



Antenna Composite Gain Test Report

Equipment	Secured Wireless Access Point
Brand Name	FORTINET
Model Name	FortiAP 441Kxxxxxx, FAP-441Kxxxxxx, FORTIAP-441Kxxxxxx (Where "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or marketing purposes only)
Applicant	Fortinet, Inc. 899 Kifer Road, Sunnyvale, CA 94086, USA
Manufacturer	Fortinet, Inc. 899 Kifer Road, Sunnyvale, CA 94086, USA
Sample Received	Jul. 11, 2023
Start Test Date	Jul. 14, 2023
Final Test Date	Jul. 14, 2023



Approved by: Jackson Tsai

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1. Operation Mode and Antenna Information

Antenna Position	RF Port	Brand Name	Model Name	Ant. Type	Connector	Modes of Operation
2G 5G 5.9G Ant1	1	Senao	5718A0730300	PIFA	I-Pex	2.4GHz, 5GHz , 5.9GHz
2G 5G 5.9G Ant2	2	Senao	5718A0731300	PIFA	I-Pex	2.4GHz, 5GHz , 5.9GHz
2G 5G 5.9G Ant3	3	Senao	5718A0732300	PIFA	I-Pex	2.4GHz, 5GHz , 5.9GHz
2G 5G 5.9G Ant4	4	Senao	5718A0733300	PIFA	I-Pex	2.4GHz, 5GHz , 5.9GHz
6G Ant1	1	AWAN	7102A0657000	Alford Loop	I-Pex	6GHz
6G Ant2	2	AWAN	7102A0659000	Alford Loop	I-Pex	6GHz
6G Ant3	3	AWAN	7102A0660000	Alford Loop	I-Pex	6GHz
6G Ant4	4	AWAN	7102A0658000	Alford Loop	I-Pex	6GHz
Scan Ant1	1	Senao	5718A0734300	PIFA	I-Pex	2.4GHz, 5GHz , 5.9GHz, 6GHz
Scan Ant2	2	Senao	5718A0735300	PIFA	I-Pex	2.4GHz, 5GHz , 5.9GHz, 6GHz

Note:

2.4GHz,5GHz and 5.9GHz Operation Mode (4TX/4RX)

2G 5G 5.9G Ant1~2G 5G 5.9G Ant4 could transmit/receive simultaneously.

6GHz Operation Mode (4TX/4RX)

6G Ant1~6G Ant4 could transmit/receive simultaneously.

2.4GHz, 5GHz , 5.9GHz, 6GHz Operation Mode (2RX)

Scan Ant1~ Scan 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
5850-5895	5885
5925-6425	6175
6425-6525	6475
6525-6875	6695
6875-7125	6995

3. Testing Location

Test Lab. : Sporton International Inc. Hsinhua Laboratory				
<input checked="" type="checkbox"/> Wen 33rd.St.	ADD:	No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)		
	TEL:	886-3-318-0787	FAX:	886-3-318-0287
Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
Radiated	05CH03-HY	Rex Liao	23.5~24.5°C / 40~50%	14/Jul/2023

Note:

Testing Site Information

Brand Name: TDK

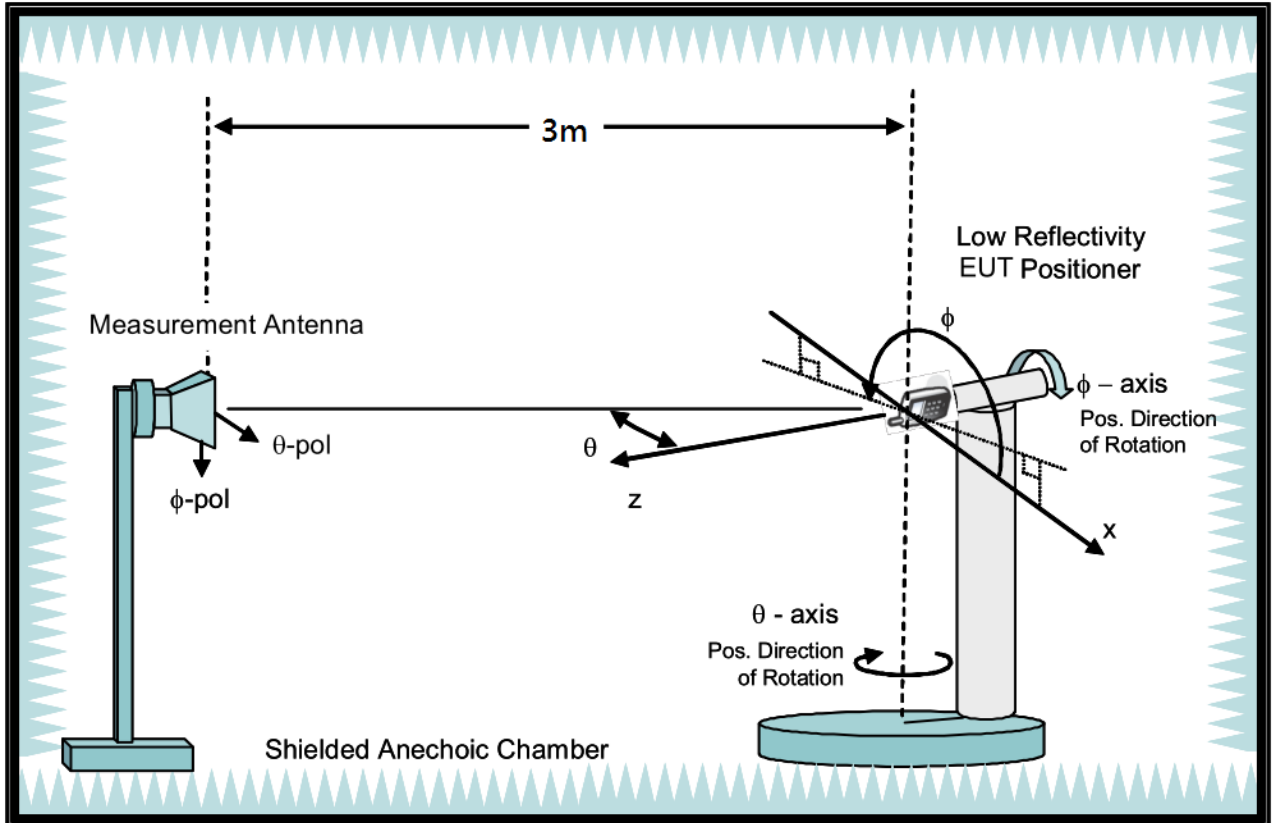
Dimension: 11m*6m*6m

Characteristic: Fully Anechoic Chamber

4. Test Facility and Configuration

Test configuration: Reference to CITA OTA distributed-axes system configuration.
 Chamber: Fully Anechoic Chamber.
 Measurement antenna: Dual Polarization Horn antenna
 Turntable: Multi-axis positioner (Theta and Phi angle).

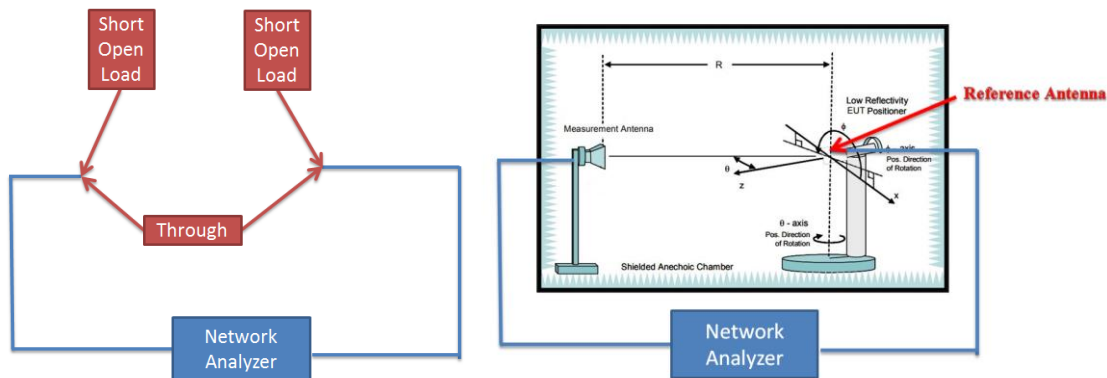
#Reference to CTIA “ctia-test-plan-for-wireless-device-over-the-air-performance-ver-3-7-1”



5. Reference Calibration

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

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



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

Note:

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

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

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

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



6. Test Method

EUT set on multi-axis positioner and adjust EUT's physical center to measurement reference center. Measurement antenna set at phi polarization and 1.5 meter height. Port 1 of Network analyzer connect to antenna 1 of EUT. Record G value every 7.5 degree from 0 to 352.5 degree on Phi angle and 0 to 180 on theta angle of multi-axis positioner. Then set measurement antenna to theta polarization and repeat process. Repeat process to each antenna of EUT.

DG steps:

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

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



7. Measured Values and Calculation of Maximum Gain Positions

DG_1SS max value position

Frequency (Hz)	2.45G	5.2G	5.3G	5.6G	5.785G	5.885G
Ant. 1 (dBi)	2.95	-0.24	-0.37	-3.36	-1.66	-1.13
Ant. 2 (dBi)	0.16	-1.27	-0.15	-0.9	-1.55	-2.18
Ant. 3 (dBi)	1.81	-0.14	-1.05	4.49	5.71	5.92
Ant. 4 (dBi))	-2.19	-1.11	-0.7	-2.47	0.03	-0.36
DG [1SS] (dBi)	6.91	5.35	5.46	6.04	7.23	7.22
Polarization	Theta	Theta	Theta	Theta	Theta	Theta
$\Theta(^{\circ})$	37.5	67.5	67.5	67.5	67.5	75
$\Phi(^{\circ})$	217.5	172.5	180	52.5	52.5	52.5

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

Frequency (Hz)	6.175G	6.475G	6.695G	6.995G
Ant. 1 (dBi)	3.23	3.04	4.1	-0.11
Ant. 2 (dBi)	0.97	0.2	2.02	4.01
Ant. 3 (dBi)	3.94	3.25	2.98	2.77
Ant. 4 (dBi))	4.65	3	1.04	2.99
DG [1SS] (dBi)	9.32	8.48	8.63	8.56
Polarization	Phi	Phi	Phi	Phi
$\Theta(^{\circ})$	67.5	67.5	67.5	67.5
$\Phi(^{\circ})$	30	127.5	127.5	210

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	5.885G
Ant. 1 [10^(G/20)]	10^(2.95/20)	10^(-0.24/20)	10^(-0.37/20)	10^(-3.36/20)	10^(-1.66/20)	10^(-1.13/20)
Ant. 2 [10^(G/20)]	10^(0.16/20)	10^(-1.27/20)	10^(-0.15/20)	10^(-0.9/20)	10^(-1.55/20)	10^(-2.18/20)
Ant. 3 [10^(G/20)]	10^(1.81/20)	10^(-0.14/20)	10^(-1.05/20)	10^(4.49/20)	10^(5.71/20)	10^(5.92/20)
Ant. 4 [10^(G/20)]	10^(-2.19/20)	10^(-1.11/20)	10^(-0.7/20)	10^(-2.47/20)	10^(0.03/20)	10^(-0.36/20)
Ant. 1 [10^(G/20)] value	1.404	0.973	0.958	0.679	0.826	0.878
Ant. 2 [10^(G/20)] value	1.019	0.864	0.983	0.902	0.837	0.778
Ant. 3 [10^(G/20)] value	1.232	0.984	0.886	1.677	1.93	1.977
Ant. 4 [10^(G/20)] value	0.777	0.88	0.923	0.752	1.003	0.959
Sum All Antenna [Amax]	4.432	3.701	3.75	4.01	4.596	4.592
DG [10*log(Amax^2/Nant)]	6.91	5.35	5.46	6.04	7.23	7.22

Note:

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

Directional gain (1SS) = 10*log(10^(G_ant1/20)+10^(G_ant2/20)+ +10^(G_ant3/20) +10^(G_ant4/20)+.....)^2/N_ant)

DG_1SS max value position calculation

Frequency (Hz)	6.175G	6.475G	6.695G	6.995G
Ant. 1 [10^(G/20)]	10^(3.23/20)	10^(3.04/20)	10^(4.1/20)	10^(-0.11/20)
Ant. 2 [10^(G/20)]	10^(0.97/20)	10^(0.2/20)	10^(2.02/20)	10^(4.01/20)
Ant. 3 [10^(G/20)]	10^(3.94/20)	10^(3.25/20)	10^(2.98/20)	10^(2.77/20)
Ant. 4 [10^(G/20)]	10^(4.65/20)	10^(3/20)	10^(1.04/20)	10^(2.99/20)
Ant. 1 [10^(G/20)] value	1.45	1.419	1.603	0.987
Ant. 2 [10^(G/20)] value	1.118	1.023	1.262	1.587
Ant. 3 [10^(G/20)] value	1.574	1.454	1.409	1.376
Ant. 4 [10^(G/20)] value	1.708	1.413	1.127	1.411
Sum All Antenna [Amax]	5.851	5.309	5.402	5.361
DG [10*log(Amax^2/Nant)]	9.32	8.48	8.63	8.56

Note:

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

Directional gain (1SS) = 10*log(10^(G_ant1/20)+10^(G_ant2/20)+ +10^(G_ant3/20) +10^(G_ant4/20)+.....)^2/N_ant)



8. Summary of Test Result

Freq(Hz)	2.45G	5.2G	5.3G	5.6G	5.785G	5.885G
Ant. 1 Max Gain (dBi)	2.95	4.2	3.07	3.26	4.63	5.28
Ant. 2 Max Gain (dBi)	3.38	2.19	1.9	2.24	2.6	2.9
Ant. 3 Max Gain (dBi)	2.05	4.19	4.7	4.49	6.22	5.92
Ant. 4 Max Gain (dBi)	2.18	2.78	2.13	3.35	3.8	4.55
Ant. 1 Polarization/ Θ ($^{\circ}$)/ Φ ($^{\circ}$)	Theta/37.5/ 217.5	Theta/67.5/ 337.5	Theta/67.5/ 345	Theta/67.5/ 337.5	Theta/67.5/ 330	Theta/67.5/ 330
Ant. 2 Polarization/ Θ ($^{\circ}$)/ Φ ($^{\circ}$)	Theta/52.5/ 60	Theta/37.5/ 180	Theta/37.5/ 187.5	Theta/45/21 7.5	Theta/45/18 7.5	Theta/45/18 7.5
Ant. 3 Polarization/ Θ ($^{\circ}$)/ Φ ($^{\circ}$)	Theta/45/22 5	Theta/67.5/ 52.5	Theta/75/52 .5	Theta/67.5/ 52.5	Theta/75/52 .5	Theta/75/52 .5
Ant. 4 Polarization/ Θ ($^{\circ}$)/ Φ ($^{\circ}$)	Theta/52.5/ 180	Theta/67.5/ 135	Theta/67.5/ 142.5	Theta/67.5/ 135	Theta/67.5/ 135	Theta/75/14 2.5
Max Gain (dBi)	3.38	4.2	4.7	4.49	6.22	5.92
DG [1SS] (dBi)	6.91	5.35	5.46	6.04	7.23	7.22
DG [2SS] (dBi)	3.91	4.2	4.7	4.49	6.22	5.92
DG [4SS] (dBi)	3.38	4.2	4.7	4.49	6.22	5.92

Note:

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



Freq(Hz)	6.175G	6.475G	6.695G	6.995G
Ant. 1 Max Gain (dBi)	3.83	3.43	4.26	3.5
Ant. 2 Max Gain (dBi)	3.75	3.43	4.38	5.89
Ant. 3 Max Gain (dBi)	5.24	3.87	4.64	5.27
Ant. 4 Max Gain (dBi)	4.65	4.19	4.59	4.86
Ant. 1 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Phi/60/120	Phi/67.5/37.5	Phi/60/127.5	Phi/67.5/142.5
Ant. 2 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Phi/52.5/210	Phi/75/67.5	Phi/60/217.5	Phi/30/240
Ant. 3 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Phi/60/30	Phi/60/37.5	Phi/60/45	Phi/67.5/37.5
Ant. 4 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Phi/67.5/30	Phi/60/315	Phi/30/315	Phi/60/322.5
Max Gain (dBi)	5.24	4.19	4.64	5.89
DG [1SS] (dBi)	9.32	8.48	8.63	8.56
DG [2SS] (dBi)	6.32	5.48	5.63	5.89
DG [4SS] (dBi)	5.24	4.19	4.64	5.89

Note:

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



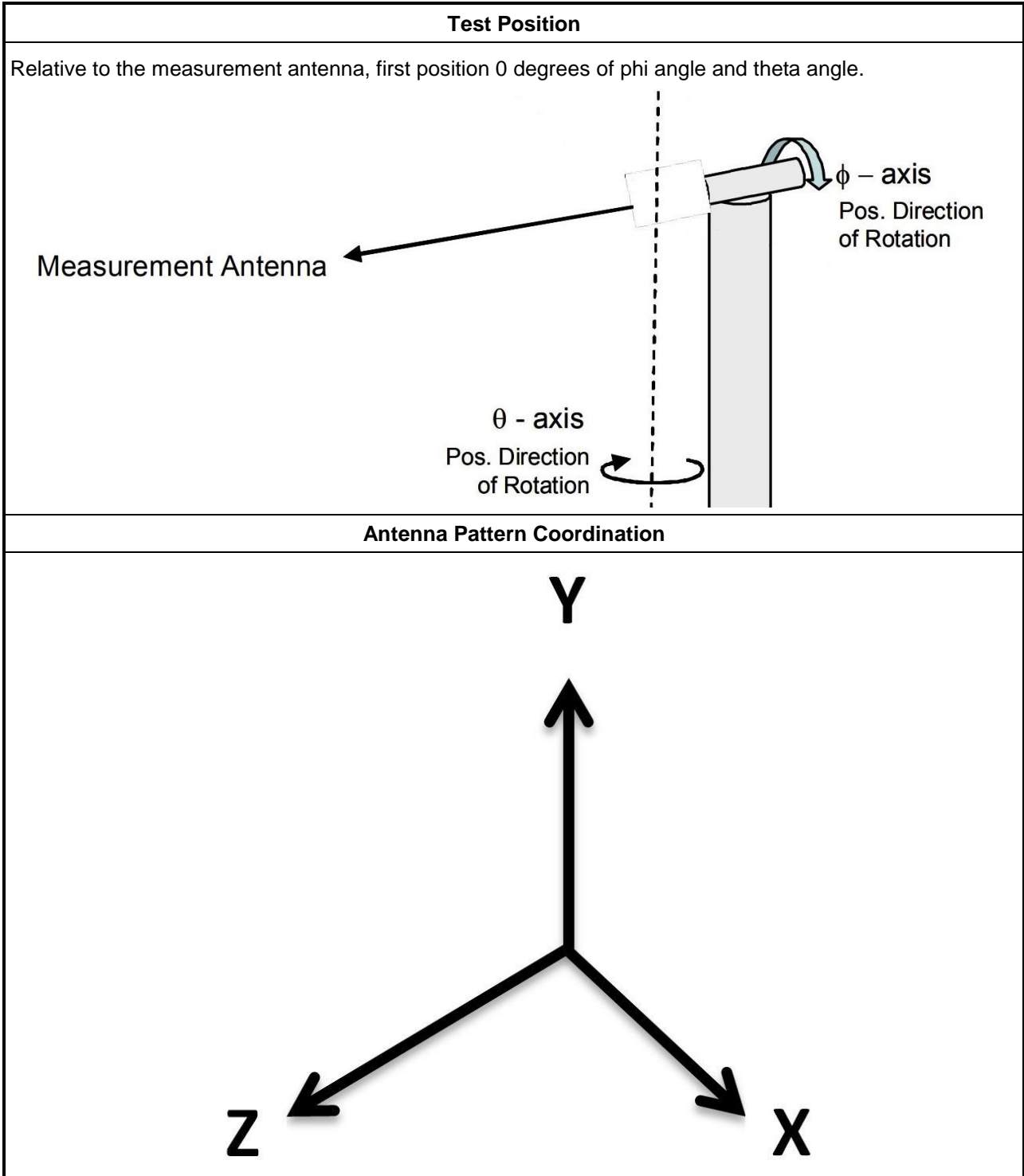
Freq(Hz)	2.45G	5.2G	5.3G	5.6G	5.785G	5.885G
Ant. 1 Max Gain (dBi)	1.76	3.44	3.27	3.16	3.75	5.11
Ant. 2 Max Gain (dBi)	1.17	2.09	2.62	2.22	2.49	2.91
Ant. 1 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/52.5/ 202.5	Theta/75/28 5	Theta/75/28 5	Theta/75/31 5	Theta/82.5/ 277.5	Theta/75/28 5
Ant. 2 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/45/60	Theta/52.5/ 172.5	Theta/67.5/ 120	Theta/52.5/ 165	Theta/52.5/ 172.5	Theta/52.5/ 157.5
Max Gain (dBi)	1.76	3.44	3.27	3.16	3.75	5.11

Freq(Hz)	6.175G	6.475G	6.695G	6.995G
Ant. 1 Max Gain (dBi)	4.19	3.34	4.02	4.41
Ant. 2 Max Gain (dBi)	3.32	2.13	3.01	4.43
Ant. 1 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/82.5/277.5	Theta/75/270	Theta/52.5/255	Theta/60/262.5
Ant. 2 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/75/180	Theta/75/127.5	Theta/75/127.5	Theta/75/112.5
Max Gain (dBi)	4.19	3.34	4.02	4.43

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 11, 2023	May 10, 2024
Dual Polarization Horn Antenna	Sporton	S0209DP	S0209DP-001	2GHz~9GHz	N.C.R.	N.C.R.
ENA Series Network Analyzer	AGILENT	E5071C	MY46419477	100kHz~8.5GHz	Jul. 20, 2022	Jul. 19, 2023
VNA Calibration Kit	TS RF	TS85033E-F	-	DC~9GHz	N.C.R.	N.C.R.
Multi-axis positioner	Sporton	MAPS01	MAPS01-001	Theta / Phi axis	N.C.R.	N.C.R.
Test Software	SPORTON	SENSE-RDG	V1.0.8	-	N.C.R.	N.C.R.

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

NCR means Non-Calibration required.



11. Test Results

Please refer to the appendix.

Appendix A – Radiated Composite Gain of 2G5G5.9G.....	Page 17
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————THE END————



Radiated Composite Gain Data of 2.4GHz&5GHz&5.9GHz

Appendix A

Freq(Hz)	2.45G	5.2G	5.3G	5.6G	5.785G	5.885G
Ant. 1 Max Gain (dBi)	2.95	4.2	3.07	3.26	4.63	5.28
Ant. 2 Max Gain (dBi)	3.38	2.19	1.9	2.24	2.6	2.9
Ant. 3 Max Gain (dBi)	2.05	4.19	4.7	4.49	6.22	5.92
Ant. 4 Max Gain (dBi)	2.18	2.78	2.13	3.35	3.8	4.55
Ant. 1 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Theta/37.5/217.5	Theta/67.5/337.5	Theta/67.5/345	Theta/67.5/337.5	Theta/67.5/330	Theta/67.5/330
Ant. 2 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Theta/52.5/60	Theta/37.5/180	Theta/37.5/187.5	Theta/45/217.5	Theta/45/187.5	Theta/45/187.5
Ant. 3 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Theta/45/225	Theta/67.5/52.5	Theta/75/52.5	Theta/67.5/52.5	Theta/75/52.5	Theta/75/52.5
Ant. 4 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Theta/52.5/180	Theta/67.5/135	Theta/67.5/142.5	Theta/67.5/135	Theta/67.5/135	Theta/75/142.5
Max Gain (dBi)	3.38	4.2	4.7	4.49	6.22	5.92
DG [1SS] (dBi)	6.91	5.35	5.46	6.04	7.23	7.22
DG [2SS] (dBi)	3.91	4.2	4.7	4.49	6.22	5.92
DG [4SS] (dBi)	3.38	4.2	4.7	4.49	6.22	5.92

Gain Result

Freq(Hz)	2.45GPol.		PhiAnt. 1		PhiAnt. 2		PhiAnt. 3		PhiAnt. 4		PhiAnt. 5		PhiAnt. 6		PhiAnt. 7		PhiAnt. 8		PhiAnt. 9		PhiAnt. 10		PhiAnt. 11		PhiAnt. 12		PhiAnt. 13		PhiAnt. 14		PhiAnt. 15		PhiAnt. 16		PhiAnt. 17		PhiAnt. 18		PhiAnt. 19		PhiAnt. 20		PhiAnt. 21		PhiAnt. 22		PhiAnt. 23		PhiAnt. 24	
Gain	Phi(0°)	Phi(7.5°)	Phi(15°)	Phi(22.5°)	Phi(30°)	Phi(37.5°)	Phi(45°)	Phi(52.5°)	Phi(60°)	Phi(67.5°)	Phi(75°)	Phi(82.5°)	Phi(90°)	Phi(97.5°)	Phi(105°)	Phi(112.5°)	Phi(120°)	Phi(127.5°)	Phi(135°)	Phi(142.5°)	Phi(150°)	Phi(157.5°)	Phi(165°)	Phi(172.5°)	Phi(180°)	Phi(187.5°)	Phi(195°)	Phi(202.5°)	Phi(210°)	Phi(217.5°)	Phi(225°)	Phi(232.5°)	Phi(240°)	Phi(247.5°)	Phi(255°)	Phi(262.5°)	Phi(270°)	Phi(277.5°)	Phi(285°)	Phi(292.5°)	Phi(300°)	Phi(307.5°)	Phi(315°)	Phi(322.5°)	Phi(330°)	Phi(337.5°)	Phi(345°)	Phi(352.5°)		
Gain	Phi(0°)	Phi(7.5°)	Phi(15°)	Phi(22.5°)	Phi(30°)	Phi(37.5°)	Phi(45°)	Phi(52.5°)	Phi(60°)	Phi(67.5°)	Phi(75°)	Phi(82.5°)	Phi(90°)	Phi(97.5°)	Phi(105°)	Phi(112.5°)	Phi(120°)	Phi(127.5°)	Phi(135°)	Phi(142.5°)	Phi(150°)	Phi(157.5°)	Phi(165°)	Phi(172.5°)	Phi(180°)	Phi(187.5°)	Phi(195°)	Phi(202.5°)	Phi(210°)	Phi(217.5°)	Phi(225°)	Phi(232.5°)	Phi(240°)	Phi(247.5°)	Phi(255°)	Phi(262.5°)	Phi(270°)	Phi(277.5°)	Phi(285°)	Phi(292.5°)	Phi(300°)	Phi(307.5°)	Phi(315°)	Phi(322.5°)	Phi(330°)	Phi(337.5°)	Phi(345°)	Phi(352.5°)		
Theta(°)	Theta(0°)	Theta(7.5°)	Theta(15°)	Theta(22.5°)	Theta(30°)	Theta(37.5°)	Theta(45°)	Theta(52.5°)	Theta(60°)	Theta(67.5°)	Theta(75°)	Theta(82.5°)	Theta(90°)	Theta(97.5°)	Theta(105°)	Theta(112.5°)	Theta(120°)	Theta(127.5°)	Theta(135°)	Theta(142.5°)	Theta(150°)	Theta(157.5°)	Theta(165°)	Theta(172.5°)	Theta(180°)	Theta(187.5°)	Theta(195°)	Theta(202.5°)	Theta(210°)	Theta(217.5°)	Theta(225°)	Theta(232.5°)	Theta(240°)	Theta(247.5°)	Theta(255°)	Theta(262.5°)	Theta(270°)	Theta(277.5°)	Theta(285°)	Theta(292.5°)	Theta(300°)	Theta(307.5°)	Theta(315°)	Theta(322.5°)	Theta(330°)	Theta(337.5°)	Theta(345°)	Theta(352.5°)		
Gain	Phi(0°)	Phi(7.5°)	Phi(15°)	Phi(22.5°)	Phi(30°)	Phi(37.5°)	Phi(45°)	Phi(52.5°)	Phi(60°)	Phi(67.5°)	Phi(75°)	Phi(82.5°)	Phi(90°)	Phi(97.5°)	Phi(105°)	Phi(112.5°)	Phi(120°)	Phi(127.5°)	Phi(135°)	Phi(142.5°)	Phi(150°)	Phi(157.5°)	Phi(165°)	Phi(172.5°)	Phi(180°)	Phi(187.5°)	Phi(195°)	Phi(202.5°)	Phi(210°)	Phi(217.5°)	Phi(225°)	Phi(232.5°)	Phi(240°)	Phi(247.5°)	Phi(255°)	Phi(262.5°)	Phi(270°)	Phi(277.5°)	Phi(285°)	Phi(292.5°)	Phi(300°)	Phi(307.5°)	Phi(315°)	Phi(322.5°)	Phi(330°)	Phi(337.5°)	Phi(345°)	Phi(352.5°)		



Radiated Composite Gain Data of 2.4GHz&5GHz&5.9GHz

Appendix A

Freq(Hz)	ThetaAnt 1	Phi(15°)Φ(22.5°)	Phi(30°)Φ(37.5°)	Phi(45°)Φ(52.5°)	Phi(60°)Φ(67.5°)	Phi(75°)Φ(82.5°)	Phi(90°)Φ(97.5°)	Phi(105°)Φ(112.5°)	Phi(120°)Φ(127.5°)	Phi(135°)Φ(142.5°)	Phi(150°)Φ(157.5°)	Phi(165°)Φ(172.5°)	Phi(180°)Φ(187.5°)	Phi(195°)Φ(202.5°)	Phi(210°)Φ(217.5°)	Phi(225°)Φ(232.5°)	Phi(240°)Φ(247.5°)	Phi(255°)Φ(262.5°)	Phi(270°)Φ(277.5°)	Phi(285°)Φ(292.5°)	Phi(300°)Φ(307.5°)	Phi(315°)Φ(322.5°)	Phi(330°)Φ(337.5°)	Phi(345°)Φ(352.5°)																								
5755GPol	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+																								
Gain	Φ(0°)Φ(7.5°)	Φ(15°)Φ(22.5°)	Φ(30°)Φ(37.5°)	Φ(45°)Φ(52.5°)	Φ(60°)Φ(67.5°)	Φ(75°)Φ(82.5°)	Φ(90°)Φ(97.5°)	Φ(105°)Φ(112.5°)	Φ(120°)Φ(127.5°)	Φ(135°)Φ(142.5°)	Φ(150°)Φ(157.5°)	Φ(165°)Φ(172.5°)	Φ(180°)Φ(187.5°)	Φ(195°)Φ(202.5°)	Φ(210°)Φ(217.5°)	Φ(225°)Φ(232.5°)	Φ(240°)Φ(247.5°)	Φ(255°)Φ(262.5°)	Φ(270°)Φ(277.5°)	Φ(285°)Φ(292.5°)	Φ(300°)Φ(307.5°)	Φ(315°)Φ(322.5°)	Φ(330°)Φ(337.5°)	Φ(345°)Φ(352.5°)																								
Theta	0°	7.5°	15°	22.5°	30°	37.5°	45°	52.5°	60°	67.5°	75°	82.5°	90°	97.5°	105°	112.5°	120°	127.5°	135°	142.5°	150°	157.5°	165°	172.5°	180°	187.5°	195°	202.5°	210°	217.5°	225°	232.5°	240°	247.5°	255°	262.5°	270°	277.5°	285°	292.5°	300°	307.5°	315°	322.5°	330°	337.5°	345°	352.5°
Phi	0°	7.5°	15°	22.5°	30°	37.5°	45°	52.5°	60°	67.5°	75°	82.5°	90°	97.5°	105°	112.5°	120°	127.5°	135°	142.5°	150°	157.5°	165°	172.5°	180°	187.5°	195°	202.5°	210°	217.5°	225°	232.5°	240°	247.5°	255°	262.5°	270°	277.5°	285°	292.5°	300°	307.5°	315°	322.5°	330°	337.5°	345°	352.5°
Gain	-11.74-10.24	-8.72-7.51	-6.77-6.59	-6.37-5.89	-5.52-5.16	-5.39-6.61	-7.47-7.45	-7.61-7.67	-8.76-9.61	-9.87-11.2	-12.38-12.02	-11.19-14.09	-9.76-9.24	-8.33-7.46	-6.97-6.69	-6.29-5.88	-5.63-9.41	-4.67-4.72	-4.97-5.68	-6.39-7.15	-7.74-8.45	-10.67-13.64	-17.76-18.18	-17.63-14.15																								
Theta	0°	7.5°	15°	22.5°	30°	37.5°	45°	52.5°	60°	67.5°	75°	82.5°	90°	97.5°	105°	112.5°	120°	127.5°	135°	142.5°	150°	157.5°	165°	172.5°	180°	187.5°	195°	202.5°	210°	217.5°	225°	232.5°	240°	247.5°	255°	262.5°	270°	277.5°	285°	292.5°	300°	307.5°	315°	322.5°	330°	337.5°	345°	352.5°
Phi	0°	7.5°	15°	22.5°	30°	37.5°	45°	52.5°	60°	67.5°	75°	82.5°	90°	97.5°	105°	112.5°	120°	127.5°	135°	142.5°	150°	157.5°	165°	172.5°	180°	187.5°	195°	202.5°	210°	217.5°	225°	232.5°	240°	247.5°	255°	262.5°	270°	277.5°	285°	292.5°	300°	307.5°	315°	322.5°	330°	337.5°	345°	352.5°
Gain	-11.74-10.24	-8.72-7.51	-6.77-6.59	-6.37-5.89	-5.52-5.16	-5.39-6.61	-7.47-7.45	-7.61-7.67	-8.76-9.61	-9.87-11.2	-12.38-12.02	-11.19-14.09	-9.76-9.24	-8.33-7.46	-6.97-6.69	-6.29-5.88	-5.63-9.41	-4.67-4.72	-4.97-5.68	-6.39-7.15	-7.74-8.45	-10.67-13.64	-17.76-18.18	-17.63-14.15																								
Theta	0°	7.5°	15°	22.5°	30°	37.5°	45°	52.5°	60°	67.5°	75°	82.5°	90°	97.5°	105°	112.5°	120°	127.5°	135°	142.5°	150°	157.5°	165°	172.5°	180°	187.5°	195°	202.5°	210°	217.5°	225°	232.5°	240°	247.5°	255°	262.5°	270°	277.5°	285°	292.5°	300°	307.5°	315°	322.5°	330°	337.5°	345°	352.5°
Phi	0°	7.5°	15°	22.5°	30°	37.5°	45°	52.5°	60°	67.5°	75°	82.5°	90°	97.5°	105°	112.5°	120°	127.5°	135°	142.5°	150°	157.5°	165°	172.5°	180°	187.5°	195°	202.5°	210°	217.5°	225°	232.5°	240°	247.5°	255°	262.5°	270°	277.5°	285°	292.5°	300°	307.5°	315°	322.5°	330°	337.5°	345°	352.5°
Gain	-11.74-10.24	-8.72-7.51	-6.77-6.59	-6.37-5.89	-5.52-5.16	-5.39-6.61	-7.47-7.45	-7.61-7.67	-8.76-9.61	-9.87-11.2	-12.38-12.02	-11.19-14.09	-9.76-9.24	-8.33-7.46	-6.97-6.69	-6.29-5.88	-5.63-9.41	-4.67-4.72	-4.97-5.68	-6.39-7.15	-7.74-8.45	-10.67-13.64	-17.76-18.18	-17.63-14.15																								



Radiated Composite Gain Data of 2.4GHz&5GHz&5.9GHz

Appendix A

Table with columns for Frequency (MHz), Azimuth (Theta/Ant), and Gain (Phi) for various angles from 0 to 180 degrees. Each cell contains a numerical gain value.



Radiated Composite Gain Data of 2.4GHz&5GHz&5.9GHz

Appendix A

Theta	17.45-18.07	18.05-18.31	19.22-18.54	19.21-17.38	15.63-14.55	14.19-15.33	17.83-17.89	18.19-18.95	17.61-15.8	13.56-16.19	18.68-17.61	16.59-14.53	15.74-17.67	19.11-18.03	17.87-18.65	18.74-18.27	18.71-18.51	16.34-15.89	17.32-19.11	17.41-15.29	15.52-18.05	18.35-19.08	17.87-18.6	18.89-19.14
Phi	165°	159°	151°	144°	138°	132°	126°	120°	114°	108°	102°	96°	90°	84°	78°	72°	66°	60°	54°	48°	42°	36°	30°	24°
Gain	Φ(0°)/Φ(7.5°)	Φ(15°)/Φ(22.5°)	Φ(30°)/Φ(37.5°)	Φ(45°)/Φ(52.5°)	Φ(60°)/Φ(67.5°)	Φ(75°)/Φ(82.5°)	Φ(90°)/Φ(97.5°)	Φ(105°)/Φ(112.5°)	Φ(120°)/Φ(127.5°)	Φ(135°)/Φ(142.5°)	Φ(150°)/Φ(157.5°)	Φ(165°)/Φ(172.5°)	Φ(180°)/Φ(187.5°)	Φ(195°)/Φ(202.5°)	Φ(210°)/Φ(217.5°)	Φ(225°)/Φ(232.5°)	Φ(240°)/Φ(247.5°)	Φ(255°)/Φ(262.5°)	Φ(270°)/Φ(277.5°)	Φ(285°)/Φ(292.5°)	Φ(300°)/Φ(307.5°)	Φ(315°)/Φ(322.5°)	Φ(330°)/Φ(337.5°)	Φ(345°)/Φ(352.5°)
0(165°)	-17.45-18.07	-18.05-18.31	-19.22-18.54	-19.21-17.38	-15.63-14.55	-14.19-15.33	-17.83-17.89	-18.19-18.95	-17.61-15.8	-13.56-16.19	-18.68-17.61	-16.59-14.53	-15.74-17.67	-19.11-18.03	-17.87-18.65	-18.74-18.27	-18.71-18.51	-16.34-15.89	-17.32-19.11	-17.41-15.29	-15.52-18.05	-18.35-19.08	-17.87-18.6	-18.89-19.14
0(180°)	-17.45-18.07	-18.05-18.31	-19.22-18.54	-19.21-17.38	-15.63-14.55	-14.19-15.33	-17.83-17.89	-18.19-18.95	-17.61-15.8	-13.56-16.19	-18.68-17.61	-16.59-14.53	-15.74-17.67	-19.11-18.03	-17.87-18.65	-18.74-18.27	-18.71-18.51	-16.34-15.89	-17.32-19.11	-17.41-15.29	-15.52-18.05	-18.35-19.08	-17.87-18.6	-18.89-19.14
Gain	Φ(0°)/Φ(7.5°)	Φ(15°)/Φ(22.5°)	Φ(30°)/Φ(37.5°)	Φ(45°)/Φ(52.5°)	Φ(60°)/Φ(67.5°)	Φ(75°)/Φ(82.5°)	Φ(90°)/Φ(97.5°)	Φ(105°)/Φ(112.5°)	Φ(120°)/Φ(127.5°)	Φ(135°)/Φ(142.5°)	Φ(150°)/Φ(157.5°)	Φ(165°)/Φ(172.5°)	Φ(180°)/Φ(187.5°)	Φ(195°)/Φ(202.5°)	Φ(210°)/Φ(217.5°)	Φ(225°)/Φ(232.5°)	Φ(240°)/Φ(247.5°)	Φ(255°)/Φ(262.5°)	Φ(270°)/Φ(277.5°)	Φ(285°)/Φ(292.5°)	Φ(300°)/Φ(307.5°)	Φ(315°)/Φ(322.5°)	Φ(330°)/Φ(337.5°)	Φ(345°)/Φ(352.5°)



Radiated Composite Gain Data of 2.4GHz&5GHz&5.9GHz

Appendix A

θ(60°)	1.170-6.4	-1.59-3.74	-4.3-3.72	-4.09-6.59	-7.1-6.47	-4.4-2.33	-0.780-11	0.30-43	1.01-48	1.30-62	-0.18-0.73	-1.02-1.16	-1.03-0.77	-0.54-0.03	0.75-1.5	1.83-16	0.79-3.02	-1.57-2.6	-3.15-3.11	-2.41-1.54	-1.01-0.56	0.080-49	0.29-0.18	-0.040-76	
Gain	Φ(0°)Φ(7.5°)	Φ(15°)Φ(22.5°)	Φ(30°)Φ(37.5°)	Φ(45°)Φ(52.5°)	Φ(60°)Φ(67.5°)	Φ(75°)Φ(82.5°)	Φ(90°)Φ(97.5°)	Φ(105°)Φ(112.5°)	Φ(120°)Φ(127.5°)	Φ(135°)Φ(142.5°)	Φ(150°)Φ(157.5°)	Φ(165°)Φ(172.5°)	Φ(180°)Φ(187.5°)	Φ(195°)Φ(202.5°)	Φ(210°)Φ(217.5°)	Φ(225°)Φ(232.5°)	Φ(240°)Φ(247.5°)	Φ(255°)Φ(262.5°)	Φ(270°)Φ(277.5°)	Φ(285°)Φ(292.5°)	Φ(300°)Φ(307.5°)	Φ(315°)Φ(322.5°)	Φ(330°)Φ(337.5°)	Φ(345°)Φ(352.5°)	
θ(0°)	-3.93-2.9	-2.22-1.78	-1.51-1.14	-0.95-0.87	-0.91-1.02	-1.19-1.16	-2.29-3.21	-4.37-5.77	-7.45-8.67	-9.72-9.85	-9.34-8.07	-6.73-5.18	-3.66-2.77	-2.16-1.63	-1.12-0.79	-0.56-0.49	-0.65-0.95	-1.47-2.21	-3.12-4.06	-4.91-6.04	-7.34-8.54	-9.49-10.57	-8.69-7.24	-6.01-4.77	
θ(7.5°)	-4.59-3.11	-2.13-1.51	-1.07-0.25	-0.10-0.17	0.10-0.24	-0.52-1.14	-1.97-2.73	-3.64-4.85	-5.97-6.86	-7.87-8.46	-8.42-7.55	-6.39-5.08	-4.01-3.18	-2.46-1.61	-0.79-0.26	-0.50-0.49	-0.84-0.84	-1.04-1.45	-1.57-2.12	-2.46-2.84	-3.11-3.77	-4.73-5.97	-7.51-8.74	-9.44-8.83	-6.53-3.82



Radiated Composite Gain Data of 2.4GHz&5GHz&5.9GHz

Appendix A

Freq(Hz)	Theta(°)	Phi(°)	Phi(7.5°)	Phi(15°)	Phi(22.5°)	Phi(30°)	Phi(37.5°)	Phi(45°)	Phi(52.5°)	Phi(60°)	Phi(67.5°)	Phi(75°)	Phi(82.5°)	Phi(90°)	Phi(97.5°)	Phi(105°)	Phi(112.5°)	Phi(120°)	Phi(127.5°)	Phi(135°)	Phi(142.5°)	Phi(150°)	Phi(157.5°)	Phi(165°)	Phi(172.5°)	Phi(180°)	Phi(187.5°)	Phi(195°)	Phi(202.5°)	Phi(210°)	Phi(217.5°)	Phi(225°)	Phi(232.5°)	Phi(240°)	Phi(247.5°)	Phi(255°)	Phi(262.5°)	Phi(270°)	Phi(277.5°)	Phi(285°)	Phi(292.5°)	Phi(300°)	Phi(307.5°)	Phi(315°)	Phi(322.5°)	Phi(330°)	Phi(337.5°)	Phi(345°)	Phi(352.5°)
5.6GPol.	Theta(°)	Phi(°)	Phi(7.5°)	Phi(15°)	Phi(22.5°)	Phi(30°)	Phi(37.5°)	Phi(45°)	Phi(52.5°)	Phi(60°)	Phi(67.5°)	Phi(75°)	Phi(82.5°)	Phi(90°)	Phi(97.5°)	Phi(105°)	Phi(112.5°)	Phi(120°)	Phi(127.5°)	Phi(135°)	Phi(142.5°)	Phi(150°)	Phi(157.5°)	Phi(165°)	Phi(172.5°)	Phi(180°)	Phi(187.5°)	Phi(195°)	Phi(202.5°)	Phi(210°)	Phi(217.5°)	Phi(225°)	Phi(232.5°)	Phi(240°)	Phi(247.5°)	Phi(255°)	Phi(262.5°)	Phi(270°)	Phi(277.5°)	Phi(285°)	Phi(292.5°)	Phi(300°)	Phi(307.5°)	Phi(315°)	Phi(322.5°)	Phi(330°)	Phi(337.5°)	Phi(345°)	Phi(352.5°)
Gain	0°	0	-12.31-10.91	-9.21-7.72	-6.74-5.94	-4.61-4.49	-2.24-2.81	0.60-1.49	3.12-4.81	5.22-6.48	6.67-7.87	7.17-7.87	7.61-8.07	7.91-8.82	8.03-9.12	8.03-9.12	7.91-8.82	7.61-8.07	7.17-7.87	6.67-7.87	6.07-6.98	5.32-6.12	4.47-5.06	3.55-3.96	2.59-2.81	1.61-1.83	0.61-0.83	-0.41-0.63	-1.41-1.63	-2.41-2.63	-3.41-3.63	-4.41-4.63	-5.41-5.63	-6.41-6.63	-7.41-7.63	-8.41-8.63	-9.41-9.63	-10.41-10.63	-11.41-11.63	-12.41-12.63	-13.41-13.63	-14.41-14.63	-15.41-15.63	-16.41-16.63	-17.41-17.63	-18.41-18.63	-19.41-19.63	-20.41-20.63	



Radiated Composite Gain Data of 2.4GHz&5GHz&5.9GHz

Appendix A

Table with columns for Frequency (FreqHz), Polarization (Phi), Azimuth (Ant), and Gain for various combinations of 2.4GHz, 5GHz, and 5.9GHz across 360-degree azimuthal angles (0 to 180 degrees).



Radiated Composite Gain Data of 2.4GHz&5GHz&5.9GHz

Appendix A

Theta	Phi	Phi(7.5)	Phi(15)	Phi(22.5)	Phi(30)	Phi(37.5)	Phi(45)	Phi(52.5)	Phi(60)	Phi(67.5)	Phi(75)	Phi(82.5)	Phi(90)	Phi(97.5)	Phi(105)	Phi(112.5)	Phi(120)	Phi(127.5)	Phi(135)	Phi(142.5)	Phi(150)	Phi(157.5)	Phi(165)	Phi(172.5)	Phi(180)	
Theta(37.5)	Phi(7.5)	-3.6/-5.77	-8.7/-9.25	-10.22/-14.8	-15.12/-8.35	-6.07/-8.93	-7.87/-4.35	-3.77/-3.55	-2.94/-2.3	-1.98/-1.55	-1.23/-2.57	-5.52/-5.73	-3.22/-2.76	-2.97/-1.71	-1.24/-3.95	-6.78/-5.12	-5.05/-7.52	-12.97/-13.43	-8.58/-7.21	-6.6/-2.93	-0.66/-0.16	0.01/-0.7	-1.34/-0.76	-0.53/-0.57	-0.98/-1.99	
Theta(45)	Phi(7.5)	-3.87/-4.88	-7.86/-10.18	-10.47/-16.55	-17.81/-8.6	-5.03/-5.6	-4.1/-4.54	-5.94/-5.79	-5.22/-3.6	-2.44/-1.43	-0.97/-1.47	-3.49/-5.12	-6.26/-6.99	-6.85/-6.18	-5.15/-7.65	-9.75/-8.12	-9.58/-10.94	-17.12/-19.21	-10.18/-10.24	-7.92/-2.13	-1.60/-5	0.52/-0.54	-1.91/-5.3	-1.2/-1.41	-1.06/-1.88	
Theta(52.5)	Phi(7.5)	-4.63/-4.86	-6.73/-8.2	-8.02/-13.06	-18.28/-11.81	-6.48/-5.21	-4.2/-8.03	-6.06/-7.16	-11.83/-9.77	-6.02/-5.15	-5.74/-5.61	-5.91/-3.97	-4.22/-6.7	-7.22/-13.06	-13.29/-16.58	-19.07/-16.38	-17.25/-17.81	-10.19/-9.69	-10.52/-14.77	-6.23/-2.35	-1.53/-0.86	-0.17/-1.16	-3.24/-3.41	-2.62/-3.41	-4.74/-4.71	
Theta(60)	Phi(7.5)	-8.87/-9.04	-8.15/-7.69	-8.65/-11.84	-15.71/-15.69	-17.43/-9.7	-5.47/-9.47	-7.53/-5.74	-6.33/-7.37	-4.6/-2.29	-2.58/-4.23	-6.21/-6.92	-4.4/-6.27	-8.91/-10.82	-15.16/-9.1	-12.39/-18.76	-17.73/-18.23	-17.38/-13.62	-12.07/-12.32	-7.26/-2.92	-3.44/-2.45	-1.28/-2.47	-4.64/-4.86	-5.15/-7.32	-10.36/-9.92	
Theta(75)	Phi(7.5)	-9.4/-12.15	-9.87/-7.22	-8.73/-8.98	-17.92/-15.29	-11.28/-18.43	-10.96/-11.91	-10.04/-6.28	-4.94/-8.19	-5.69/-2.1	-2.5/-3.41	-3.85/-7.28	-4.82/-5.88	-9.63/-10.83	-13.29/-7.82	-11.84/-11.81	-14.43/-18.57	-18.07/-15.81	-15.45/-13.5	-9.43/-6.85	-5.91/-4.8	-4.46/-6.12	-9.38/-7.62	-7.22/-8.55	-10.16/-16.53	
Theta(82.5)	Phi(7.5)	-10.75/-12.64	-11.53/-7.66	-9.45/-7.34	-17.1/-13.5	-9.13/-8.9	-14.74/-14.27	-18.17/-8.38	-6.75/-8.01	-7.43/-6.31	-3.69/-3.97	-5.61/-7.1	-8.35/-11.08	-12.63/-12.31	-11.92/-10.71	-14.32/-14.82	-18.78/-17.88	-16.27/-12.87	-16.27/-12.87	-8.77/-8.81	-7.04/-8.75	-5.91/-8.4	-7.04/-8.75	-7.02/-9.84	-11.06/-14.71	
Theta(90)	Phi(7.5)	-11.52/-16.09	-13.53/-10.5	-11.04/-7.42	-13.71/-12.61	-7.71/-17.25	-17.28/-16.82	-18.27/-13.44	-11.12/-8.31	-9.24/-5.69	-5.37/-4.97	-2.98/-4.89	-7.71/-9.46	-14.18/-13.44	-12.39/-11.12	-11.06/-11.29	-18.56/-13.92	-16.79/-16.23	-19.15/-12.85	-13.53/-9.82	-8.24/-10.84	-10.02/-10.35	-13.36/-9.57	-8.95/-12.6	-11.2/-15.97	
Theta(97.5)	Phi(7.5)	-10.53/-15.12	-14.76/-13.54	-13.89/-9.35	-12.54/-14.91	-9.57/-17.59	-13.64/-17.71	-15.55/-17.16	-15.11/-6.97	-10.94/-8.94	-5.91/-7.8	-6.13/-7.3	-10.13/-12	-14.55/-13.43	-12.76/-16.06	-12.28/-12.56	-17.45/-16.47	-16.45/-18.54	-18.99/-14.74	-18.91/-12.63	-13.07/-18.19	-14.57/-12.48	-18.25/-10.47	-9.99/-12.75	-11.36/-17.01	
Theta(105)	Phi(7.5)	-11.18/-18.62	-12.98/-17.86	-16.33/-10.26	-11.17/-15.7	-10.55/-18.75	-11.19/-18.69	-16.69/-18.5	-16.12/-8.97	-14.79/-13.68	-7.37/-10.53	-8.43/-11.43	-18.18/-18.79	-17.21/-15.76	-12.98/-16.5	-12.94/-15.27	-18.46/-17.5	-18.31/-18.69	-18.95/-15.43	-14.01/-17.06	-18.18/-18.99	-14.12/-15.04	-18.04/-11.75	-11.14/-12.23	-13.86/-18.44	
Theta(112.5)	Phi(7.5)	-11.99/-17.82	-15.73/-18.98	-14.26/-12.81	-11/-18.24	-10.67/-18.05	-13.07/-18.45	-15.34/-16.7	-18.43/-9.84	-18.53/-18.38	-10.09/-13.31	-12.93/-11.45	-18.09/-18.31	-18.23/-18.95	-12.41/-18.87	-12.98/-19.36	-19.31/-18.37	-16.65/-18.95	-17.47/-18.05	-17.91/-18.03	-17.42/-18.26	-15.07/-13.81	-17.91/-10.54	-11.28/-18.62	-17.01/-17.86	
Theta(120)	Phi(7.5)	-14.35/-19.07	-18.63/-18.79	-17.39/-16.58	-15.05/-18.83	-12.39/-15.85	-12.44/-17.69	-18.69/-15.74	-18.54/-14.41	-13.63/-16.99	-13.57/-14.54	-15.04/-16.77	-15.36/-18.37	-11.03/-17.75	-14.79/-17.93	-10.12/-18.83	-18.48/-19.09	-18.61/-18.99	-18.43/-15.79	-18.11/-18.56	-18.75/-18.97	-16.94/-13.59	-11.73/-16.87	-18.17/-16.98	-18.19/-18.18	
Theta(127.5)	Phi(7.5)	-18.11/-16.81	-18.42/-17.72	-16.05/-18.36	-15.18/-17.8	-15.05/-15.2	-12.13/-14.98	-17.16/-16.33	-18.59/-17.13	-12.27/-9.81	-14.34/-17.25	-10.02/-18.16	-12.12/-14.06	-10.93/-17.02	-11.32/-15.51	-17.91/-18	-18.76/-17.89	-18.82/-18.2	-18.41/-17.77	-18.51/-17.82	-14.97/-18.25	-14.17/-16.33	-18.37/-14.2	-19.03/-14.45		
Theta(135)	Phi(7.5)	-18.03/-16.21	-17.87/-17.8	-17.92/-18.44	-12.57/-18.44	-15.69/-13.78	-13.15/-18.69	-13.53/-17.95	-13.66/-14.73	-16.44/-11.79	-18.26/-18.74	-16.36/-13.21	-9.27/-15.01	-14.17/-19.34	-14.61/-17.82	-11.59/-17.09	-15.21/-13.13	-19.28/-17.68	-19.07/-14.06	-18.81/-18.5	-18.72/-18.27	-12.37/-10.17	-18.13/-18.49	-15.14/-18.67	-18.91/-18.79	
Theta(142.5)	Phi(7.5)	-17.85/-17.43	-17.51/-16.02	-18.39/-13.9	-13.66/-18.27	-10.46/-14.31	-18.33/-17.51	-10.59/-12.97	-17.61/-15.29	-18.98/-17.62	-18.79/-16.12	-17.78/-15.11	-18.17/-8.1	-11.84/-15.55	-13.82/-10.14	-13.68/-14.93	-17.12/-18.18	-17.91/-14.9	-17.10/-19.19	-16.18/-15.6	-18.10/-9.2	-13.91/-13.16	-18.37/-17.59	-18.86/-18.26		
Theta(150)	Phi(7.5)	-13.35/-17.28	-17.57/-15.76	-16.85/-17	-14.16/-13.71	-12.29/-19.15	-13.93/-18.83	-13.76/-12.01	-18.18/-15.65	-13.64/-16.99	-14.59/-13.23	-17.66/-18.14	-16.45/-19.09	-17.81/-15.67	-14.03/-18.18	-18.78/-18.11	-14.22/-17.94	-16.77/-17.85	-17.85/-16.68	-17.44/-14.66	-18.76/-18.04	-14.74/-16.5	-13.98/-17.19	-17.17/-6.5		
Theta(157.5)	Phi(7.5)	-17.97/-19.09	-17.46/-18.7	-18.91/-18.02	-19.17/-11.65	-11.51/-17.08	-13.89/-13.21	-18.57/-17.49	-13.48/-14.75	-16.97/-16.7	-12.91/-11.14	-13.41/-17.45	-18.75/-15.19	-11.63/-15.84	-18.61/-17.52	-15.81/-13.51	-18.43/-18.72	-17.36/-18.19	-17.38/-18.69	-15/-13.12	-16.81/-17.99	-18.54/-18.98	-18.22/-18.46	-19.15/-15.37	-12.59/-14.78	
Theta(165)	Phi(7.5)	-19.01/-18.78	-18.91/-19.39	-17.92/-19.33	-16.96/-14.18	-15.89/-17.81	-13.11/-10.36	-12.01/-18.42	-18.51/-13.9	-11.62/-11.53	-12.46/-15.72	-18.08/-18.68	-14.61/-13.5	-13.16/-15.44	-17.65/-18.52	-17.17/-18.4	-18.05/-18.16	-17.61/-18.19	-18.58/-18.46	-18.61/-8.1	-17.10/-18.56	-17.36/-15.23	-15.46/-14.52	-15.31/-17.5	-18.29/-18.09	
Theta(172.5)	Phi(7.5)	-18.01/-17.65	-18.78/-18.32	-18.91/-18.32	-18.92/-19.26	-18.14/-17.84	-15.78/-11.82	-11.25/-12	-12.59/-9.97	-9.31/-10.9	-18.51/-15.9	-18.35/-17.78	-19.08/-17.25	-13.56/-12.49	-14.16/-16.7	-17.62/-18.7	-18.08/-17.98	-18.76/-19.27	-18.72/-17.13	-15.16/-16.61	-18.92/-15.52	-15.86/-18.66	-19.22/-17.85	-19.04/-18.43		
Theta(180)	Phi(7.5)	-17.28/-17.98	-17.91/-18.52	-18.54/-18.42	-18.54/-18.86	-18.31/-18.97	-18.14/-14.85	-14.25/-13.71	-14.12/-15.17	-16.08/-16.8	-15.67/-15.57	-16.51/-18.62	-17.66/-16.42	-14.59/-14.01	-13.88/-14.75	-16.42/-17.86	-18.45/-18.41	-19.57/-17.42	-17.52/-17.98	-18.03/-18.24	-18.22/-18.03	-17.94/-17.98	-16.44/-15.77	-15.94/-15.75	-15.76/-16.17	
Theta(180)	Phi(7.5)	-13.28/-14.39	-16.11/-16.37	-18.68/-14.48	-18.65/-18.44	-18.95/-19.27	-18.82/-19.02	-19.14/-18.46	-16.81/-14.64	-13.91/-13.82	-13.78/-12.84	-12.61/-13.01	-13.82/-15.64	-15.74/-15.66	-13.81/-15.25	-19.01/-17.79	-18.61/-19.04	-17.34/-19.18	-18.99/-17.62	-16.48/-14.47	-12.75/-11.64	-11.10/-10.85	-10.96/-12.33	-13.27/-13.8		
Phi(7.5)	Theta(7.5)	-4.75/-6.18	-5.66/-5.07	-4.32/-4.18	-4.06/-4.16	-4.65/-4.97	-5.35/-5.5	-6.21/-6.6	-7.08/-7.86	-8.19/-8.48	-9.21/-10.12	-10.51/-10.51	-8.23/-6.4	-4.43/-3.22	-2.59/-2.25	-3.22/-2.21	-2.28/-2.58	-2.28/-2.58	-2.28/-2.58	-2.28/-2.58	-2.28/-2.58	-2.28/-2.58	-2.28/-2.58	-2.28/-2.58	-2.28/-2.58	-2.28/-2.58
Phi(15)	Theta(15)	-7.39/-6.22	-5.25/-4.22	-3.33/-2.77	-2.26/-2.06	-1.87/-1.69	-1.48/-1.69	-2.11/-2.85	-3.95/-5.56	-8.34/-10.66	-12.17/-11.79	-11.09/-11.69	-13.29/-13.3	-10.03/-6.89	-4.19/-2.61	-1.91/-1.54	-1.62/-1.87	-2.34/-2.99	-3.56/-3.99	-3.84/-3.83	-4.04/-3.47	-5.12/-6.25	-6.04/-9.27	-7.91/-9.63	-9.13/-8.57	
Phi(22.5)	Theta(22.5)	-6.47/-4.53	-3.43/-3.04	-3.06/-3.79	-4.39/-4.2	-3.01/-2.66	-1.59/-1.61	-1.84/-2.14	-2.72/-4.07	-5.65/-7.76	-9.68/-12.52	-14.17/-10.76	-7.07/-8.51	-6.44/-7.16	-6.51/-7.4	-3.91/-3.11	-2.55/-2.41	-3.45/-4.88	-4.79/-3.09	-1.51/-3.1	-2.61/-3.94	-6.28/-9.2	-13.23/-15.53	-16.58/-15.81	-12.05/-14.1	
Phi(30)	Theta(30)	-5.05/-6.2	-0.97/-0.4	-0.35/-0.85	-2.51/-4.87	-4.72/-3.4	-2.83/-2.83	-2.77/-2.03	-1.26/-0.99	-1.57/-1.91	-1.99/-2.5	-3.33/-5.9	-7.62/-5.14	-4.14/-5.21	-5.96/-5.63	-5.62/-5.61	-4.91/-4.92	-7.99/-17.74	-12.04/-7.28	-6.31/-6.88	-8.24/-10.89	-14.11/-18.62	-19.63/-14.43	-11.65/-10.01	-9.38/-7.74	
Phi(37.5)	Theta(37.5)	-4.84/-4.81	-2.71/-1.97	-1.65/-0.67	-1.56/-3.91	-2.65/-1.14	-0.81/-1.41	-1.09/-0.29	0.87/-0.27	-2.49/-3.96	-4.06/-3.49	-3.18/-4.29	-6.31/-7.84	-5.71/-2.3	-5.43/-6.89	-9.65/-12	-10.51/-8.98	-9.42/-13.11	-19.35/-10.13	-6.96/-7.62	-9.38/-8.98	-7.83/-8.15	-10.67/-12.79	-10.75/-7.29	-4.71	
Phi(45)	Theta(45)	0.73/-0.21	-1.67/-1.41	-1.75/-1.05	-1.32/-3.14	-1.24/-0.67	-1.89/-3.81	-1.97/-0.98	1.38/0.45	-0.19/0.47	0.11/-1.51	-3.11/-2.08	-0.56/-0.4	-0.67/-1.62	-3.53/-3.87	-3.55/-1.49	-5.38/-7.48	-12.43/-16.66	-12.54/-9.72	-6.36/-6.57	-8.35/-6.68	-5.19/-3.49	-3.32/-3.53	-3.76/-3.04	-1.25/0.33	
Phi(52.5)	Theta(52.5)	0.81/0.05	-1.12/-1.71	-2.26/-2.02	-0.75/-2.53	-1.65/-2.54	-4.91/-6.78	-2.76/-0.52	-0.43/0.34	1.06/1.95	2.07/1.36	0.11/-0.44	-0.64/-0.63	-1.43/-3.84	-6.84/-6.81	-4.31/-3.13	-4.32/-8.72	-14.61/-13.63	-7.91/-7.43	-6.59/-7.48	-9.39/-2.65	-2.86/-1.46	-1.72/-1.56	-2.93/-3.25	-2.46/-0.86	
Phi(60)	Theta(60)	-2.66/-0.82	-1.31/-2.35	-2.41/-3.86	-0.63/-2.2	-2.12/-2.28	-1.99/-2.44	-1.47/-1.22	0.56/1	0.62/1.12	2.36/1.49	-0.15/-1.04	-2.81/-3.81	-3.43/-3.33	-2.19/-3.84	-5.57/-3.69	-4.38/-9.72	-10.97/-9.46	-6.46/-6.58	-6.86/-8.84	-7.03/-3.05	-0.95/-0.58	-1.92/-3.14	-5.54/-5.32	-4.85/-2.98	
Phi(67.5)	Theta(67.5)	-5.42/-3.56	-2.12/-4.8	-1.84/-4.1	-0.85/-2.47	-2.25/-0.97	0.54/0.1	0.11/0.63	-0.05/-1.67	0.72/1.61	3.35/1.3	-1.56/-2.27	-3.07/-2.59	-1.71/-1.45	0.53/0.44	-4.37/-3.29	-2.59/-1.7	-8.25/-5.66	-6.09/-6.69	-7.98/-5.47	-4.89/-1.55	-0.94/-0.91	-2.98/-5.4	-1.09/-9.74	-7.78/-4.46	
Phi(75)	Theta(75)	-6.21/-7.98	-4.44/-2.8</																							



Radiated Composite Gain Data of 2.4GHz&5GHz&5.9GHz

Appendix A

Theta(°)	-8.94/-9	-11.07/-11.19	-17.58/-11.51	-14.96/-7.99	-15.28/-9.25	-10.91/-15.25	-12.95/-10.99	-12.52/-8.93	-11.19/-8.77	-8.51/-11.57	-7.38/-12.36	-10.11/-13.37	-17.42/-15.1	-11.64/-13.49	-18.44/-11.27	-11.41/-12.71	-17.99/-17.39	-18.88/-18.55	-18.41/-11.48	-18.23/-12.93	-8.31/-17.65	-10.16/-13.31	-14.52/-7.11	-17.81/-10.43
Theta(°)	-10.47/-9.98	-10.3/-9.8	-16.12/-16.94	-18.96/-11	-14.43/-11.02	-9.97/-18.67	-10.85/-13.15	-18.22/-8	-12.12/-11.26	-7.93/-12.74	-9.77/-12.54	-12.11/-14.67	-17.88/-18.73	-11.22/-14.49	-19.71/-12.34	-15.18/-12.89	-18.5/-16.96	-18.05/-16.27	-17.89/-14.59	-17.56/-13.18	-11.25/-17.62	-11.46/-10.77	-17.93/-9.23	-13.33/-10.28
Theta(°)	-12.51/-12.09	-17.95/-16.6	-14.64/-18.49	-18.67/-11.86	-13.48/-11.83	-12.84/-15.92	-12.59/-15.89	-15.77/-9.56	-10.17/-19.38	-8.48/-13.35	-12.73/-15.81	-19.27/-17.97	-18/-17.99	-11.95/-17.97	-17.62/-13.8	-19.13/-13.2	-18.38/-18.88	-18.48/-14.68	-18.45/-18.48	-19.25/-11.5	-11.2/-18.34	-12.98/-10.09	-18.45/-12.25	-12.94/-10.08
Theta(112.5°)	-18.21/-11.64	-18.49/-18.04	-15.32/-17.62	-14.96/-11.85	-11.36/-15.82	-10.85/-19.13	-10.6/-18.32	-13.82/-10.64	-14.56/-17.98	-11.63/-12.87	-16.84/-17.01	-18.18/-18.62	-16.39/-19.06	-11.91/-19.66	-13.22/-13.61	-18.55/-14.85	-18.31/-16.65	-18.31/-16.63	-18.44/-18.96	-18.33/-15.65	-14.08/-13.12	-17.84/-11.94	-10.85/-17.21	-16.67/-18.46
Theta(120°)	-16.88/-16.98	-17.9/-18.82	-17.62/-14.65	-14.3/-15.3	-12.68/-16.2	-13.22/-17.91	-10.39/-16.15	-14.94/-13.32	-16.11/-12.33	-11.3/-12.9	-18.43/-17.96	-14.17/-19.24	-14.6/-17.76	-8.34/-14.91	-17.99/-17.5	-19.11/-15.67	-15.26/-17.6	-17.58/-14.58	-18.27/-18.67	-17.54/-15.53	-18.99/-9.98	-15.83/-18.99	-10.28/-17.85	-18.31/-17.23
Theta(127.5°)	-17.07/-17.53	-15.6/-16.21	-18.81/-13.57	-18.64/-16.45	-8.61/-16.53	-17.69/-18.8	-10.87/-18.21	-17.88/-18.35	-18.47/-9.71	-13.01/-14.39	-19.04/-15.91	-17.95/-18.74	-19.24/-14.57	-18.98/-17.31	-17.88/-18.08	-16.57/-16.36	-13.02/-17.47	-17.25/-12.37	-17.56/-16.91	-18.74/-14.69	-17.29/-15.47	-15.02/-17.43	-12.13/-15.05	-14.23/-15.11
Theta(135°)	-16.51/-18.71	-18.79/-17.19	-19.01/-10.77	-15.9/-18.62	-18.56/-18.52	-10.39/-12.58	-15.74/-13.04	-18.11/-10.32	-12.52/-15.4	-17.92/-18.31	-19.09/-18.13	-17.82/-16.53	-16.34/-16.7	-18.82/-14.94	-18.28/-17.33	-14.18/-17.69	-13.38/-17.99	-17.61/-16.8	-18.04/-14.63	-17.41/-19.23	-17.75/-14.73	-11.09/-18.58	-18.72/-18.42	-13.18/-16.84
Theta(142.5°)	-18.94/-18.85	-17.63/-17.37	-18.28/-11.42	-10.07/-12.56	-17.01/-18.47	-12.52/-13.05	-18.99/-12.42	-18.16/-15.34	-11.23/-10.29	-12.29/-16.19	-18.61/-17.65	-18.78/-18.58	-18.34/-17.81	-18.06/-14.49	-15.58/-18.26	-19.34/-17.46	-17.95/-18.82	-16.07/-18.68	-18.33/-17.62	-17.35/-18.15	-18.37/-14.62	-12.61/-14.31	-13.96/-17.8	-18.92/-18.67
Theta(150°)	-18.33/-16.39	-11.09/-13.28	-17.32/-17.69	-17.74/-18.14	-14.95/-12.94	-18.43/-19.15	-18.58/-18.4	-18.12/-18.09	-19.17/-17.27	-17.63/-16.82	-13.39/-16.8	-17.93/-18.01	-13.65/-18.63	-12.42/-11.97	-16.46/-18.08	-18.98/-17.75	-17.99/-19.1	-19.19/-19.13	-13.9/-18.72	-18.55/-11.52	-11.08/-15.01	-18.43/-16.99	-14.13/-16.5	-19.07/-17.82
Theta(157.5°)	-17.99/-18.17	-13.12/-17.01	-17.89/-19.04	-18.63/-17.62	-17.69/-17.74	-13.71/-11.55	-9.77/-12.67	-19.24/-16.76	-12.69/-12.25	-141/-15.8	-18.15/-17.97	-17.51/-12.39	-12.53/-18.36	-18.57/-11.47	-11.69/-17.58	-18.84/-18.3	-17.98/-17.67	-18.83/-14.2	-11.81/-11.87	-15.52/-17.98	-17.56/-18.47	-18.28/-18.84	-17.99/-17.23	-15.08/-14.94
Theta(165°)	-18.38/-18.58	-18.73/-18.6	-17.4/-16.02	-13.88/-14.12	-14.49/-18.3	-18.76/-17.98	-18.44/-18.92	-19.18/-19.07	-17.25/-18.36	-17.9/-18.17	-18.28/-19.24	-18.88/-17.6	-19.24/-19.13	-16.43/-18.19	-18.57/-19.34	-17.69/-19.31	-19.01/-18.04	-19.05/-18.52	-14.32/-13.94	-14.56/-17.53	-18.66/-17.56	-17.34/-16.01	-16.91/-17.21	-17.44/-19.1
Theta(172.5°)	-17.61/-18.47	-18.17/-17.81	-18.98/-18.58	-18.42/-17	-18.45/-18.61	-18.26/-18.85	-17.41/-15.88	-14.74/-15	-16.05/-18.2	-18.22/-18.36	-17.48/-19.07	-16.86/-15.66	-14.26/-13.76	-16.82/-18.7	-18.27/-18.45	-15.14/-15.13	-14.12/-14.52	-14.36/-13.69	-13.4/-13.3	-11.6/-10.13	-9.93/-10.14	-10.38/-11.48	-13.11/-16.04	-17.24/-16.56
Theta(180°)	-14.81/-13.94	-11.85/-15.18	-18.59/-18.15	-17.71/-18.81	-18.25/-18.08	-18.81/-17.87	-18.54/-19.07	-13.67/-12.63	-11.66/-11.03	-10.37/-10.27	-9.22/-9.05	-8.98/-9.83	-12.14/-13.53	-13.41/-14.74	-18.38/-17.7	-17.2/-17.2	-17.26/-16.05	-14.72/-12.61	-11.26/-10.93	-10.27/-10.32	-10.19/-10.23	-9.48/-9.51	-10.34/-11.72	-12.66/-13.58
Freq(Hz)	5.885GPol.	ThetaAnt. 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gain	Phi(0°)Phi(5°)	Phi(15°)Phi(22.5°)	Phi(30°)Phi(37.5°)	Phi(45°)Phi(52.5°)	Phi(60°)Phi(67.5°)	Phi(75°)Phi(82.5°)	Phi(90°)Phi(97.5°)	Phi(105°)Phi(112.5°)	Phi(120°)Phi(127.5°)	Phi(135°)Phi(142.5°)	Phi(150°)Phi(157.5°)	Phi(165°)Phi(172.5°)	Phi(180°)Phi(187.5°)	Phi(195°)Phi(202.5°)	Phi(210°)Phi(217.5°)	Phi(225°)Phi(232.5°)	Phi(240°)Phi(247.5°)	Phi(255°)Phi(262.5°)	Phi(270°)Phi(277.5°)	Phi(285°)Phi(292.5°)	Phi(300°)Phi(307.5°)	Phi(315°)Phi(322.5°)	Phi(330°)Phi(337.5°)	Phi(345°)Phi(352.5°)
Theta(0°)	-8.39/-7.02	-5.98/-5.59	-4.51/-4.07	-3.53/-2.97	-3.16/-3.29	-3.51/-3.4	-4.05/-5.22	-6.09/-7.52	-9.46/-11.96	-13.02/-15.55	-15.94/-14.06	-11.75/-9.52	-7.79/-6.26	-5.21/-4.33	-4.11/-3.83	-3.12/-2.75	-2.8/-3.08	-3.55/-4.12	-4.77/-5.31	-6.37/-7.97	-9.51/-11.39	-13.36/-15.8	-19.73/-19.04	-14.16/-10.5
Theta(7.5°)	-6.96/-6.02	-4.99/-4.31	-3.71/-3.9	-3.98/-4.08	-4.92/-5.75	-6.4/-6.74	-7.9/-9.04	-8.94/-9.97	-10.24/-10.28	-9.38/-9.39	-8.96/-10.63	-11.39/-9.92	-8.53/-6.15	-4.81/-3.58	-2.81/-2.64	-2.28/-2.49	-3.15/-4.11	-5.19/-6.15	-6.85/-7.23	-7.27/-7.88	-8.35/-9.13	-9.68/-10.65	-11.11/-11.39	-10.06/-8.31
Theta(15°)	-14.33/-12.29	-9.06/-6.34	-4.03/-3.34	-2.76/-3.1	-4.04/-5.11	-5.89/-7.47	-7.97/-8.29	-8/-7.6	-7.92/-7.53	-7.14/-6.65	-6.6/-6.27	-5.49/-4.66	-4.01/-4.04	-4.25/-4.1	-3.69/-3.02	-2.51/-3.02	-4.21/-4.8	-3.95/-2.51	-1.57/-1.37	-2.28/-4.62	-8.46/-14.44	-19.04/-18.85	-19.01/-18.83	-17.73/-16.2
Theta(22.5°)	-2.61/-1.66	-1.47/-2.22	-2.68/-2.17	-1.58/-2.41	-4.32/-4.37	-3.04/-1.37	-1.03/-1.43	-2.33/-3.02	-4.12/-5.41	-6.54/-7.44	-7/-7.46	-7.49/-7.13	-5.93/-4.24	-3.67/-5.27	-6.55/-4.33	-2.29/-2.57	-3.82/-3.68	-2.58/-2.12	-2.6/-3.31	-5.08/-8.69	-16.44/-15.46	-12.78/-12.48	-13.55/-10.03	-6.71/-4.16
Theta(30°)	-3.37/-2.1	-0.86/-0.98	-1.98/-1.2	-0.09/-1.43	-6.14/-6.24	-3.94/-3.43	-3.67/-4.22	-5.74/-5.06	-3.05/-1.8	-1.77/-2.25	-3.64/-5.33	-5.22/-2.84	-2.81/-4.65	-4.79/-4.92	-7.66/-8.66	-5.55/-8.27	-16.29/-8.65	-5.86/-5.33	-5.12/-5.89	-8.45/-14	-17.27/-18.41	-17.96/-12.66	-8.71/-6.33	-4.17/-3.57
Theta(37.5°)	-1.56/-1.93	-3.36/-2.54	-2.74/-2.76	-0.64/-2.93	-5.2/-1.44	-1.24/-1.73	-2.07/-1.53	-1.06/-1.3	-1.82/-2.51	-3.05/-2.92	-2.79/-3.57	-4.4/-5.59	-5.29/-5.73	-6.15/-5.34	-6.61/-12.79	-19.06/-15.26	-17.66/-11.51	-8.04/-6.61	-6.46/-7.79	-10.27/-10.23	-12.29/-15.12	-11.72/-6.03	-3.72/-2.9	-1.79/-1.91
Theta(45°)	-0.03/-1.84	0.63/-2.2	-1.95/-3.87	-1.47/-3.37	-3.97/-1.37	-1.02/-0.44	-1.54/-0.12	0.85/-2.19	-3.67/-2.24	-2.65/-1.66	-0.55/-1.7	-3.39/-3.69	-3.01/-2.69	4.1/-5.67	-3.55/-3.91	-10.43/-8.26	-9.29/-12.98	-18.68/-8.78	-7.28/-10.97	-11.97/-9.99	-6.28/-6.11	-5.37/-3.83	-5.74/-6.78	-3.35/-1.6
Theta(52.5°)	-2.95/-0.69	0.82/-1.74	-1.65/-3.78	-4.37/-5.24	-5.09/-4.89	-1.98/-1.04	-3.7/-0.19	0.27/-3.34	0.44/2.4	1.98/2.61	3.39/1.09	-1.09/-2.82	-2.51/-1.7	-2.65/-2.96	-1.9/-1.89	-7.21/-7.8	-8.35/-7.33	-16.61/-9.34	-8.41/-15.17	-11.59/-6.01	-2.65/-1.78	-2.27/-4.35	-12.04/-18.43	-7.06/-2.34
Theta(60°)	-4.01/-2.57	0.09/0.65	-0.33/-1.41	-4/-3.29	-3.26/-7.09	-1.27/-1.15	-2.46/0.16	0.43/-0.73	1.29/1.81	1.23/2.01	2.65/0.59	-0.79/-2.72	-2.79/-2.95	-1.78/-2.32	-4.24/-2.86	-6.35/-6.84	-6.48/-6.34	-10.12/-5.43	-7.18/-10.26	-8.75/-5.82	-2.31/-1.15	-1.2/-3.14	-6.26/-9.26	-8.33/-4.58
Theta(67.5°)	-0.95/-0.26	-0.25/-1.5	-0.35/-0.87	-2.91/-1.3	-0.23/-3.75	0.61/0.3	0.49/1.13	1.31/0.54	3.26/3.77	1.6/-0.81	-0.97/-3.51	-3.63/-3.19	-1.17/-1.6	-4.28/-2.51	-5.55/-4.76	-4.91/-6.02	-5.78/-2.94	-7.18/-7.3	-4.74/-3.07	-1.51/-1.23	-1.92/-2.79	-5.18/-8.71	-6.46/-1.98	
Theta(75°)	-0.04/0.46	-1.14/0.61	-1.1/-0.36	-1.89/-0.36	0.41/-2.71	0.42/0.7	0.69/0.4	-0.43/-0.01	1.21/0.91	3.74/5.55	1.29/-2.32	-1.49/-3.96	-6.43/-2.89	-0.62/-0.04	-2.66/-3.25	-5.01/-3.91	-3.97/-4.36	-3.24/-1.65	-6.68/-5.04	-4.58/-2.74	-2.27/-2.82	-3.94/-3.83	-5.64/-10.33	-6.3/-0.28
Theta(82.5°)	-0.92/-0.42	-2.27/-0.98	-2.9/-1.43	-2.72/-1.37	-0.65/-2.87	-0.35/-0.52	0.08/0.66	-3.02/-1.79	0.09/0.19	2.66/3.37	-0.07/-4.04	-2.57/-4.75	-8.6/-4.64	-1.76/-1.41	-4.5/-3.56	-4.14/-2.82	-3.61/-4.98	-1.76/-1.34	-6.78/-4.39	-5.05/-2.61	-3.09/-4.42	-5.77/-4.46	-5.86/-13.23	-7.99/-0.72
Theta(90°)	-1.36/-1.06	-1.9/-2.35	-2.73/-1.32	-3.24/-3.81	-2.63/-4.97	-1.93/-2.95	-0.63/-2.14	-7.23/-4.65	-2.15/-1.57	-0.05/-1.83	-0.95/-5.77	-5.12/-5.91	-11.08/-7.76	-3.46/-4.05	-5.74/-6.74	-3.74/-2.99	-2.92/-5.28	-3.22/-2.64	-9.97/-4.27	-6.73/-5.4	-5.57/-5.83	-7.36/-6.05	-7.1/-17.31	-11.1/-3.48
Theta(97.5°)	-5.49/-5.54	-4.62/-5.65	-3.91/-2.93	-7.84/-8.73	-4.65/-7.62	-3.8/-4.95	-2/-5.67	-9.94/-7.34	-4.68/-3.77	-5.34/-1.46	-2.4/-7.37	-5.93/-7.49	-13.02/-12.58	-4.28/-6.94	-9.68/-11.88	-7.66/-3.66	-4.56/-8.24	-4.59/-5.38	-16.71/-7.19	-9.12/-8.2	-7.89/-8.82	-8.65/-6.64	-6.97/-13.95	-13.69/-7.85
Theta(105°)	-11.42/-14.2	-7.15/-10.86	-6.38/-5.67	-16.81/-7.67	-4.1/-9.27	-5.69/-8.82	-4.93/-11.84	-9.37/-12.25	-7.3/-6.95	-9.48/-3.21	-2.96/-8.27	-9.28/-11.12	-14.53/-18.04	-7.05/-10.04	-14.3/-17.97	-11.7/-6.28	-6.15/-17.21	-7.83/-7.62	-18.32/-12.14	-10.61/-12.03	-10.91/-12.73	-9.28/-9.16	-9.01/-10.94	-10.54/-6.72
Theta(112.5°)	-7.93/-11.28	-12.49/-14.46	-15.25/-12	-8/-4.75	-4.95/-16.48	-6.56/-9.72	-9.13/-10.66	-10.24/-13.9	-9.72/-13.14	-8.87/-4.87	-5.59/-9.68	-15.29/-14.81	-17.84/-18.28	-8.71/-10.13	-11.56/-17.21	-15.37/-6.39	-7.75/-17.47	-6.24/-8.46	-18.86/-13.19	-17.83/-11.77	-6.82/-17.96	-11.91/-11.22	-12.78/-9.49	-6.42/-4.51



Freq(Hz)	6.175G	6.475G	6.695G	6.995G
Ant. 1 Max Gain (dBi)	3.83	3.43	4.26	3.5
Ant. 2 Max Gain (dBi)	3.75	3.43	4.38	5.89
Ant. 3 Max Gain (dBi)	5.24	3.87	4.64	5.27
Ant. 4 Max Gain (dBi)	4.65	4.19	4.59	4.86
Ant. 1 Polarization/ $\theta(^{\circ})/\phi(^{\circ})$	Phi/60/120	Phi/67.5/37.5	Phi/60/127.5	Phi/67.5/142.5
Ant. 2 Polarization/ $\theta(^{\circ})/\phi(^{\circ})$	Phi/52.5/210	Phi/75/67.5	Phi/60/217.5	Phi/30/240
Ant. 3 Polarization/ $\theta(^{\circ})/\phi(^{\circ})$	Phi/60/30	Phi/60/37.5	Phi/60/45	Phi/67.5/37.5
Ant. 4 Polarization/ $\theta(^{\circ})/\phi(^{\circ})$	Phi/67.5/30	Phi/60/315	Phi/30/315	Phi/60/322.5
Max Gain (dBi)	5.24	4.19	4.64	5.89
DG [1SS] (dBi)	9.32	8.48	8.63	8.56
DG [2SS] (dBi)	6.32	5.48	5.63	5.89
DG [4SS] (dBi)	5.24	4.19	4.64	5.89



Radiated Composite Gain Data of 6GHz

Appendix B

DG 1SS Result

Freq(Hz)	6.175GPol.	PhiL	Phi(30°)Phi(37.5°)	Phi(45°)Phi(52.5°)	Phi(60°)Phi(67.5°)	Phi(75°)Phi(82.5°)	Phi(90°)Phi(97.5°)	Phi(105°)Phi(112.5°)	Phi(120°)Phi(127.5°)	Phi(135°)Phi(142.5°)	Phi(150°)Phi(157.5°)	Phi(165°)Phi(172.5°)	Phi(180°)Phi(187.5°)	Phi(195°)Phi(202.5°)	Phi(210°)Phi(217.5°)	Phi(225°)Phi(232.5°)	Phi(240°)Phi(247.5°)	Phi(255°)Phi(262.5°)	Phi(270°)Phi(277.5°)	Phi(285°)Phi(292.5°)	Phi(300°)Phi(307.5°)	Phi(315°)Phi(322.5°)	Phi(330°)Phi(337.5°)	Phi(345°)Phi(352.5°)																								
DG(dB)	Phi(0°)Phi(7.5°)	Phi(15°)Phi(22.5°)	Phi(30°)Phi(37.5°)	Phi(45°)Phi(52.5°)	Phi(60°)Phi(67.5°)	Phi(75°)Phi(82.5°)	Phi(90°)Phi(97.5°)	Phi(105°)Phi(112.5°)	Phi(120°)Phi(127.5°)	Phi(135°)Phi(142.5°)	Phi(150°)Phi(157.5°)	Phi(165°)Phi(172.5°)	Phi(180°)Phi(187.5°)	Phi(195°)Phi(202.5°)	Phi(210°)Phi(217.5°)	Phi(225°)Phi(232.5°)	Phi(240°)Phi(247.5°)	Phi(255°)Phi(262.5°)	Phi(270°)Phi(277.5°)	Phi(285°)Phi(292.5°)	Phi(300°)Phi(307.5°)	Phi(315°)Phi(322.5°)	Phi(330°)Phi(337.5°)	Phi(345°)Phi(352.5°)																								
Theta	0	7.5	15	22.5	30	37.5	45	52.5	60	67.5	75	82.5	90	97.5	105	112.5	120	127.5	135	142.5	150	157.5	165	172.5	180	187.5	195	202.5	210	217.5	225	232.5	240	247.5	255	262.5	270	277.5	285	292.5	300	307.5	315	322.5	330	337.5	345	352.5
Theta	0	7.5	15	22.5	30	37.5	45	52.5	60	67.5	75	82.5	90	97.5	105	112.5	120	127.5	135	142.5	150	157.5	165	172.5	180	187.5	195	202.5	210	217.5	225	232.5	240	247.5	255	262.5	270	277.5	285	292.5	300	307.5	315	322.5	330	337.5	345	352.5
Theta	0	7.5	15	22.5	30	37.5	45	52.5	60	67.5	75	82.5	90	97.5	105	112.5	120	127.5	135	142.5	150	157.5	165	172.5	180	187.5	195	202.5	210	217.5	225	232.5	240	247.5	255	262.5	270	277.5	285	292.5	300	307.5	315	322.5	330	337.5	345	352.5



Radiated Composite Gain Data of 6GHz

Appendix B

Table with 37 columns (Theta and Phi angles) and 37 rows (Frequency and Theta/Phi values). It contains numerical data for radiated composite gain across various frequencies and angles.



Radiated Composite Gain Data of 6GHz

Appendix B

Theta (°)	7.891-6.48	-5.431-4.74	-4.333-3.27	-2.211-1.58	-0.911-0.44	-0.961-2.26	-3.641-5	-5.631-5.79	-5.541-4.49	-3.111-5.53	-3.121-4.62	-5.011-4.48	-4.571-5.08	-4.271-3	-2.651-3.23	-4.411-4.78	-3.831-3.06	-3.041-3.48	-3.491-3.18	-2.711-2.38	-2.661-3.26	-3.311-3.76	-5.181-8.36	-12.811-10.44	
Gain	Φ(0°)/Φ(7.5°)	Φ(15°)/Φ(22.5°)	Φ(30°)/Φ(37.5°)	Φ(45°)/Φ(52.5°)	Φ(60°)/Φ(67.5°)	Φ(75°)/Φ(82.5°)	Φ(90°)/Φ(97.5°)	Φ(105°)/Φ(112.5°)	Φ(120°)/Φ(127.5°)	Φ(135°)/Φ(142.5°)	Φ(150°)/Φ(157.5°)	Φ(165°)/Φ(172.5°)	Φ(180°)/Φ(187.5°)	Φ(195°)/Φ(202.5°)	Φ(210°)/Φ(217.5°)	Φ(225°)/Φ(232.5°)	Φ(240°)/Φ(247.5°)	Φ(255°)/Φ(262.5°)	Φ(270°)/Φ(277.5°)	Φ(285°)/Φ(292.5°)	Φ(300°)/Φ(307.5°)	Φ(315°)/Φ(322.5°)	Φ(330°)/Φ(337.5°)	Φ(345°)/Φ(352.5°)	
Gain	0.0	-1.391-0.04	2.970-0.77	-1.151-2.58	-0.851-0.82	-0.411-1.95	-3.851-5.67	-5.481-1.53	-0.131-0.09	1.280-0.97	2.640-0.92	0.611	0.311-0.22	-0.851-4.65	-3.210-97	1.641-0.01	-0.051-0.73	1.281-33	-0.211-3.63	-4.091-1.88	-0.441	1.381-52	1.411-83	0.541-74	0.621-0.02
Gain	0(°)	-1.391-0.04	2.970-0.77	-1.151-2.58	-0.851-0.82	-0.411-1.95	-3.851-5.67	-5.481-1.53	-0.131-0.09	1.280-0.97	2.640-0.92	0.611	0.311-0.22	-0.851-4.65	-3.210-97	1.641-0.01	-0.051-0.73	1.281-33	-0.211-3.63	-4.091-1.88	-0.441	1.381-52	1.411-83	0.541-74	0.621-0.02
Gain	0(°)	-1.391-0.04	2.970-0.77	-1.151-2.58	-0.851-0.82	-0.411-1.95	-3.851-5.67	-5.481-1.53	-0.131-0.09	1.280-0.97	2.640-0.92	0.611	0.311-0.22	-0.851-4.65	-3.210-97	1.641-0.01	-0.051-0.73	1.281-33	-0.211-3.63	-4.091-1.88	-0.441	1.381-52	1.411-83	0.541-74	0.621-0.02
Gain	0(°)	-1.391-0.04	2.970-0.77	-1.151-2.58	-0.851-0.82	-0.411-1.95	-3.851-5.67	-5.481-1.53	-0.131-0.09	1.280-0.97	2.640-0.92	0.611	0.311-0.22	-0.851-4.65	-3.210-97	1.641-0.01	-0.051-0.73	1.281-33	-0.211-3.63	-4.091-1.88	-0.441	1.381-52	1.411-83	0.541-74	0.621-0.02



Radiated Composite Gain Data of 6GHz

Appendix B

Theta	6.175GPol.	ThetaAnt 2	Phi(7.5)	Phi(15)	Phi(22.5)	Phi(30)	Phi(37.5)	Phi(45)	Phi(52.5)	Phi(60)	Phi(67.5)	Phi(75)	Phi(82.5)	Phi(90)	Phi(105)	Phi(120)	Phi(135)	Phi(150)	Phi(165)	Phi(180)	Phi(195)	Phi(210)	Phi(225)	Phi(240)	Phi(255)	Phi(270)	Phi(285)	Phi(300)	Phi(315)	Phi(330)	Phi(345)	
Theta(7.5)	-0.561-1.93	-3.651-1.71	0.742-32	2.652-55	3.122-9	1.090-36	-0.091-05	0.851-04	-1.411-09	-0.111-87	-3.321-33	-4.311-38	-1.21-02	0.480-19	0.061-07	-1.851-36	-2.981-24	-2.281-08	-0.221-13	1.092-28	2.040-38	-1.561-67	-1.771-102	-0.570-58								



Radiated Composite Gain Data of 6GHz

Appendix B

Freq(Hz)	Theta/Pol	Phi(Ant 3)	Phi(15°)(22.5°)	Phi(30°)(37.5°)	Phi(45°)(52.5°)	Phi(60°)(67.5°)	Phi(75°)(82.5°)	Phi(90°)(97.5°)	Phi(105°)(112.5°)	Phi(120°)(127.5°)	Phi(135°)(142.5°)	Phi(150°)(157.5°)	Phi(165°)(172.5°)	Phi(180°)(187.5°)	Phi(195°)(202.5°)	Phi(210°)(217.5°)	Phi(225°)(232.5°)	Phi(240°)(247.5°)	Phi(255°)(262.5°)	Phi(270°)(277.5°)	Phi(285°)(292.5°)	Phi(300°)(307.5°)	Phi(315°)(322.5°)	Phi(330°)(337.5°)	Phi(345°)(352.5°)
18.34-17.77	-18.44-17.78	-17.86-18.87	-17.85-19.18	-18.21-17.22	-18.31-18.65	-17.81-18.64	-18.57-18.84	-17.75-18.78	-18.09-17.96	-17.84-19.66	-18.64-17.38	-18.43-18.38	-19.05-18.11	-18.96-18.9	-17.63-17.7	-18.63-18.12	-18.58-18.34	-18.58-18.12	-19.19-10.6	-18.67-18.5	-18.68-19.22	-18.51-18.29	-17.59-18.2		
18.46-17.75	-17.24-18.78	-19.18-18.22	-17.53-17.89	-18.08-18.22	-19.27-18.25	-19.31-18.01	-17.79-19.06	-18.75-19.05	-18.17-17.72	-18.24-18.61	-15.25-13.88	-13.96-15.43	-18.12-17.45	-17.99-19.03	-19.23-17.69	-18.34-18.14	-19.08-17.89	-18.64-18.46	-17.96-17.75	-17.44-17.66	-17.86-17.92	-18.96-18.47	-19.13-17.65		
18.27-19.17	-16.61-14.62	-14.11-14.75	-13.32-11.92	-11.46-12.56	-18.73-17.39	-19.16-15.36	-11.92-9.27	-7.53-6.43	-7.67-8.54	-9.86-11.97	-11.36-9.04	-7.58-6.89	-6.81-6.78	-7.45-8.94	-10.59-9.86	-8.38-6.9	-5.93-5.48	-3.88-6.9	-5.93-6.61	-6.25-7.09	-8.06-9.14	-10.05-12.9			
13.28-11.95	-10.75-11.39	-15.03-16.46	-14.83-15.41	-18.81-18.98	-17.32-18.55	-16.93-15	-15.05-14.41	-13.36-13.89	-15.22-13	-9.93-8.53	-7.29-6.48	-8.28-15.88	-18.39-11.99	-10.69-10.19	-9.05-7.54	-6.91-7.86	-10.22-12.42	-14.01-13.52	-11.61-9.98	-9.09-8.69	-8.54-8.79	-9.79-11.85	-15.31-16.55		
19.07-18.29	-15.37-18.25	-19.43-17.47	-17.05-14.62	-14.75-15.48	-16.14-14.54	-11.13-10.3	-11.82-15.15	-18.98-18.95	-18.43-18.32	-12.09-8.78	-6.71-4.95	-6.82-15.34	-18.82-18.76	-18.85-18.17	-17.86-14.82	-13.44-15.1	-18.18-18.86	-15.39-11.83	-10.59-11.83	-11.94-13.04	-13.41-12.05	-10.59-6.69	-11.51-17.51		
18.01-17.27	-18.21-17.48	-17.65-14.81	-11.46-10.45	-12.29-11.73	-10.11-9.64	-9.29-9.82	-12.25-13.64	-14.15-16.75	-18.32-18.5	-12.21-10	-9.52-9.49	-15.31-18.12	-13.47-13.65	-19.31-18.5	-18.23-18.87	-18.64-17.19	-16.26-18.89	-19.16-18.03	-15.27-11.29	-17.17-18.02	-17.13-12.07	-13.29-13.48	-10.05-12.9		
17.61-18.17	-19.28-18.95	-18.21-18.69	-13-12.49	-13.67-15.37	-11.81-9.02	-9.22-14.73	-18.03-13.59	-10.75-10.01	-16.59-17.92	-16.04-12.02	-17.19-18.33	-15.91-16.04	-14.55-12.98	-19.02-18.3	-18.33-14.15	-15.85-18.94	-16.75-19.27	-18.08-17.35	-17.55-15.18	-18.97-18.65	-19.04-18.6	-15.32-18.44	-18.51-18.08		
18.64-18.04	-18.37-17.57	-18.67-18.95	-17.72-17.83	-17.48-17.41	-18.12-13.06	-12.76-17.8	-18.73-14.25	-14.43-13.38	-16.29-19.17	-15.26-19.6	-13.98-16.35	-11.98-15.21	-18.69-13.78	-18.18-17.32	-13.24-10.06	-12.29-19.69	-17.91-6.69	-17.11-19.07	-15.98-12.84	-15.09-18.98	-18.41-18.01	-13.91-14.1	-18.66-17.83		
18.93-17.74	-18.76-17.92	-18.79-15.61	-14.06-15.37	-16.24-18.7	-17.81-14.16	-13.39-18.76	-16.93-13.32	-17.48-18.06	-15.31-18.99	-18.91-15.77	-17.21-18.57	-12.79-14.51	-19.14-18.78	-16.87-17.02	-15.76-10.95	-12.28-18.77	-19.01-17.64	-15.63-18.75	-17.88-13.84	-17.78-19.14	-19.16-19.14	-13.91-14.3	-18.34-18.59		
18.57-17.42	-17.84-18.06	-18.49-16.74	-12.85-11.69	-13.66-15.7	-16.15-14.1	-10.77-15.1	-15.01-12.43	-16.16-16.24	-12.34-17.64	-19.31-18.82	-19.85-19.63	-13.68-13	-12.55-12.77	-12.09-15.22	-18.24-18.12	-16.61-18.87	-18.17-16.08	-14.26-18.75	-18.61-15.84	-18.68-16.74	-15.16-18.05	-14.63-14.99	-17.44-17.86		
19.21-19.02	-18.72-18.02	-17.8-18.45	-16.98-15.28	-16.36-14.82	-10.43-15.35	-13.99-11.54	-14.11-13.78	-12.21-15.06	-17.34-17.78	-18.52-19.13	-16.71-17.39	-18.21-15.73	-14.56-17.21	-19.32-18.76	-18.85-18.94	-17.43-17.87	-15.38-16.28	-18.71-18.02	-17.17-18.79	-11.08-18.37	-14.24-19.24	-17.1-18.2	-18.12-15.35		
18.57-18.66	-17.46-18.84	-17.86-18.31	-19.11-17.14	-18.98-15.14	-16.68-14.82	-10.75-17.97	-13.99-13.78	-15.36-14.86	-12.68-13.41	-13.75-14.69	-13.07-13.39	-13.64-15.09	-14.14-16.58	-13.12-12.43	-12.69-18.07	-17.49-18.49	-18.04-18.78	-12.11-17.28	-15.87-13.78	-18.42-18.13	-16.25-18.14	-18.39-19.88	-19.2-16.37		
16.14-19.09	-18.89-18.6	-17.86-18.97	-18.37-18.07	-17.63-16.25	-18.39-14.62	-12.98-17.47	-14.11-14.93	-17.02-17.78	-14.22-13	-14.75-16.71	-13.07-13.58	-15.92-16.76	-18.92-18.1	-16.72-13.71	-13.09-14.54	-17.17-17.75	-18.64-18.01	-13.38-14.21	-17.89-13.47	-18.88-18.04	-18.66-18.11	-17.87-17.7	-18.68-18.19		
17.86-18.59	-18.39-18.41	-17.9-18.26	-18.73-19.54	-19.02-18.9	-18.45-13.81	-17.06-17.62	-17.34-17.78	-18.52-19.13	-16.71-17.39	-18.21-15.73	-14.56-17.21	-19.32-18.76	-18.85-18.94	-17.43-17.87	-15.38-16.28	-18.71-18.02	-17.17-18.79	-15.64-18	-18.14-15.91	-18.04-18.76	-18.61-17.86	-18.57-17.98	-17.66-18.10		
17.31-18.19	-17.99-19.23	-18.52-18.45	-17.62-18.44	-17.99-18.56	-18.22-15.45	-18.91-9.01	-18.72-19.25	-18.16-19	-17.14-14.91	-17.78-17.07	-18.61-18.95	-18.05-18.1	-18.57-19.21	-17.98-18.66	-19.01-18.62	-17.89-18.03	-17.49-18.14	-17.71-18.24	-18.57-17.39	-18.94-18.43	-19.21-18.22	-19.34-18.23			
17.94-18.7	-19.26-18.93	-18.31-18.35	-19.05-18.78	-17.81-18.32	-16.59-18.47	-18.58-17.35	-18.18-17.12	-18.98-18.06	-18.15-17.07	-19.32-18.76	-18.23-18.17	-16.52-18.76	-18.78-18.12	-19.01-19.07	-18.68-17.54	-19.03-19	-18.69-19.06	-19.05-17.72	-18.12-18.57	-19.13-15.54	-15.5-19.41	-17.58-17.87	-17.47-19.61		
18.48-18.51	-17.75-19.07	-17.92-18.67	-18.75-17.8	-18.37-15.73	-17.1-18.51	-17.99-16.46	-18.43-18.1	-19.21-18.55	-17.71-18.68	-17.96-17.14	-18.76-17.94	-18.91-18.86	-18.83-18.8	-19.46-17.57	-18.95-18.26	-16.21-18.42	-18.76-18.16	-15.76-18.65	-16.64-17.55	-18.44-14.34	-15.65-18.99	-18.91-18.41	-18.79-16.53		
18.07-18.23	-18.66-18.48	-19.2-18.53	-17.73-19.32	-17.83-18.64	-19.14-16.74	-19.05-17.64	-19.12-17.57	-18.07-19.2	-18.4-17.94	-18.89-18.08	-18.26-18.21	-18.66-18.2	-17.42-18.81	-17.52-18.09	-18.62-18.37	-16.25-17.47	-17.98-18.13	-13.76-18.75	-15.88-17.34	-16.34-18.77	-18.24-17.77	-18.61-19.36	-18.81-17.38		
18.94-17.54	-18.1-19.39	-17.65-18.88	-18.54-18.49	-17.92-18.7	-18.17-19.8	-18.35-18.23	-18.03-17.96	-17.71-18.67	-18.08-17.47	-18.39-18.87	-19.12-17.66	-18.28-19	-17.96-18.72	-19.01-19.08	-17.53-18.09	-18.28-18.86	-18.96-18.1	-17.37-17.59	-19.25-19.86	-18.65-18.48	-18.48-17.71	-19.24-18.94	-18.17-18.37		
18.02-19.17	-17.32-18.29	-18.19-19.34	-18.34-18.21	-17.96-17.88	-18.22-19.11	-18.67-18.84	-17.84-18.84	-17.37-18.26	-18.69-18.72	-18.11-17.75	-18.36-18.1	-18.31-17.42	-17.94-18.69	-17.94-16.36	-18.13-18.91	-18.28-18.72	-17.65-16.35	-18.01-17.85	-17.79-18.47	-18.32-18.68	-17.89-18.55	-18.39-18.6	-17.55-18.4		
18.46-17.99	-18.84-18.19	-17.84-17.17	-18.85-19.09	-18.38-17.79	-19.69-18.37	-18.47-17.7	-18.76-18.88	-18.94-19.1	-18.51-17.39	-18.68-18.17	-17.54-17.19	-18.75-18.76	-18.39-18.16	-17.33-18.49	-18.19-18.33	-18.29-18.81	-18.19-18.33	-18.29-18.81	-17.51-17.91	-18.61-18.36	-18.14-18.16	-17.71-18.9	-17.48-18.1		
18.36-17.77	-18.21-19.59	-17.87-17.75	-18.11-18.88	-17.81-18.32	-18.15-18.88	-15.56-17.74	-19.11-18.82	-17.95-18.05	-18.87-18.89	-18.65-18.1	-18.16-18.99	-18.69-18.98	-18.91-17.18	-18.54-18.45	-18.39-18.05	-18.51-18.33	-18.12-18.06	-19.25-19.09	-19.21-18.45	-18.11-18.1	-18.48-18.87	-19.21-17.18	-19.14-19.16		
17.69-17.87	-17.23-18.27	-19.29-18.86	-19.08-17.89	-18.34-17.56	-18.61-18.56	-18.58-18.72	-18.1-18.72	-17.67-17.88	-18.56-19	-18.04-18.35	-17.97-18.43	-17.84-19.2	-18.23-19.02	-18.43-17.3	-18.78-17.64	-18.74-18.31	-19.06-17.92	-19.34-18.49	-17.32-17.75	-18.58-18.07	-18.93-17.71	-18.24-18.5	-18.06-18.5		
19.31-18.48	-18.41-18.49	-16.66-18.83	-17.15-17.03	-18.71-17.11	-18.95-18.47	-18.04-18.29	-18.2-17.71	-18.43-18.51	-18.32-17.7	-18.11-17.71	-17.74-18.84	-18.88-19.08	-17.42-18.82	-19.19-18.04	-18.28-17.21	-17.73-18.63	-17.72-17.72	-18.47-18.41	-19.12-17.79	-18.97-18.27	-18.19-17.49	-19.31-19.02	-17.94-18.92		
18.19-18.22	-19.38-18.38	-17.56-18.99	-18.88-17.48	-19.07-17.68	-18.34-18.64	-18.61-18.03	-19.17-18.06	-18.58-18.98	-18.11-17.5	-19.37-19.02	-18.15-18.78	-17.17-17.78	-18.01-18.24	-17.46-18.2	-18.11-18.66	-17.79-18.63	-17.96-17.92	-17.98-18.12	-18.26-18.5	-18.45-19.22	-18.74-19.03	-19.1-19.04	-18.93-18.17		



Radiated Composite Gain Data of 6GHz

Appendix B

Theta (°)	-11.82/-17.93	-16.57/-17.73	-17.29/-18.68	-19.57/-14.12	-10.9/-8.88	-8.4/-8.34	-8.34/-7.99	-7.92/-8.46	-9.42/-10.79	-11.63/-10.63	-8.67/-8.01	-8.76/-10.58	-12.48/-14.1	-13.32/-9.85	-7.12/-5.39	-4.92/-5.76	-7.61/-10.4	-10.15/-8.88	-7.08/-5.79	-4.97/-4.55	-4.28/-4.58	-5.15/-5.61	-5.73/-5.7	-6.35/-8.13
Gain	Phi(0°)Phi(7.5°)	Phi(15°)Phi(22.5°)	Phi(30°)Phi(37.5°)	Phi(45°)Phi(52.5°)	Phi(60°)Phi(67.5°)	Phi(75°)Phi(82.5°)	Phi(90°)Phi(97.5°)	Phi(105°)Phi(112.5°)	Phi(120°)Phi(127.5°)	Phi(135°)Phi(142.5°)	Phi(150°)Phi(157.5°)	Phi(165°)Phi(172.5°)	Phi(180°)Phi(187.5°)	Phi(195°)Phi(202.5°)	Phi(210°)Phi(217.5°)	Phi(225°)Phi(232.5°)	Phi(240°)Phi(247.5°)	Phi(255°)Phi(262.5°)	Phi(270°)Phi(277.5°)	Phi(285°)Phi(292.5°)	Phi(300°)Phi(307.5°)	Phi(315°)Phi(322.5°)	Phi(330°)Phi(337.5°)	Phi(345°)Phi(352.5°)
Theta (°)	-11.82/-17.93	-16.57/-17.73	-17.29/-18.68	-19.57/-14.12	-10.9/-8.88	-8.4/-8.34	-8.34/-7.99	-7.92/-8.46	-9.42/-10.79	-11.63/-10.63	-8.67/-8.01	-8.76/-10.58	-12.48/-14.1	-13.32/-9.85	-7.12/-5.39	-4.92/-5.76	-7.61/-10.4	-10.15/-8.88	-7.08/-5.79	-4.97/-4.55	-4.28/-4.58	-5.15/-5.61	-5.73/-5.7	-6.35/-8.13
Gain	Phi(0°)Phi(7.5°)	Phi(15°)Phi(22.5°)	Phi(30°)Phi(37.5°)	Phi(45°)Phi(52.5°)	Phi(60°)Phi(67.5°)	Phi(75°)Phi(82.5°)	Phi(90°)Phi(97.5°)	Phi(105°)Phi(112.5°)	Phi(120°)Phi(127.5°)	Phi(135°)Phi(142.5°)	Phi(150°)Phi(157.5°)	Phi(165°)Phi(172.5°)	Phi(180°)Phi(187.5°)	Phi(195°)Phi(202.5°)	Phi(210°)Phi(217.5°)	Phi(225°)Phi(232.5°)	Phi(240°)Phi(247.5°)	Phi(255°)Phi(262.5°)	Phi(270°)Phi(277.5°)	Phi(285°)Phi(292.5°)	Phi(300°)Phi(307.5°)	Phi(315°)Phi(322.5°)	Phi(330°)Phi(337.5°)	Phi(345°)Phi(352.5°)
Theta (°)	-11.82/-17.93	-16.57/-17.73	-17.29/-18.68	-19.57/-14.12	-10.9/-8.88	-8.4/-8.34	-8.34/-7.99	-7.92/-8.46	-9.42/-10.79	-11.63/-10.63	-8.67/-8.01	-8.76/-10.58	-12.48/-14.1	-13.32/-9.85	-7.12/-5.39	-4.92/-5.76	-7.61/-10.4	-10.15/-8.88	-7.08/-5.79	-4.97/-4.55	-4.28/-4.58	-5.15/-5.61	-5.73/-5.7	-6.35/-8.13
Gain	Phi(0°)Phi(7.5°)	Phi(15°)Phi(22.5°)	Phi(30°)Phi(37.5°)	Phi(45°)Phi(52.5°)	Phi(60°)Phi(67.5°)	Phi(75°)Phi(82.5°)	Phi(90°)Phi(97.5°)	Phi(105°)Phi(112.5°)	Phi(120°)Phi(127.5°)	Phi(135°)Phi(142.5°)	Phi(150°)Phi(157.5°)	Phi(165°)Phi(172.5°)	Phi(180°)Phi(187.5°)	Phi(195°)Phi(202.5°)	Phi(210°)Phi(217.5°)	Phi(225°)Phi(232.5°)	Phi(240°)Phi(247.5°)	Phi(255°)Phi(262.5°)	Phi(270°)Phi(277.5°)	Phi(285°)Phi(292.5°)	Phi(300°)Phi(307.5°)	Phi(315°)Phi(322.5°)	Phi(330°)Phi(337.5°)	Phi(345°)Phi(352.5°)
Theta (°)	-11.82/-17.93	-16.57/-17.73	-17.29/-18.68	-19.57/-14.12	-10.9/-8.88	-8.4/-8.34	-8.34/-7.99	-7.92/-8.46	-9.42/-10.79	-11.63/-10.63	-8.67/-8.01	-8.76/-10.58	-12.48/-14.1	-13.32/-9.85	-7.12/-5.39	-4.92/-5.76	-7.61/-10.4	-10.15/-8.88	-7.08/-5.79	-4.97/-4.55	-4.28/-4.58	-5.15/-5.61	-5.73/-5.7	-6.35/-8.13

