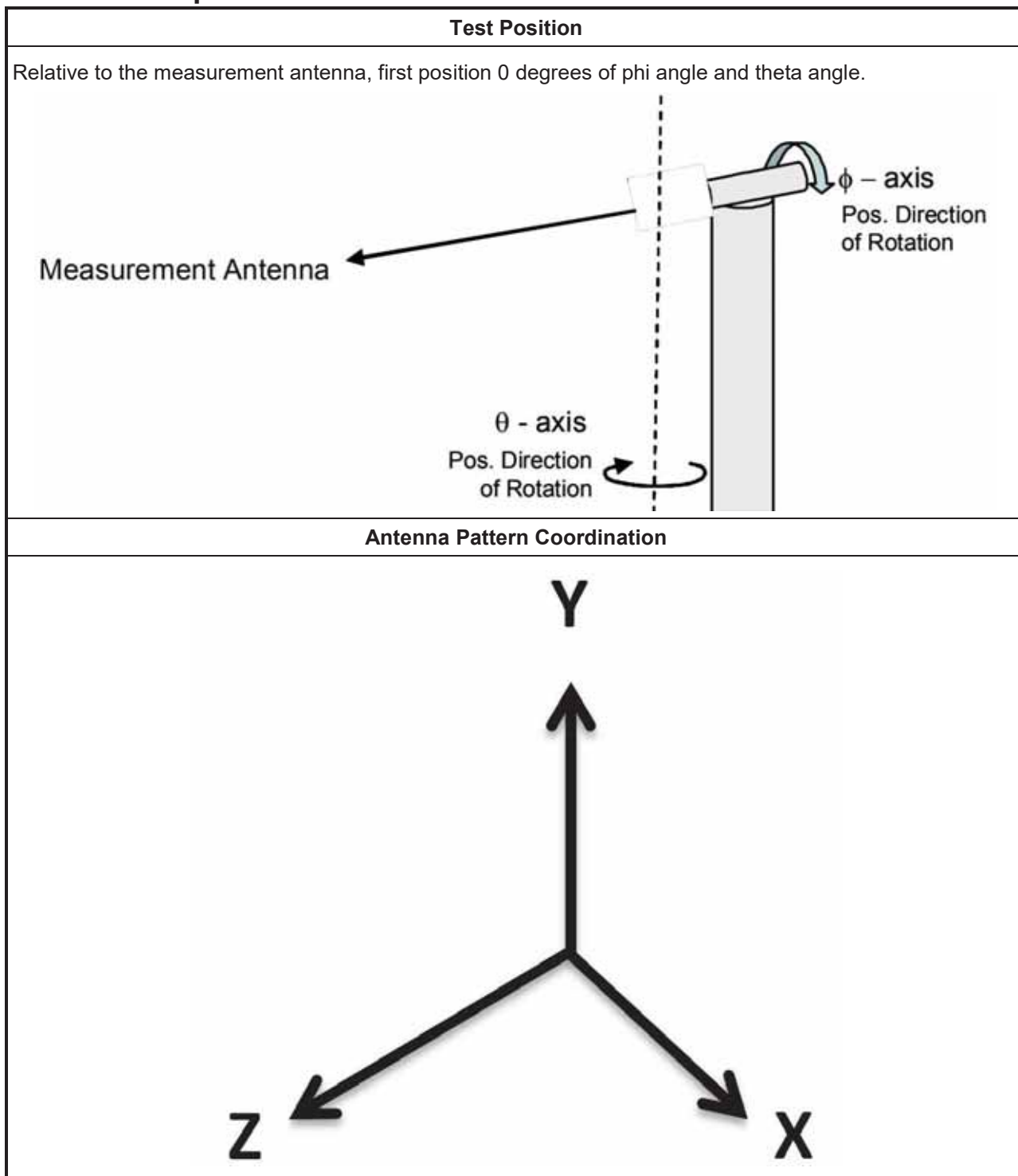
Frequency (Hz)	5.2G	5.3G	5.6G	5.785G
Ant. 1 Max Gain (dBi)	2.31	1.48	1.91	2.48
Ant. 2 Max Gain (dBi)	4.29	3.18	3.16	3.09
Max Gain (dBi)	4.29	3.18	3.16	3.09
DG [1SS] (dBi)	4.5	3.9	3.82	4.72
DG [2SS] (dBi)	4.29	3.18	3.16	3.09

Frequency (Hz)	6.175G	6.475G	6.695G	6.995G
Ant. 1 Max Gain (dBi)	5.17	4.29	5.79	4.94
Ant. 2 Max Gain (dBi)	5.88	5.1	5.81	5.86
Max Gain (dBi)	5.88	5.1	5.81	5.86
DG [1SS] (dBi)	6.06	5.38	6.58	6.18
DG [2SS] (dBi)	5.88	5.1	5.81	5.86

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)

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. 31, 2022	May. 30, 2023
Dual Polarization Horn Antenna	Sporton	S0209DP	S0209DP-001	2GHz~9GHz	NCR.	NCR.
ENA Series Network Analyzer	AGILENT	E5071C	MY46419201	100kHz~8.5GHz	Feb. 21, 2022	Feb. 20, 2023
VNA Calibration Kit	TS RF	TS85033E-F	-	DC~9GHz	NCR.	NCR.
Multi-axis positioner	Sporton	MAPS01	MAPS01-001	Theta / Phi axis	NCR.	NCR.
Test Software	SPORTON	SENSE-RDG	V1.0.8	-	NCR.	NCR.

Note: NCR means Non-Calibration required.



11. Test Results

Please refer to the appendix.

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————THE END————



Radiated Composite Gain Data_2.4GHz WLAN, 5GHz WLAN

Appendix A.1

Freq(Hz)	2.45G	5.2G	5.3G	5.6G	5.785G
Ant. 1 Max Gain (dBi)	1.31	2.31	1.48	1.91	2.48
Ant. 2 Max Gain (dBi)	1.14	4.29	3.18	3.16	3.09
Ant. 1 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/67.5/15	Theta/22.5/285	Phi/37.5/210	Theta/30/292.5	Theta/22.5/277.5
Ant. 2 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/52.5/105	Theta/52.5/225	Theta/45/60	Theta/52.5/225	Theta/52.5/225
Max Gain (dBi)	1.31	4.29	3.18	3.16	3.09
DG [1SS] (dBi)	2.43	4.5	3.9	3.82	4.72
DG [2SS] (dBi)	1.31	4.29	3.18	3.16	3.09



(6)25	4.161489	-7.765758	6.520558	-5.202421	-3.172023	-1.040452	6.219108	-0.340481	0.986116	-1.973136	-5.641636	-6.739489	-8.8957	6.599436	-7.366782	-5.682424	-3.326258	-1.680119	-1.16113	-1.920254	2.022266	-2.323261	-3.302362	-3.875586
(6)52	4.652149	-8.579491	6.404558	-4.353546	-4.483365	-1.051504	-0.331466	-0.890462	-1.232307	-5.373139	-6.559755	-7.586452	-7.927676	-7.863124	-4.864317	-7.640634	-3.484317	-1.920255	-2.780245	-1.920255	-2.323261	-3.302362	-3.875586	
(6)75	-7.860405	-8.9787	7.767382	-8.171872	-6.520454	-2.01609	-1.25027	-3.32489	-1.520743	-0.986246	-4.725739	-6.350504	-6.238489	-11.43217	-9.16421	-8.14758	7.82537	2.0318	-3.13356	-3.34437	-2.741282	-1.6205	-3.420501	-6.07481
(7)53	-8.783473	-1.078629	7.6436	-10.1838	-8.48946	-3.55212	-2.75456	-4.881274	-2.71158	-1.091244	-3.45464	-6.66939	-6.93917	-11.43217	-7.84746	-8.61173	7.82538	-3.3228	-4.022453	-4.23537	-4.58739	-1.851269	-2.87528	-7.77949
(8)25	-4.84451	-10.2908	-0.051309	-11.74466	-8.87457	-5.21372	-4.087128	-5.99446	-3.46233	-2.173345	-2.688456	-6.75915	-8.55787	-7.309182	-7.42382	-8.91768	7.85912	-4.07311	-5.621	-5.815565	-5.181345	-2.462345	-3.51671	-8.3453
(8)52	-3.937396	-10.0997	-0.341237	-12.22152	-7.68324	-4.83424	-4.89813	-7.463137	-6.29852	-8.712	-8.559165	-8.649434	-9.91344	-9.91344	-6.84326	-5.94464	7.85755	-4.18296	-5.4564	-5.75185	-3.94123	-2.96373	-3.08688	
(8)75	-8.296477	-12.32112	8.93138	-11.63433	-6.771305	-3.167427	-4.33771	-9.1678	-5.00634	-2.7832	-5.51655	-5.816172	-6.42858	-8.151249	-10.81157	-8.68705	8.82733	-4.50136	-5.72468	-6.85597	-5.15137	-2.88334	-3.47133	-8.78194
(9)57	-10.589163	-12.071257	-8.113	-12.45482	-7.120344	-7.78342	-4.380769	-9.484	-5.38838	-2.99331	-3.54338	-3.76045	-6.29658	-8.07158	-8.77634	-11.45639	8.857358	-4.65611	-7.38655	-7.44627	-7.37362	-2.30234	-5.01703	-8.78111
(10)25	4.896152	-13.011002	-8.92122	-14.86055	-8.88119	-7.78342	-6.910155	-10.8486	-3.39236	-1.99249	-3.74341	-4.23349	-6.234	-7.859459	-6.9987	-10.648128	-10.97387	-7.08538	-7.79174	-4.65152	-3.51652	-4.807364	-8.37474	
(10)52	4.896152	-13.011002	-8.92122	-14.86055	-8.88119	-7.78342	-6.910155	-10.8486	-3.39236	-1.99249	-3.74341	-4.23349	-6.234	-7.859459	-6.9987	-10.648128	-10.97387	-7.08538	-7.79174	-4.65152	-3.51652	-4.807364	-8.37474	
(10)75	5.480705	-10.18114	8.86119	-14.76157	-14.32373	-7.78342	-6.910155	-10.8486	-3.39236	-1.99249	-3.74341	-4.23349	-6.234	-7.859459	-6.9987	-10.648128	-10.97387	-7.08538	-7.79174	-4.65152	-3.51652	-4.807364	-8.37474	
(11)25	4.850491	-13.4391051	-10.336138	-15.440154	-14.83117	8.539743	5.91597	-6.02557	-5.22564	6.075566	-5.45475	-4.555455	-5.961304	-13.95017	-11.869157	-15.599175	-14.431426	-12.747117	-9.899336	-7.816418	-5.959066	-4.27472	-7.11640	-6.120146
(12)5	-8.861072	-13.331554	-11.741483	-14.823034	-14.322142	-10.322783	-8.735167	-5.959532	-5.69048	4.81798	-7.82049	-6.794318	-10.322783	-13.31781	-12.20818	-15.371556	-16.580156	-15.533137	-10.83463	-7.893782	-6.089182	-4.969166	-4.27472	-7.11640
(12)52	-10.861323	-12.41399	-15.334183																					

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Radiated Composite Gain Data 2.4GHz WLAN, 5GHz WLAN

Appendix A.1

φ(25°)	-0.550.1	0.701.43	2.192.82	2.882.36	1.980.38	-0.930.21	-5.57.57	-8.49.9.34	7.191.6.59	-4.920.3.77	-2.520.1.71	-0.930.25	1.442.13	2.332.42	2.962.37	1.720.14	0.930.44	-1.612.58	4.320.57	-8.671.74	-7.614.93	-5.260.3.43	-1.710.125	-1.561.0.77
φ(30°)	0.230.95	1.341.92	2.191.89	1.81.57	0.591.47	2.211.46	-6.30.9.42	-11.46.11.44	-10.31.46.7	6.09.61.1	-1.011.56	-1.76.53	1.620.92	0.226.64	1.030.42	-0.517.429	-0.60.91	2.771.371	3.521.473	-8.757.815	-5.691.64	4.941.635	4.730.384	-2.714.699
φ(35°)	0.350.71	1.472.31	2.762.44	1.611.22	0.671.11	-3.761.73	-7.361.61	-8.31.10.86	-8.361.7.88	-6.69.6.26	-1.961.43	-1.420.37	0.580.08	0.870.77	1.741.36	0.421.	-4.781.073	-2.54.82	-4.521.495	-8.591.734	-6.441.785	-6.49.619	-5.616.05	-2.751.15
φ(40°)	1.681.67	0.411.56	2.623.38	1.70.22	-2.21.64	-7.461.11	-6.61.61.73	-6.01.7.48	-7.51.77	-7.91.37	-3.19.3.42	-2.25.25.1	-1.441.01.8	1.21.26	1.11.12	0.771.066	-3.19.2.87	5.061.709	8.91.725	-8.861.493	-7.361.10.98	-12.361.87	-8.851.918	-4.721.43
φ(45°)	1.761.26	-1.271.16	1.160.53	0.651.0.82	-3.52.48.7	-6.87.56	-6.59.6.06	-7.441.8.05	-5.18.7.2	-7.49.17.43	-6.451.8.88	-1.81.25.4	-0.341.0.37	0.42	0.631.71	-0.791.11	-3.681.425	-4.281.603	-8.721.682	-10.881.67	-10.91.143	-11.31.10.64	-11.951.622	-6.871.62
φ(50°)	2.21.32	-0.871.08	0.411.34	0.731.19	-3.09.11.38	4.251.66	-6.461.9.82	-8.331.8.14	-7.841.6.66	-12.11.6.8	-6.541.0.71	-1.69.3.97	-0.581.67	0.740.42	-0.161.074	-2.611.284	-3.321.485	-5.781.947	-8.81.79	-11.11.475	-14.931.15.42	-8.881.12.7	-11.441.498	-7.661.674
φ(55°)	-3.21.42	-0.811.06	0.011.95	0.171.31	-3.511.37	-4.011.7.35	-5.241.61	-6.531.11.04	-8.021.60.3	-8.721.14.63	-5.341.47.1	-0.271.25	1.340.17	-0.961.22	-0.941.72	-2.961.545	-5.41.782	-9.371.314	-11.521.12.74	-15.011.15.57	-8.451.11.83	-9.961.519	-6.881.747	
φ(60°)	5.841.487	-1.781.188	-1.111.27	-1.031.324	-2.561.426	-6.391.28	-2.491.6.68	-4.41.71	-11.371.8.95	-11.731.6.82	-7.861.6.56	2.321.85	0.431.0.83	-2.381.137	-4.681.558	-2.371.521	6.611.46	6.941.394	9.381.10.85	-15.691.12.18	-7.841.11.41	-10.11.6.91	-8.181.10.83	
φ(65°)	4.291.632	3.441.551	2.110.63	3.571.35	2.231.53	6.681.572	2.961.54	4.721.753	3.221.813	-15.551.14.72	-11.891.9.83	4.571.472	1.11.232	3.231.25	5.841.434	-3.231.586	5.581.434	9.571.10.88	-13.121.12.88	-8.451.12.28	-8.611.6.84	6.791.11.58		
φ(70°)	8.881.678	4.531.65	3.571.281	4.421.522	4.191.749	5.521.429	-3.861.64	4.011.673	6.181.915	-15.361.15.59	-11.891.9.83	4.871.37	6.631.27	-2.601.835	-4.361.538	-6.011.389	-4.951.467	4.541.287	6.481.538	-8.351.10.82	-10.121.1378	-10.251.10.87	-10.331.113	
φ(75°)	9.591.933	6.551.638	4.521.635	5.591.591	6.041.753	5.511.97	3.671.971	5.521.	7.511.919	-18.241.19.69	-18.241.19.69	8.951.913	9.911.974	9.731.957	4.451.614	6.631.92	6.431.936	5.541.936	5.541.936	7.731.955	-10.711.9141	-10.331.14.26	-9.641.917	
φ(80°)	7.261.935	8.891.815	6.421.635	7.711.916	8.631.768	5.971.916	4.131.703	6.161.919	7.671.914	-14.101.96	-6.871.918	9.221.918	7.621.919	7.621.919	8.111.914	4.911.916	6.161.917	6.161.917	6.161.917	10.261.1472	-10.471.913	-10.571.913	-10.571.913	
φ(85°)	8.971.929	-12.771.1118	-11.161.811	-8.61.71	9.941.813	6.571.82	6.891.819	4.571.878	11.641.818	-6.171.818	-5.931.87	9.931.835	9.341.847	10.511.876	9.711.872	11.871.878	8.811.869	7.911.871	11.71.831	-12.591.1478	-10.971.1451	-12.991.1436	-9.331.798	
φ(90°)	-10.211.1413	-10.211.1413	-10.261.866	-7.151.913	9.681.1194	11.511.914	8.111.9124	12.141.9113	11.941.1544	-14.981.9113	-11.291.9187	11.891.9143	-14.271.9138	9.411.9143	9.821.9149	10.851.911	9.601.9193	-10.261.1472	-14.981.1436	-13.711.1454	-10.261.1472	-13.711.1472	-13.711.1472	
φ(127°)	-14.671.12.76	-13.261.12.92	-14.861.912	-11.741.918	-8.761.9118	-13.261.11.7	-10.371.11.56	-11.131.13.35	-10.961.11.11	-15.561.15.54	-12.361.11.71	-14.471.12.68	-11.211.12.6	-10.261.12.58	-10.031.11	-8.231.86	-10.81.8	-11.641.12.93	-15.451.1378	-14.271.1311	-12.761.12.14	-13.131.1472	-13.711.1472	
φ(132°)	-13.711.1518	-10.431.10.97	-11.041.11.45	-15.361.14.97	-12.531.811	-15.151.97	-12.521.10.19	-8.891.12.89	-11.141.13.43	-12.351.14.88	-15.261.15.29	-14.991.13.58	-11.451.12	-10.631.10.38	-11.761.10.83	-10.761.10.86	-7.791.838	-11.651.1472	-11.881.15.94	-13.711.14.54	-15.261.15.99	-11.751.1337	-15.761.12.68	
φ(137°)	-11.271.11.11	-11.171.10.56	-10.51.10.33	-15.371.14.91	-11.041.10.58	-11.091.13.79	-14.51.11.41	-15.41.13.48	-13.261.15.12	-14.991.14.98	-11.11.11.8	-11.251.13.08	-11.841.9.83	-9.251.10.83	-12.741.10.86	-14.331.10.62	-10.371.10.34	-10.881.11.76	-14.911.15.15	-15.161.15.56	-15.311.13.13	-14.511.13.48	-14.261.15.55	
φ(142°)	-15.841.14.38	-13.251.10.77	-10.991.11.86	-12.821.12.77	-14.531.15.27	-14.161.15.27	-10.591.13.32	-10.891.13.36	-14.671.16.09	-15.561.15.39	-13.711.12.83	-12.961.15.77	-14.901.13.84	-15.131.15.01	-14.211.15.71	-15.361.15.59	-14.131.12.9	-14.11.13.73	-15.881.15.64	-15.691.15.17	-13.301.11.9	-12.161.14.11	-14.261.15.43	
φ(147°)	-15.121.15.82	-15.351.15	-13.851.11.84	-11.861.13.46	-12.921.13.24	-15.441.14.17	-14.041.14.78	-15.131.11.45	-10.71.10.76	-12.401.11.11	-14.831.15.32	-15.621.15.36	-14.761.15.13	-15.661.16.11	-15.131.14.88	-14.361.17.12	-12.841.13.11	-15.011.12.91	-11.711.10.42	-14.141.12.92	-9.781.10.34	-11.411.12.81	-15.261.15.87	
φ(152°)	-11.01.12.82	-15.311.14.91	-13.741.11.77	-10.841.17.97	-8.851.7.88	-7.331.37	-7.021.47.67	-6.081.6.43	-7.081.6.81	-10.371.12.69	-13.921.15.35	-15.241.15.46	-15.061.15.28	-15.371.14.98	-15.581.15.18	-15.021.14.08	-10.811.916	-7.881.6.96	-7.411.7.29	-7.521.8.2	-8.871.33	-9.081.49	-11.811.87	
φ(157°)	-11.911.12.48	-13.161.15.7	-14.011.12.85	-12.811.12.02	-8.75.86	-7.871.8.1	-6.141.11.7	-7.281.8.39	-6.271.11.56	-11.311.12.85	-14.491.15.21	-15.841.14.71	-14.671.13.11	-15.421.14.99	-14.631.12.82	-11.791.11.79	-12.701.10.85	-11.171.11.02	-10.331.14.31	-7.961.6.82	-9.071.812	-10.141.12	-9.711.10.78	
φ(162°)	-11.891.13.23	-13.911.12.82	-15.061.15.42	-16.121.14.15	-13.141.12.18	-10.331.10.12	-10.311.10.12	-10.71.12.2	-11.821.11.51	-11.341.11.66	-13.011.14.46	-14.161.12.72	-13.931.15.25	-15.141.14.67	-13.061.12.71	-11.911.10.77	-10.281.10.14	-10.421.14.3	-8.731.8.48	-6.961.9.92	-10.141.12	-10.511.14.69	-11.811.11.57	
φ(167°)	5.851.914	Theta	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
φ(172°)	φ(170°/57°)	φ(170°/52.5°)	φ(170°/47.5°)	φ(170°/42.5°)	φ(170°/37.5°)	φ(170°/32.5°)	φ(170°/27.5°)	φ(170°/22.5°)	φ(170°/17.5°)	φ(170°/12.5°)	φ(170°/7.5°)	φ(170°/2.5°)	φ(170°/0°)	φ(170°/2.5°)	φ(170°/7.5°)	φ(170°/12.5°)	φ(170°/17.5°)	φ(170°/22.5°)	φ(170°/27.5°)	φ(170°/32.5°)	φ(170°/37.5°)	φ(170°/42.5°)	φ(170°/47.5°)	
φ(177°)	4.191.548	-7.011.614	8.611.701	5.621.142	-2.771.811	6.541.23	0.721.99	9.891.77	6.881.63	6.451.1	-6.411.157	-2.11.36	4.481.57	4.751.74	8.811.716	4.841.651	3.511.237	1.231.17	6.441.7	0.840.99	1.11.97	5.661.14	4.31.96	2.121.29
φ(182°)	4.651.659	6.321.102	7.571.971	6.621.942	-4.191.279	-1.651.4	0.361.94	1.171.91	1.721.99	6.861.39	-6.121.95	1.771.926	4.571.97	4.211.954	4.781.915	-1.241.927	-2.031.96	1.041.74	5.911.971	1.411.974	0.511.915	2.31.9	-2.491.96	
φ(187°)	4.461.654	-6.481.124	2.151.177	1.081.638	0.551.919	0.161.67	1.271.13	2.31.92	2.091.5	0.621.65	0.281.24	1.561.937	3.561.94	5.791.938	5.871.924	6.761.947	8.571.928	7.471.971	1.111.939	1.331.938	0.961.918	3.911.974	-1.541.937	
φ(192°)	3.261.529	-1.111.41	-0.011.018	-1.1.69	-1.731.12	-2.511.03	0.711.98	1.171.93	1.621.96	0.431.92	1.571.91	2.251.93	3.721.923	4.471.934	4.631.94	2.961.976	-1.331.1	-1.321.916	0.351.95	0.961.93	0.231.916	0.311.93	0.261.916	
φ(197°)	2.631.517	-0.731.403	-2.21.373	2.521.659	0.341.604	0.341.604	9.891.677	2.352.7	20.9	2.361.51	1.791.638	1.591.66	1.521.67	3.911.65	3.91.638	1.861.608	0.231.602	0.511.618	0.211.619	-1.121.628	3.961.62	5.961.62	5.961.62	
φ(202°)	4.951.63	-0.91.57	0.451.98	2.181.27	3.631.13	2.071.04	1.662.1	1.662.15	3.261.11	1.221.31	1.671.33	1.791.98	1.241.67	1.811.66	-1.311.513	2.731.96	-0.721.971	7.611.96	-3.11	0.291.96	-1.531.27	-0.821.95	1.041.17	
φ(207°)	5.541.63	1.151.96	1.412.71	3.421.39	3.122.22	-0.051.26	-0.391.46	-1.041.44	4.231.67	1.971.77	1.501.121	1.371.85	1.601.122	-1.721.35	0.891.92	-0.911.122	0.771.117	0.961.94	1.981.62	0.491.139	-1.231.127	-1.121.151	-0.771.151	
φ(212°)	0.381.14	1.121.34	0.412.82	3.181.39	1.421.06	-0.131.82	0.301.32	-1.591.148	1.521.01	1.451.95	1.771.96	0.861.95	0.31.3	0.211.73	1.412.38	2.511.1	1.022.11	1.842.19	2.191.97	1.941.79	-1.231.141	-1.131.28	-1.051.145	
φ(217°)	0.731.89	-1.691.327	-1.811.68	1.921.45	1.201.52	4.211.29	-0.321.6	-1.201.57	1.321.63	1.321.63	0.901.35	1.211.67	1.291.63	2.821.85	2.641.83	1.491.21	0.561.74	0.671.74	1.511.701	-2.211.731	-2.211.731	-4.461.73	-4.461.73	
φ(222°)	0.541.323	4.211.463	-1.431.7	4.31.193	-1.131.168	3.241.65	-0.361.28	-1.291.352	-0.461.102	1.271.52	0.911.04	1.862.35	2.461.52	1.681.09	3.921.97	1.791.18	0.911.58	1.441.142	1.421.132	1.161.26	0.471.65	-1.971.228	-1.971.228	
φ(227°)	0.541.323	5.271.554	-2.491.63	3.551.196	0.121.103	-1.941.12	-0.191.57	-1.431.322	2.321.51	0.261.52	0.261.52	2.231.52	0.301.52	1.471.52	1.241.53	0.381.52	0.31.52	-1.781.76	1.421.53	0.581.68	2.281.71	2.671.68	-1.911.59	
φ(232°)	1.571.382	5.771.584	-3.561.21	3.591.27	-1.011.297	2.791.45	-0.361.23	-2.671.32	-1.891.243	0.011.633	1.361.69	1.821.31	-1.391.15	0.091.91	-3.711.338	-0.651.21	0.011.14	-0						



Radiated Composite Gain Data_2.4GHz WLAN, 5GHz WLAN

Appendix A.1

φ(0°)	-3.6(-2.3)	-2.2(0.3)	-0.1(2.8)	0.3(-2.2)	0.2(1.3)	-5.2(-4.3)	-5.5(-7.6)	-10.9(-9.6)	-14.0(-10.3)	-11.1(-12.0)	-13.2(-9.8)	-8.2(-6.1)	-7.6(-9.1)	0.7(-0.3)	-0.2(2.8)	-2.0(-5.4)	-3.8(-3.5)	5.2(-1.7)	-2.7(1.2)	-4.6(-6.0)	-7.5(-9.4)	-9.5(-10.7)	-9.3(-9.7)	-8.9(-3.7)
φ(82.5°)	-7.6(-4.3)	-4.0(-1.6)	-1.2(0.3)	-0.4(-1.4)	-3.8(-1.8)	-6.3(-4.2)	-5.1(-7.0)	-9(-11.6)	-10.4(-12.4)	-13.4(-11.5)	-12.5(-7.7)	-6.7(-5.4)	-8.6(-2.8)	2.5(-1.7)	-0.9(-1)	-3.2(-4.4)	-3.3(-3.2)	-3.8(-1.8)	2.3(1.4)	-7.5(-4.3)	-6.3(-9.2)	-10.3(-12.3)	-6.9(-7.2)	-7.6(-4.3)
φ(90°)	-8.6(-7.9)	-7.2(-2.7)	-1.8(-1.2)	-1.8(-2.1)	-4.3(-3.9)	-6.2(-4.8)	-5.7(-6.2)	-7.4(-8.8)	-9.7(-12.4)	-14.9(-10.4)	-10.4(-7.1)	-5.9(-4.7)	-6.4(-5.1)	-3.9(-2.7)	-2.2(-4)	-3.9(-4.1)	-5.8(-3.1)	-4.8(-2.0)	-4.6(-4.7)	-10.2(-5.8)	-7.4(-9.1)	-9.1(-11.0)	-8.0(-7.6)	-6.9(-4.8)
φ(97.5°)	-10.3(-12.4)	-8.6(-6.6)	-2.8(-3.2)	-3.3(-3.5)	-9.5(-6.6)	-5.6(-4.3)	-6.3(-6.7)	-7.0(-7.6)	-11.2(-12.8)	-14.7(-11.1)	-8.7(-7.0)	-6.7(-4.9)	-6.4(-6.2)	-6.4(-3.4)	-2.3(-1.7)	-5.7(-4.8)	-7.9(-4.7)	-5.2(-4.4)	-6.8(-14.3)	-13.0(-7.4)	-11.7(-11.4)	-10.7(-12.2)	-7.9(-10.4)	-8.4(-8.8)
φ(105°)	-11.2(-12.7)	-12.4(-10.0)	-4.5(-5.8)	-4.2(-4.8)	-10.2(-9.6)	-6.3(-4.1)	-7.6(-6.7)	-7.5(-7.1)	-12.7(-14.3)	-15.2(-10.1)	-12.3(-7.9)	-6.7(-6.3)	-8.0(-8.2)	-10.0(-8.1)	-4.0(-7.6)	-7.7(-5.3)	-7.3(-7.2)	-7.3(-5.8)	-6.8(-15.7)	-11.5(-8.5)	-12.4(-15.3)	-6.0(-13.8)	-5.8(-9.2)	-5.7(-4.2)
φ(112.5°)	-8.4(-13.8)	-12.6(-14.2)	-8.3(-7.5)	-6.8(-7.2)	-6.6(-11.8)	-6.0(-9.4)	-6.6(-5.8)	-11.7(-9.1)	-12.7(-13.8)	-15.4(-11.4)	-10.4(-10.5)	-8.6(-6.1)	-8.9(-10.4)	-12.4(-11.8)	-6.6(-7.0)	-8.3(-8.7)	-9.0(-7.8)	-6.1(-6.2)	-7.4(-15.7)	-14.9(-12.7)	-12.8(-9.4)	-12.8(-11.0)	-8.1(-7.5)	-9.7(-4.2)
φ(120°)	-10.2(-10.7)	-15.5(-13.4)	-13.3(-16.2)	-6.9(-17)	-6.7(-11.8)	-9.5(-12.1)	-10.7(-9.6)	-13.7(-11.5)	-14.9(-11.4)	-13.7(-15.5)	-11.8(-12.6)	-14.4(-10.6)	-9.5(-10.2)	-12.5(-11.6)	-8.7(-7.7)	-8.3(-13.1)	-8.2(-10.2)	-8.7(-13.9)	-13.0(-15.3)	-11.1(-12.8)	-13.2(-14.7)	-14.1(-15.1)	-11.8(-11.6)	
φ(127.5°)	-15.8(-14.5)	-14.2(-11.2)	-15.7(-8.3)	-8.9(-9.4)	-11.8(-9.7)	-8.9(-11.4)	-12.1(-12.3)	-11.7(-10.6)	-15.9(-12.1)	-13.1(-15.3)	-15.2(-11.5)	-11.8(-15.6)	-15.0(-16.0)	-13.2(-11.7)	-10.9(-9.4)	-7.7(-10.1)	-13.1(-10.4)	-10.4(-9.1)	-12.7(-15.0)	-14.5(-12.2)	-11.3(-15.7)	-10.9(-10.8)	-10.9(-15.4)	-15.7(-15.2)
φ(135°)	-15.3(-12.8)	-14.7(-12.5)	-10.4(-12.3)	-12.0(-11.9)	-12.1(-8.6)	-9.4(-10.7)	-9.2(-11.6)	-15.4(-9.5)	-11.0(-15.6)	-11.7(-12.3)	-14.7(-12.3)	-14.3(-13.1)	-15.0(-15.7)	-12.1(-9.3)	-8.2(-11.4)	-12.6(-12.8)	-10.4(-10.7)	-10.4(-7.5)	-7.4(-13.8)	-15.3(-15.1)	-13.4(-13.4)	-8.9(-13.4)	-13.2(-15.5)	-15.4(-14.3)
φ(142.5°)	-11.0(-9.2)	-15.0(-11.7)	-8.8(-10.8)	-12.8(-12.3)	-14.7(-13.7)	-14.9(-12.1)	-10.8(-11.8)	-13.1(-15.4)	-12.9(-9.3)	-13.5(-14.7)	-12.3(-11.6)	-12.3(-13.8)	-9.1(-7.4)	-16.4(-11.2)	-16.3(-11.8)	-13.5(-13.8)	-14.7(-11.7)	-13.3(-13.1)	-10.9(-11.9)	-13.6(-15.2)	-12.5(-14.8)	-14.9(-15.4)	-15.3(-10.8)	-8.9(-13.4)
φ(150°)	-14.1(-14.8)	-13.8(-15.4)	-15.7(-15.1)	-15.4(-15.1)	-13.4(-10.6)	-10.7(-12.3)	-10.3(-10.8)	-9.1(-11.1)	-13.9(-12.4)	-12.0(-11.4)	-11.5(-12.4)	-11.8(-12.4)	-9.3(-13.2)	-13.7(-15.2)	-15.4(-14.1)	-12.3(-14.4)	-14.1(-13.2)	-13.2(-14.3)	-15.9(-12.4)	-14.3(-14.2)	-15.9(-13.1)	-13.1(-14.6)	-9.8(-9.9)	
φ(157.5°)	-13.1(-15.4)	-15.5(-15.1)	-15.1(-11.8)	-16.9(-12.7)	-14.5(-16.1)	-13.5(-13.2)	-10.3(-10.7)	-11.5(-13.7)	-11.4(-14.2)	-8.3(-11.2)	-12.1(-12.7)	-14.3(-13.1)	-14.9(-16.1)	-15.2(-16.7)	-14.2(-15.4)	-15.1(-16.2)	-15.1(-16.2)	-10.9(-10.5)	-12.0(-13.1)	-10.3(-15.4)	-9.5(-16.1)	-11.4(-11.5)	-12.1(-13.6)	-12.3(-12.4)
φ(165°)	-13.8(-13.2)	-13.2(-13.2)	-12.7(-13.7)	-16.0(-15.4)	-15.3(-14.7)	-14.9(-14.7)	-14.9(-13.9)	-11.4(-15.8)	-10.7(-9.8)	-8.6(-9.8)	-11.3(-13.4)	-14.3(-16.0)	-14.9(-15.0)	-14.9(-13.8)	-13.0(-13.1)	-13.7(-15.7)	-15.8(-15.7)	-15.8(-13.4)	-11.2(-10.9)	-10.7(-10.3)	-10.1(-10.9)	-11.7(-10.7)	-9.4(-9.7)	-11.2(-13.0)
φ(172.5°)	-11.3(-12.8)	-15.1(-15.9)	-15.3(-14.0)	-14.3(-15.7)	-13.7(-12.5)	-12.2(-9.7)	-8.7(-8.4)	-7.6(-7.7)	-8.7(-10.2)	-12.1(-13.7)	-14.7(-14.0)	-13.9(-15.2)	-14.3(-13.8)	-13.1(-13.5)	-14.1(-14.7)	-15.1(-14.6)	-13.0(-12.8)	-12.3(-11.8)	-12.1(-11.5)	-11.7(-10.7)	-11.1(-11.2)	-9.9(-9.1)	-10.1(-10.2)	
φ(180°)	-11.6(-12.7)	-13.9(-13.9)	-14.3(-15.7)	-15.4(-15.1)	-14.1(-12.3)	-12.7(-11.9)	-10.8(-10.6)	-11.8(-12.5)	-12.4(-11.4)	-10.7(-10.1)	-10.7(-11.8)	-12.8(-12.3)	-12.1(-13.7)	-15.0(-15.6)	-15.2(-14.4)	-15.8(-15.7)	-13.8(-13.1)	-13.9(-11.7)	-11.1(-10.1)	-9.8(-9.8)	-8.9(-9.4)	-8.7(-7.7)	-7.8(-9.1)	-10.7(-11.1)
FeedNo	5.7855P6	Theta	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ	φ
φ(0°)	φ(0°/φ(0.5°))	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°))
φ(0°)	-6.2(-7.2)	-6.3(-5.9)	-5.1(-3.9)	-2.2(-1.5)	-1.0(-0.3)	0.5(1.2)	1.2(31.2)	1.1(0.9)	0.4(0.1)	0.0(-0.4)	-1.1(-7.2)	-3.5(-4.5)	-4.4(-7.5)	-7.5(-7)	-5.9(-4.4)	-3.2(-2.9)	-1.1(-0.2)	0.2(7.0)	1.3(4.1)	1.3(5.1)	0.9(4.7)	0.2(-0.3)	-1.1(-7.2)	-3.1(-4.4)
φ(15°)	-4.8(-7.5)	-7.7(-6.4)	-5.5(-4.1)	-2.8(-1.3)	-0.4(-0.1)	0.6(1.3)	1.7(91.7)	1.8(11.2)	1.6(1.3)	1.1(0.1)	-0.0(-0.9)	-2.1(-2.3)	-3.4(-4.2)	-4.3(-3.9)	-2.8(-1.7)	-1.1(-0.2)	0.5(7.0)	1.2(5.0)	1.0(5.7)	0.5(5.1)	-0.2(-0.1)	-0.5(-0.5)	-1.2(-5.1)	-2.9(-3.2)
φ(30°)	-6.9(-5.7)	-4.7(-3.2)	-1.9(-0.8)	0.5(31.5)	2.2(42.1)	2.8(31.3)	3.4(3)	2.5(21.8)	1.5(1.7)	1.1(0.7)	-0.0(-1.2)	-2.3(-2.9)	-3.4(-4.3)	-4.7(-4.2)	-3.2(-2.1)	-1.7(0.4)	1.3(12.1)	2.5(62.7)	2.7(92.3)	1.7(91.2)	0.9(61.1)	0.8(-0.9)	-1.2(-2.6)	-4.0(-4.4)
φ(45°)	-4.9(-4.4)	-4.7(-5.8)	-6.6(-5.5)	-3.7(-3.9)	0.8(41.5)	2.1(32.4)	3.3(3)	3.2(21.1)	1.0(30.1)	0.6(50.2)	-0.0(-0.3)	-0.5(-1.4)	-3.1(-4.3)	-4.1(-3.9)	-4.2(-4.2)	-3.8(-2.4)	-2.9(-1.1)	0.1(51.5)	2.4(42.7)	2.7(92.1)	0.8(50.4)	0.6(52.2)	-1.5(-3.3)	-4.4(-5.1)
φ(60°)	-3.5(-2.4)	-1.3(-0.7)	0.4(-0.2)	2.0(61.7)	3.0(22.9)	2.0(81.3)	1.7(72.9)	2.8(81.9)	0.5(44.4)	1.2(50.6)	0.0(10.2)	0.3(-0.2)	-0.4(-0.3)	-0.8(-0.7)	-0.9(-0.3)	0.5(50.1)	0.5(50.1)	0.5(50.1)	1.0(12.1)	2.4(32.3)	1.8(20.8)	0.7(40.1)	-1.5(-1.8)	-2.7(-4.2)
φ(75°)	-1.2(-1)	-1.2(-0.5)	2.0(93.8)	3.7(53.2)	3.6(63.7)	2.0(11.4)	1.5(22.1)	1.6(71.2)	2.2(91.7)	1.4(80.2)	-0.2(-0.1)	-0.8(-1.3)	-1.4(-0.7)	-1.5(-1.7)	-1.1(20.2)	1.9(22.3)	0.3(-0.8)	-1.0(20.7)	1.7(11.7)	1.1(20.7)	0.3(0.4)	-1.1(-1.7)	-1.9(-2.9)	
φ(90°)	0.3(-1.4)	-3.4(-1.9)	1.5(62.9)	3(24)	1.4(61.6)	1.4(61.6)	1.4(61.6)	1.7(11.2)	1.9(12.1)	0.9(50.5)	0.0(-0.3)	0.1(44.4)	1.5(21)	2.1(90.2)	0.2(61.6)	1.7(60.4)	-0.6(-0.7)	0.8(91.7)	-0.1(10.6)	0.3(-0.3)	-1.9(-0.5)	-1.6(-2.2)		
φ(95.25°)	0.1(-0.1)	-6.4(-0.6)	1.5(11.2)	1.8(31.7)	6.6(61.4)	0.8(-0.2)	-0.3(62.5)	-0.0(-3.3)	0.1(41.2)	6.5(11.9)	1.1(50.8)	0.2(-0.2)	-1.1(30.1)	1.3(52.7)	2.9(14.0)	4.9(11.5)	1.7(21.7)	2.3(62.1)	1.5(40.3)	0.5(11.4)	0.1(-1.5)	0.0(-3.1)	-3.7(62.2)	2.4(32)
φ(97.5°)	1.2(-1.2)	-1.2(-1.2)	1.4(-0.1)	0.3(50.5)	-2.1(-1.7)	0.5(30.1)	-2.9(91.3)	0.9(-2.8)	-2.6(90.6)	2.7(12)	0.4(50.4)	-0.1(-0.3)	-0.3(20.2)	1.6(16)	3.3(94.2)	1.7(21.7)	1.6(62.5)	0.7(40.7)	1.2(60.9)	0.2(91.2)	11.5(9)	0.4(-2.4)	1.2(91.6)	
φ(105°)	2.9(-6.1)	-2.1(-0.5)	1.1(60.9)	1.0(-1.2)	3.7(51.5)	-1.5(-0.8)	3.8(51.1)	0.7(-0.7)	3.6(11.8)	3.8(11.1)	2.3(-0.5)	0.1(-1.2)	1.4(10.9)	3.3(10.1)	3.9(40.7)	2.1(-0.3)	2.2(60.8)	0.4(53)	-0.2(41.2)	1.0(11.6)	0.7(-1.3)	-6.6(-3.4)	-1.3(-1.7)	
φ(112.5°)	3.3(-7.3)	-3.5(-1.6)	0.1(-0.4)	0.7(50.4)	1.2(21.3)	-4.0(-2.9)	-2.9(-4.5)	-0.3(-3.7)	-3.0(-3.4)	-3.4(0.5)	-3.5(-1.7)	0.1(91.1)	1(16)	0.9(50.2)	1.2(62.6)	2.4(-0.8)	2.1(60.4)	-1.5(-0.7)	-0.0(11.5)	0.2(-0.3)	1.4(51.4)	0.8(-1.4)	-5.9(-3.6)	-3.5(-7.3)
φ(120°)	4.4(-7.8)	-4.7(-4.0)	-1.2(-1.4)	-0.3(41.3)	2.3(61.1)	5.2(61.7)	-2.9(-4.1)	-0.2(-4.0)	-2.3(-4.0)	-4.5(-1.2)	-4.4(-1.0)	-0.7(10.7)	0.7(40.1)	0.9(51.6)	0.9(50.3)	0.0(10.7)	0.5(10.1)	-0.2(11.2)	0.9(11.2)	-0.5(-1.4)	0.8(60.3)	0.8(-2.0)	-7.0(-3.7)	-4.2(-4.3)
φ(127.5°)	6.4(-10.3)	-6.2(-5.2)	-2.7(-3.9)	-2.3(70.7)	1.4(11.2)	-5.5(-8.5)	-3.9(-4.1)	-0.4(-4.4)	-2.3(-4.7)	-6.3(-2.6)	-6.3(-2.6)	-5.9(-0.5)	-3.8(-2.4)	-1.8(-3.3)	-1.9(-1.4)	-2(-2)	-3.0(-12.3)	-0.3(11.5)	-0.3(11.5)	-2.8(-4.2)	-1.0(-1.0)	-1.1(-3.1)	-8.5(-3.1)	-6.2(-6.1)
φ(135°)	6.6(-10.5)	-7.1(-5.7)	-3.4(-4.3)	-3.6(-5.6)	-1.5(-4.3)	-7.0(-4.8)	-5.2(-5.4)	-2.0(-7.1)	-2.3(-8.4)	-7.0(-4.8)	-6.9(-4.4)	-3.7(-3.0)	-6.2(-3.2)	-4.5(-6.3)	-4.1(-2.1)	-4.5(-2.8)	-4.1(-3.2)	-5.0(-3.8)	-3.0(-11.4)	-5.4(-4.2)	-3.2(-4.6)	-3.8(-4.7)	-11.6(-8.5)	-8.6(-9.6)
φ(142.5°)	-6.3(-10.3)	-8.7(-9.3)	-6.6(-6.1)	-4.7(-7.2)	-3.9(-7.7)	-3.9(-7.7)	-7.6(-4.3)	-7.5(-7.1)	-12.7(-9.7)	-14.2(-9.7)	-8.1(-6.3)	-5.8(-4.4)	-9.7(-7.1)	-6.0(-12.9)	-3.6(-11.5)	-5.7(-4.8)	-6.0(-9.9)	-5.9(-14.2)	-6.9(-4.3)	-5.4(-13.7)	-5.0(-7.3)	-7.0(-5.2)	-10.3(-10.2)	-11.2(-11.5)
φ(150°)	-8.1(-9.5)	-8.9(-6.6)	-5.7(-7.5)	-5.3(-5.8)	-3.5(-4.3)	-7.3(-4.4)	-6.1(-6.5)	-7.8(-10.2)	-6.1(-8.0)	-7.1(-10.7)	-11.3(-8.7)	-8.0(-6.2)	-6.0(-7.6)	-6.6(-7.5)	-4.5(-4.7)	-6.2(-6.9)	-10.3(-9.1)	-5.7(-6.1)	-6.3(-4.6)	-7.3(-5.9)	-4.7(-6.2)	-9.0(-7.2)	-8.4(-8.8)	-11.9(-8.7)
φ(157.5°)	-6.3(-6.7)	-8.6(-7.8)	-7.5(-6.3)	-5.8(-5.6)	-4.6(-4.6)	-8.4(-5.2)	-4.8(-7.2)	-7.5(-12.5)	-9.2(-7.2)	-10.2(-11.4)	-9.5(-8.7)	-8.9(-6.3)	-7.2(-8.0)	-7.3(-4.1)	-10.2(-6.6)	-4.3(-4.6)	-4.1(-4.5)	-5.9(-6.5)	-7.1(-12.7)	-8.5(-8.0)	-5.3(-10.1)	-11.4(-12.2)	-11.3(-7.8)	-11.5(-10.4)
φ(165°)	-8.2(-9.4)	-11.6(-4.3)	-7.5(-6.1)	-4.1(-5.0)	-6.7(-6.2)	-7.5(-6.4)	-7.2(-10.1)	-8.0(-12.4)	-7.1(-10.2)	-13.5(-9.7)	-9.9(-11.3)	-12.4(-9.8)	-12.6(-9.8)	-6.2(-13.4)	-7.1(-3.4)	-5.5(-11.3)	-5.5(-10.4)	-5.9(-7.1)	-7.4(-10.3)	-7.3(-5.7)	-6.4(-10.1)	-10.1(-13.4)	-6.2(-10.3)	-12.8(-8.6)
φ(172.5°)	-10.2(-9.5)	-10.7(-11.7)	-12.2(-12.4)	-13.1(-12.9)	-12.4(-13.2)	-13.5(-12.7)	-13.9(-14)	-13.9(-12.9)	-13.6(-14.9)	-13.0(-12.1)	-11.8(-11.7)	-12.0(-12.1)	-12.3(-10.2)	-9.3(-10.2)	-9.3(-9.7)	-8.2(-8.4)	-8.1(-7.8)	-6.1(-6.4)	-10.8(-11.4)	-12.8(-13.7)	-14.5(-15.1)	-14.7(-12.7)	-11.9(-11.5)	
φ(180°)	-9.9(-9.3)	-8.3(-4.4)	-8.5(-4.7)	-7.9(-8.2)	-7.9(-8.2)	-7.9(-8.4)	-8.0(-9.2)	-9.1(-11.5)	-13.2(-14.2)	-16.4(-16.7)	-15.8(-15.1)	-15.1(-14.3)	-13.3(-12.5)	-11.2(-9.7)	-8.3(-7.3)	-6.7(-6.2)	-7.1(-7.3)	-7.7(-7.5)	-8.2(-8.1)	-6.4(-11.4)	-12.4(-13.3)	-13.3(-14.3)	-15.3(-15.1)	-15.1(-10.6)



Radiated Composite Gain Data 2.4GHz WLAN, 5GHz WLAN

Appendix A.1

(H25.7)	4.79±4.3	-3.83±1.99	-0.57±0.01	-0.30±1.13	1.65±2.59	4.32±6.94	-9.8±13.79	-18.19±17	-11.01±4.17	4.94±6.44	-4.04±2.94	-2.23±1.59	-1.19±0.97	0.83±0.58	0.02±8	0.2203	0.14±0.89	-2.94±5.26	7.2±9.45	-0.41±0.10	-9.90±9.1	-0.09±8.4	6.84±5.36	4.58±4.48
(H26.7)	5.68±3.4	-1.71±5.2	-0.22±1.08	-2.58±3.4	4.24±4.07	4.49±6.83	-7.99±7.98	-16.07±18.1	-17.50±14.68	-11.54±6.23	-3.36±4.26	-1.80±7.7	4.71±1.65	-1.71±4.46	0.470±3	0.09±0.22	-0.93±1.76	-2.88±4.79	4.14±8.56	-12.25±19.29	-10.9±9.9	8.49±10.4	6.68±6.36	7.66±11.5
(H27.7)	4.75±2.95	-2.28±1.75	-1.99±2.98	-3.30±3.43	3.29±4.96	9.60±11.94	-6.60±11.94	-16.86±16.05	-17.31±19.92	-10.52±6.49	-3.76±5.52	-2.53±1.51	-1.59±2.3	-1.330±4.7	1.461±21	0.12±0.52	-1.11±1.97	-2.62±4.49	4.48±6.22	-10.01±12.8	-9.69±9.51	-10.02±10.84	-10.96±9.84	8.56±6.69
(H28.7)	6.69±4.66	-4.41±2.4	-1.94±2.66	-2.31±2.76	4.75±7.02	9.61±10.62	-13.89±12.72	-12.89±15.77	-19.21±18.1	-13.6±7.5	6.52±6	-4.16±3.36	-3.12±3.27	-1.59±0.37	0.480±54	-0.73±1.89	-2.68±2.81	-3.43±6	-7.98±7.93	-10.30±13.23	-12.59±13.45	-13.98±13.3	-13.77±9.91	-10.84±12.31
(H29.7)	7.01±6.7	-4.83±2.8	-4.46±4.7	-5.25±3.3	7.19±7.76	9.44±13.04	-14.71±14.08	-15.18±16.49	-13.72±11.25	-10.77±6.1	-4.71±3.45	-2.85±2.73	-1.75±0.78	-0.36±0.58	1.41±1.46	-2.29±2.99	-2.72±4.55	-8.17±10.23	-14.1±13.73	-14.07±18.36	-14.69±15.33	-15.68±12.31	-13.81±12.39	
(H30.7)	6.45±6.86	-4.99±3.2	-4.66±1.92	-1.91±0.55	7.57±9.21	7.99±13.1	-17.09±11.68	-14.88±18.54	-16.48±13.43	-18.91±16.31	-13.56±6.88	6.06±3.64	-3.42±3.88	-1.37±0.49	-1.02±1.64	-2.22±1.33	-1.46±3.4	-4.68±0.97	-10.34±13.04	-14.83±16.63	-19.21±18.23	-12.24±15.35	-16.1±12.99	-17.51±14.64
(H31.7)	6.6±7	-4.12±3.4	-3.830±5	-1.5±5.4	-7.08±10.92	-11.02±8.69	-10.53±7.26	-10.23±12.04	-16.99±12.99	-17.76±17.85	-14.87±18.58	8.89±4.2	-3.65±3.05	-1.74±1.47	-2.89±2.91	-3.39±2.99	-2.58±3.85	-4.53±9.37	-14.54±18.16	-17.33±15.15	-18.18±14.1	-11.65±18.61	-17.39±15.8	-15.57±11.1
(H32.7)	-18.18±8.1	-3.71±3.1	-5.37±0.99	-3.96±7.3	5.74±11.15	-19.03±7.05	-7.28±6.65	-6.44±8.12	-14.44±11.82	-17.91±19.27	-15.93±6.73	-12.75±9.19	-3.94±7.9	-2.43±1.3	4.4±4.32	-4.34±3.1	-2.88±3.75	-5.54±3.95	-13.56±19.38	-19.19±16.3	-18.16±13	-10.86±17.99	-14.45±18.65	-18.06±18.02
(H33.7)	-11.81±18	-4.98±7.87	-7.59±4.13	-7.21±7.6	-10.46±13.46	-17.27±6.5	-6.69±6.67	-11.52±10.05	-18.48±17.76	-15.72±9.59	-12.47±3.7	6.3±6.95	-3.84±3.46	-4.97±4.4	-4.3±4.97	-3.79±4.43	-4.55±2.8	-13.78±18.09	-17.92±16.05	-18.06±13.7	-11.21±17.54	-14.57±14.56	-19.23±18.29	
(H34.7)	-1.49±16.55	-5.89±11.04	-8.16±7.72	-9.25±6.9	-4.02±16.53	8.62±7.2	-6.78±6.36	-5.78±6.85	-8.7±6.8	-17.96±19.13	-18.91±25.1	-14.26±9.51	-7.99±9.2	-4.36±6.02	-4.59±6.2	-4.48±6.02	-4.96±6.31	-5.97±9.88	-13.81±6.1	-15.94±16.48	-15.63±14.9	-13.07±15.73	-15.89±18.09	-17.95±16
(H35.7)	-10.59±19.91	7.61±13.31	7.29±14.87	-15.52±9.58	-13.08±17.66	6.97±7.87	7.07±6.54	6.64±7.73	8.57±11.35	-19.36±19.93	-19.97±16.7	-15.11±6.4	-9.31±10.7	-4.46±7.63	-5.29±7.68	-5.22±6.65	-7.77±8.96	-18.44±16.75	-17.93±17.42	-11.81±17.92	-11.81±17.92	-12.65±14.92		
(H36.7)	5.16±7.82	-12.96±14.95	9.89±18.47	14.64±9.15	-17.10±16.57	6.82±10.19	-7.29±7.54	-7.77±7.95	8.94±17.79	-16.94±19.97	-18.76±16.99	-17.23±15.11	10.56±14.39	9.79±5.4	5.4±16.2	-1.74±6.07	-7.94±6.89	-17.91±17.12	-17.51±19.12	-16.65±12.74	-16.65±12.74	-13.34±13.32	-12.34±13.66	
(H37.7)	17.29±16.48	-18.26±16.2	-14.02±15.1	-14.41±13.05	-18±15	7.66±17.99	8.02±16.06	4.71±9.93	-12.33±19.32	-17.68±16.98	-18.62±17.61	-19.39±16.02	-16.31±17.7	-13.26±18.06	8.5±4.9	7.96±9.53	-10.76±9.71	-7.49±7.94	-10.96±17.25	-18.19±17.67	-16.63±16.42	-15.91±16.1	-17.71±10.32	-13.57±14.78
(H38.7)	-17.19±19.21	-15.11±14.12	-17.94±16.5	-11.21±17.96	-17.17±15.7	-12.37±17.78	-12.21±15.4	-13.26±15.76	-13.44±19.19	-18.17±17.78	-18.87±17.9	-17.17±17.9	-15.79±14.9	8.4±6.8	8.93±7.37	4.34±10.35	-8.07±9.1	-10.26±14.76	-16.91±16.94	-17.79±16.29	-16.98±14.46	-18.88±17.64	-16.16±16.16	
(H39.7)	-18.68±19.1	-17.45±14.42	-18.69±16.29	-16.25±16.92	-17.26±18.96	-17.69±18.92	-13.52±19.95	-15.03±14.72	-16.34±17.37	-16.96±18.95	-17.51±17.83	-18.34±17.41	-15.26±15.54	-12.93±18.96	-9.92±10.33	-7.83±9.99	-10.71±10.4	-10.26±12.42	-12.54±12.31	-18.59±16.93	-18.42±17.91	-14.19±12.12	-12.94±18.96	-16.16±16.16
(H40.7)	-18.68±18.96	-15.11±14.12	-17.94±14.78	-18.39±17.83	-16.04±11.15	-11.21±19.92	-13.93±17.67	-14.71±15.52	-15.84±14.71	-14.96±18.12	-17.84±18.3	-17.18±18.1	-16.98±13.97	-12.62±13.34	-10.95±11.3	-12.73±13.35	-10.72±6.1	-7.2±6.05	-14.71±6.12	-15.51±17.95	-10.07±12.37	-10.07±12.37	-18.17±18.12	
(H41.7)	-12.55±15.79	-18.49±11.15	-12.42±18.91	-18.71±15.45	-18.98±16.74	-15.62±16.98	-17.34±17.91	-18.36±17.59	-15.26±15.68	-16.37±16.55	-16.37±16.55	-16.37±16.55	-16.37±16.55	-16.37±16.55	-16.37±16.55	-16.37±16.55	-16.37±16.55	-16.37±16.55	-16.37±16.55	-16.37±16.55	-16.37±16.55	-16.37±16.55	-16.37±16.55	
(H42.7)	-18.62±18.96	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2
(H43.7)	-18.62±18.96	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2
(H44.7)	-18.62±18.96	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2
(H45.7)	-18.62±18.96	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2
(H46.7)	-18.62±18.96	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2
(H47.7)	-18.62±18.96	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2
(H48.7)	-18.62±18.96	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2
(H49.7)	-18.62±18.96	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2
(H50.7)	-18.62±18.96	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2
(H51.7)	-18.62±18.96	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2
(H52.7)	-18.62±18.96	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2
(H53.7)	-18.62±18.96	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2
(H54.7)	-18.62±18.96	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2
(H55.7)	-18.62±18.96	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2
(H56.7)	-18.62±18.96	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2
(H57.7)	-18.62±18.96	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2	-18.67±16.2
(H58.7)	-18.62±18.96	-18.67±16.2	-18.67±16.2	-18																				



Radiated Composite Gain Data 2.4GHz WLAN, 5GHz WLAN

Appendix A.1

(H2)	8.4714.35	-4.8611.81	-3.110.14	-1.7714.54	4.4110.05	-17.7213.37	-13.4611.87	-18.2914.57	-18.9918.45	-19.0216.3	-14.3510.16	-8.341.02	-7.0914.05	4.1714.08	-3.4413.12	-4.7414.98	-4.3613.41	5.4714.98	5.0816.84	-4.7715.75	-7.8918.86	8.1819.14	-17.8319.17	-16.1810.52
(H2)	-17.0216.61	-5.3312.09	-3.9611.98	-3.2914.35	5.3415.55	-10.3611.68	-13.0414.71	-16.7119	-17.2616.28	-17.0611.74	9.5716.8	-7.7814.56	4.3615.22	-3.9614.68	-5.9615.22	-4.9313.38	5.3914.48	5.8918.87	-6.3315.02	6.4715.86	-10.4215.32	-11.1116.17	-10.9914.26	
(H2)	-17.7410.78	-8.7931.31	-3.9614.04	-5.3614.86	-17.0217.18	-12.0314.03	-8.3111.02	-9.5010.86	-15.3116.16	-17.6916.55	-16.1411.8	-17.0714.48	4.5615.08	4.5615.08	4.5615.08	6.4125.48	-4.19	-3.9310.74	-10.1615.02	-6.9116.82	-8.8213.93	-9.3719.24	-8.1214.53	
(H2)	-15.0819.11	-10.4814.84	-4.9517.24	4.5816.16	-14.4916.34	9.3913.7	-8.4121.01	-8.8719.38	-13.0218.31	-19.3117.8	-15.2912.78	-12.317.9	9.4614.67	8.0218.88	6.1816.87	-6.7316.02	-2.7115.62	8.6111.17	-11.2519.28	-15.0215.25	-11.7111.89	-13.3213.13	8.0413.38	
(H2)	-13.1618.29	-18.0714.63	-6.1911.95	-10.7717.39	-16.5317.71	-6.0711.1	-11.4212.5	8.9910.47	-15.9417.98	-17.7617.64	-18.7113.66	-13.8411	-13.0610.76	-10.519.32	4.4110.37	-6.7915.58	-4.6317	-7.7319.53	-13.18148	-18.3315.12	-16.58116	-12.0615.56	-16.0417.55	
(H2)	-8.5317.11	-16.7117.48	-9.5612.29	-12.8910.6	-17.9718.26	9.8418.15	-13.9211.68	-12.7913.05	-18.3818.19	-17.4918.38	-16.5413.88	-13.7313.13	-15.5112.14	-13.2412.21	8.0114.46	8.4218.73	8.3116.88	6.718.17	-10.9219.12	-17.5414.91	-16.0914.82	-15.1814.12	-9.5919	
(H2)	-10.8610.55	-16.0315.12	-15.6718.35	8.0817.71	-17.3918.97	-17.2418.18	-15.9718.45	-17.5018.11	-18.2318.98	-18.5418.16	-18.7319.21	-17.1916.34	-13.6217.17	-18.8916.99	-10.3113.94	-10.2317.96	7.4910.05	-10.1219.51	-11.1818.38	-14.8318.98	-17.1716.13	-17.8818.96	-12.3112.04	
(H2)	-16.8916.38	-18.7618.58	-18.9912.73	-11.4118.97	-17.7618.15	-18.3916.05	-18.7616.27	-17.8119.32	-18.8617.56	-18.4217.48	-18.3715.55	-18.7218.33	-18.0618.64	-15.1118.84	-11.5219.29	9.8215.12	-13.8911.92	-10.3916.65	-13.7817.77	-17.8417.47	-16.5919.13	-16.0618.01	-13.5218.11	
(H2)	-17.8518.14	-17.9118.08	-10.7114.53	-17.2016.62	-18.4416.52	-16.5717.37	-17.4817.54	-16.7816.85	-19.192	-18.1817.33	-18.1115.12	-18.0718.25	-18.2415.54	-18.4815.13	-14.0415.24	-18.1617.13			-18.4717.3	-15.1115.97	-12.5418.71	-16.7519.17	-16.7817.15	
(H2)	-10.8816.8	-18.2515.48	-16.0413.57	-15.5215.19	-18.3719.1	-18.8919.19	-17.5718.28	-16.9418.24	-18.2717.78	-18.5317.98	-18.3415.53	-18.7817.83	-18.4113.5	-15.5917.17	-10.1119.11	-14.7818.09	-12.7217.02	-11.8917.24	-18.0114.88	-14.7118.94	-17.3518.48	-16.5719.08	-10.2515.12	
(H2)	-17.7518.91	-18.5917.81	-18.5217.57	-17.7719.13	-18.8917.67	-17.5915.59	-14.119.22	-18.5717.62	-18.4217.98	-18.1913	-17.7318.16	-18.5714.14	-18.5617.75	-18.5617.75	-18.5617.75	-18.5617.75	-18.5617.75	-18.5617.75	-18.5617.75	-18.5617.75	-18.5617.75	-18.5617.75	-18.5617.75	
(H2)	-18.1818.29	-18.5917.67	-17.4314.15	-15.7118.11	-18.3718.67	-16.1918.98	-18.0219.36	-18.5615.17	-17.7115.52	-18.0417.3	-18.6115.13	-18.5519.11	-18.6418.17	-15.1118.76	-13.7515	-14.4113.38	-14.8814.16	-18.0918.32	-17.9918.13	-16.9613.17	-15.5117.34	-17.1517.85		
(H2)	-17.9417.98	-18.5419.13	-18.2318.75	-18.0319.19	-18.6118.88	-17.5214.68	-12.3914.42	-11.5712.89	-13.1119.56	-11.2612.29	-13.5614.51	-17.8719.13	-17.3918.44	-17.9618.26	-14.5614.15	-15.7816.62	-19.2119.18	-19.2316.76	-14.4115.29	-14.8417.17	-19.2117.72	-18.5418.16	-17.8118.16	
(H2)	-17.4417.69	-18.5918.81	-19.2617.83	-19.1218.31	-18.719	-17.6919.51	-14.7619.13	-12.5112.81	-12.5112.33	-12.5614.16	-17.5917.52	-16.9816.15	-16.4316.87	-15.9316.38	-18.1718.78	-14.0714.43	-14.5115.68	-18.1619.13	-19.182	-19.2417.48	-19.2918.13	-18.4718.48	-19.2719.78	
(H2)	-17.7415.57	-14121.51	-16.7818.34	-18.1618.26	-17.9917.17	-19.417.47	-16.2615.51	-15.0214.07	-14.2613.13	-13.1213.13	-13.5913.03	-13.0213.88	-14.9619.15	-18.5318.21	-17.8817.72	-18.7118.73	-17.4217.13	-18.7319.08	-19.1318.74	-18.6918.87	-18.4217.28	-15.5913.76	-13.9818.56	
FreeRx	5.7652Rx	Thermal 1																						
Gain	60179(97.5)	60179(97.5)	60179(97.5)	60179(97.5)	60179(97.5)	60179(97.5)	60179(97.5)	60179(97.5)	60179(97.5)	60179(97.5)	60179(97.5)	60179(97.5)	60179(97.5)	60179(97.5)	60179(97.5)	60179(97.5)	60179(97.5)	60179(97.5)	60179(97.5)	60179(97.5)	60179(97.5)	60179(97.5)	60179(97.5)	
(H1)	-12.1715.38	-13.9115.37	-10.0417.62	-5.8414.45	-3.6012.82	-1.9411.15	-0.9019.87	-6.0214.21	-1.6218.18	-2.1119.33	-3.7514.48	-6.1717.77	-10.9714.21	-14.7113.81	-11.4914.68	-6.4515.14	-3.7315.26	-1.8814.11	9.1616.64	-0.7119.76	-1.1619.18	-2.2219.52	-3.9815.48	
(H1)	4.6415.13	4.6415.13	8.817.53	4.2516.46	3.7113.06	2.3315.75	-1.1615.15	-1.2914.16	-1.912.32	2.8614.12	-5.3617.47	-8.918.52	-10.5412.36	-13.3111.75	-7.6716.07	4.5415.33	-3.8719.29	2.0312.16	2.2412.22	-2.2615.94	-2.6612.78	-2.813	2.9913.39	
(H1)	5.7516.85	-7.7116.44	-5.1413.2	-3.4612.86	-2.4712.09	-1.6211.12	-0.6710.85	-1.6112.87	-3.9113.86	-3.9113.86	-3.9113.86	-1.0110.92	-13.2818	-18.6418.56	-12.5816.42	-6.8415.31	-3.1114.4	0.2610.35	0.4410	-0.6614.61	-2.0412.08	-2.1312.37	-1.9114.13	
(H2)	3.3113.78	-5.0314.78	-7.0915.19	-3.1111.98	1.2811.33	-1.431.61	-1.010.87	-1.5712.98	5.1714.59	3.213.18	4.4416.4	-8.7111.44	-14.0214.73	-11.1312	-11.8812.82	-6.4812.26	-6.0213.14	1.2810.35	1.7812.48	2.1405.19	-1.141.25	-4.6712.12	-4.6513.78	
(H2)	-1.6210.46	-1.4710.23	-1.4710.23	-5.5512.04	2.2612.14	2.7512.29	2.3112.46	2.3617.39	5.8714.59	4.1713.36	-2.6017.39	7.819.04	-10.118.88	8.115.12	-6.8110.23	-3.4312.42	-2.0610.61	0.8811.26	1.4407.12	1.4407.12	0.0612.77	-3.2712.72	-3.9612.48	
(H2)	-1.3610.36	-1.2311.89	-0.5710.93	1.301.72	0.2810.49	-2.6914.39	-3.1913	-2.6512.57	2.8614.34	-4.1714.13	-8.5912.74	-6.5714.43	-9.6218.97	-7.8315.93	-5.5314.04	-3.0313.18	-1.9912.34	2.7211.13	-0.7615.01	0.6215.46	1.3310.44	-0.0114.08	-1.3310.91	
(H2)	2.1711.19	-1.3910.32	0.1612	0.2501.37	0.2501.37	2.3214.76	6.5918.61	7.2714.34	3.8614.66	-4.4715.45	4.3916.43	4.3916.46	1.6612.41	-1.3512.22	-2.8713.19	2.3811.58	1.8112.24	2.0711.08	3.6012.82	6.611.32	-14.4510.22	-4.7210.43		
(H2)	3.9115.1	-2.4812.15	0.0210.63	0.3310.36	0.0211.18	1.7513	4.3814.73	9.5316.42	5.5615.09	5.1515.85	-3.9414.31	5.6414.9	5.5615.31	-1.8114	0.6810.02	0.2612.17	2.2612	1.5711.26	-1.5117.16	13.018.10	-13.071.75	-1.7915.52		
(H2)	4.8615.33	-1.4612.13	0.0310.94	0.2610.12	3.1214.19	3.6915.32	4.6815.24	7.4317.27	7.4317.27	7.4317.27	4.2414.43	4.2414.43	4.2414.43	5.5318.11	6.5812.05	6.2618.17	-1.7613.06	3.3214.85	4.641.85	6.6017.12	-0.7614.42	-1.71	5.4813.39	
(H2)	8.791.791	4.9212	4.9212	0.1710.27	7.1610.68	9.77121	9.6918.61	8.2319.10	6.8819.84	4.9918.83	4.5614.9	7.2915.83	4.76154	2.2416.69	-1.8117.1	-1.2619.12	2.2511.99	2.6212	0.9617.94	2.3710.43	4.4615.41	4.7515.49		
(H2)	15.3215.44	6.8915.75	2.1918.62	1.9416.41	2.5115.58	-13.5616.37	-11.2210.61	4.4111.13	7.4811.08	6.2313.93	8.6115.46	6.0715.45	8.7915.82	3.7711.28	3.3114.61	3.7115.15	3.7115.21	1.6911.16	1.4611.87	0.2313.43	1.6414.77	4.4115.93	6.5215.49	
(H2)	-12.7714.88	8.8117.13	5.0316.48	3.7913.52	4.9814.88	14.6515.21	-11.2316.64	4.9719.96	8.7117.38	4.6918.78	-10.7714.3	8.6819.78	11.2615.49	8.7219.36	3.7712.36	6.8019.91	3.7112.22	2.971.22	2.4712.81	1.2411.81	8.9116.24	8.5719.42		
(H2)	-13.5416.98	-11.4913.33	-7.8919.31	-3.3013.69	-1.7617.48	-15.2210.62	-10.4616.36	6.3219.19	8.2415.94	-11.2718.52	-12.7517.59	8.8919.15	-14.0017.38	4.9614.96	3.4917.25	4.9219.29	8.8514.41	4.9117.38	2.1913.48	5.7214.29	3.3416.93	9.4319.12		
(H2)	-12.2918.95	-16.0914.46	8.9310.63	-7.9616.16	1.1317.34	-15.7210.85	-12.6416.35	-8.0212.11	6.1419.28	-12.2618.16	-13.9418.19	9.971.07	-13.018.62	4.5210.65	7.5410.82	-12.8417.6	5.6518.02	8.5210.82	6.931.72	7.7518.92	-14.3612.16	-10.5917.48		
(H2)	-18.3817.38	-14.7118.14	-12.3814.66	-16.7210.53	-12.0218.61	-11.4218.1	-17.7315.12	-18.2116.58	-11.5812.12	-10.2210.35	-16.5516.46	8.9116.85	-11.3210.51	6.3114.94	-5.5816.19	6.191.72	-11.5016.55	4.4216.41	5.7411.61	-6.8817.29	-7.7612.31	-10.8510.15		
(H2)	-19.2914.47	-13.5717.64	-12.7112.06	-16.5710.16	-8.7912.13	-11.4218.1	-13.9314.16	-18.0116.58	-10.9512.29	6.2612.16	-14.8119.23	-10.5914.65	-10.5914.65	-10.5914.65	-10.5914.65	-10.5914.65	-10.5914.65	-10.5914.65	-10.5914.65	-10.5914.65	-10.5914.65	-10.5914.65	-10.5914.65	
(H2)	-18.5114.39	-19.2714.88	-1915.57	-14.0813.14	-14.8918.62	-10.5713.32	-10.0310.17	-17.8918.36	-19.1116.27	-17.3114.31	-11.1210.38	-11.7719.48	9.413.14	8.7717.47	-11.6110.01	7.2314.11	-11.9211.12	5.8517.45	5.8413.93	-12.3110.81	-10.0318.51	-15.4114.47	-17.7619.21	
(H2)	-17.2417.72	-19.3615.28	-17.6918.01	-16.0712.06	-16.5713.84	-16.0516.18	-14.7918.08	-10.4219.17	-16.3514.13	-10.7112.24	-13.313.35	-13.9313.95	-13.9313.95	-13.9313.95	-13.9313.95	-13.9313.95	-13.9313.95	-13.9313.95	-13.9313.95	-13.9313.95	-13.9313.95	-13.9313.95	-13.9313.95	
(H2)	-19.0214.19	-17.8619.12	-1918.35	-8.4618.66	-13.3614.16	-16.0210.38	-14.4318.09	-14.7318.14	-18.4117.75	-18.7711.33	-10.5111.68	8.3410.86	-12.4912.33	8.52117.17	-7.0417.27	9.1913.14	-17.9119.18	6.4515.48	6.7810.12	-10.8110.48	-4.7217.22	-14.4114.41	-15.1213.73	
(H2)	-14.7414.19	-12.9114.93	-18.8618.51	-16.9617.25	-18.7618.38	-17.7818.18	-16.7718.18	-16.7718.18	-17.5615.15	-13.9114.88	-12.6511.18	-10.1510.48	-14.2613.48	-10.1510.48	-13.6416.88	-8.8917.22	-15.1412.83	-7.7316.61	-12.5116.66					



Radiated Composite Gain Data 2.4GHz WLAN, 5GHz WLAN

Appendix A.1

(1120*)	-10.78-6.64	-9.44-12.93	-7.77-17.49	-5.12-7.33	-9.49-9.94	-8.57-9.41	-11.78-18.22	-16.95-9.98	-11.02-17.88	-17.47-12.71	-12.87-9.89	-14.61-11.76	-9.97-14.54	-17.39-18.61	-18.91-13.08	-19.31-18.43	-15.98-14.57	-16.98-14.38	-16.93-12.61	-18.33-18.96	-18.88-15.4	-15.77-17.42	-13.37-12.29	-12.14-13.07
(1127*)	-11.23-10.97	-11.47-14.07	-13.48-17.17	-13.80-9.44	-10.54-9.85	-10.19-9.97	-11.53-13.94	-16.08-17.75	-12.49-13.08	-18.78-16.97	-11.88-11.76	-16.72-14.17	-16.57-16.14	-17.91-13.1	-18.46-12.45	-15.92-16.99	-14.97-11.38	-17.78-17.35	-18.25-18.61	-18.17-17.83	-18.78-17.78	-16.08-17.84	-11.02-13.16	-15.35-18.93
(1130*)	-13.26-15.09	-10.76-10.05	-10.25-11.94	-13.86-14.87	-11.57-7.29	-8.35-11.81	-12.09-13.84	-12.44-13.92	-18.79-16	-12.03-19.47	-17.36-18.43	-16.07-11.31	-13.16-18.92	-13.54-16.68	-17.81-80.1	-18.98-13.87	-18.92-16.12	-17.36-19	-19.11-17.96	-19.03-17.37	-18.09-19.21	-18.09-18.96	-14.27-13.16	-18.85-14.98
(1142*)	-17.94-10.15	-9.33-9.19	-12.85-14.12	-16.14-15.15	-11.43-11.63	-9.25-7.96	-10.53-15.85	-11.86-11.72	-11.88-12.16	-14.54-16.57	-18.16-11.93	-8.21-9.66	-6.24-13.15	-15.11-18.05	-18.91-18.66	-18.48-15.75	-18.84-17.47	-15.72-18.99	-18.18-134	-17.18-16.51	-18.38-17.89	-16.57-17.86	-18.83-18.98	-15.45-17.18
(1150*)	-10.84-18.06	-12.82-9.75	-9.52-9.73	-10.95-11.84	-13.46-12.88	-12.02-11.9	-10.57-10.61	-13.14-15.93	-18.98-16.07	-11.79-13.19	-12.83-10.65	-12.03-13.65	-12.47-15.97	-18.06-17.41	-19.25-18.02	-18.97-17.77	-18.48-18.02	-18.16-19.3	-18.16-15.72	-18.04-19.04	-17.25-14.32	-15.39-17.77	-17.14-16.18	
(1157*)	-10.87-18.62	-17.47-11.61	-11.9-9.47	-9.38-9.53	-10.14-12.71	-14.24-16.18	-18.11-15.72	-13.14-10.76	-8.83-8.07	-8.61-9.36	-15.55-16.83	-18.63-18.99	-17.21-19.13	-17.35-18.24	-16.99-18.4	-17.35-18.36	-17.87-18.93	-18.1-19.98	-14.74-13.08	-12.95-14.27	-12.97-14.22	-11.74-12.32	-12.97-15.92	-18.88-18.63
(1160*)	-11.89-14.12	-14.22-16.13	-14.22-16.18	-9.58-9.11	-7.29-6.49	-6.55-6.61	-6.59-7.6	-9.18-9.52	-9.99-9.29	-11.11-14.18	-10.71-18.1	-12.70-18.7	-18.26-18.15	-18.72-18.4	-18.18-17.24	-18.21-15.9	-17.51-13.96	-15.71-18.1	-9.81-9.3	-10.91-10.69	-12.97-12.84	-12.54-12.22	-11.95-14.78	
(1172*)	-14.03-14.19	-17.77-17.62	-14.83-12.34	-10.22-9.86	-8.21-7.31	-5.74-13	-6.89-7.12	-9.11-11.72	-13.59-15.84	-17.72-17.21	-15.78-16.38	-17.68-18.64	-18.21-17.78	-18.44-17.92	-18.15-17.44	-17.96-17.91	-19.09-17.83	-16.57-14.42	-15.92-14.34	-10.89-9.35	-8.41-9.2	-10.89-11.6	-11.81-19.98	-13.29-14.26
(1180*)	-15.24-17.13	-17.98-18.21	-18.62-18.42	-18.94-18.19	-13.78-12.64	-12.91-12.27	-11.62-13.63	-17.64-18.58	-17.59-18.91	-18.77-18.67	-19.17-17.88	-15.22-14.12	-15.92-18.17	-18.15-18.97	-18.98-15.14	-14.11-13.63	-11.55-11.53	-11.62-10.51	-9.89-9.94	-8.35-8.99	-10.02-11.23	-12.42-12.89	-12.42-13.42	
FreeGain	5.359Pa	FreeGain 2	5.359Pa	FreeGain 2	5.359Pa	FreeGain 2	5.359Pa	FreeGain 2	5.359Pa	FreeGain 2	5.359Pa	FreeGain 2	5.359Pa	FreeGain 2	5.359Pa	FreeGain 2	5.359Pa	FreeGain 2	5.359Pa	FreeGain 2	5.359Pa	FreeGain 2	5.359Pa	FreeGain 2
Gain	(107°/97.5°)	(107°/97.5°)	(107°/97.5°)	(107°/97.5°)	(107°/97.5°)	(107°/97.5°)	(107°/97.5°)	(107°/97.5°)	(107°/97.5°)	(107°/97.5°)	(107°/97.5°)	(107°/97.5°)	(107°/97.5°)	(107°/97.5°)	(107°/97.5°)	(107°/97.5°)	(107°/97.5°)	(107°/97.5°)	(107°/97.5°)	(107°/97.5°)	(107°/97.5°)	(107°/97.5°)	(107°/97.5°)	
(107°)	7.327-7.58	5.955-5.96	5.918-5.94	3.850-3.84	3.232-3.24	2.232-2.1	1.969-2.04	1.9-1.58	1.623-1.3	2.73-3	3.974-4.08	5.72-7.3	7.827-7.9	7.864-6.95	5.989-5.23	4.914-4.04	3.492-7.5	2.082-2.58	2.222-2.58	2.332-2.84	3.34-3.86	4.523-5.98	5.954-6.66	
(117°)	-13.78-16.97	-14.05-12.84	-10.829-12.1	-8.167-8.1	4.274-3	3.272-2.97	-1.894-1.07	0.242-1.21	-4.71-12.4	-2.52-3.86	4.29-6.49	-5.99-6.65	1.767-25	4.53-5.6	5.994-25	-3.962-7.4	2.482-7.1	-3.233-3.4	-3.113-5	4.24-4.56	-5.53-2	4.687-7.54	-8.721-15.96	
(119°)	-15.91-12.12	-10.69-10.72	-6.154-6.1	3.75-3.43	5.513-5.75	3.11-2.5	2.25-1.3	-0.530-0.9	0.040-1.4	0.014-2.7	-0.53-0.66	-1.31-1.7	-2.97-2.47	4.23-4.3	5.61-6.85	-7.88-6.42	5.84-5.94	-6.001-6.23	-6.23-6.18	-6.64-5.92	-6.99-5.62	-7.71-6.48	-10.75-14.32	
(122°)	-16.81-11.52	-8.35-6.68	-3.76-2.91	-2.72-2.46	2.38-2.35	-1.53-0.48	-0.41-0.45	0.220-0.46	0.02-0.66	-0.410-3.6	0.941-25	0.9-0.6	-1.14-1.8	2.5-3.9	4.02-4.61	-5.04-5.38	-6.69-6.96	-12.19-17.38	-13.08-10.37	-9.78-10.51	-8.99-7.79	-7.63-9.18	-5.65-6.41	
(124°)	-7.64-7.55	-7.64-6.58	-6.92-6.19	-6.02-6.97	-2.08-2.81	0.221-0.85	2.411-85	1.250-74	0.361-0.58	0.840-68	1.892-47	2.051-41	1.1-0.48	0.712-0.28	-3.76-5.55	-4.13-2.46	-1.83-1.7	-4.08-8.21	-16.01-10.28	-6.89-6.46	-10.35-15.41	-13.14-11.24	-8.86-7.7	
(127°)	-14.57-15.65	-11.89-13.89	-14.93-10.34	5.63-6.11	0.650-88	1.262-3	0.434	1.891-05	1.230-91	0.974-16	1.132-27	2.962-02	0.29-1.5	3.714-4.5	-3.33-1.21	-2.27-4.56	-3.81-4.68	-1.63-4.67	-11.16-17.7	-8.93-7.5	-3.96-9.71	-18.62-12.69	-6.03-6.13	
(130°)	-9.34-15.65	-9.31-13.48	-2.27-9.91	0.702-64	3.470-66	0.861-19	3.572-5	0.31-38	1.560-98	0.674-16	-0.271-13	1.403-51	6.80-2.61	5.93-47	3.411-22	2.96-1.69	1.38-1.02	-2.07-5.66	-6.18-5.65	-2.93-5.67	-14.08-11.73	-8.411-7.45	-11.89-13.95	
(132°)	-6.47-13.86	-2.31-2.69	-2.81-0.47	1.33-25	2.932	0.68-0.35	1.800-48	-1.830-36	1.260-11	0.65-2.39	-0.95-0.53	0.281-5.65	-3.49-4.62	1.320-25	3.214-25	4.292-97	0.56-1.12	2.061-62	-0.88-2.16	-2.313-7.27	-2.96-4.71	-7.771-63	-9.71-15.02	
(134°)	-5.46-4.41	-0.48-0.48	-6.03-1.86	0.541-09	0.343-19	2.8-0.43	2.860-26	-5.82-1.48	1.43-7.6	0.31-2	0.580-48	3.072-63	3.884-04	1.773-34	1.9-0.94	2.732-2.25	-0.99-4.53	-2.59-2.74	-4.62-5.55	-8.99-12.13	-1.39-7.44			
(137°)	-6.51-5.09	-6.86-11.86	-6.31-10.28	-1.02-1.09	-1.86-2.75	-5.42-6.82	-0.32-0.45	-6.17-4.78	2.111-144	0.912-45	-2.84-1.4	2.442-29	2.031-33	2.032-61	3.420-14	1.801-8.4	0.61-1.36	0.937-139	-4.33-1.58	-1.1-5.04	-2.4-2	-3.12-4.38	-4.84-13.74	
(140°)	-6.88-6.51	-6.99-14.73	-5.24-12.59	-2.97-2.76	4.48-5.07	-4.66-15.52	-2.53-1.07	6.19-9.85	3.71-216	0.124-203	-2.530-75	2.73-32	1.830-99	1.371-15	4.410-8	0.289-5.99	1.2-1.36	3.97-3.69	-4.31-6.38	-3.23-4.15	-3.23-4.19	-4.87-12.81	-12.54-9.66	
(142°)	-8.24-8.33	-8.35-12.33	-5.77-3.69	-5.471-7.1	7.154-38	-3.76-14.6	4.23-27	8.23-9.4	4.44-3.35	-1.82-4.27	-2.48-2.5	1.992-51	0.71-85	-1.713-17	-2.29-5.49	-4.02-2.75	-1.89-2.25	2.46-1.66	-2.09-0.51	0.071-8.81	-2.71-2.29	-2.84-0.52	-4.99-11.82	
(145°)	-5.25-5.65	-8.26-14.23	-6.53-4.17	-7.17-6.16	7.51-7.9	4.411-14.6	-5.33-3.64	-9.68-6.41	1.88-1.39	-3.91-5.29	-3.2-0.66	2.16-2.16	6.49-7.86	5.13-4.52	-5.42-5.12	-2.34-2.55	-8.33-5.53	3.77-2.4	-1.37-1.37	-3.27-2.17	-4.59-5.67	-5.59-5.67	-9.80-6.31	
(147°)	-6.03-6.44	-5.93-14.53	-6.49-5.44	-4.33-4.72	8.48-5.51	-3.78-13.88	-5.87-5.14	-8.99-6.96	-7.83-10.28	-7.92-5.39	-5.24-2.26	-4.51-5.15	-6.58-7.71	-1.44-8.35	-4.76-6.86	-11.31-3.34	-4.871-7.99	-7.93-10.11	-7.23-6.1	-6.88-11.37	-2.43-4.37	-6.011-7.35	-5.98-9.99	
(150°)	-7.24-7.53	-5.53-6.94	-9.03-6.97	-6.98-7.92	2.89-2.97	3.721-19.9	-5.95-6.98	-7.95-7.98	4.99-5.96	-11.37-8.44	-10.37-10.19	-12.80-10.33	-7.50-6.07	-7.91-6.42	-4.56-7.4	-1.49-7.08	0.389-14.98	-6.971-7.48	-12.65-9.93	-14.13-10.22	-4.92-6.98	-7.27-7.98	-7.57-8.71	
(152°)	-4.88-1.89	-8.98-6.92	-6.67-11.12	3.95-4.47	6.071-5	6.071-5	6.254-71	6.921-65	1.24-18.89	-10.51-9.48	-10.57-10.93	-12.44-10	-6.71-7.79	3.91-1.62	8.55-11.32	12.37-4.6	4.48-7.78	-10.20-13.6	-10.20-13.6	6.571-6.86	7.821-7.82	6.33-6.46	-5.471-7.3	
(154°)	-6.74-6.96	-5.24-5.1	-7.52-5.97	-7.58-11.93	10.59-10.96	6.03-9.41	-6.91-5.26	-7.827-29	-10.77-11.93	-11.41-10.86	-15.48-17.92	-12.64-7.63	-7.96-7.7	-12.68-17.98	-15.99-17.25	-7.91-7.35	-10.87-13.21	-11.48-9.48	-15.52-13.13	-15.18-16.48	-6.42-0.34	-7.78-7.77	-6.981-6.43	
(157°)	-5.92-4.47	-5.76-5.45	-6.49-7.47	-7.52-7.47	7.73-8.62	-7.80-12.46	-5.96-5.1	-9.6-10.77	-12.82-10.15	-14.14-18.4	-13.86-13.64	-17.71-18.74	-15.70-17.28	-16.71-16.86	-19.24-19.44	-15.75-17.12	-12.02-18.53	-16.47-18.47	-17.56-18.34	-16.74-16.05	-6.24-6.48	-6.24-6.23	-8.77-11.61	
(160°)	-6.93-6.47	-5.71-6.47	-6.96-6.49	-7.72-6.13	4.93-6.27	-9.711-10.28	-7.02-6.74	-6.19-11.57	-8.61-12.51	-12.42-10.86	-18.64-8.99	-5.96-7.24	-7.14-11.42	8.83-8.86	-8.76-18.47	-17.85-15.04	-10.02-15.95	-13.31-15.4	-10.44-13.37	-12.46-10.48	-13.35-12.39	-11.83-9.36	-11.47-11.74	
(163°)	-5.23-6.45	-3.34-4.97	-7.88-10.28	-6.02-4.76	3.75-5.73	-5.96-10.77	-9.22-9.71	-10.31-10.89	-8.82-14.13	-10.26-14.54	-11.39-10.67	-12.14-18.81	-15.85-16.38	-16.85-18.59	-17.47-14.38	-15.98-10.51	-10.54-16.46	-13.83-12.88	-12.1-11.69	-18.08-17.67	-13.02-12.89	-12.16-9.1	-13.77-11.77	
(166°)	-6.09-6.78	-7.65-7.73	-8.76-9.84	-8.54-6.98	-6.16-7.12	-8.81-8.41	-8.84-9.63	-11.72-12.33	-11.76-9.57	-7.32-9.42	-14.06-17.93	-17.17-17.59	-18.91-16.71	-18.31-16.4	-14.72-16.07	-16.41-18.96	-16.86-13.5	-17.59-17.53	-18.48-17.64	-18.85-16.44	-14.44-12.67	-12.92-13.57	-9.73-9.67	
(169°)	-6.37-6.76	-6.96-6.03	-5.66-6.14	-7.14-6.89	-10.57-11.93	-11.28-11.86	-8.17-8.71	-5.50-6.82	-11.37-14.47	-15.76-10.67	-8.9-8.3	-9.08-10.79	-16.81-17.25	-16.81-17.25	-16.81-17.25	-16.81-17.25	-16.81-17.25	-16.81-17.25	-16.81-17.25	-16.81-17.25	-16.81-17.25	-16.81-17.25	-16.81-17.25	
(172°)	-13.34-7.65	-6.24-6.91	-8.31-8.71	-6.22-11.23	-11.10-8.8	-10.99-11.88	-11.08-12.14	-16.98-18.77	-16.99-13.63	-12.11-12.81	-15.31-16.2	-15.76-19.49	-15.08-17.07	-17.53-19.02	-16.21-14.86	-16.87-17.52	-19.32-18.45	-15.14-15.18	-18.35-18.94	-17.08-17.52	-11.01-10.11	-6.64-6.38	-6.26-6.47	
(175°)	-8.96-8.31	-6.12-6.11	-7.84-7.31	-8.37-9.63	-10.42-12.16	-13.40-12.16	-13.40-12.16	-15.07-18.18	-14.21-13.67	-12.57-11.88	-11.31-10.87	-11.53-12.87	-14.11-14.28	-15.12-15.18	-11.91-15.95	-11.44-10.75	-10.52-10.35	-12.45-13.76	-15.15-18.75	-14.				



Radiated Composite Gain Data_6GHz WLAN

Appendix A.2

Freq(Hz)	6.175G	6.475G	6.695G	6.995G
Ant. 1 Max Gain (dBi)	5.17	4.29	5.79	4.94
Ant. 2 Max Gain (dBi)	5.88	5.1	5.81	5.86
Ant. 1 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/67.5/202.5	Theta/67.5/202.5	Theta/67.5/202.5	Theta/37.5/292.5
Ant. 2 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/45/37.5	Theta/45/37.5	Theta/45/37.5	Theta/52.5/37.5
Max Gain (dBi)	5.88	5.1	5.81	5.86
DG [1SS] (dBi)	6.06	5.38	6.58	6.18
DG [2SS] (dBi)	5.88	5.1	5.81	5.86



Appendix A.2

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Radiated Composite Gain Data 6GHz WLAN

Appendix A.2

(H9)	8.73-6.82	-8.47-7.82	-10.81-9.48	-10-18.68	-16.81-9.1	8.73-66	-7.88-31.1	-13.87-16.11	-10.81-11.13	-13.11-11.08	-10.87-12.09	-11.29-11.98	-14.35-10.68	-12.48-15.46	-17.82-17.37	-18.21-18.03	-17.77-19.77	-12.48-14.64	9.41-7.66	-10.52-10.27	-7.74-4.51	9.66-8.66	6.43-7.07	-17.75-19.11
(H2)	8.76-9.9	-7.54-7.86	-11.59-10.57	-12.61-18.7	-19.27-14.46	9.64-83	-8.93-11.1	-16.39-14.98	-10.45-11.83	-11.51-14.3	-12.07-12.16	-11.07-12.04	-18.27-15.07	-12.55-14.48	-18.26-18.52	-17.33-17.49	-15.68-15.45	-11.43-12.47	8.73-7.69	-8.64-8.73	4.5-6.81	8.37-8.1	7.27-7.49	-18.77-19.06
(H6)	-13.15-11.63	-7.74-9.9	-12.33-11.41	-16.53-15.93	-15.26-15.4	-13.66-12.7	-10.37-11.28	-17.98-15.45	-11.41-12.66	-11.12-12.22	-12.51-12.31	-11.04-13.43	-18.61-11.99	-11.65-18.15	-18.02-18.48	-18.50-18.4	-15.48-15.81	-12.55-11.41	9.32-9.64	-9.63-9.64	-6.66-6.61	-12.06-10.08	-7.89-8.92	
(H7)	-18.33-11.98	8.53-13.1	-13.86-12.77	-18.61-15.4	-14.09-13.1	-15.04-14.25	-13.07-13.69	-18.92-13.1	-13-13.6	-12.01-13.83	-13.92-13.93	-13.81-17.2	-17.96-14.62	-12.27-18.15	-19.23-17.98	-18.97-18.1	-14.07-11.7	-14.27-10.12	-10.78-13.29	-8.19-7.1	-14.96-12.42	8.83-14.49	-19.22-14.18	
(H15)	-15.09-12.97	-14-13.16	-12.56-15.78	-16.65-15.65	-17.74-13.3	-16.23-14.99	-17.87-17.62	-18.37-18.39	-15.3-14.58	-12.74-14.59	-15.73-14.11	-17.61-17.52	-14.24-17.92	-14.29-16.68	-19.22-18.98	-18.44-18.77	-18.87-18.3	-18.83-13.1	-18.95-14.67	-17.78-17.95	-16.01-11.82	-15.63-16.69	-15.33-15.23	
(H12)	-18.87-16.45	-17.75-15.71	-14.51-19.12	-18.16-19.1	-11.99-14.38	-18.77-16.12	-17.52-14.97	-17.86-17.17	-17.89-15.15	-15.28-17.01	-18.43-18.38	-18.4-18.3	-18.81-19.06	-16.26-17.97	-17.75-13.31	-18.99-17.7	-17.88-18.96	-17.57-14.53	-18.01-15.23	-18.4-12.24	-12.06-14.71	-17.39-12.32	-14.92-18.12	
(H20)	-16.88-18.36	-17.83-15.18	-14.41-18.12	-16.63-16.68	-10.25-14.31	-19.03-18.12	-17.62-17.23	-18.79-16.69	-14.8-16.53	-15.42-14.93	-18.07-19.06	-18.51-18.12	-19.07-18.69	-18.21-17.53	-17.23-19.17	-19.05-17.78	-18.14-13.69	-18.71-17.07	-13.5-18.21	-18.45-15.36	-11.53-16.28	-17.78-19.09	-17.88-19.09	
(H27)	-17.82-16.93	-15.78-17.31	-18.03-17.71	-18.06-12.09	-11.76-18.66	-17.83-17.7	-18.25-16.99	-14.49-17.35	-14.69-18.79	-15.3-18.63	-19.34-19.27	-18.81-18.66	-19.27-18.11	-18.67-18.66	-17.33-18.49	-17.38-17.93	-19.96-18.54	-16.35-17.81	-15.76-18.88	-18.34-17.69	-17.47-18.24	-18.21-15.54	-17.96-18.54	
(H35)	-18.44-18.89	-18.52-18.69	-18.58-18.65	-12.29-19.07	-12-11.911	-18.86-17.24	-13.96-19.21	-18.94-19.16	-18.52-18.48	-19.21-18.13	-16.5-17.85	-17.98-18.37	-17-17.95	-18.68-17.88	-18.51-18.45	-16.3-17.8	-18.98-18.63	-18.16-18.53	-18.68-18.02	-17.78-18.23	-18.33-18.76	-18.69-18.25	-18.39-17.82	
(H42)	-15.22-17.12	-16.18-15.22	-16.88-14.29	-13.03-13.96	-17.91-7.39	-17.67-17.23	-14.97-17.44	-17.74-17.47	-17.42-16.86	-17.86-18.68	-18.44-16.81	-18.28-18.34	-18.49-18.68	-18.52-18.91	-17.29-18.34	-18.25-18.52	-17.48-18.57	-18.93-18.81	-18.98-18.51	-18.02-18.81	-18.67-17.22	-18.67-17.22	-18.67-17.22	
(H50)	-14.83-18.69	-15.48-14.48	-19.21-18.22	-17.22-19.17	-16.83-16.36	-17.36-14.54	-14-19.13	-18.96-17.7	-15.44-16.25	-18.27-17.96	-18.54-16.25	-18.27-17.96	-18.54-16.25	-18.27-17.96	-18.54-16.25	-18.27-17.96	-18.54-16.25	-18.27-17.96	-18.54-16.25	-18.27-17.96	-18.54-16.25	-18.27-17.96	-18.54-16.25	
(H57)	-16.83-18.32	-16.83-18.32	-16.83-18.32	-16.83-18.32	-16.83-18.32	-16.83-18.32	-16.83-18.32	-16.83-18.32	-16.83-18.32	-16.83-18.32	-16.83-18.32	-16.83-18.32	-16.83-18.32	-16.83-18.32	-16.83-18.32	-16.83-18.32	-16.83-18.32	-16.83-18.32	-16.83-18.32	-16.83-18.32	-16.83-18.32	-16.83-18.32	-16.83-18.32	
(H62)	-17.82-18.64	-18.17-18.67	-19.06-18.3	-18.6-18.29	-18.57-18.31	-18.56-18.67	-17.27-18.56	-18.8-18.37	-17.98-17.98	-18.19-18.1	-17.77-18.43	-19.01-17.8	-17.67-18.2	-18.76-19.09	-19.59-18.91	-17.88-19.11	-17.82-18.96	-18.36-19.23	-18.17-19.33	-18.47-18.95	-17.88-18.46	-17.54-18.67	-17.77-18.64	
(H72)	-16.25-18.91	-18.16-19.01	-17.86-19.38	-16.78-19.42	-17.85-18.23	-18.47-18.47	-19.06-18.79	-18.16-18.79	-18.45-18.85	-18.89-17.47	-18.67-17.98	-19.38-18.38	-18.83-18.42	-18.61-18.56	-19-19.38	-19.27-19.08	-19.53-19.16	-18.07-18.66	-17.22-18.95	-18.47-19.14	-19-19.21	-18.69-17.93	-18.67-18.71	
(H80)	-17.89-17.85	-18.96-19.03	-17.83-18.47	-18.16-18.93	-18.72-17.99	-17.98-18.16	-17.88-18.03	-18.98-18.44	-18.5-17.47	-17.31-18.1	-18.15-18.18	-17.81-18.32	-19-18.06	-18.08-17.7	-18.44-17.93	-18.51-18.46	-17.93-18.17	-18.18-18.26	-19.08-18.55	-18.94-17.5	-17.37-17.47	-18.32-18.17	-19-18.38	
FreeH0	6.1755H0	Phuket 2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Gen	(H9)(H7)	(H15)(H22)	(H6)(H30)	(H45)(H62)	(H50)(H67)	(H57)(H62)	(H60)(H67)	(H65)(H72)	(H70)(H72)	(H75)(H72)	(H80)(H72)	(H85)(H72)	(H90)(H72)	(H95)(H72)	(H100)(H72)	(H105)(H72)	(H110)(H72)	(H115)(H72)	(H120)(H72)	(H125)(H72)	(H130)(H72)	(H135)(H72)	(H140)(H72)	
(H1)	-13.26-14.34	-15.15-16.11	-16.68-15.88	-15.06-14.24	-13.76-13.56	-13.65-14.3	-15.51-15.7	-15.96-16.57	-17.63-17.24	-16.44-15.74	-15.24-14.72	-14.72-14.32	-12.9-12.58	-12.52-11.98	-11.99-12	-11.71-11.75	-11.47-11.2	-11.18-11.34	-11.61-12.1	-12.41-12.47	-12.41-12.08	-11.76-11.82	-13.11-14.02	
(H2)	3.85-3.88	4-15.44	4.79-5.33	5.63-6.03	6.01-6	5.71-6.3	4.78-4.04	3.44-3.99	3-3.36	3.62-4.22	5.09-6.36	8.11-10.06	-1.84-13.31	-12.99-12.42	-11.81-11.21	-10.91-10.78	-10.11-11.02	-10.97-10.74	9.94-10.3	6.9-8.52	4.96-5.75	7.59-8.42	8.83-9.15	
(H3)	-1.821	1.21-1.73	0.47-0.36	0.31-0.42	0.72-1.14	-1.58-2.16	-2.71-2.04	-3-2.65	2.04-1.54	2.14-1.93	-1.1-2.22	6.28-6.65	7.28-8.18	8.17-1.41	6.55-6.45	4.48-3.87	3.34-3.27	2.77-3.03	3.68-4.29	5.15-5.12	4.49-4.07	3.88-3.39	3.51-4.08	
(H4)	0.421-34	1.96-22	2.56-28	2.81-36	1.76-122	0.96-57	0-1.3	2.43-2.85	2.41-2.33	-1.34-4.42	0.65-1.82	3.26-1.33	3.61-1.45	5-5.36	4-73.39	2-19-145	-1.45-1.84	-1.69-1.01	-0.41-11.8	-3.01-3.34	2.74-1.58	-1.66-1.81	-1.21-12.42	
(H5)	2.403-24	3.75-68	3.88-14	4.11-10.8	3.26-78	3.61-10.6	5.19-1.1	0.99-12.3	1.59-18.6	-1.78-1.43	-1.43-0.98	-1.01-1.85	-2.64-2.64	-0.08-2.02	0.53-0.61	0.58-0.75	1.22-1.69	1.76-9.82	1.21-2.12	0.71-1.61	0.58-1.63	0.31-1.65		
(H6)	1.792-34	4.11-8	5.15-43	4.98-41	3.91-36	2.97-29	1.93-17	1.31-37	1.35-14	1.89-1	0.97-37	-0.45-0.99	0.53-0.37	0.39-0.6	0.25-0.9	-0.15-0.08	0.67-1.31	1.79-1.65	2.01-1.74	1.01-1.52	2.32-1.88	0.41-27	0.01-47	
(H7)	0.842-39	3.53-71	5.15-68	4.99-43	3.84-36	2.081-49	0.97-56	1.14-78	1.73-24	0.70-58	0.58-132	-1.46-1.38	1.26-1.56	4.6-6.19	0.01-0.97	-0.02-0.96	1.37-2.5	4.57-10.7	0.75-1	0.75-1	1.41-6.19	0.62-1		
(H8)	1.037-71	1.762-83	4.975-98	5.28	1.821-33	0.73-17	0.24-42	0.53-17	0.448-58	1.21-67	0.88-63	-0.42-1.47	1.82-2.46	-1.8-1.47	-1.11-0.91	-0.89-1.26	-1.62-1.38	-1.04-1.53	-2.38-2.67	-1.68-1.38	-0.49-0.34	0.76-0.84	0.79-1.12	
(H9)	0.56-69	0.47-18	3.26-53	5.99-68	-1.37-94	0.54-148	0.77-69	0.47-148	0.93-71	0.97-162	0.96-69	4.1-11.51	-1.73-17.77	3.96-17.7	4.59-17.7	3.96-17.7	4.59-17.7	3.96-17.7	4.59-17.7	3.96-17.7	4.59-17.7	3.96-17.7	4.59-17.7	
(H10)	1.061-196	0.77-18	2.01-27	4.12-53	1.88-114	-1.52-1.03	-1.37-0.93	-1.1-0.72	0.53-1.24	0.38-1.33	0.32-1.22	0.32-1.22	0.38-1.33	0.32-1.22	0.38-1.33	0.32-1.22	0.38-1.33	0.32-1.22	0.38-1.33	0.32-1.22	0.38-1.33	0.32-1.22	0.38-1.33	
(H11)	3.26-2.95	3.26-2.95	1.46-1.1	4.23-1.96	0.61-0.64	2.51-2.94	4-16.15	3.14-6.73	4.79-3.96	5.97-7.56	4.59-6.52	4.59-6.52	4.59-6.52	4.59-6.52	4.59-6.52	4.59-6.52	4.59-6.52	4.59-6.52	4.59-6.52	4.59-6.52	4.59-6.52	4.59-6.52	4.59-6.52	
(H12)	5.34-4.36	5.29-2.03	0.09-1.51	1.46-1.16	1.46-1.16	4.02-4.95	7.23-11	6.89-6.65	7.85-6.07	6.39-13.42	6.95-6.49	6.95-6.49	6.95-6.49	6.95-6.49	6.95-6.49	6.95-6.49	6.95-6.49	6.95-6.49	6.95-6.49	6.95-6.49	6.95-6.49	6.95-6.49	6.95-6.49	
(H13)	8.14-8.9	8.57-5.34	2.83-41	2.44-23.34	2.53-3.85	8.81-8.01	-11.87-8.48	8.57-8.45	-11.17-8.42	-10.86-13.42	-13.39-14.48	8.6-8.42	7.93-8.43	-10.96-8.3	9.78-10.5	8.93-8.44	8.52-8.44	7.26-8.61	8.43-8.02	5.84-3.47	4.78-5.32	3.59-2.94	8.96-8.69	
(H14)	-10.45-10.07	-11.11-8.37	5.43-38	4.32-39.49	4.04-6.85	9.73-7.4	-14.59-10.17	-10.68-10.7	-11.88-10.27	-11.41-13.84	-15.77-12.02	6.98-7.54	9.11-9.53	-10.82-10.65	-12.39-13.42	-17.69-11.09	-11.24-11.02	-11.47-8.74	-15.53-10.34	-10.17-8.51	8.7-7.08	7.67-10.81	-13.71-13.33	
(H15)	-12.11-10.67	-14.99-17.19	-7.82-8.56	-6.97-7.38	-11.21-11.88	-15.07-13.42	0.28-12.45	-14.93-14.68	-13.96-17.52	-18-17.37	-18.13-17.6	8.88-10.94	-11.79-13.48	-14.53-16.48	-11.53-11.33	-13.32-13.43	-17.62-15.34	-17.84-13.78	-18.49-18.11	-13.01-10.94	0.69-13.34	-15.22-14.11	-13.54-10.94	
(H16)	-17.73-15.68	-16.51-14.04	-10.9-25	9.37-10.12	-11.54-8.84	-13.41-12.88	-14.74-13.99	-9.51-14.5	-12.88-14.58	-10.96-17.81	-16-15.05	-11.34-9.58	-10.78-12.14	-11.86-12.99	-14.86-12.41	-13.59-13.2	-16.66-17.24	-17.11-12.54	-16.06-14.78	-12.89-11.91	3.98-15.2	-17.32-14.4	-14.96-17.81	
(H17)	-15.27-18.04	-15.35-16.63	-14.27-16.16	-10.24-11.73	-12.31-15.06	-14.81-17.94	-18.25-14.44	5.28-11.14	-13.18-15.11	-16.78-17.64	-18.25-17.17	-14.66-10.51	-11.07-14	-14.75-16.11	-18.16-18.6	-18.63-13.67	-17.83-17.26	-15.13-17.99	-19.18-19.08	-17.37-13.92	-13.08-8.73	-16.53-14.49	-17.03-14	
(H18)	-10.57-14.1	-10.57-14.1	-11.58-8.83	9.84-12.16	-12.32-16.98	-15.61-18.91	-16.31-17.91	-18.52-16.17	-17.26-19.04	-14.61-18.66	-13.56-10.84	-17.73-18.04	-18.21-17.81	-18.11-14.37	-18.09-19.05	-11.52-10.39	-18.39-14.07	-19.22-12.44	-18.04-12.81	-17.11-14.61	-14.84-17.94	-14.58-13.13		
(H19)	-14.67-15.91	-17.71-18.88	9.24-10.86	-16.96-18.66	-17.35-12.4	-16.17-18.78	-16.34-16.92	-13.18-14.79	-18.84-18.95	-17.79-17.97	-1													



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Antenna Pattern 2.4GHz WLAN, 5GHz WLAN

Appendix B.1

(H25)	0.880474	0.645008	-0.480097	0.520075	1.099102	0.707018	-0.591089	-1.319237	-0.380330	-1.980101	-0.866127	-1.802124	2.520275	0.320121	-0.277006	-0.194018	0.248092	1.309192	2.62282	2.279103	-0.414074	0.330911	0.729071	0.110086
(H26)	0.560176	2.030181	1.940232	1.860242	0.501122	-1.484150	-1.802033	-2.298276	0.551556	-2.401033	-1.862182	-2.864148	-4.051189	-0.689005	0.879152	1.779153	1.839187	1.820222	2.380236	2.379234	1.580013	0.130155	-1.450136	0.360002
(H27)	0.490183	1.830168	2.270100	2.060159	0.900402	-2.310287	-2.391267	-2.399220	0.219144	-2.740286	-3.699286	-3.159286	-1.980130	-1.110103	0.520149	1.641586	1.789114	0.250087	0.810488	1.040195	1.520012	0.060036	-0.960035	-0.250115
(H28)	0.790026	0.890186	2.710243	1.420132	1.400017	-1.984149	-0.601036	-6.950149	0.319324	-3.160346	-3.500185	-1.370376	-0.600087	1.800175	1.550133	1.250074	0.930117	0.510146	-1.230139	0.800052	-0.070171	0.530119	-1.160012	0.150007
(H29)	1.500190	0.840092	2.680020	1.410141	0.940202	-1.584281	-1.470353	-3.880457	0.530136	-4.460328	-2.990122	-2.240179	-1.480001	0.940086	1.632131	0.980026	0.330205	0.470054	-0.880003	0.000024	-1.020068	-1.750069	-0.440189	-0.080044
(H30)	0.720036	0.600028	1.570020	1.200029	0.580296	-2.720337	-0.690141	-5.890496	0.670076	-4.070028	-1.310035	-3.330193	-2.080183	-0.570091	1.742041	2.650144	0.840085	-1.910050	1.010042	0.710002	-0.350035	-1.880036	-0.520035	-1.100026
(H31)	0.350127	-0.970022	1.190135	2.320101	-0.770030	-1.470030	-8.400499	-9.150472	-7.430072	-6.480050	-5.510037	-4.540292	-3.590258	-0.880113	1.070115	0.920018	-0.040067	-1.160003	0.020104	0.060038	-1.640001	0.140020	-0.510003	-0.470000
(H32)	0.720102	0.350109	0.430101	1.210000	0.350463	-12.050181	-9.190048	-6.140061	-7.180005	0.601039	-7.580049	-5.190075	-4.850187	-0.400005	-0.360033	-1.220025	-1.040006	-0.370030	0.700067	0.020041	0.490037	0.940042	0.110001	0.670040
(H33)	-11.020000	0.720103	-1.450038	0.520049	0.880043	-13.020048	-7.760046	-4.340071	-7.980122	0.800039	-6.850006	-5.980450	-6.160203	-1.870009	-0.830044	-2.830002	-2.580003	-0.830005	0.020000	-0.970077	0.190005	0.740044	0.540046	0.580046
(H34)	-12.140004	-6.880239	-6.240236	2.330100	0.960004	-10.510006	-6.220046	-4.030129	0.430109	-16.280189	-11.710019	-6.890022	-7.470007	-2.380058	-1.270034	-3.870035	-3.810042	-2.280239	-1.360073	-4.390038	-1.980230	-2.290044	0.490017	0.160000
(H35)	-16.410000	0.750000	0.370000	0.500000	0.550000	-0.850042	-7.090000	-4.710007	-7.620000	-11.480000	-11.230000	-7.970000	-7.980000	-3.930000	-1.410000	-6.210000	-3.250000	-3.710002	-7.880000	0.540000	-6.690000	-7.920000	0.940000	0.940000
(H36)	-16.990000	-10.420000	-5.250000	0.950000	-1.390000	-1.560000	-10.430000	-7.960000	-6.020000	-12.020000	-10.520000	-14.540000	-9.780000	-6.960000	-3.760000	-3.370000	-5.570000	-2.860000	-4.960000	-1.760000	-10.420000	-8.300000	-6.370000	0.370000
(H37)	0.480000	-13.790000	-15.450000	-7.890000	-11.430000	0.190000	-7.670007	-10.910000	-11.790000	-13.420000	-10.770000	-12.580000	-9.070000	-10.490000	-6.770000	-4.280000	-2.710000	-2.940000	-4.740000	0.140000	-0.790000	-10.890000	0.530000	0.980000
(H38)	-16.170000	-10.160000	-12.400000	-12.400000	-7.710000	-12.950000	-14.880000	-12.910000	-15.390000	-15.460000	-14.450000	-13.970000	-10.970000	-8.710000	-6.460000	-5.530000	-7.980000	-3.990000	-5.930000	-9.310000	-11.300000	-13.190000	-14.170000	-15.610000
(H39)	-14.880000	-16.040000	-16.040000	-15.280000	-8.070000	-11.110000	-14.050000	-12.940000	-15.130000	-11.580000	-14.440000	-14.380000	-12.900000	-8.860000	-11.330000	-12.200000	-12.290000	-8.680000	-11.140000	-14.790000	-7.540000	-7.640000	-14.500000	-13.210000
(H40)	-16.170000	-14.710000	-10.120000	-10.120000	-12.910000	-12.160000	-12.830000	-12.140000	-12.880000	-13.280000	-13.810000	-11.560000	-10.450000	-8.900000	-6.850000	-10.370000	-12.500000	-6.460000	-9.070000	-11.310000	-12.500000	-10.390000	-15.570000	-11.550000
(H41)	0.697000	-11.800000	-10.030000	-12.920000	-11.550000	-10.160000	-14.860000	-11.140000	-13.240000	-15.220000	-14.880000	-15.300000	-12.500000	-11.860000	-8.870000	-10.880000	-7.330000	-12.410000	-12.080000	-6.300000	-7.530000	-12.690000	-11.810000	-7.630000
(H42)	-14.880000	-16.040000	-13.300000	-12.570000	-14.300000	-11.140000	-12.860000	-12.170000	-15.310000	-15.360000	-14.720000	-14.200000	-13.000000	-10.340000	-7.300000	-6.300000	-10.830000	-6.720000	-11.910000	-12.880000	-16.020000	-14.910000	-16.010000	-15.720000
(H43)	-15.040000	-15.800000	-15.800000	-15.040000	-13.440000	-14.040000	-12.020000	-10.100000	-12.990000	-13.660000	-14.840000	-14.110000	-11.020000	-12.100000	-10.480000	-8.690000	-6.250000	-8.570000	-10.010000	-11.450000	-11.830000	-11.130000	-11.530000	-10.910000
(H44)	-15.040000	-15.150000	-15.150000	-15.150000	-12.880000	-12.410000	-12.020000	-11.200000	-13.070000	-13.810000	-14.110000	-11.870000	-12.310000	-10.750000	-8.680000	-6.890000	-6.280000	-6.280000	-12.070000	-11.630000	-11.800000	-11.730000	-14.170000	-13.220000
(H45)	-15.860000	-14.710000	-15.890000	-15.860000	-15.560000	-15.610000	-14.710000	-14.720000	-13.610000	-11.570000	-11.570000	-12.320000	-12.320000	-11.500000	-11.150000	-11.150000	-11.210000	-8.210000	-7.870000	-8.710000	-10.240000	-12.890000	-14.470000	-14.630000
(H46)	-13.300000	-12.040000	-11.910000	-12.740000	-12.740000	-11.610000	-12.010000	-12.010000	-13.590000	-12.520000	-12.520000	-12.040000	-12.040000	-11.450000	-10.760000	-10.760000	-10.890000	-11.940000	-11.300000	-13.300000	-13.300000	-13.220000	-15.150000	-15.150000
Freq(Hz)	2.450000	Table 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Gain	(H15)(H27)	(H15)(H222)	(H30)(H37)	(H45)(H62)	(H67)(H67)	(H75)(H62)	(H90)(H97)	(H105)(H112)	(H120)(H127)	(H135)(H142)	(H150)(H157)	(H165)(H172)	(H180)(H187)	(H195)(H202)	(H210)(H217)	(225)(H232)	(H240)(H247)	(H255)(H262)	(H270)(H277)	(H285)(H292)	(H300)(H307)	(H315)(H322)	(H330)(H337)	(H345)(H352)
(H1)	2.420020	2.460020	-1.840000	0.630004	0.880107	0.910408	0.210023	0.550088	1.210157	-1.880128	-2.430027	-2.690023	2.170172	-1.230005	-0.730008	-1.170133	-1.250007	0.530029	0.250038	0.630006	-1.150134	-1.520172	-1.860021	0.130020
(H2)	2.430020	2.500020	-1.940000	0.790002	0.690000	0.840001	0.210023	0.550088	1.180007	-2.210026	-2.800026	-2.380008	2.190001	-1.050001	-0.730008	-1.250007	-1.050003	0.670002	0.460001	0.580000	-1.010000	-1.320000	-1.630000	0.130020
(H3)	2.790102	3.270000	2.010000	-1.340000	0.730007	-1.060000	0.740000	-0.310000	-0.510000	-1.910000	-2.370000	-2.830000	-3.090000	-3.260000	-3.300000	-2.770000	-2.070000	-1.880007	-1.650000	-1.120000	-1.250000	-1.390000	-1.540000	-1.940000
(H4)	2.760000	3.420000	3.020000	-1.340000	0.280000	0.720000	-0.890000	0.690000	1.290000	-1.800000	-2.120000	-3.030000	-4.200000	-3.580000	-3.500000	-2.970000	-2.340000	-3.490000	-3.360000	-2.970000	-1.910000	-1.880000	-1.670000	-1.890000
(H5)	1.760000	2.590000	2.990000	-1.360000	0.080000	0.140000	-0.280000	-1.070000	-2.410000	-2.080000	-1.840000	-3.710000	-4.840000	-6.070000	-5.470000	-4.410000	-3.350000	-3.540000	-3.600000	-3.620000	-2.970000	-2.290000	-1.850000	-1.550000
(H6)	0.590000	1.140000	2.980000	2.170000	0.130000	0.460000	0.840000	0.700000	0.640000	-2.520000	-1.710000	-2.390000	-3.440000	-4.060000	-4.340000	-3.260000	-2.960000	-3.760000	-3.660000	-3.650000	-3.300000	-2.680000	-1.780000	-1.450000
(H7)	0.390000	-1.590000	3.190000	3.430000	1.100000	0.950000	1.200000	0.750000	0.890000	-1.260000	-1.120000	-2.790000	-3.450000	-4.230000	-4.370000	-3.800000	-3.210000	-3.130000	-3.480000	-3.150000	-3.010000	-3.710000	-2.470000	-1.910000
(H8)	-1.430000	-1.860000	3.130000	3.890000	2.100000	0.370000	0.870000	1.050000	0.780000	-1.570000	-1.820000	-2.770000	-3.710000	-4.280000	-4.840000	-4.840000	-4.840000	-3.650000	-3.260000	-2.200000	-1.930000	-3.320000	-2.440000	-2.280000
(H9)	-1.610000	-2.430000	2.970000	2.710000	3.020000	2.990000	-0.480000	0.720000	0.850000	-0.480000	-1.190000	-2.280000	-2.190000	-2.190000	-2.190000	-1.860000	-1.350000	-2.420000	-2.990000	-2.990000	-2.990000	-2.990000	-2.400000	-2.400000
(H10)	0.210000	2.440000	2.960000	2.240000	0.360000	0.240000	-1.070000	0.090000	0.510000	0.820000	0.280000	0.280000	2.240000	2.240000	2.240000	2.240000	2.240000	2.240000	2.240000	2.240000	2.240000	2.240000	2.240000	2.240000
(H11)	2.880000	3.300000	3.860000	3.090000	2.490000	-3.640000	-1.810000	-1.150000	0.990000	0.220000	0.310000	-2.940000	-2.040000	-2.900000	-2.380000	-4.560000	-4.710000	-3.170000	-1.770000	-4.820000	2.680000	2.930000	4.430000	4.930000
(H12)	2.590000	2.960000	2.270000	2.510000	2.650000	2.390000	2.240000	2.240000	0.810000	-1.710000	-3.480000	-3.780000	-1.780000	0.390000	-1.740000	0.480000	0.540000	0.530000	0.430000	0.240000	0.590000	0.360000	0.470000	0.480000
(H13)	0.390000	2.960000	2.960000	2.270000	2.890000	-3.120000	-3.140000	-2.820000	2.170000	-1.390000	-1.850000	-4.330000	-2.980000	-3.370000	-3.990000	-3.990000	-4.060000	-4.060000	-3.980000	-3.980000	-3.980000	-3.980000	-3.980000	-3.980000
(H14)	0.590000	1.140000	2.960000	2.170000	0.130000	0.460000	0.840000	0.700000	0.640000	-2.520000	-1.710000	-2.390000	-3.440000	-4.060000	-4									

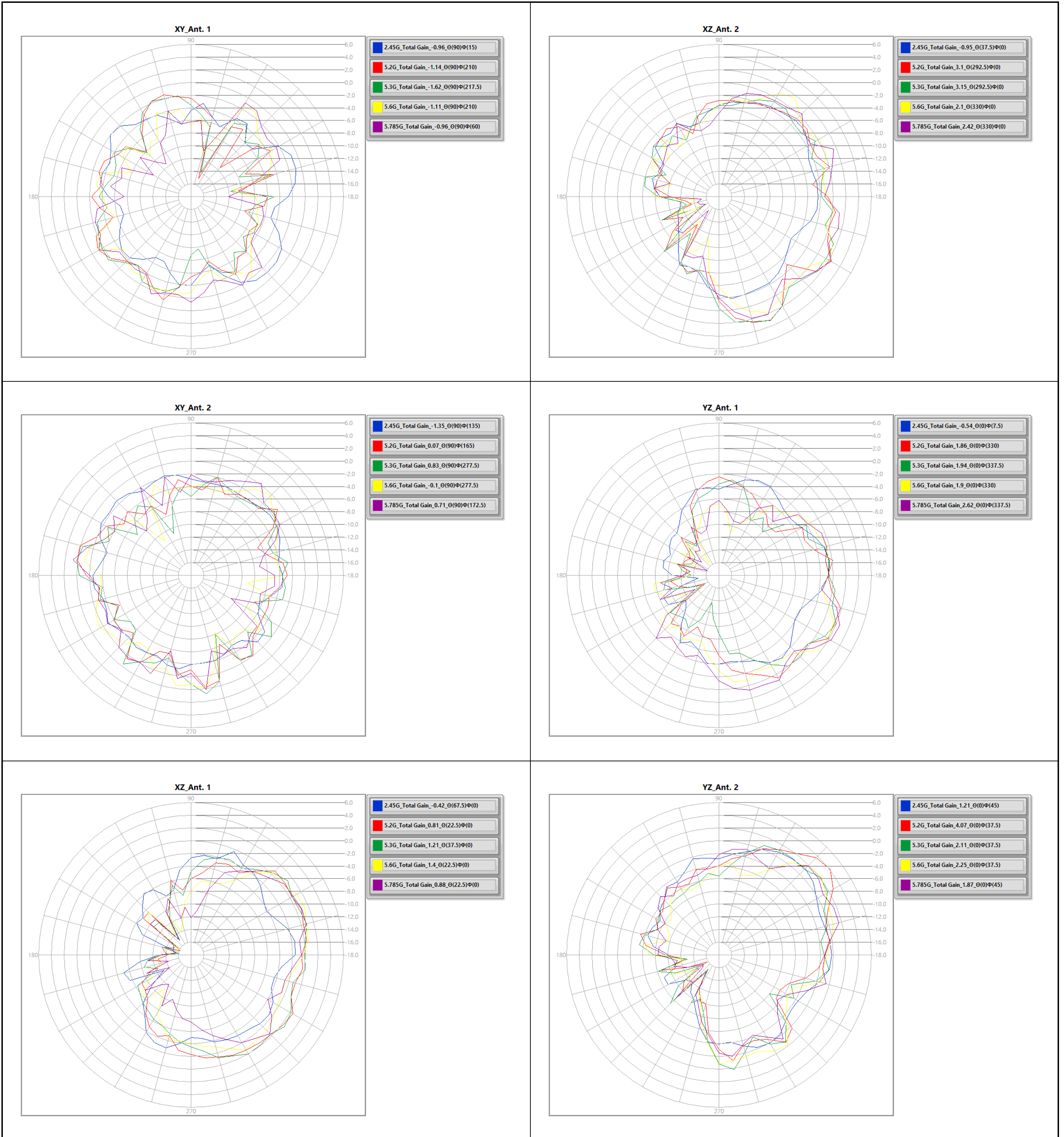


Antenna Pattern 2.4GHz WLAN, 5GHz WLAN

Appendix B.1

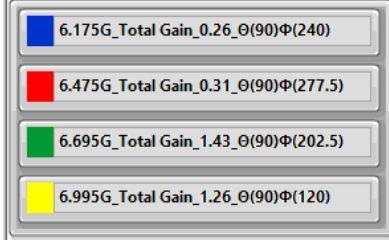
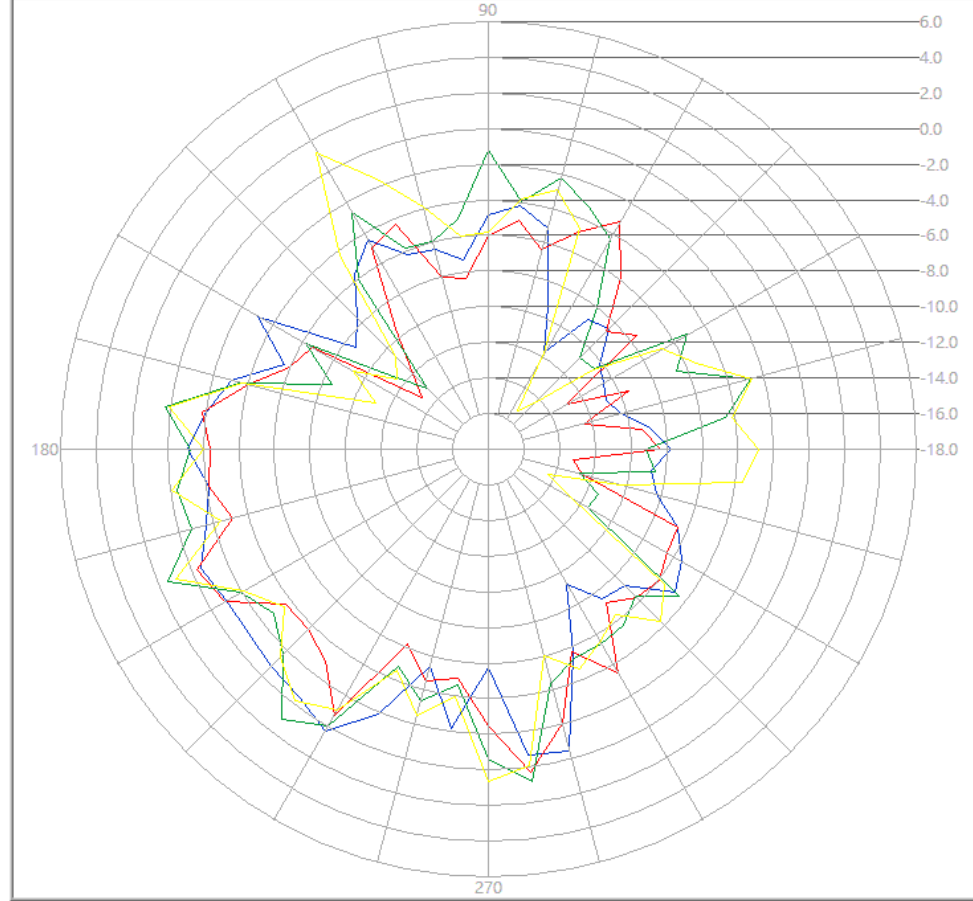
φ(θ) 5°	-1.36(-1.32)	0.36(1.12)	0.04(-1.62)	0.38(0.08)	0.48(0.21)	0.18(0.40)	-4.44(-0.68)	-0.99(-5.16)	-2.07(-1.02)	-2.36(-0.22)	-2.34(-4.43)	-1.38(0.88)	1.74(1.09)	1.17(1.03)	3.13(3.61)	2.42(-1.42)	0.84(-3.30)	-4.39(-5.85)	-1.60(0.40)	-5.01(-6.27)	-3.17(-4.22)	-3.30(-2.30)	-5.28(-7.23)	-1.80(-1.70)
φ(10°)	-2.54(-2.39)	-0.82(-1.2)	-0.60(-1.47)	0.42(-0.06)	-1.40(-1.08)	-1.99(-1.52)	-5.09(-3.16)	-1.74(-4.48)	-5.16(-2.83)	-3.79(-1.62)	-3.52(-3.88)	-0.78(-1.0)	0.76(0.05)	-0.67(0.40)	2.87(3.5)	0.76(-0.12)	0.41(-1.75)	-6.58(-4.22)	-1.48(-1.77)	-2.03(-5.81)	-3.42(-4.72)	-4.54(-2.68)	-6.28(-4.31)	-2.04(-1.89)
φ(15°)	-2.53(-2.80)	-2.20(-1.53)	-1.70(-1.31)	0.53(-0.41)	-2.39(-2.96)	-3.94(-2.44)	-3.34(-4.05)	-3.47(-2.89)	-5.13(-7.42)	-3.32(-3.03)	-3.90(-2.49)	-0.62(0.06)	-1.15(-0.97)	-0.86(0.19)	1.47(1.79)	-0.39(-2.60)	-1.60(-2.25)	-4.11(-1.44)	-1.29(-1.56)	-2.26(-6.53)	-4.27(-5.29)	-3.57(-3.64)	-8.74(-4.57)	-3.95(-7.04)
φ(18°)	-3.88(-4.27)	-4.44(-3.21)	-2.50(-1.92)	0.22(-1.00)	-2.63(-3.53)	-4.39(-3.49)	-4.11(-4.09)	-4.62(-2.73)	-5.26(-11.12)	-5.69(-4.38)	-4.19(-2.89)	-1.45(-1.07)	-3.82(-3.75)	-3.79(-1.79)	-1.44(-2.58)	-2.62(-4.89)	-4.57(-2.24)	-2.76(-0.49)	-0.75(-0.10)	-3.21(-8.25)	-5.09(-6.29)	-5.67(-4.22)	-7.70(-8.89)	-5.02(-0.00)
φ(18°) 5°	-5.21(-4.78)	-5.55(-5.17)	-4.02(-2.14)	0.26(-2.02)	-3.38(-4.48)	-5.84(-4.32)	-5.44(-3.91)	-5.94(-4.03)	-7.16(-12.37)	-6.57(-6.19)	-4.53(-3.09)	-2.93(-3.46)	-5.77(-6.35)	-7.02(-6.85)	-3.89(-7.48)	-6.69(-2.37)	-4.19(-4.47)	-6.77(-1.67)	-4.08(-3.13)	-7.49(-9.86)	-5.30(-6.45)	-6.61(-5.01)	-6.22(-6.18)	-6.78(-6.98)
φ(18°) 5°	-6.14(-5.20)	-7.88(-8.02)	-5.60(-2.29)	-1.09(-2.21)	-3.80(-4.38)	-6.23(-5.54)	-6.59(-5.51)	-5.84(-6.15)	-8.21(-15.24)	-6.25(-6.73)	-7.85(-4.12)	-3.31(-5.82)	-11.27(-8.82)	-15.45(-13.89)	-2.80(-7.29)	-8.32(-4.23)	-7.61(-14.36)	-12.49(-6.60)	-7.18(-7.44)	-9.33(-11.07)	-6.46(-9.54)	-5.88(-4.82)	-6.27(-6.45)	-6.86(-10.02)
φ(112.5°)	-6.89(-5.87)	-7.72(-7.46)	-5.90(-3.58)	-3.16(-3.30)	-3.61(-4.83)	-5.14(-5.35)	-6.94(-6.50)	-7.16(-6.75)	-6.33(-11.50)	-9.07(-11.86)	-6.54(-6.23)	-4.83(-4.63)	-8.80(-11.23)	-12.93(-14.42)	-5.24(-4.21)	-10.94(-7.38)	-15.09(-12.83)	-11.02(-8.51)	-10.60(-11.78)	-13.45(-12.87)	-9.06(-11.64)	-7.47(-8.16)	-6.67(-7.16)	-6.82(-6.47)
φ(120°)	-7.94(-5.01)	-6.81(-8.51)	-6.77(-5.07)	-4.24(-3.60)	-4.43(-4.45)	-4.90(-4.43)	-6.09(-6.32)	-6.89(-9.55)	-7.49(-9.78)	-10.10(-14.67)	-8.96(-12.89)	-9.81(-6.43)	-7.99(-6.36)	-14.02(-14.90)	-10.38(-7.08)	-13.21(-14.49)	-15.47(-10.05)	-8.85(-10.26)	-11.36(-11.95)	-12.38(-11.24)	-9.04(-15.03)	-6.26(-7.74)	-6.67(-7.52)	-8.13(-10.70)
φ(127.5°)	-7.98(-6.28)	-7.43(-10.09)	-9.54(-6.80)	-4.72(-4.15)	-4.26(-2.29)	-4.26(-4.50)	-5.88(-7.34)	-6.52(-10.04)	-7.35(-9.36)	-8.82(-10.01)	-10.66(-11.65)	-14.75(-14.80)	-13.26(-10.34)	-16.09(-12.50)	-13.51(-11.19)	-8.45(-9.39)	-10.33(-9.84)	-12.11(-15.34)	-14.65(-12.30)	-16.14(-11.52)	-11.91(-16.48)	-5.93(-9.93)	-7.66(-7.10)	-7.53(-12.17)
φ(135°)	-5.23(-4.33)	-5.60(-7.88)	-6.07(-6.82)	-7.13(-6.80)	-4.31(-4.06)	-4.74(-4.30)	-7.32(-10.50)	-6.93(-6.52)	-5.28(-9.31)	-10.28(-10.35)	-12.22(-15.44)	-15.59(-11.30)	-6.42(-6.41)	-10.00(-9.89)	-8.71(-7.76)	-7.86(-14.70)	-10.62(-15.70)	-14.59(-12.08)	-10.04(-12.26)	-8.73(-14.82)	-14.86(-8.73)	-11.20(-11.04)	-6.49(-9.84)	-8.90(-12.17)
φ(142.5°)	-8.14(-6.07)	-6.59(-8.26)	-8.23(-7.90)	-7.38(-7.75)	-8.23(-8.30)	-7.16(-7.26)	-8.38(-7.57)	-7.79(-9.95)	-8.41(-7.89)	-9.22(-10.81)	-10.39(-10.80)	-15.73(-13.15)	-8.94(-9.02)	-13.84(-15.41)	-15.59(-13.49)	-12.82(-8.69)	-7.51(-11.39)	-15.20(-13.27)	-12.28(-12.71)	-12.48(-10.85)	-11.58(-12.29)	-15.28(-12.36)	-8.67(-8.80)	-8.85(-10.19)
φ(150°)	-6.14(-5.52)	-5.48(-7.59)	-8.25(-6.15)	-7.12(-7.35)	-7.68(-8.39)	-8.99(-8.69)	-8.25(-6.55)	-4.46(-9.65)	-14.46(-14.78)	-12.37(-8.46)	-8.94(-9.82)	-10.59(-11.12)	-14.94(-14.17)	-15.37(-15.30)	-13.44(-14.21)	-13.85(-11.98)	-13.56(-16.19)	-12.91(-11.81)	-11.35(-12.66)	-12.28(-11.67)	-13.59(-12.05)	-9.22(-9.25)	-8.91(-7.55)	-9.17(-7.55)
φ(157.5°)	-6.50(-6.37)	-4.15(-4.53)	-6.74(-6.84)	-6.19(-6.88)	-6.88(-7.83)	-8.12(-9.73)	-9.60(-10.76)	-8.89(-8.34)	-8.16(-9.64)	-9.69(-9.82)	-10.79(-12.72)	-14.02(-11.18)	-10.45(-10.67)	-11.18(-11.37)	-12.35(-15.08)	-15.47(-15.70)	-14.30(-12.53)	-12.41(-12.18)	-9.83(-9.02)	-9.39(-10.60)	-8.90(-6.22)	-8.89(-12.32)	-14.10(-14.79)	-11.92(-7.74)
φ(165°)	-16.46(-9.55)	-8.03(-8.15)	-8.28(-7.93)	-8.44(-10.16)	-10.96(-11.23)	-12.94(-12.03)	-9.59(-9.35)	-2.71(-7.02)	-7.17(-8.11)	-9.86(-11.42)	-11.71(-11.72)	-13.37(-13.82)	-12.88(-13.27)	-13.35(-12.15)	-10.54(-9.97)	-9.93(-8.43)	-8.89(-8.74)	-8.18(-9.50)	-10.32(-10.93)	-10.88(-9.28)	-8.59(-8.97)	-10.14(-10.52)	-10.15(-10.63)	-10.82(-10.02)
φ(172.5°)	-7.83(-7.16)	-8.21(-8.30)	-7.63(-7.76)	-8.07(-8.42)	-8.43(-8.14)	-7.64(-7.18)	-6.30(-4.08)	-6.84(-6.21)	-10.33(-12.29)	-11.64(-10.57)	-10.83(-11.98)	-13.59(-13.84)	-15.44(-15.41)	-15.07(-13.81)	-12.82(-14.73)	-13.80(-13.07)	-14.78(-14.28)	-14.91(-13.82)	-12.58(-11.05)	-9.62(-9.16)	-6.20(-10.10)	-10.64(-10.92)	-9.95(-9.21)	-8.63(-8.08)
φ(180°)	-7.48(-7.13)	-5.86(-6.87)	-6.93(-7.02)	-6.97(-6.73)	-6.29(-5.80)	-5.59(-6.03)	-7.01(-6.05)	-9.22(-11.30)	-12.86(-13.74)	-13.17(-11.87)	-11.52(-11.15)	-8.91(-8.37)	-7.21(-6.48)	-6.78(-5.53)	-5.64(-5.52)	-5.81(-6.84)	-7.28(-7.84)	-7.15(-7.04)	-7.59(-7.45)	-7.15(-7.00)	-6.79(-6.77)	-7.15(-7.75)	-7.65(-7.13)	-7.13(-7.44)
Freq(MHz)	5.7850GHz	TotalAnt. 2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Gain	φ(5°)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°)
φ(5°)	-1.36(-1.24)	-1.33(-1.39)	-1.63(-1.50)	-1.24(-1.55)	-2.10(-1.70)	-1.16(-1.26)	-1.27(-1.34)	-1.53(-1.56)	-1.64(-1.48)	-1.17(-1.02)	-1.10(-1.57)	-2.22(-2.09)	-1.29(-1.22)	-1.62(-1.53)	-1.18(-1.52)	-1.43(-1.49)	-1.91(-1.43)	-1.48(-1.55)	-1.38(-1.26)	-1.20(-1.75)	-1.69(-1.49)	-1.48(-1.47)	-1.47(-1.18)	-1.34(-1.42)
φ(7.5°)	-0.36(-0.35)	-0.13(-0.1)	0.00(-0.01)	0.06(0.04)	0.04(-0.44)	0.29(-0.03)	0.32(-0.53)	0.38(-0.13)	0.13(0.00)	0.49(0.98)	1.21(-1.2)	1.02(0.91)	1.09(-1.42)	1.41(0.85)	0.82(1.03)	0.30(0.02)	0.04(-0.78)	0.90(-1.62)	-1.53(-1.46)	-1.62(-1.43)	-1.40(-0.78)	0.69(-0.76)	-0.79(-0.59)	-0.58(-0.39)
φ(15°)	0.48(-1.24)	1.92(2.40)	2.42(2.35)	2.69(2.68)	2.46(2.19)	1.86(-1.92)	1.57(0.96)	0.65(0.83)	0.89(0.97)	1.11(-1.36)	1.32(-1.26)	1.08(-1.26)	1.49(-1.33)	1.19(-1.02)	1.13(-1.67)	1.98(-1.97)	1.75(-1.27)	0.88(-0.05)	0.53(-0.79)	-1.14(-0.97)	-0.71(-0.04)	0.29(-0.22)	-0.76(-1.13)	-0.99(-0.61)
φ(22.5°)	1.53(0.70)	-0.23(-0.49)	-0.69(-0.99)	-0.64(0.04)	0.38(0.54)	0.70(-1.31)	1.58(2.01)	1.88(-1.12)	1.12(-1.33)	0.57(-1.41)	-0.27(0.47)	1.16(-1.49)	0.75(0.22)	0.64(0.48)	-0.61(-0.99)	-1.14(-2.03)	-2.25(-2.69)	3.19(-2.99)	-3.21(-2.77)	-2.67(-2.30)	-2.86(-2.11)	-1.82(-1.91)	-1.95(-1.08)	0.11(-1.09)
φ(30°)	-1.38(-1.69)	-0.32(-1.15)	2.25(2.85)	2.33(2.38)	3.09(2.60)	2.01(-1.07)	0.97(2.24)	2.20(-1.42)	0.83(0.92)	0.74(-0.64)	0.96(-1.85)	2.24(2.20)	2.42(2.39)	1.70(0.65)	-0.06(-0.62)	-1.23(-1.34)	-0.85(-1.88)	4.16(-5.05)	-5.66(-3.57)	-3.13(-3.07)	-3.91(-4.07)	-3.79(-3.15)	-1.97(-2.08)	0.94(0.20)
φ(37.5°)	-1.23(-0.32)	0.55(-1.33)	2.71(0.30)	2.66(2.07)	2.43(2.77)	2.43(-1.64)	1.74(2.15)	1.11(0.99)	1.44(-1.37)	1.31(0.08)	0.97(-1.80)	1.51(-1.08)	1.23(0.32)	0.30(0.63)	-0.39(-2.43)	-2.88(-1.25)	0.63(-1.35)	-1.39(-6.76)	6.41(-3.29)	-3.32(-4.30)	-6.59(-4.38)	-3.37(-3.32)	-3.21(-2.07)	0.41(-0.88)
φ(45°)	0.47(-0.79)	0.46(2.27)	2.72(2.48)	1.91(0.92)	0.60(-1.32)	1.00(-0.51)	1.87(0.31)	0.21(-2.23)	1.26(2.82)	1.63(-1.67)	-0.26(-1.13)	0.67(-0.67)	0.26(-0.69)	-4.30(-3.38)	0.89(-1.93)	2.29(2.23)	-1.54(0.14)	0.15(-2.82)	-4.94(-6.77)	-5.42(-3.17)	-4.88(-3.89)	-2.95(-4.57)	-6.21(-3.41)	0.39(-1.35)
φ(52.5°)	2.27(-0.19)	0.91(-1.08)	0.64(-0.08)	0.26(-1.08)	-0.83(-2.51)	0.83(-0.59)	-6.42(3.34)	1.00(-2.80)	-2.71(-2.86)	-4.19(-4.27)	0.29(-0.90)	1.26(-1.08)	-1.99(-0.60)	0.87(-1.89)	1.45(2.89)	4.07(2.30)	-0.07(-0.48)	0.94(-0.32)	-1.34(-3.38)	-5.42(-3.22)	-4.47(-2.34)	-3.99(-4.60)	-4.40(-2.07)	0.49(0.85)
φ(60°)	0.48(0.65)	-1.18(-1.35)	0.88(0.04)	0.53(-1.25)	-1.60(-0.38)	0.88(0.21)	2.26(0.13)	1.13(-1.97)	3.67(-0.99)	-1.12(0.75)	-0.54(-1.89)	0.88(-1.15)	0.37(-0.64)	1.67(2.30)	2.16(2.35)	3.50(2.15)	0.83(-2.33)	1.26(-2.97)	3.07(-1.98)	-5.54(-3.94)	3.31(-2.37)	2.05(-3.41)	-5.16(-3.58)	-0.94(-0.88)
φ(67.5°)	0.63(-2.80)	-2.29(-2.26)	0.83(-3.2)	0.59(-1.11)	-1.16(-1.18)	0.32(-0.16)	-1.74(-2.58)	0.13(-1.73)	6.11(-1.28)	-2.46(0.54)	-3.22(-2.19)	-0.20(-1.16)	2.10(-2.00)	1.39(-1.79)	2.76(-3.96)	3.30(-1.84)	0.80(-3.30)	-3.63(-4.55)	-4.31(-1.38)	-4.58(-4.48)	-3.51(-1.97)	-1.89(-2.72)	-3.31(-3.64)	-2.94(-1.54)
φ(75°)	-1.15(-4.37)	-3.07(-0.80)	-0.43(0.07)	0.09(0.32)	0.16(-1.45)	-0.62(0.26)	-0.77(-3.98)	-0.66(-3.00)	-4.50(-2.65)	-4.72(-7.02)	-4.36(-1.93)	0.40(2.95)	1.81(-1.92)	0.38(-0.47)	1.47(0.08)	2.98(-1.86)	1.87(-1.76)	-6.89(-2.76)	-3.98(-0.90)	-3.83(-4.24)	-2.95(-2.00)	-2.52(-3.55)	-7.74(-4.29)	-4.86(-1.68)
φ(82.5°)	2.44(-5.37)	-4.89(-0.53)	-1.09(-0.41)	0.29(-0.82)	0.04(-1.24)	-1.88(-1.43)	-1.18(-4.06)	-1.32(-5.15)	2.32(-4.56)	-4.79(-2.22)	-4.99(-1.80)	0.60(2.03)	0.26(0.06)	-0.28(-1.13)	0.04(0.86)	0.93(0.37)	0.55(-1.33)	-6.40(-1.58)	-1.91(-1.07)	-4.89(-0.50)	-3.63(-3.05)	-3.03(-4.92)	-8.61(-4.7)	-4.80(-0.96)
φ(90°)	-4.85(-7.16)	-6.23(-3.63)	-1.88(-1.73)	-1.85(0.22)	-0.88(-1.87)	-2.77(-3.01)	-2.21(-4.78)	-1.99(-6.08)	-2.03(-6.63)	-4.16(-2.67)	-4.12(-3.17)	-1.11(-0.71)	-2.20(-3.35)	-2.96(-3.45)	-2.85(-4.13)	-1.94(-1.69)	-2.86(-1.30)	-5.70(-1.59)	-3.20(-1.11)	-5.72(-4.58)	-4.74(-3.83)	-4.79(-4.85)	-4.67(-6.35)	-6.72(-0.70)
φ(97.5°)	-6.58(-8.41)	-7.84(-4.50)	-2.31(-2.56)	-1.99(-3.08)	-2.56(-1.97)	-3.61(-3.10)	-4.16(-6.14)	-2.99(-6.73)	-2.43(-6.63)	-7.73(-5.03)	-4.36(-4.40)	-2.53(-1.87)	-4.57(-1.11)	-7.20(-9.65)	-3.51(-5.35)	-6.98(-2.00)	-3.51(-4.48)	-7.54(-7.20)	-5.28(-9.27)	-7.64(-6.48)	-6.96(-5.61)	-5.47(-6.32)	-11.12(-9.61)	-8.67(-9.78)
φ(105°)	-7.23(-8.71)	-8.31(-5.20)	-4.37(-3.30)	-1.21(-1.61)	0.20(-2.23)	-5.42(-3.54)	-5.01(-5.33)	-4.56(-6.86)	-4.19(-9.95)	-6.59(-7.07)	-7.28(-7.09)	-4.51(-4.12)	-8.30(-8.26)	-11.45(-12.27)	-3.75(-4.92)	-11.75(-4.80)	-6.65(-13.63)	-12.78(-6.09)	-7.28(-9.05)	-8.10(-8.84)	-7.99(-9.07)	-7.44(-7.09)	-7.89(-8.48)	-10.59(-8.25)
φ(112.5°)	-6.55(-7.38)	-7.76(-5.29)	-5.60(-4.27)	2.55(-3.10)	-0.04(-3.71)	-6.53(-4.29)	-5.01(-5.33)	-6.27(-8.32)	-5.06(-9.00)	-11.68(-8.08)	-9.42(-11.52)	-7.56(-4.75)	-7.55(-0.67)	-10.59(-15.24)	-8.05(-8.46)	-10.54(-8.76)	-12.88(-14.77)	-11.23(-8.57)	-9.49(-14.88)	-10.86(-11.20)	-8.19(-8.35)	-10.18(-8.10)	-4.38(-8.28)	-10.83(-8.45)
φ(120°)	-4.64(-6.51)	-8.56(-7.48)	-7.08(-4.20)	4.27(-4.16)	3.28(-4.46)	-5.57(-4.38)	-5.03(-6.07)	-6.44(-9.53)	-8															

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

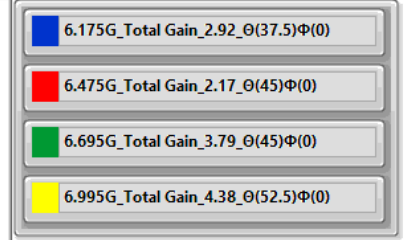
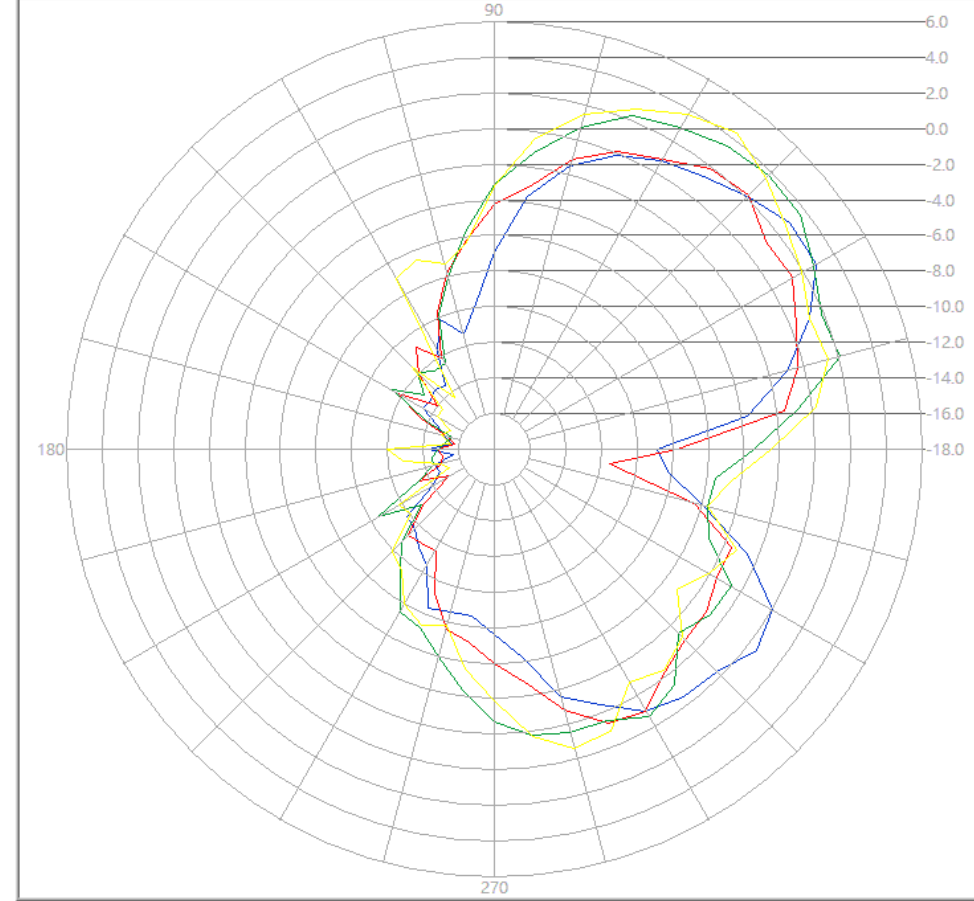


E1(XY plane) – $\Theta(90)\Phi(0-360)$
E2(XZ plane) – $\Theta(0-180)\Phi(0)$ and $\Theta(0-180)\Phi(180)$
E3(YZ plane) – $\Theta(0-180)\Phi(90)$ and $\Theta(0-180)\Phi(270)$

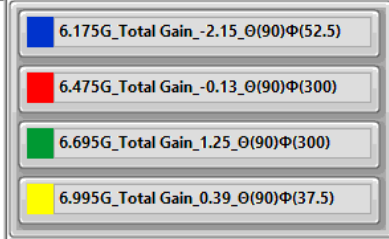
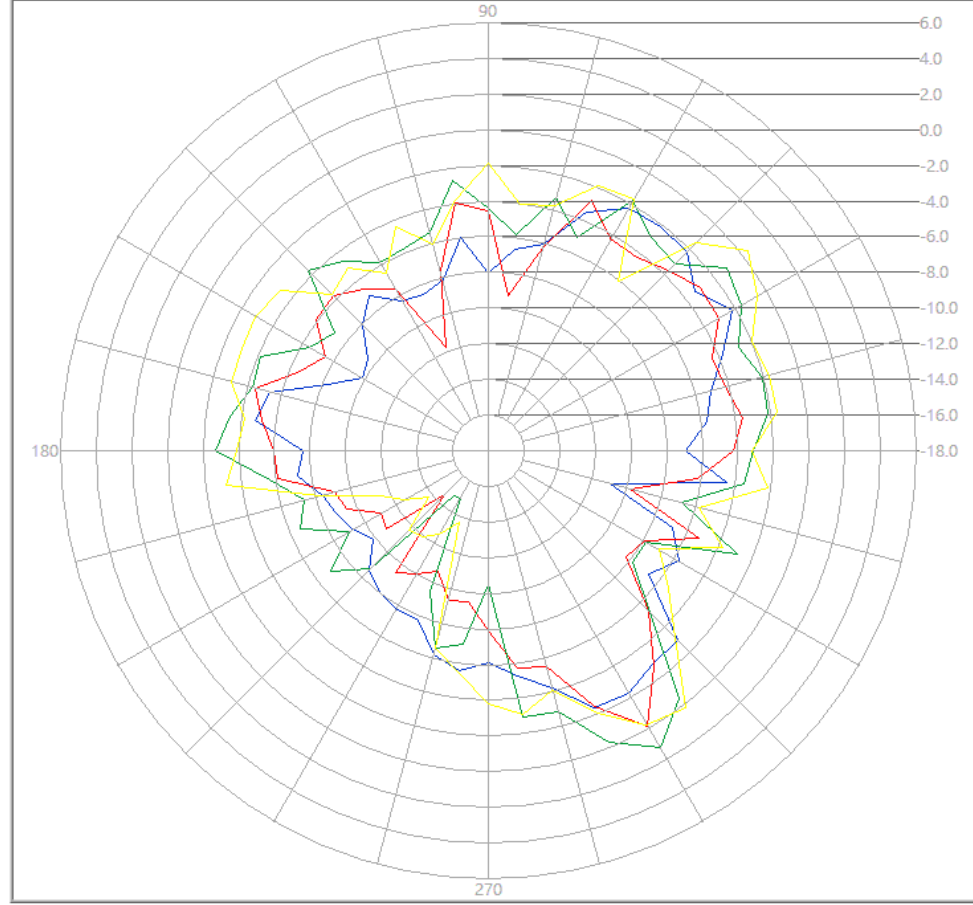
XY_Ant. 1



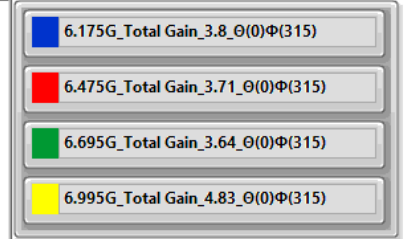
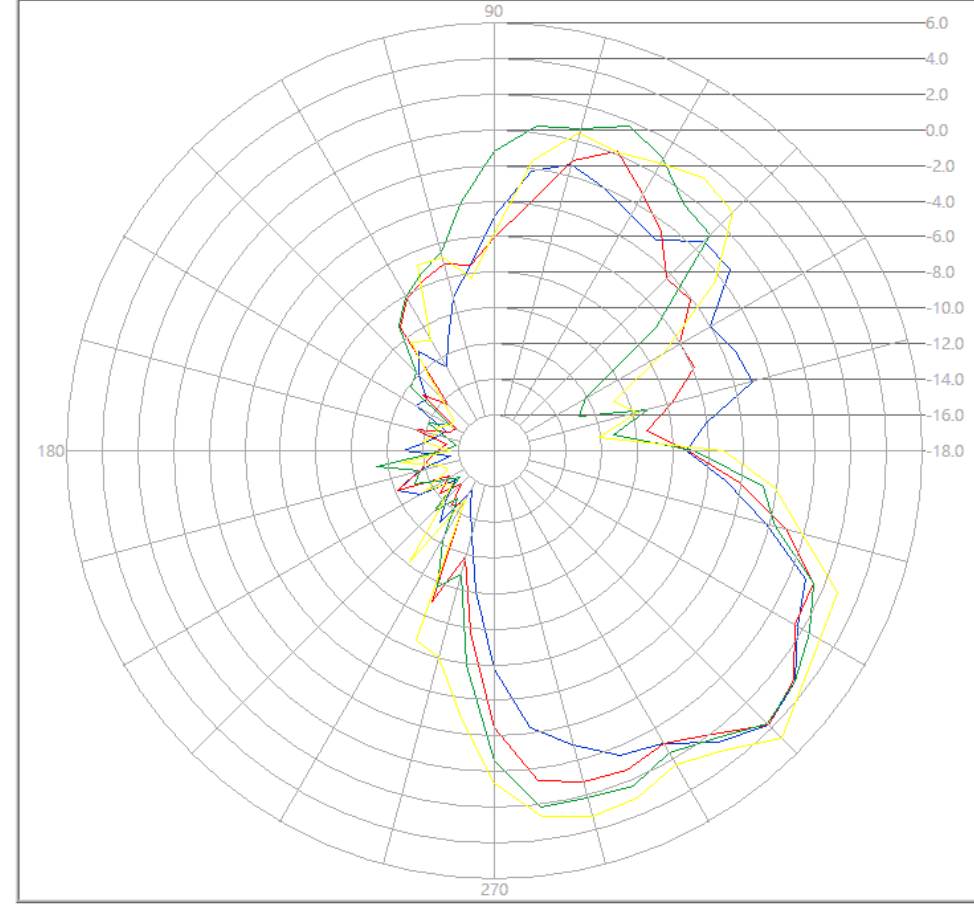
XZ_Ant. 2



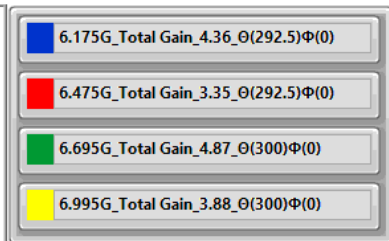
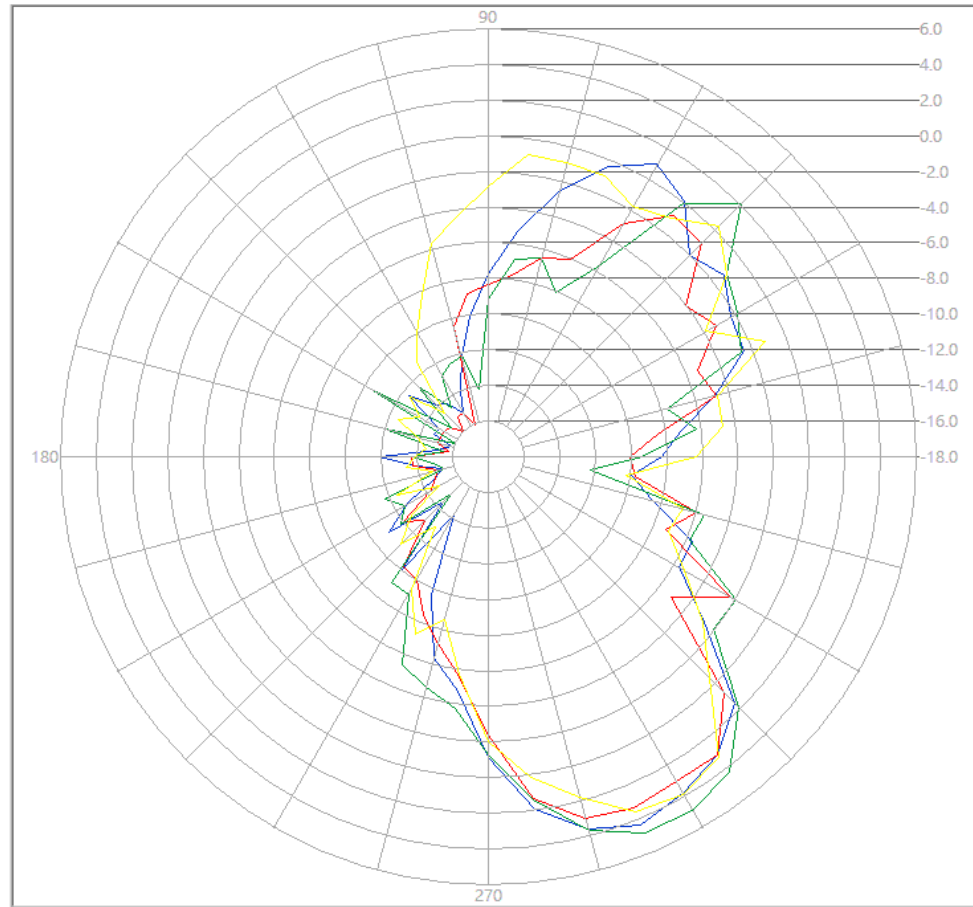
XY_Ant. 2



YZ_Ant. 1



XZ_Ant. 1



YZ_Ant. 2

