



# Antenna Composite Gain Test Report

Equipment	WiFi 7 Router
Model Name	SBE1V1K
Applicant	ASKEY COMPUTER CORPORATION 10F, No.119, Jiankang Rd., Zhonghe Dist., New Taipei City, Taiwan
Manufacturer	ASKEY COMPUTER CORPORATION 10F, No.119, Jiankang Rd., Zhonghe Dist., New Taipei City, Taiwan
Standard	KDB 662911 D03 v01
Sample Received	Dec. 08, 2023
Start Test Date	Dec. 09, 2023
Final Test Date	Dec. 09, 2023



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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
2G5G Ant1	1	NA	N03AKBYA	PCB	I-Pex	2.4G+5G
2G5G Ant2	2	NA	N03AKBYB	PCB	I-Pex	2.4G+5G
2G5G Ant3	3	NA	N03AKBYC	PCB	I-Pex	2.4G+5G
2G5G Ant4	4	NA	N03AKBYD	PCB	I-Pex	2.4G+5G
6G Ant1	1	NA	N06AKBYE	PCB	I-Pex	6G
6G Ant2	2	NA	N06AKBYF	PCB	I-Pex	6G
6G Ant3	3	NA	N06AKBG	PCB	I-Pex	6G
6G Ant4	4	NA	N06AKBYH	PCB	I-Pex	6G
IOT Ant	1	NA	N01AKBYJ	PCB	I-Pex	BT+Thread

Note:

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

2G5G Ant1~2G5G Ant4 could transmit/receive simultaneously.

#### 6GHz Operation Mode (4TX/4RX)

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

#### BT Operation Mode (1TX/1RX)

IOT Ant could transmit/receive.

#### Thread Operation Mode (1TX/1RX)

IOT Ant could transmit/receive.

### 2. Test Frequency

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

Band [MHz]	Test Frequency [MHz]
2400-2483.5	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

<b>Test Lab. : Sporton International Inc. Hsinhua Laboratory</b>				
<input checked="" type="checkbox"/> Wen 33rd.St.	<b>ADD:</b>	No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)		
	<b>TEL:</b>	886-3-318-0787	<b>FAX:</b>	886-3-318-0287
Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
Radiated	05CH03-HY	Vivi Jiang	23.5~24.5°C / 50~55%	09/Dec/2023

Note:

Testing Site Information

Brand Name: TDK

Dimension: 11m\*6m\*6m

Characteristic: Fully Anechoic Chamber

#### 4. Test Facility and Configuration

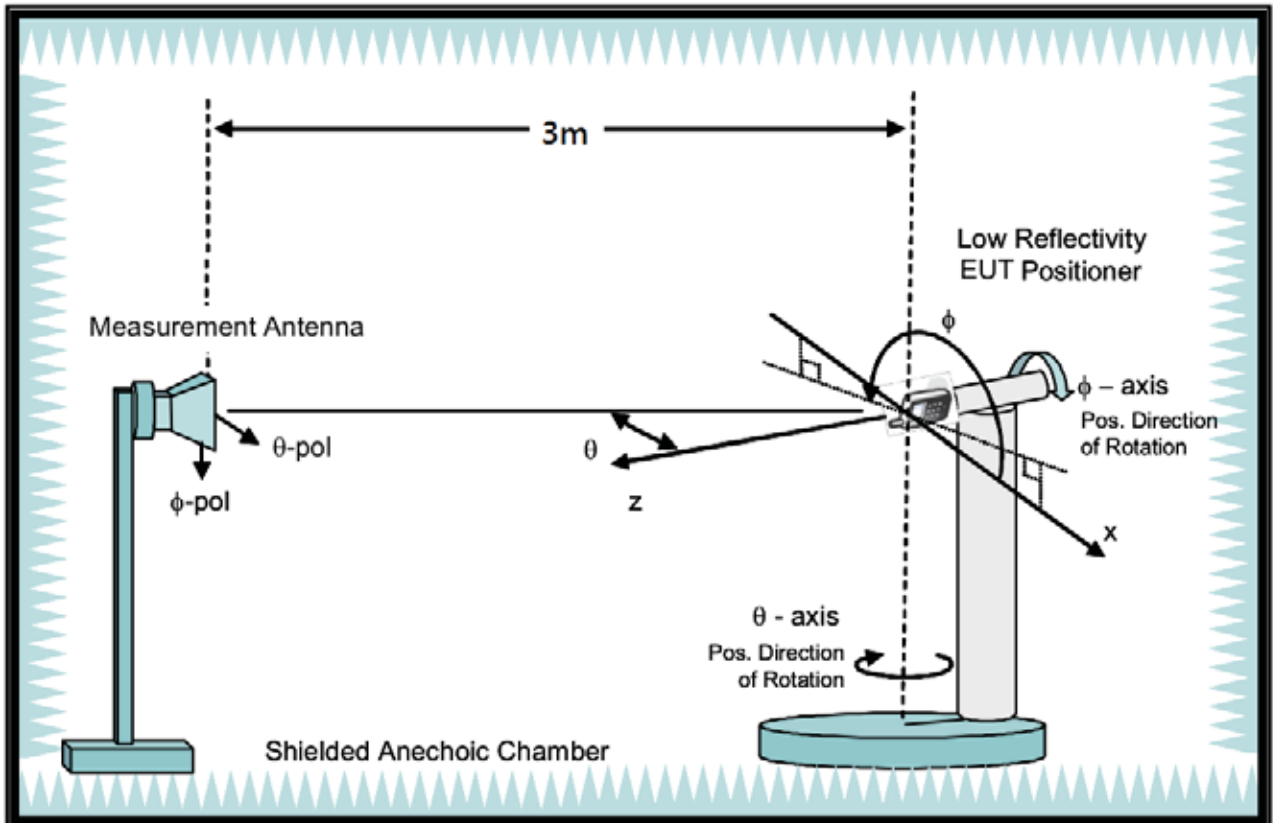
Test configuration: Reference to CITA OTA distributed-axes system configuration.

Chamber: Fully Anechoic Chamber.

Measurement antenna: Dual Polarization Horn antenna

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

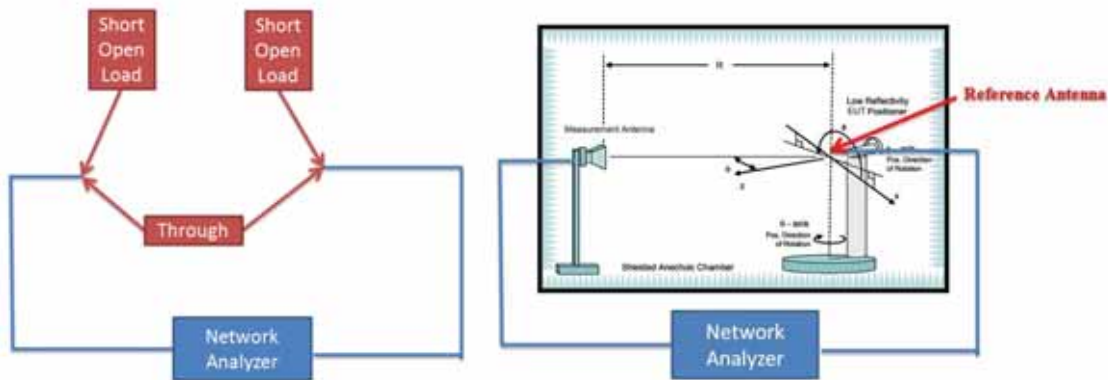
#Reference to CTIA “ctia-test-plan-for-wireless-device-over-the-air-performance-ver-3-7-1”



### 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

2G5G Ant.

Frequency (Hz)	2.45G	5.2G	5.3G	5.6G	5.785G
Ant. 1 (dBi)	-0.32	-3.02	-9.45	-5.22	-8.9
Ant. 2 (dBi)	-0.19	1.96	0.36	3.82	2.15
Ant. 3 (dBi)	-6.32	0.9	4.45	2.1	4.43
Ant. 4 (dBi)	-5.15	-5.82	-2.72	-5.37	-2.25
DG [1SS] (dBi)	3.46	5.06	5.53	5.83	6.19
Polarization	Phi	Theta	Theta	Theta	Theta
$\Theta(^{\circ})$	120	52.5	105	127.5	105
$\Phi(^{\circ})$	322.5	172.5	270	240	262.5

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

6G Ant.

Frequency (Hz)	6.175G	6.475G	6.695G	6.995G
Ant. 1 (dBi)	-2.97	-1.46	-3.36	-0.71
Ant. 2 (dBi)	1.54	0.92	2.41	-0.54
Ant. 3 (dBi)	2.46	2.73	1	0.38
Ant. 4 (dBi)	0.2	1.07	0.42	0.47
DG [1SS] (dBi)	6.56	6.96	6.38	5.94
Polarization	Theta	Theta	Theta	Theta
$\Theta(^{\circ})$	97.5	97.5	105	105
$\Phi(^{\circ})$	352.5	345	345	352.5

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



DG\_1SS max value position calculation

2G5G Ant.

Frequency (Hz)	2.45G	5.2G	5.3G	5.6G	5.785G
Ant. 1 [10^(G/20)]	10^(-0.32/20)	10^(-3.02/20)	10^(-9.45/20)	10^(-5.22/20)	10^(-8.9/20)
Ant. 2 [10^(G/20)]	10^(-0.19/20)	10^(1.96/20)	10^(0.36/20)	10^(3.82/20)	10^(2.15/20)
Ant. 3 [10^(G/20)]	10^(-6.32/20)	10^(0.9/20)	10^(4.45/20)	10^(2.1/20)	10^(4.43/20)
Ant. 4 [10^(G/20)]	10^(-5.15/20)	10^(-5.82/20)	10^(-2.72/20)	10^(-5.37/20)	10^(-2.25/20)
Ant. 1 [10^(G/20)] value	0.964	0.706	0.337	0.548	0.359
Ant. 2 [10^(G/20)] value	0.978	1.253	1.042	1.552	1.281
Ant. 3 [10^(G/20)] value	0.483	1.109	1.669	1.274	1.665
Ant. 4 [10^(G/20)] value	0.553	0.512	0.731	0.539	0.772
Sum All Antenna [Amax]	2.978	3.58	3.78	3.913	4.077
DG [10*log(Amax^2/Nant)]	3.46	5.06	5.53	5.83	6.19

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)

6G Ant.

Frequency (Hz)	6.175G	6.475G	6.695G	6.995G
Ant. 1 [10^(G/20)]	10^(-2.97/20)	10^(-1.46/20)	10^(-3.36/20)	10^(-0.71/20)
Ant. 2 [10^(G/20)]	10^(1.54/20)	10^(0.92/20)	10^(2.41/20)	10^(-0.54/20)
Ant. 3 [10^(G/20)]	10^(2.46/20)	10^(2.73/20)	10^(1/20)	10^(0.38/20)
Ant. 4 [10^(G/20)]	10^(0.2/20)	10^(1.07/20)	10^(0.42/20)	10^(0.47/20)
Ant. 1 [10^(G/20)] value	0.71	0.845	0.679	0.922
Ant. 2 [10^(G/20)] value	1.194	1.112	1.32	0.94
Ant. 3 [10^(G/20)] value	1.327	1.369	1.122	1.045
Ant. 4 [10^(G/20)] value	1.023	1.131	1.05	1.056
Sum All Antenna [Amax]	4.255	4.457	4.171	3.962
DG [10*log(Amax^2/Nant)]	6.56	6.96	6.38	5.94

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

#### 2G5G Ant.

Freq(Hz)	2.45G	5.2G	5.3G	5.6G	5.785G
Ant. 1 Max Gain (dBi)	3.1	4.97	5.15	5.24	5.22
Ant. 2 Max Gain (dBi)	1.08	3.48	3.77	4.84	4.89
Ant. 3 Max Gain (dBi)	1.62	2.48	4.45	4.3	5.28
Ant. 4 Max Gain (dBi)	1.27	1.28	2.25	3.67	4.13
Ant. 1 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Phi/82.5/90	Phi/97.5/90	Phi/112.5/90	Phi/105/90	Phi/97.5/90
Ant. 2 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Phi/142.5/330	Theta/112.5/247.5	Theta/112.5/255	Theta/112.5/247.5	Theta/112.5/247.5
Ant. 3 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Phi/105/247.5	Theta/120/232.5	Theta/105/270	Theta/105/262.5	Theta/112.5/270
Ant. 4 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/60/322.5	Theta/135/52.5	Theta/120/67.5	Theta/90/135	Theta/120/105
Max Gain (dBi)	3.1	4.97	5.15	5.24	5.28
DG [1SS] (dBi)	3.46	5.06	5.53	5.83	6.19
DG [2SS] (dBi)	3.1	4.97	5.15	5.24	5.28
DG [4SS] (dBi)	3.1	4.97	5.15	5.24	5.28

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)



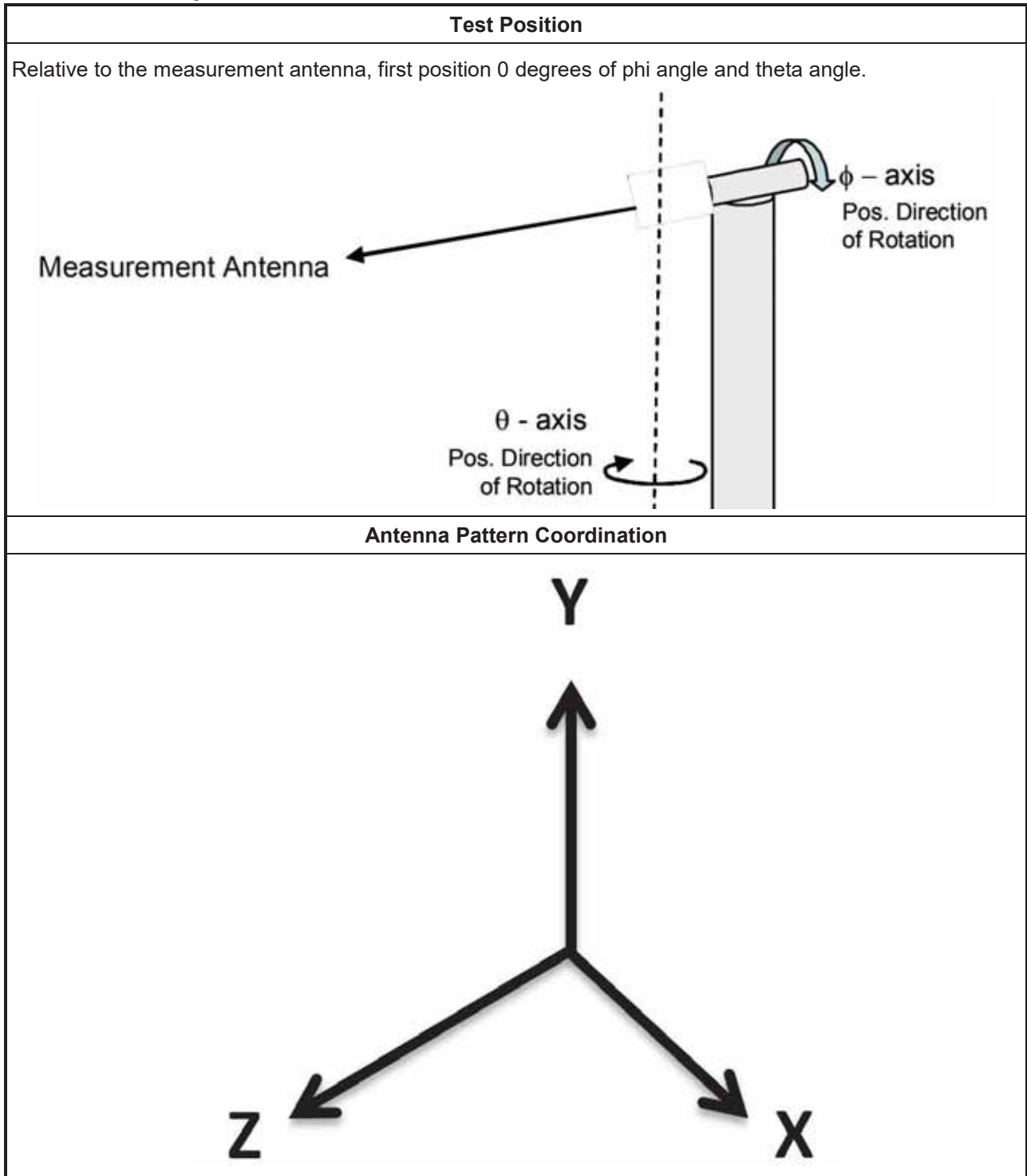
6G Ant.

Freq(Hz)	6.175G	6.475G	6.695G	6.995G
Ant. 1 Max Gain (dBi)	3.65	2.68	2.4	2.38
Ant. 2 Max Gain (dBi)	3.09	2.54	3.38	1.79
Ant. 3 Max Gain (dBi)	4.21	3.27	3.47	2.7
Ant. 4 Max Gain (dBi)	3.78	3.55	2.51	2.69
Ant. 1 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/45/165	Theta/127.5/345	Theta/45/195	Theta/45/187.5
Ant. 2 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/45/30	Theta/127.5/187.5	Theta/127.5/187.5	Theta/75/30
Ant. 3 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/82.5/82.5	Theta/90/352.5	Theta/82.5/75	Theta/97.5/75
Ant. 4 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/97.5/292.5	Theta/97.5/330	Theta/97.5/105	Theta/75/7.5
Max Gain (dBi)	4.21	3.55	3.47	2.7
DG [1SS] (dBi)	6.56	6.96	6.38	5.94
DG [2SS] (dBi)	4.21	3.96	3.47	2.94
DG [4SS] (dBi)	4.21	3.55	3.47	2.7

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. 28, 2023	Jul. 27, 2024
VNA Calibration Kit	TS RF	TS85033E-F	-	DC~9GHz	N.C.R.	N.C.R.
Multi-axis positioner	Sporton	MAPS01	MAPS01-001	Theta / Phi axis	N.C.R.	N.C.R.
Test Software	SPORTON	SENSE-RDG	V1.0.8	-	N.C.R.	N.C.R.

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

NCR means Non-Calibration required.



## 11. Test Results

Please refer to the appendix.

Appendix A – Radiated Composite Gain Data of 2.4GHz&5GHz.....Page 16  
Appendix B – Radiated Composite Gain Data of 6GHz.....Page 30  
Appendix C – Antenna Pattern of 2.4GHz&5GHz.....Page 41  
Appendix D – Antenna Pattern of 6GHz.....Page 48  
Appendix E – Test Photos..... Page 54

————THE END————



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

## Appendix A

Freq(Hz)	2.45G	5.2G	5.3G	5.6G	5.785G
Ant. 1 Max Gain (dBi)	3.1	4.97	5.15	5.24	5.22
Ant. 2 Max Gain (dBi)	1.08	3.48	3.77	4.84	4.89
Ant. 3 Max Gain (dBi)	1.62	2.48	4.45	4.3	5.28
Ant. 4 Max Gain (dBi)	1.27	1.28	2.25	3.67	4.13
Ant. 1 Polarization/ $\theta(^{\circ})/\phi(^{\circ})$	Phi/82.5/90	Phi/97.5/90	Phi/112.5/90	Phi/105/90	Phi/97.5/90
Ant. 2 Polarization/ $\theta(^{\circ})/\phi(^{\circ})$	Phi/142.5/330	Theta/112.5/247.5	Theta/112.5/255	Theta/112.5/247.5	Theta/112.5/247.5
Ant. 3 Polarization/ $\theta(^{\circ})/\phi(^{\circ})$	Phi/105/247.5	Theta/120/232.5	Theta/105/270	Theta/105/262.5	Theta/112.5/270
Ant. 4 Polarization/ $\theta(^{\circ})/\phi(^{\circ})$	Theta/60/322.5	Theta/135/52.5	Theta/120/67.5	Theta/90/135	Theta/120/105
Max Gain (dBi)	3.1	4.97	5.15	5.24	5.28
DG [1SS] (dBi)	3.46	5.06	5.53	5.83	6.19
DG [2SS] (dBi)	3.1	4.97	5.15	5.24	5.28
DG [4SS] (dBi)	3.1	4.97	5.15	5.24	5.28







# Radiated Composite Gain Data of 2.4GHz&5GHz

# Appendix A

(H12)	5.84548	-4.61339	-2.52138	-0.67104	-0.470161	0.431008	0.92008	-0.59168	0.34118	0.71109	-0.94099	-1.37149	-1.13181	0.69102	-0.59173	-1.18156	-1.72113	-0.39086	1.79204	1.9216	1.34108	0.67123	-1.39121	-3.24188
(H22)	4.56148	-4.49137	-2.89129	-1.89138	-1.311072	0.18104	1.29123	0.42148	0.63153	-1.09126	0.93146	0.611	-1.53118	-1.84154	-1.35138	-1.58147	-3.23165	-2.94128	0.18187	0.79149	0.75193	0.71127	0.691149	2.14133
(H32)	2.67148	-5.99148	-3.27151	-3.62165	-1.41003	1.16104	0.89123	-1.57184	4.07138	-3.23102	2.82145	2.09121	-2.05185	-1.61182	-1.681	-0.17146	-2.00139	-3.01176	0.74144	0.44103	1.33162	2.06187	2.71124	0.9411
(H42)	0.731107	-2.61133	-4.77141	-3.34125	0.381137	2.2312	1.95168	0.91128	3.28128	2.46129	-3.93144	-3.53158	-6.23147	3.33128	-1.60149	-0.41117	-0.74131	3.41121	-1.09143	-0.24104	0.79179	2.46128	2.81165	0.23165
(H52)	0.171023	-2.21141	-5.98113	-7.61142	0.2212	2.2312	1.95168	0.91128	3.28128	2.46129	-3.93144	-3.53158	-6.23147	3.33128	-1.60149	-0.41117	-0.74131	3.41121	-1.09143	-0.24104	0.79179	2.46128	2.81165	0.23165
(H62)	0.79106	-0.39141	-4.69143	-3.83142	-1.23144	1.49148	-2.59121	-1.52123	3.47139	-2.99128	-2.84127	-2.78125	-4.821	0.46144	1.38121	-0.11113	-0.16127	3.33129	-1.24131	-2.78125	-2.231197	-1.88127	-1.74125	-2.81129
(H72)	1.24122	-1.14136	-3.93158	-6.09152	0.691	2.47129	2.81123	3.13178	4.84188	-4.59125	-3.76177	-3.83147	-8.23138	2.21126	-1.83155	-1.33129	-1.81145	0.49165	0.53138	2.18188	-2.88135	3.03125	2.99137	-2.88124
(H82)	1.59156	-3.74159	-7.36159	-4.11166	2.88114	-1.71123	3.86174	4.84188	-4.62137	-3.75179	-5.64183	-8.54196	-7.33198	2.32119	-2.13194	0.30175	0.89107	0.03104	-1.11124	-3.43127	-2.591149	-1.16115	-1.46127	-1.76126
(H92)	3.21148	-5.51163	-9.92168	-6.46178	2.49112	-2.23119	-1.02166	-2.46156	5.61161	-4.49137	-6.19153	-6.69177	-4.89137	3.36196	-1.48104	-0.2113	0.66194	2.84138	-3.03155	-4.22131	-2.81175	-1.6114	-0.74184	-1.76126
(H102)	2.94159	-3.91173	-5.54186	-8.78168	3.87179	0.02125	0.60173	0.79126	-4.04158	3.91173	-5.19157	-5.99163	-3.41198	1.46187	1.14687	0.36121	0.47101	3.99159	-1.46187	0.36121	0.47101	3.99159	-1.46187	0.36121
(H112)	4.63164	-6.14177	-8.71189	-12.52181	6.11155	1.69133	0.26117	0.11198	-1.37174	-2.96155	-4.12142	-3.96153	-3.07163	2.01199	-2.99157	0.00137	0.51163	2.85185	-3.24128	-4.51181	-2.98116	-1.81113	-2.34188	-3.52122
(H122)	3.17187	-5.91198	-3.92151	-1.61199	0.44134	0.60131	0.27199	0.81133	-1.29119	-1.89126	3.11139	-3.57143	-3.49112	-3.6214	-2.38149	1.44119	-0.26121	0.44134	0.77103	-1.36107	0.71137	1.211	2.65112	-4.68155
(H132)	3.97140	-1.77115	-3.37135	-1.45118	-1.03165	0.02174	-0.28174	-1.52122	1.14162	-0.98134	3.54151	-3.41154	-4.04123	5.54155	-3.54151	1.46126	0.66184	0.91143	-0.45113	-0.45113	0.1113	1.43147	0.43147	-1.29128
(H142)	3.061162	-2.49114	-2.14192	-3.89125	0.32107	-0.21106	0.091196	0.29172	0.94163	-1.02192	-2.63127	-2.29193	0.92144	-0.76127	-0.67196	2.33112	2.31183	-2.7114	0.93121	-1.49102	1.96124	2.89137	-1.31158	1.98121
(H152)	3.43147	-4.26144	-3.66157	-6.68126	2.37126	-1.06116	0.12125	-2.86138	0.50163	-0.94157	-3.67132	-2.67152	-1.94148	4.75126	-3.29191	-1.54149	2.92167	1.31101	-3.22144	-1.45103	0.95109	-0.37107	-0.42186	-1.29128
(H162)	3.01169	-4.53178	-2.92143	-6.62164	-0.45144	4.97143	4.38129	-1.9214	-1.79125	-1.77138	3.12149	-1.25147	-3.31171	-3.81196	-5.65104	-2.03133	-1.37102	1.58122	-1.49132	2.21131	0.01133	0.35113	-0.81125	1.16134
(H172)	4.04161	-4.31143	-3.79147	-7.58177	6.38116	6.75167	-3.99142	-4.99179	-2.94124	-3.10144	2.73126	-1.53113	-2.83103	-1.51104	0.62103	0.48103	-3.46124	-1.21108	-1.20137	2.94167	-2.94167	-4.65127	-3.88145	-1.16134
(H182)	2.04118	-4.09165	-6.84127	-9.02149	7.31163	6.62145	-3.93113	-3.28144	6.87161	-5.63143	-5.07153	-2.91182	-4.06195	-1.63135	0.71153	-2.85146	-6.02142	-2.24162	-1.77143	2.51158	0.16173	-0.13137	-0.33186	1.11126
(H192)	6.83126	-4.59163	-6.69163	-7.05142	-1.09172	-1.01178	-0.79163	-4.17173	8.52165	-7.25106	-6.06152	-4.21136	-3.33163	-2.92172	-4.07188	0.81112	0.58138	-3.1211	0.89138	-3.1211	0.89138	-3.1211	0.89138	-3.1211
(H202)	2.8111	-6.86116	-7.79174	-4.72165	-8.86165	-4.99143	-4.44167	-6.6114	6.95162	-6.38106	-8.89176	-7.97174	4.29138	-4.65147	-4.45136	-7.79197	-7.67114	5.91123	-4.45163	-5.24146	-3.59124	-1.77132	0.95101	0.891146
(H212)	6.45115	-4.62148	-5.01149	-4.83165	-8.64179	8.12102	-7.31191	9.81184	6.96154	8.73169	-8.73169	-5.27146	-3.33154	-6.81179	-7.89181	-7.56176	-7.65174	7.65174	-3.33154	-6.81179	-7.56176	-7.65174	7.65174	-3.33154
(H222)	7.57189	-8.58156	-7.66137	-7.18143	7.71178	-7.75140	-8.64189	-9.34108	6.11172	-4.76152	6.44168	-7.12127	-7.6182	-8.73139	-6.44135	-6.811	-5.9611	6.13144	-6.81161	-6.48115	-6.34184	-6.43125	-4.81158	-5.52104
(H232)	5.53164	5.53164	5.53164	5.53164	5.53164	5.53164	5.53164	5.53164	5.53164	5.53164	5.53164	5.53164	5.53164	5.53164	5.53164	5.53164	5.53164	5.53164	5.53164	5.53164	5.53164	5.53164	5.53164	5.53164
(H242)	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi
(H252)	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi

















# Radiated Composite Gain Data of 2.4GHz&5GHz

# Appendix A

Model	18.18-18.88	17.88-18.41	18.72-17.94	18.59-17.19	18.74-15.88	14.13-12.91	12.54-12.53	12.72-12.13	11.45-10.99	11.14-11.81	12.67-13.83	15.45-17.46	19.38-18.46	19.11-18.22	17.01-15.61	14.91-14.73	15.13-14.64	14.18-14.06	13.89-13.65	13.84-13.68	13.72-14.11	14.45-14.72	15.33-14.61	17.58-18.57	
Model	15.15-15.01	14.88-15.09	15.98-17.63	18.67-18.28	18.05-18.88	17.12-14.38	13.11-13.27	12.49-10.26	11.27-10.68	11.09-11.83	12.82-13.91	15.85-17.29	17.43-17.12	16.02-14.57	13.41-12.33	11.55-11.18	11.55-13.59	13.72-15.69	15.51-16.04	15.23-14.45	13.98-13.89	13.01-12.98	13.21-13.16	14.63-14.99	
Model	16.91-16.71	16.13-10.17	10.29-10.91	11.99-14.79	18.15-19.17	17.17-12.18	15.33-13.82	12.21-12.62	11.08-11.17	11.09-11.36	11.77-12.16	12.22-12.05	11.75-11.31	11.47-10.99	10.17-9.79	9.13-8.95	8.99-9.34	10.07-10.52	11.76-12.11	11.56-11.63	10.40-9.86	8.84-8.67	8.89-9.62	10.46-10.59	
Model	7.98-7.77	7.64-7.45	7.65-8.38	8.25-10.31	13.87-14.87	15.18-18.79	19.03-18.28	13.12-11.61	10.02-8.84	8.11-7.6	7.88-7.33	7.24-7.23	7.42-7.66	8.05-8.25	8.48-8.17	7.89-8.31	8.09-7.74	8.52-8.68	8.45-8.08	8.62-7.96	7.71-8.42	6.12-6.03	8.14-8.24	8.9-7.4	
Model	6.24-6.48	6.42-6.52	6.41-6.64	7.03-8.75	8.92-12.2	14.33-15.04	17.03-18.79	8.03-7.78	5.55-5.54	4.95-4.46	4.15-3.98	3.81-3.81	4.18-4.61	4.53-4.63	4.75-5.04	4.89-4.62	4.88-4.52	5.07-5.79	5.72-6.57	6.00-6.45	5.97-6.37	3.97-3.62	4.71-4.12	4.78-4.48	
Model	5.13-5.27	4.79-4.25	4.06-4.23	4.53-5.34	6.32-7.62	8.78-9.3	9.17-9.79	6.17-6.87	4.82-4.02	4.47-3.04	2.66-2.22	1.76-1.46	1.41-1.84	2.54-3.39	4.61-5.2	6.37-6.83	6.88-6.35	5.66-5.11	4.79-4.48	4.29-4.09	3.84-4.36	2.81-2.89	2.95-3.36	4.06-4.91	
Model	3.81-3.41	3.09-2.77	2.57-2.62	2.84-3.63	4.21-5.11	6.32-6.9	7.45-8.68	6.16-6.34	4.21-3.54	3.25-3.04	2.72-2.18	1.53-0.94	0.72-0.91	1.22-1.79	2.84-3.82	5.16-6.34	6.91-6.01	5.63-5.24	4.31-3.83	3.12-2.95	2.83-2.83	2.92-3.15	3.38-3.76	4.61-4.94	
Model	4.81-3.79	3.13-2.49	2.34-2.2	1.90-1.82	2.03-2.62	3.52-4.68	5.67-6.71	6.78-7.52	4.46-3.76	3.35-3.56	3.43-2.82	2.39-1.91	1.61-1.36	1.26-1.23	1.59-2.27	3.31-4.63	5.09-4.88	3.71-3.05	2.88-2.47	2.41-2.53	2.72-2.94	2.19-1.98	2.22-2.67	3.81-4.46	
Model	4.06-2.51	1.54-2.12	1.34-1.33	1.27-1.34	1.86-2.44	3.74-5.47	7.55-9.37	9.82-8.23	6.75-6.03	6.16-6.05	5.14-5.05	3.38-3.11	2.94-2.68	2.07-2.17	1.41-1.18	1.57-1.65	3.84-3.35	2.88-2.37	2.09-2	1.35-1.95	1.76-1.65	1.89-2.46	3.55-4.15	4.61-5.18	
Model	3.29-2.23	1.93-1.4	1.88-1.37	1.81-1.95	2.56-3.49	5.12-7.37	9.88-11.19	10.91-9	7.99-7.89	6.44-6.36	7.53-6.18	6.93-6.38	5.19-4.18	3.26-3.13	1.24-1.04	1.86-2.49	3.55-3.89	3.45-2.9	2.24-1.78	1.55-1.81	1.64-1.86	2.62-3.31	4.23-4.99	4.48-4.9	
Model	3.32-1.99	1.35-1.11	1.35-1.74	1.98-1.98	1.82-2.44	6.19-6.68	12.44-10.67	10.24-10.52	8.95-9.21	9.16-7.46	8.53-6.12	5.81-6.37	7.53-7.02	4.98-3.2	1.87-1.91	2.75-3.1	1.59-2.18	1.54-2.24	1.36-1.77	1.36-1.79	1.75-1.75	2.12-2.34	4.15-5.13	5.41-5.45	
Model	3.25-2.28	2.25-2.25	2.13-2.13	3.76-4.26	4.77-6.68	9.36-11.1	11.71-11.64	11.97-11.64	9.17-8.24	9.17-8.24	8.29-8.46	5.39-5.18	6.33-6.19	6.89-6.57	7.41-6.97	3.59-3.81	1.26-1.79	2.29-2.48	2.98-3.26	2.61-3.25	3.64-3.64	3.14-3.44	4.11-4.23	5.21-5.43	
Model	6.21-4.99	4.53-3.56	4.71-5.89	4.05-4.24	6.78-8.25	9.97-12.05	10.85-11.41	8.83-8.82	11.31-9.65	8.97-8.48	4.24-4.86	6.89-6.4	6.97-6.13	11.48-7.59	5.21-5.13	1.87-1.16	0.80-0.79	1.06-1.45	1.67-1.98	1.77-2.08	4.31-5.64	4.55-5.22	5.38-6.11	6.27-7.13	
Model	6.99-5.96	5.49-5.46	6.33-9.76	11.19-12.33	11.75-12.79	15.23-14.39	13.51-12.41	12.86-12.86	14.27-11.1	7.02-6.59	4.54-5.97	4.71-5.4	9.73-10.79	10.82-9.97	4.39-6.65	4.71-5.4	1.61-0.87	1.57-1.93	1.86-1.93	2.51-3.2	3.35-3.16	3.58-4.16	5.71-7.46	6.92-7.45	
Model	8.77-8.75	4.69-4.48	6.4-3	13.36-12.46	12.92-15.24	14.14-15.4	15.27-14.06	14.68-16.29	15.41-12.69	6.24-6.43	4.73-5.68	7.41-8.71	9.17-13.2	12.81-10.86	8.86-7.11	5.61-5.38	2.25-1.09	1.11-1.47	2.03-2.21	2.08-1.73	1.75-2.55	3.69-4.4	4.76-6.83	6.28-7.78	
Model	8.83-7.76	8.82-6.66	7.88-9.09	17.05-18.99	16.58-15.02	16.11-11.7	11.71-11.79	17.64-18.7	19.01-10.59	5.94-6.33	6.98-9.72	9.37-9.34	10.01-10.53	10.50-10.53	9.31-6.42	8.71-7.29	5.54-4.19	3.88-4.29	4.27-4.52	3.76-4.59	3.99-4.7	5.74-6.47	7.21-7.77	8.04-8.63	
Model	10.27-11.74	8.68-8.63	8.85-10.27	12.42-18.41	19.17-16.2	14.85-15.15	16.25-17.83	18.45-19.38	18.61-12.48	10.93-10.58	10.65-10.54	10.36-10.34	11.51-13.24	14.51-15.08	13.52-11.55	9.21-7.31	6.15-6.77	6.34-6.69	6.75-6.76	4.84-4.72	4.71-6.47	5.72-5.75	7.52-7.95	11.35-12.17	12.86-13.37
Model	9.33-9.98	8.79-8.42	8.23-8.93	10.59-14.57	13.83-18.96	17.41-18.47	17.11-18.21	18.84-18.77	18.65-19.4	17.16-15.49	13.33-12.21	11.89-12.37	11.38-13.66	16.88-18.48	15.31-14.62	15.97-16.21	14.02-14.94	14.56-14.74	14.71-15.07	14.83-15.01	14.71-15.07	14.71-15.07	14.71-15.07	14.71-15.07	14.71-15.07
Model	12.15-11.45	10.25-9.46	8.98-8.89	10.19-12.31	14.55-17.7	18.57-17.88	18.16-18.02	18.99-18.86	18.42-18.28	19.05-17.66	15.33-14.42	14.44-15.3	15.05-15.76	17.29-18.74	19.06-15.17	11.84-9.74	8.67-8.61	7.7-7.1	4.38-5.67	5.17-6.43	4.3-4.47	4.94-4.76	6.92-8.47	10.17-11.17	12.86-13.37
Model	13.43-12.96	11.79-10.84	10.25-10.21	11.05-12.48	14.16-15.16	16.59-17.48	16.27-15.63	16.54-16.04	17.42-18.25	17.85-17.65	14.61-13.95	14.17-15.99	16.88-17.77	18.37-17.77	18.37-17.77	18.37-17.77	18.37-17.77	18.37-17.77	18.37-17.77	18.37-17.77	18.37-17.77	18.37-17.77	18.37-17.77	18.37-17.77	18.37-17.77
Model	15.73-12.48	12.67-13.02	11.73-14.26	16.18-18.9	18.87-18.42	17.36-15.45	14.34-13.14	14.84-15.12	16.22-17.19	18.22-17.83	18.22-17.83	18.22-17.83	18.22-17.83	18.22-17.83	18.22-17.83	18.22-17.83	18.22-17.83	18.22-17.83	18.22-17.83	18.22-17.83	18.22-17.83	18.22-17.83	18.22-17.83	18.22-17.83	18.22-17.83
Model	17.24-14.27	15.96-17.7	17.62-17.34	18.17-18.93	17.84-17.25	18.17-18.93	17.84-17.25	18.17-18.93	17.84-17.25	18.17-18.93	17.84-17.25	18.17-18.93	17.84-17.25	18.17-18.93	17.84-17.25	18.17-18.93	17.84-17.25	18.17-18.93	17.84-17.25	18.17-18.93	17.84-17.25	18.17-18.93	17.84-17.25	18.17-18.93	17.84-17.25
Model	18.13-18.18	18.52-17.81	18.48-17.6	18.22-18.57	17.82-17.19	18.54-18.56	17.77-18.17	18.54-18.56	17.77-18.17	18.54-18.56	17.77-18.17	18.54-18.56	17.77-18.17	18.54-18.56	17.77-18.17	18.54-18.56	17.77-18.17	18.54-18.56	17.77-18.17	18.54-18.56	17.77-18.17	18.54-18.56	17.77-18.17	18.54-18.56	17.77-18.17
Model	18.17-17.91	18.58-18.32	18.67-17.84	18.28-18.52	18.21-17.93	18.13-19.11	17.82-18.11	18.13-19.11	17.82-18.11	18.13-19.11	17.82-18.11	18.13-19.11	17.82-18.11	18.13-19.11	17.82-18.11	18.13-19.11	17.82-18.11	18.13-19.11	17.82-18.11	18.13-19.11	17.82-18.11	18.13-19.11	17.82-18.11	18.13-19.11	17.82-18.11
Model	5.20Pkt3	Phat3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
Model	Gain	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	
Model	Gain	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	(0°/90°/270°)	
(0°/90°)	9.21-8.97	11.31-11.24	15.52-14.99	14.88-13.18	9.62-8.68	5.33-5.15	4.91-5.63	2.95-3.19	1.94-2.25	2.26-2.61	3.54-4.52	5.49-6.07	7.14-7.73	14.21-17.97	17.29-17.37	19.07-8.11	7.42-6.16	4.62-3.83	3.29-3.77	3.65-3.32	3.58-3.75	4.13-5.06	6.42-7.68		
(0°/90°)	10.10-10.29	15.16-16.15	17.14-18.18	11.00-9.98	7.03-7.51	4.48-3.83	3.98-4.31	3.85-3.17	3.24-3.52	3.51-3.98	3.94-4.67	4.63-5.27	6.06-6.77	11.44-15.53	15.91-17.95	15.96-16.38	7.72-6.11	4.62-3.99	2.97-3.65	3.32-3.12	3.32-3.25	3.98-4.56	6.27-6.69		
(0°/90°)	10.25-10.11	13.29-16.52	15.57-17.33	8.26-7.74	4.93-5.1	3.89-3.27	3.85-3.25	4.05-4.11	4.49-4.79	4.54-5.43	7.59-6.68	6.96-7.13	7.34-8.67	11.71-13.58	18.23-17.78	18.11-15.85	8.44-6.61	4.93-3.79	3.78-3.75	3.71-3.76	4.27-4.25	4.29-4.57	6.4-6.18		
(0°/90°)	7.19-5.98	5.21-5.14	10.41-13.22	12.39-14.69	8.44-8.39	3.19-2.74	2.71-3.17	5.78-5.73	8.84-13.43	15.44-17.08	16.17-16.75	18.19-18.06	15.45-14.68	14.79-13.82	13.28-13.32	9.67-9.20	4.49-4.4	3.80-3.99	3.78-3.18	3.42-3.15	3.42-3.15	3.12-3.29	3.62-4.54	6.45-7.58	
(0°/90°)	10.17-11.31	15.77-11.61																							



# Radiated Composite Gain Data of 2.4GHz&5GHz

# Appendix A

(E)S(2)	6.5144-48	-4.717-02	-11.39-11.36	-10.64-8.49	6.674-03	3.49-2.68	-2.65-2.45	-2.52-2.29	2.612-2.63	3.48-0.23	-1.81-0.36	-1.33-3.37	6.61-6.57	8.62-6.34	-3.91-1.24	0.21-0.68	-1.59-1.19	3.62-0.41	3.67-4.2	-1.47-1.95	-12.41-18	-1.91-10.67	4.71-6		
(E)S(2)	8.66-4.73	6.38-6.89	-10.32-17.81	-10.75-51	3.72-2.46	2.44-3.09	-2.73-2.28	2.22-2.57	3.30-4.44	4.64-6.07	-4.06-1.09	0.150-3.6	0.13-1.4	3.43-3.57	2.85-4.45	-6.45-2.56	-1.69-0.4	0.97-2.9	4.44-2.24	-3.76-4.99	-6.55-6.62	8.46-16.2	-18.24-13.4	-13.24-12.51	
(E)S(2)	8.42-9.34	-6.89-6.8	-6.89-6.8	-4.62-4.15	-4.34-6.6	3.98-1.96	-0.190-0.21	-6.61-2.47	-6.07-2.2	4.67-6.08	-4.70-2.6	3.70-1.52	2.84-3.06	3.44-4.45	-3.98-3.36	-4.61-2.47	2.51-0.73	0.24-1.35	2.76-4.99	-5.71-6.65	6.51-6.62	4.03-9.25	-14.56-14.1	9.22-9.63	
(E)S(2)	4.99-6.4	-10.11-12.9	-7.91-6.35	-7.73-9.26	-11.54-14.56	6.25-0.37	2.011-6.8	-1.31-6.15	-10.33-10.47	6.51-7.33	-5.88-1.07	-1.74-3.1	4.22-2.78	3.56-4.26	4.79-4	-2.59-2.49	3.28-1.5	1.081-3.3	0.48-1.18	-4.93-7.96	8.94-12	-7.26-7.75	-10.67-14.9	-17.17-22	
(E)S(2)	6.17-8.33	-6.41-13.19	-1.86-2.75	8.45-10.32	-13.77-11.17	4.49-6.66	0.61-0.28	4.17-4.5	-4.73-4.47	4.81-5.73	5.53-2.57	-4.71-5.1	8.1-4.7	-1.62-3.37	7.49-4	-3.94-4.84	2.59-2.69	0.65-0.43	1.641-3.8	-1.11-6.44	-7.22-13.93	6.49-7.88	-8.07-6.4	-2.72-3.3	
(E)S(2)	5.31-1.3	-1.71-0.08	0.25-3.61	-0.74-1.11	8.42-7.42	-4.25-0.5	0.95-0.34	-1.54-1.07	-1.18-1.68	-4.13-2.21	2.32-1.5	2.22-2.39	-1.35-1.07	3.24-3.38	8.75-18.88	-13.28-4.5	-0.77-0.26	0.34-2.22	3.11-7.95	0.48-1.4	2.75-2.95	6.11-35	-3.71-3.47	-1.88-2.08	
(E)S(2)	6.63-3.33	0.67-0.23	-3.62-6.6	9.44-8.66	-8.26-10.94	1.331-0.65	5.49-5.56	-1.02-1.42	-2.01-1.75	-1.21-1.75	6.24-1.97	3.6-2.29	-1.15-0.11	6.19-7.98	-5.51-4.97	-7.39-6.88	-5.00-0.1	2.29-2.54	4.21-2.74	0.80-0.57	4.62-5.95	5.51-4.97	-1.87-1.6	-1.88-1.26	
(E)S(2)	0.13-0.34	-1.54-3.64	-12.49-6.55	5.31-6.7	5.88-5.1	6.16-1.28	0.989-99	3.26-10.48	-13.66-7.26	9.211-7.79	-12.61-3.66	-4.72-7.2	8.06-8.98	4.83-9.98	-7.02-6.99	-1.64-0.25	3.23-3.47	4.55-6.7	1.65-0.96	1.77-1.37	0.57-1.42	3.37-1.45	-2.84-3.9	2.80-3.9	
(E)S(2)	8.85-4.43	2.63-1.71	5.43-5.15	4.26-2.27	-11.88-8.47	6.84-3.45	1.26-0.47	3.43-1.28	0.77-2.22	6.33-7.19	-8.26-5.9	-0.75-2.42	-7.49-7.88	7.83-8.77	7.72-6.48	-0.58-0.04	0.02-0.21	2.14-0.25	1.65-0.25	1.00-0.25	1.01-0.25	4.7-1.2	8.91-2.4	2.86-7.8	
(E)S(2)	0.17-0.37	2.68-2.29	-11.01-14.38	13.79-6.82	8.19-10.74	-10.47-12.9	0.27-0.35	4.25-1.19	-10.02-4.2	-11.20-11.51	-11.36-11.9	12.86-10.44	-11.78-6.42	-4.06-5.1	8.13-0.44	-0.77-0.83	1.57-1.31	0.98-2.83	1.38-2.84	-0.59-1.02	0.07-0.42	5.32-11.54	-15.41-16	-5.42-0.19	
(E)S(2)	5.51-2.82	1.79-1.88	0.75-1.27	-14.24-4.91	5.53-3.06	6.77-4.66	2.92-2.08	3.45-1.13	-12.94-12.2	-12.24-13.54	-10.43-10.28	-10.47-9.28	4.79-9.23	9.89-9.57	3.10-1.09	1.60-3.62	4.45-1.37	0.57-0.83	3.66	4.44-6.17	2.56-11.97	-10.14-5.03	-1.00-0.65	-1.00-0.65	
(E)S(2)	2.05-0.59	6.88-5.54	6.38-7.64	7.59-6.11	7.91-14.74	-11.61-3.3	3.41-3.4	5.59-7.25	6.26-19.24	-18.31-17.2	-13.64-10.29	-10.17-1.36	5.28-16.16	5.58-7.76	6.19-7.99	3.25-0.67	5.71-1.69	3.26-0.59	5.71-1.69	5.98-1.08	3.30-1.93	1.57-1.25	13.32-10.62	3.31-1.19	
(E)S(2)	3.78-6.36	-14.09-10.55	0.69-1.12	-11.72-12.48	-16.61-18.44	-15.58-17.22	-10.16-3.1	8.31-15	-10.43-10.67	-15.78-11.3	-15.91-10.02	-10.68-12.3	-4.46-2.1	-12.17-12.5	-13.78-8.77	5.4-4	7.72-7.17	3.21-1.34	1.15-1.17	2.44-3.97	0.69-2.41	8.89-13.84	-13.31-18.62	-15.19-12.4	
(E)S(2)	2.03-1.34	-0.71-1.51	7.04-7.19	2.58-13.14	-17.41-18.52	-17.48-17.17	-14.03-14.08	-10.23-10.19	-13.16	-14.19-13.91	-2.51-16.2	-14.12	18.04-11.19	9.56-11.9	-17.16-10.1	-12.38-15.4	-15.57-7.49	2.96-1.15	1.5-2.72	4.02-2.12	3.24-2.71	6.51-6.13	-16.66-16.69	8.33-12.5	
(E)S(2)	6.21-9.93	-5.74-1.2	-10.71-10.11	-7.81-7.46	8.94-11.79	-13.69-12.43	-11.77-10.52	-13.21-12.1	8.34-18.4	-6.02-6.63	-6.17-6.44	5.23-4.99	-7.27-2.49	6.33-10.1	-10.01-12.74	-16.74-13.47	-18.46-12.75	6.31-3.96	8.4-6.44	6.89-4.67	8.53-6.9	6.94-12.5	-17.56-12.72	7.61-7.4	
(E)S(2)	1.99-1.58	8.84-6.13	8.16-12.28	-15.96-18.14	-17.41-18.52	-17.48-18.14	-18.40-17.07	-17.53-17.93	-19.17-18.24	-15.72-12.58	-10.46-9.82	8.9-8.97	13.94-18.85	-12.27-13.28	-10.59-12.54	-9.99-9.26	-10.97-13.08	-12.13-18.57	-14.01-18.1	-18.04-18.15	-16.02-15.4	6.88-12.2	-15.91-17.82	-10.22-10.3	
(E)S(2)	-17.82-17.82	-17.82-17.82	-10.47-10.4	-6.3-6.3	-5.26-5.49	6.81-6.67	7.0-7.1	7.3-6.4	6.89-8.44	-4.76-6.03	-5.97-7.5	-1.99-1.34	-15.9-12.1	-10.87-10.59	-10.22-10.89	-10.54-10.03	-6.83-7.59	-7.72-8.18	8.22-2.56	6.99-9.48	8.28-8.49	4.77-7.97	-12.82-13.3	-12.82-13.3	
(E)S(2)	-15.11-12.2	-11.46-11.24	-8.02-6.89	-7.14-6.53	-7.34-7.3	-7.79-7.74	-7.68-7.22	-7.17-7.64	8.79-8.45	-6.30-5.17	-12.42-12.62	-12.86-13.5	-13.54-14.18	-15.69-17.85	-18.11-17.8	-18.92-18.7	-13.93-14.63	-15.12-13.98	-16.54-14.15	-12.92-12.15	-12.88-17.4	-18.19-15.11	-18.19-15.11	-18.19-15.11	
FreeHd	5.65-0.61	PhdA.3																							
Gain	(E)S(2)	(E)S(2)	(E)S(2)	(E)S(2)	(E)S(2)	(E)S(2)	(E)S(2)	(E)S(2)	(E)S(2)	(E)S(2)	(E)S(2)	(E)S(2)	(E)S(2)	(E)S(2)	(E)S(2)	(E)S(2)	(E)S(2)	(E)S(2)	(E)S(2)	(E)S(2)	(E)S(2)	(E)S(2)	(E)S(2)	(E)S(2)	
(E)S(2)	-12.32-15.52	-18.99-18.49	-18.79-19.17	-17.88-14.31	-11.66-10.66	-9.95-6.18	7.16-2.4	6.67-2.28	6.59-5.54	-5.74-1.3	-7.41-7.76	8.67-10.2	-14.62-16.02	-13.82-18.9	-18.07-18.15	-15.04-12.66	-11.48-11.77	-12.74-11.65	9.69-9.4	8.88-6.4	9.21-8.57	8.84-2.5	-8.89-3.96	-10.44-11.54	
(E)S(2)	-12.39-15.92	-15.98-15.28	-17.31-19.07	-15.11-11.91	-12.29-11.52	-11.41-11.22	-10.59-9.84	-9.98-8.58	-8.06-8.79	-6.24-6.12	-11.41-11.25	-14.91-13.67	-18.07-16.64	-11.9-8.88	-10.57-10.58	-10.57-10.58	-10.57-10.58	-10.57-10.58	-10.57-10.58	-10.57-10.58	-10.57-10.58	-10.57-10.58	-10.57-10.58	-10.57-10.58	-10.57-10.58
(E)S(2)	-17.81-19.4	-17.81-19.4	-17.81-19.4	-17.81-19.4	-17.81-19.4	-17.81-19.4	-17.81-19.4	-17.81-19.4	-17.81-19.4	-17.81-19.4	-17.81-19.4	-17.81-19.4	-17.81-19.4	-17.81-19.4	-17.81-19.4	-17.81-19.4	-17.81-19.4	-17.81-19.4	-17.81-19.4	-17.81-19.4	-17.81-19.4	-17.81-19.4	-17.81-19.4	-17.81-19.4	
(E)S(2)	-15.02-16.99	-15.13-14.56	-10.32-12.3	6.07-1.3	4.08-3.99	4.84-4.62	6.96-7.43	8.15-11.55	-17.41-19.55	-18.41-19.59	-17.75-17.8	-19.16-19.08	-14.78-14.21	-12.66-10.92	8.97-7.3	7.17-7.17	7.32-7.27	6.56-6.59	5.26-5.15	4.88-4.57	5.64-5.53	-10.23-12.13	-12.13-14.16	-12.13-14.16	
(E)S(2)	-12.29-12.41	-18.69-18.15	-18.62-15.28	-11.95-7.84	-3.37-3.97	-3.02-2.18	-4.2-2.29	-5.14-2.23	-10.15-10.58	-14.41-15.88	-18.62-18.55	-17.22-17.31	-17.04-16.84	-17.08-14.84	6.75-7.36	4.59-4.89	4.84-4.76	7.29-7.41	6.78-6.11	6.08-4.8	4.32-4.92	7.25-9.91	6.35-7.14	-12.31-14.16	
(E)S(2)	-12.29-12.41	-18.69-18.15	-18.62-15.28	-11.95-7.84	-3.37-3.97	-3.02-2.18	-4.2-2.29	-5.14-2.23	-10.15-10.58	-14.41-15.88	-18.62-18.55	-17.22-17.31	-17.04-16.84	-17.08-14.84	6.75-7.36	4.59-4.89	4.84-4.76	7.29-7.41	6.78-6.11	6.08-4.8	4.32-4.92	7.25-9.91	6.35-7.14	-12.31-14.16	
(E)S(2)	-14.29-12.11	-13.59-10.55	-16.89-12.63	-14.84-12.21	2.79-7.31	4.46-1.19	3.17-7.07	6.57-7.26	2.62-6.1	7.26-7.95	6.41-6.78	-11.22-12.3	-13.27-10.73	-14.61-17.84	17.95-15.12	5.21-6.11	5.93-7.25	5.98-6.32	5.98-6.32	5.98-6.32	5.98-6.32	5.98-6.32	5.98-6.32	5.98-6.32	5.98-6.32
(E)S(2)	-14.29-12.11	-13.59-10.55	-16.89-12.63	-14.84-12.21	2.79-7.31	4.46-1.19	3.17-7.07	6.57-7.26	2.62-6.1	7.26-7.95	6.41-6.78	-11.22-12.3	-13.27-10.73	-14.61-17.84	17.95-15.12	5.21-6.11	5.93-7.25	5.98-6.32	5.98-6.32	5.98-6.32	5.98-6.32	5.98-6.32	5.98-6.32	5.98-6.32	
(E)S(2)	-17.21-18.72	-15.53-13.12	-10.51-11.1	-10.57-12.92	7.12-7.07	6.13-6.26	5.71-12.3	-13.04-14.4	-11.57-11.1	7.18-7.79	-7.99-6.66	-11.54-11.36	-17.59-18.54	-17.93-19.23	-17.83-19.23	-15.04-14.1	7.11-6.63	8.53-12.3	5.71-3.94	4.15-4.16	6.03-15.69	11.57-14.71	-13.71-13	-15.28-16.3	
(E)S(2)	-17.21-18.72	-15.53-13.12	-10.51-11.1	-10.57-12.92	7.12-7.07	6.13-6.26	5.71-12.3	-13.04-14.4	-11.57-11.1	7.18-7.79	-7.99-6.66	-11.54-11.36	-17.59-18.54	-17.93-19.23	-17.83-19.23	-15.04-14.1	7.11-6.63	8.53-12.3	5.71-3.94	4.15-4.16	6.03-15.69	11.57-14.71	-13.71-13	-15.28-16.3	
(E)S(2)	-17.21-18.72	-15.53-13.12	-10.51-11.1	-10.57-12.92	7.12-7.07	6.13-6.26	5.71-12.3	-13.04-14.4	-11.57-11.1	7.18-7.79	-7.99-6.66	-11.54-11.36	-17.59-18.54	-17.93-19.23	-17.83-19.23	-15.04-14.1	7.11-6.63	8.53-12.3	5.71-3.94	4.15-4.16	6.03-15.69	11.57-14.71	-13.71-13	-15.28-16.3	
(E)S(2)	-17.21-18.72	-15.53-13.12	-10.51-11.1	-10.57-12.92	7.12-7.07	6.13-6.26	5.71-12.3	-13.04-14.4	-11.57-11.1	7.18-7.79	-7.99-6.66	-11.54-11.36	-17.59-18.54	-17.93-19.23	-17.83-19.23	-15.04-14.1	7.11-6.63	8.53-12.3	5.71-3.94	4.15-4.16	6.03-15.69	11.57-14.71	-13.71-13	-15.28-16.3	
(E)S(2)	-17.21-18.72	-15.53-13.12	-10.51-11.1																						





# Radiated Composite Gain Data of 2.4GHz&5GHz

# Appendix A

(H150)	-11.14:11.18	-11.33:8.84	-5.82:3.77	-3.33:4.83	-2.23:6.54	-3.31:10.6	-1.27:3.49	-6.4:1.1	-1.53:19.17	-17.44:14.59	-12.55:11.12	-10.52:11.36	-13.41:11.45	-6.4:31	-8.82:16.16	-8.38:10.08	-11.52:11.07	-8.88:8.27	-10.11:13.61	-11.03:12.91	-18.31:13.92	-14.82:16.09	-12.2:12.11	-11.77:11.68
(H151)	8.99:11.9	-5.82:3.77	-7.18:8.85	-10.73:8.83	-6.4:17.4	1.36:10.35	3.22:3.76	-4.83:7.43	-10.5:16.88	-18.79:17.82	-18.89:14.11	-14.11:11.85	-9.29:8.88	5.58:5.3	-6.03:4.33	-10.73:13.45	-13.51:14.16	-17.63:16.81	-17.76:12.77	-18.26:12.56	-19.34:16.85	-14.69:11.53	-10.68:10.73	-10.36:11.31
(H152)	3.57:5.23	-4.51:14.42	-1.46:10.33	-11.03:11.32	-10.18:10.96	-10.75:11.56	-13.7:15.94	-17.82:17.2	-18.47:19.08	-18.72:19.98	-15.99:11.99	-8.91:3.43	6.92:8.32	3.92:6.28	-7.09:4.23	-8.96:11.74	-11.99:12.03	-11.77:11.52	-17.95:17.38	-18.01:17.29	-16.79:15.58	-14.21:14	-11.57:10.74	-11.77:11.68
(H153)	8.99:13.2	-0.78:7.84	-10.46:11.31	-6.49:7.7	-8.96:7.47	-7.98:8.73	-9.79:9.81	-9.78:9.66	6.36:9.79	-10.54:11.49	-12.85:13.65	-13.83:13.78	-14.36:15.64	-18.84:17.52	-17.87:15.16	-14.96:12.15	-11.55:10.96	-10.38:10.63	-10.78:12.13	-13.14:17	-12.06:10.77	6.83:10.77	-8.87:9.44	-6.84:9.96
Frq(Hz)	5.350Pcs	Phase1.4																						
Gain	(H150)0.5	(H150)2.5	(H150)3.5	(H150)4.5	(H150)5.5	(H150)6.5	(H150)7.5	(H150)8.5	(H150)9.5	(H150)10.5	(H150)11.5	(H150)12.5	(H150)13.5	(H150)14.5	(H150)15.5	(H150)16.5	(H150)17.5	(H150)18.5	(H150)19.5	(H150)20.5	(H150)21.5	(H150)22.5	(H150)23.5	(H150)24.5
(H1)	6.71:6.62	6.67:7.28	4.05:9.19	-10.31:12.71	-15.38:18.38	-17.73:18.11	-19.43:18.38	-22.23:9.84	4.99:9.29	9.15:9.38	-7.65:17.2	7.18:27	-10.28:12.21	-18.39:13.84	-17.23:17.77	-16.24:17.51	-17.62:16.25	-19.09:19.08	-16.38:15.34	-13.67:11.72	-9.92:9.45	-8.77:9.25	-7.62:7.31	-7.76:7.39
(H2)	3.99:10.25	-10.52:11.18	-11.03:13.27	-16.23:18.41	-16.71:18.91	-18.91:19.91	-17.75:14.84	-14.48:12.85	-11.89:11.95	-8.23:7.98	6.26:7.55	6.65:7.78	-7.55:9.27	9.23:10.46	-12.39:10.45	-12.39:10.45	-18.91:18.91	-16.00:16.31	-12.39:10.45	-9.84:9.75	-8.89:10.15	-10.00:10.31	-12.39:10.45	-9.84:9.75
(H3)	8.71:8.38	8.51:11.42	-14.32:16.86	-16.71:17.65	-18.26:18.61	-18.26:18.61	-18.26:18.61	-18.26:18.61	-17.62:15.77	-17.62:15.77	-17.62:15.77	-17.62:15.77	-17.62:15.77	-17.62:15.77	-17.62:15.77	-17.62:15.77	-17.62:15.77	-17.62:15.77	-17.62:15.77	-17.62:15.77	-17.62:15.77	-17.62:15.77	-17.62:15.77	-17.62:15.77
(H22)	7.27:7.58	6.51:10.42	-10.52:12.54	-15.85:17.11	-18.06:14.57	-10.59:10.22	8.89:9.49	-11.05:11.2	8.44:9.44	-10.77:9.77	-7.96:4.44	6.04:6.29	8.59:11	8.57:7.53	-5.47:7.07	4.89:10.58	-14.92:18.59	-18.84:13.59	-10.29:9.43	-11.44:13.32	-11.51:9.77	-8.87:8.74	-7.76:7.77	-7.53:9.68
(H4)	4.67:7.98	3.51:8.13	-11.39:15.43	-18.64:14.58	-19.98:24.5	-6.26:8.4	4.17:10.39	8.33:13.39	-18.24:18.54	-18.74:18.43	-16.36:13.11	19.79:10.8	4.61:3.49	3.03:3.56	-4.93:8.38	-7.99:8.57	-12.92:17.76	-18.21:13.45	-10.23:13.77	-16.53:17.19	-10.21:13.75	-8.83:8.75	-7.41:7.47	-4.79:7.53
(H5)	6.38:7.61	-7.74:8.43	-11.11:12.81	-12.93:8.67	7.37:8.52	7.46:8.85	7.48:10.89	-15.74:18.14	-18.73:19.11	-17.71:18.99	-17.97:17.95	-18.00:14.57	-11.61:8.82	8.76:8.33	-2.96:3.33	-7.05:11	-14.79:16.76	-12.91:8.73	-8.38:11.17	-11.92:10.43	-11.17:8.85	-11.17:8.85	-11.17:8.85	-11.17:8.85
(H6)	6.68:6.68	-7.56:8.24	-10.27:11.41	-10.9:8.29	-5.5:4.39	4.95:7.12	-11.46:16.14	-14.76:16.78	8.1:11.69	-4.22:9.17	-3.82:3.33	-3.86:4.63	-10.24:12.93	6.10:6.52	-3.77:4.01	-5.04:9.89	-13.81:13.81	-13.81:13.81	-13.81:13.81	-13.81:13.81	-13.81:13.81	-13.81:13.81	-13.81:13.81	-13.81:13.81
(H52)	7.09:6.41	-5.96:7.01	8.89:11.8	-12.21:9	8.65:6.62	7.82:10.54	-17.01:18.74	-13.59:10.91	-15.91:18.64	-16.27:10.84	-7.55:6.65	-3.38:1.29	-7.85:1.51	3.87:7.44	6.6:4.67	-5.87:8.22	-10.44:11.79	-17.54:14.33	-15.69:17.13	-13.71:13.73	-10.89:8.44	-3.99:6.45	-8.91:10.58	-8.91:10.58
(H7)	7.45:7.44	-7.47:8.01	-10.59:12.29	-11.29:11.4	-10.55:11.09	-11.52:12.62	-17.21:11.72	-7.63:7.12	9.19:16.56	-18.19:18.82	-14.28:10.17	8.47:8.72	8.29:5.21	3.47:5.29	4.34:2.76	3.44:5.59	-18.19:15.77	-15.94:16.68	-8.59:9.51	-17.19:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77
(H8)	7.45:7.44	-7.47:8.01	-10.59:12.29	-11.29:11.4	-10.55:11.09	-11.52:12.62	-17.21:11.72	-7.63:7.12	9.19:16.56	-18.19:18.82	-14.28:10.17	8.47:8.72	8.29:5.21	3.47:5.29	4.34:2.76	3.44:5.59	-18.19:15.77	-15.94:16.68	-8.59:9.51	-17.19:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77
(H9)	7.45:7.44	-7.47:8.01	-10.59:12.29	-11.29:11.4	-10.55:11.09	-11.52:12.62	-17.21:11.72	-7.63:7.12	9.19:16.56	-18.19:18.82	-14.28:10.17	8.47:8.72	8.29:5.21	3.47:5.29	4.34:2.76	3.44:5.59	-18.19:15.77	-15.94:16.68	-8.59:9.51	-17.19:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77
(H10)	7.45:7.44	-7.47:8.01	-10.59:12.29	-11.29:11.4	-10.55:11.09	-11.52:12.62	-17.21:11.72	-7.63:7.12	9.19:16.56	-18.19:18.82	-14.28:10.17	8.47:8.72	8.29:5.21	3.47:5.29	4.34:2.76	3.44:5.59	-18.19:15.77	-15.94:16.68	-8.59:9.51	-17.19:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77
(H11)	7.45:7.44	-7.47:8.01	-10.59:12.29	-11.29:11.4	-10.55:11.09	-11.52:12.62	-17.21:11.72	-7.63:7.12	9.19:16.56	-18.19:18.82	-14.28:10.17	8.47:8.72	8.29:5.21	3.47:5.29	4.34:2.76	3.44:5.59	-18.19:15.77	-15.94:16.68	-8.59:9.51	-17.19:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77
(H12)	7.45:7.44	-7.47:8.01	-10.59:12.29	-11.29:11.4	-10.55:11.09	-11.52:12.62	-17.21:11.72	-7.63:7.12	9.19:16.56	-18.19:18.82	-14.28:10.17	8.47:8.72	8.29:5.21	3.47:5.29	4.34:2.76	3.44:5.59	-18.19:15.77	-15.94:16.68	-8.59:9.51	-17.19:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77
(H13)	7.45:7.44	-7.47:8.01	-10.59:12.29	-11.29:11.4	-10.55:11.09	-11.52:12.62	-17.21:11.72	-7.63:7.12	9.19:16.56	-18.19:18.82	-14.28:10.17	8.47:8.72	8.29:5.21	3.47:5.29	4.34:2.76	3.44:5.59	-18.19:15.77	-15.94:16.68	-8.59:9.51	-17.19:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77
(H14)	7.45:7.44	-7.47:8.01	-10.59:12.29	-11.29:11.4	-10.55:11.09	-11.52:12.62	-17.21:11.72	-7.63:7.12	9.19:16.56	-18.19:18.82	-14.28:10.17	8.47:8.72	8.29:5.21	3.47:5.29	4.34:2.76	3.44:5.59	-18.19:15.77	-15.94:16.68	-8.59:9.51	-17.19:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77
(H15)	7.45:7.44	-7.47:8.01	-10.59:12.29	-11.29:11.4	-10.55:11.09	-11.52:12.62	-17.21:11.72	-7.63:7.12	9.19:16.56	-18.19:18.82	-14.28:10.17	8.47:8.72	8.29:5.21	3.47:5.29	4.34:2.76	3.44:5.59	-18.19:15.77	-15.94:16.68	-8.59:9.51	-17.19:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77
(H16)	7.45:7.44	-7.47:8.01	-10.59:12.29	-11.29:11.4	-10.55:11.09	-11.52:12.62	-17.21:11.72	-7.63:7.12	9.19:16.56	-18.19:18.82	-14.28:10.17	8.47:8.72	8.29:5.21	3.47:5.29	4.34:2.76	3.44:5.59	-18.19:15.77	-15.94:16.68	-8.59:9.51	-17.19:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77
(H17)	7.45:7.44	-7.47:8.01	-10.59:12.29	-11.29:11.4	-10.55:11.09	-11.52:12.62	-17.21:11.72	-7.63:7.12	9.19:16.56	-18.19:18.82	-14.28:10.17	8.47:8.72	8.29:5.21	3.47:5.29	4.34:2.76	3.44:5.59	-18.19:15.77	-15.94:16.68	-8.59:9.51	-17.19:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77
(H18)	7.45:7.44	-7.47:8.01	-10.59:12.29	-11.29:11.4	-10.55:11.09	-11.52:12.62	-17.21:11.72	-7.63:7.12	9.19:16.56	-18.19:18.82	-14.28:10.17	8.47:8.72	8.29:5.21	3.47:5.29	4.34:2.76	3.44:5.59	-18.19:15.77	-15.94:16.68	-8.59:9.51	-17.19:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77
(H19)	7.45:7.44	-7.47:8.01	-10.59:12.29	-11.29:11.4	-10.55:11.09	-11.52:12.62	-17.21:11.72	-7.63:7.12	9.19:16.56	-18.19:18.82	-14.28:10.17	8.47:8.72	8.29:5.21	3.47:5.29	4.34:2.76	3.44:5.59	-18.19:15.77	-15.94:16.68	-8.59:9.51	-17.19:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77
(H20)	7.45:7.44	-7.47:8.01	-10.59:12.29	-11.29:11.4	-10.55:11.09	-11.52:12.62	-17.21:11.72	-7.63:7.12	9.19:16.56	-18.19:18.82	-14.28:10.17	8.47:8.72	8.29:5.21	3.47:5.29	4.34:2.76	3.44:5.59	-18.19:15.77	-15.94:16.68	-8.59:9.51	-17.19:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77
(H21)	7.45:7.44	-7.47:8.01	-10.59:12.29	-11.29:11.4	-10.55:11.09	-11.52:12.62	-17.21:11.72	-7.63:7.12	9.19:16.56	-18.19:18.82	-14.28:10.17	8.47:8.72	8.29:5.21	3.47:5.29	4.34:2.76	3.44:5.59	-18.19:15.77	-15.94:16.68	-8.59:9.51	-17.19:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77
(H22)	7.45:7.44	-7.47:8.01	-10.59:12.29	-11.29:11.4	-10.55:11.09	-11.52:12.62	-17.21:11.72	-7.63:7.12	9.19:16.56	-18.19:18.82	-14.28:10.17	8.47:8.72	8.29:5.21	3.47:5.29	4.34:2.76	3.44:5.59	-18.19:15.77	-15.94:16.68	-8.59:9.51	-17.19:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77
(H23)	7.45:7.44	-7.47:8.01	-10.59:12.29	-11.29:11.4	-10.55:11.09	-11.52:12.62	-17.21:11.72	-7.63:7.12	9.19:16.56	-18.19:18.82	-14.28:10.17	8.47:8.72	8.29:5.21	3.47:5.29	4.34:2.76	3.44:5.59	-18.19:15.77	-15.94:16.68	-8.59:9.51	-17.19:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77
(H24)	7.45:7.44	-7.47:8.01	-10.59:12.29	-11.29:11.4	-10.55:11.09	-11.52:12.62	-17.21:11.72	-7.63:7.12	9.19:16.56	-18.19:18.82	-14.28:10.17	8.47:8.72	8.29:5.21	3.47:5.29	4.34:2.76	3.44:5.59	-18.19:15.77	-15.94:16.68	-8.59:9.51	-17.19:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77
(H25)	7.45:7.44	-7.47:8.01	-10.59:12.29	-11.29:11.4	-10.55:11.09	-11.52:12.62	-17.21:11.72	-7.63:7.12	9.19:16.56	-18.19:18.82	-14.28:10.17	8.47:8.72	8.29:5.21	3.47:5.29	4.34:2.76	3.44:5.59	-18.19:15.77	-15.94:16.68	-8.59:9.51	-17.19:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.77	-16.77:16.7



# Radiated Composite Gain Data of 2.4GHz&5GHz

# Appendix A

Theta (°)	7.8717	6.47599	5.61535	5.21496	4.91601	5.331619	7.45922	10.271069	11.921517	18.25182	14.881232	10.38907	7.61635	5.43508	4.58126	4.31425	4.23393	4.5315	5.37463	6.98743	8.71962	10.271156	12.11414	11.03481
Theta (°)	7.756429	5.11457	4.51426	3.97138	3.53336	3.920403	4.19474	5.34568	6.89175	6.121846	11.8314	12.521209	12.08111	10.41829	7.29463	6.04159	6.46702	7.979303	10.11076	12.261552	18.311789	16.31137	12.09532	8.736
Theta (°)	5.29516	4.87397	4.011399	3.59142	3.93414	4.46488	5.87135	8.91102	10.42957	8.31137	6.621597	6.57439	7.161769	8.18452	7.89172	6.81105	6.441084	8.411084	10.441817	15.031783	14.111121	9.96961	7.9161	5.381616
Theta (2.5°)	6.661495	3.91321	3.221315	3.91473	4.86165	6.21766	8.191105	13.7815	12.631183	12.621282	12.911199	8.78199	6.93144	8.151638	7.371913	11.181189	10.131967	10.311204	16.881871	16.711156	8.78107	9.221959	8.651749	8.16149
Theta (30°)	7.27584	4.951418	3.631373	4.01477	5.48176	6.411173	13.941774	17.881783	14.851533	14.831118	7.151654	5.77155	6.77184	8.95163	7.811004	13.011233	11.151329	16.871168	12.351019	10.781058	10.861884	8.821842	7.681715	
Theta (37.5°)	8.941769	6.781655	7.221698	6.13842	7.171861	9.781374	17.881948	13.181202	15.341877	19.041909	17.821422	8.581651	3.67121	2.94144	6.37175	7.251828	12.64178	18.211901	14.461248	12.441425	12.851933	8.08137	7.74136	9.82185
Theta (45°)	11.691649	18.891434	11.19167	8.03178	8.15187	8.951275	16.241837	17.721835	16.941565	19.31188	17.51188	18.931653	8.531372	1.21087	2.921791	10.881678	5.831861	10.981181	13.731621	17.811333	9.931679	4.861428	6.261725	7.021841
Theta (52.5°)	10.271124	14.541932	16.841329	12.611275	14.161178	18.121897	17.151811	17.891567	18.951701	14.171872	7.861897	7.721615	6.46154	4.321308	3.21308	4.931616	8.931361	16.191551	14.871024	10.221144	8.871663	4.781505	6.551748	9.111038
Theta (60°)	7.751812	8.181918	10.671231	12.091523	16.44117	18.691159	9.731296	13.711818	8.941803	12.021712	4.8104	3.481329	2.39121	2.89141	4.9115	5.621781	7.34181	18.861831	12.091212	14.761124	8.231924	9.981048	10.811096	9.351783
Theta (67.5°)	5.98612	5.11451	6.371022	17.351916	17.84184	12.361298	13.31918	14.271081	11.771425	19.221381	12.331884	8.24129	7.571111	6.031533	4.8164	5.161681	4.411278	16.221374	16.11125	8.811728	12.28183	8.18188	13.981538	9.72171
Theta (75°)	6.141646	6.541782	11.071912	15.271119	16.071895	15.311807	13.07188	6.25127	10.91971	8.471885	16.771772	13.12165	5.04148	2.591775	8.95136	8.531138	10.71807	14.441003	13.911838	9.841198	17.881114	9.49149	9.24163	6.21176
Theta (82.5°)	2.221292	4.281643	8.011087	7.181783	8.511598	18.821056	9.311279	8.03195	10.37155	6.821108	13.51199	10.91811	10.07817	11.08191	13.98143	5.23121	18.41119	11.021443	16.631174	9.441123	10.14785	8.191437	3.43141	3.54121
Theta (90°)	3.581749	10.441187	16.411164	15.031655	10.481249	17.6114	16.871123	10.419187	10.831564	19.011809	18.991143	9.019107	16.811453	12.69195	9.561041	10.781423	18.821981	13.34175	13.871838	15.781243	16.97132	4.741327	3.851427	5.111419
Theta (97.5°)	8.911884	13.371095	2.34127	5.981181	15.791463	15.311818	15.211456	2.77164	13.241389	9.591278	7.25141	12.311303	12.41478	7.571217	7.861178	15.141829	13.331172	16.331866	11.88142	3.981922	4.271303	6.291617	7.031768	
Theta (105°)	17.311137	8.11483	3.821612	17.771225	8.881474	10.91496	12.73163	6.751553	15.591848	6.04304	3.71319	4.47173	8.151379	9.351865	5.95152	13.361882	8.85148	7.2411648	18.561927	19.291923	14.681139	16.851423	11.781081	13.881757
Theta (112.5°)	6.114159	4.11468	6.591789	7.189737	12.561127	16.351175	16.951103	18.471841	18.991488	4.151309	2.93199	4.061675	13.771689	11.27183	9.461113	17.951909	12.161429	7.7192	13.821695	13.731921	16.351688	8.681743	11.561353	12.351827
Theta (120°)	4.989408	3.891441	7.83193	10.671887	13.321799	7.071154	15.21164	11.881162	12.581419	1.331087	1.31121	2.871451	6.431102	10.211237	10.881025	16.811166	9.951477	12.291215	13.691877	14.821855	17.841143	10.881147	9.481538	5.861249
Theta (127.5°)	6.691744	7.318103	11.891334	10.231986	10.431032	7.081113	10.231153	11.581823	10.271291	6.33929	6.45184	6.86183	10.691128	10.02169	9.281468	16.92177	18.031173	18.031173	17.931767	17.931767	16.2194	10.291102	14.341032	9.62182
Theta (135°)	6.461653	6.271881	5.521459	3.71436	8.88872	10.461409	12.371882	8.221063	6.7202	2.42336	0.591284	8.051179	17.951164	12.561173	17.4911851	12.361181	18.631178	13.881111	15.16196	8.681021	8.831151	11.811535	10.0911429	10.98163
Theta (142.5°)	12.951009	9.071095	6.621789	7.991789	7.91165	10.861913	7.591343	3.611783	6.31723	5.63138	2.86114	6.241854	12.881136	13.811789	11.681097	8.2311839	16.721925	7.961144	16.721925	15.07169	3.981507	11.671823	16.361164	10.911462
Theta (150°)	8.71934	5.64117	4.771489	5.931705	7.581664	6.65167	3.671255	3.221452	6.861153	4.031427	0.96104	1.11127	4.76184	18.9611104	6.32142	11.791197	14.821152	7.441937	18.92118	10.251422	3.981916	15.691117	7.28154	7.89142
Theta (157.5°)	7.41675	6.191686	6.921869	14.291916	19.051052	7.081472	4.051351	3.13134	4.15116	13.45169	2.841206	2.621403	6.181108	12.471951	12.211766	18.921153	12.291119	10.551159	13.381806	12.871748	6.7183	13.611812	15.851753	12.26178
Theta (165°)	5.821702	8.221038	14.811837	12.171115	11.441283	13.581151	10.67168	5.791515	8.711098	17.281134	9.48131	7.771813	10.151137	15.931673	13.11086	10.31948	7.1574	5.92162	8.23155	10.051102	12.461103	10.681755	6.52158	8.16187
Theta (172.5°)	4.291511	5.961676	4.961743	9.031113	15.521863	17.9711391	12.071036	8.431747	7.52193	12.531457	13.271288	14.031659	18.321807	17.441871	16.471143	10.74191	7.661674	6.161586	6.721628	4.84174	4.721424	3.151189	2.061243	2.93164
Theta (180°)	10.871137	12.571139	16.021135	17.3211618	15.531138	12.241115	11.661117	10.711979	8.421899	9.291035	11.431125	11.4911274	15.0211463	13.311122	9.96189	7.931737	7.491723	7.27182	8.311678	9.06118	8.031042	12.981131	12.161066	10.161043
Theta (°)	7.8717	6.47599	5.61535	5.21496	4.91601	5.331619	7.45922	10.271069	11.921517	18.25182	14.881232	10.38907	7.61635	5.43508	4.58126	4.31425	4.23393	4.5315	5.37463	6.98743	8.71962	10.271156	12.11414	11.03481
Theta (°)	7.756429	5.11457	4.51426	3.97138	3.53336	3.920403	4.19474	5.34568	6.89175	6.121846	11.8314	12.521209	12.08111	10.41829	7.29463	6.04159	6.46702	7.979303	10.11076	12.261552	18.311789	16.31137	12.09532	8.736
Theta (°)	5.29516	4.87397	4.011399	3.59142	3.93414	4.46488	5.87135	8.91102	10.42957	8.31137	6.621597	6.57439	7.161769	8.18452	7.89172	6.81105	6.441084	8.411084	10.441817	15.031783	14.111121	9.96961	7.9161	5.381616
Theta (2.5°)	6.661495	3.91321	3.221315	3.91473	4.86165	6.21766	8.191105	13.7815	12.631183	12.621282	12.911199	8.78199	6.93144	8.151638	7.371913	11.181189	10.131967	10.311204	16.881871	16.711156	8.78107	9.221959	8.651749	8.16149
Theta (30°)	7.27584	4.951418	3.631373	4.01477	5.48176	6.411173	13.941774	17.881783	14.851533	14.831118	7.151654	5.77155	6.77184	8.95163	7.811004	13.011233	11.151329	16.871168	12.351019	10.781058	10.861884	8.821842	7.681715	
Theta (37.5°)	8.941769	6.781655	7.221698	6.13842	7.171861	9.781374	17.881948	13.181202	15.341877	19.041909	17.821422	8.581651	3.67121	2.94144	6.37175	7.251828	12.64178	18.211901	14.461248	12.441425	12.851933	8.08137	7.74136	9.82185
Theta (45°)	11.691649	18.891434	11.19167	8.03178	8.15187	8.951275	16.241837	17.721835	16.941565	19.31188	17.51188	18.931653	8.531372	1.21087	2.921791	10.881678	5.831861	10.981181	13.731621	17.811333	9.931679	4.861428	6.261725	7.021841
Theta (52.5°)	10.271124	14.541932	16.841329	12.611275	14.161178	18.121897	17.151811	17.891567	18.951701	14.171872	7.861897	7.721615	6.46154	4.321308	3.21308	4.931616	8.931361	16.191551	14.871024	10.221144	8.871663	4.781505	6.551748	9.111038
Theta (60°)	7.751812	8.181918	10.671231	12.091523	16.44117	18.691159	9.731296	13.711818	8.941803	12.021712	4.8104	3.481329	2.39121	2.89141	4.9115	5.621781	7.34181	18.861831	12.091212	14.761124	8.231924	9.981048	10.811096	9.351783
Theta (67.5°)	5.98612	5.11451	6.371022	17.351916	17.84184	12.361298																		



## Radiated Composite Gain Data of 6GHz

## Appendix B

Freq(Hz)	6.175G	6.475G	6.695G	6.995G
Ant. 1 Max Gain (dBi)	3.65	2.68	2.4	2.38
Ant. 2 Max Gain (dBi)	3.09	2.54	3.38	1.79
Ant. 3 Max Gain (dBi)	4.21	3.27	3.47	2.7
Ant. 4 Max Gain (dBi)	3.78	3.55	2.51	2.69
Ant. 1 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/45/165	Theta/127.5/345	Theta/45/195	Theta/45/187.5
Ant. 2 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/45/30	Theta/127.5/187.5	Theta/127.5/187.5	Theta/75/30
Ant. 3 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/82.5/82.5	Theta/90/352.5	Theta/82.5/75	Theta/97.5/75
Ant. 4 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/97.5/292.5	Theta/97.5/330	Theta/97.5/105	Theta/75/7.5
Max Gain (dBi)	4.21	3.55	3.47	2.7
DG [1SS] (dBi)	6.56	6.96	6.38	5.94
DG [2SS] (dBi)	4.21	3.96	3.47	2.94
DG [4SS] (dBi)	4.21	3.55	3.47	2.7











# Radiated Composite Gain Data of 6GHz

# Appendix B

(H)2)	9:37:11.06	-15:10:17.35	-14:14:12.26	8:03:07.71	6:01:47.67	4:16:44.24	-2:08:47.07	3:89:14.14	4:43:49.99	-4:93:28.62	-5:45:52.12	-6:07:81.81	9:17:10.82	-11:48:97.77	-7:57:45.25	-6:02:48.25	-1:16:07.73	6:02:05.65	6:08:27.24	-3:72:05.75	-5:25:46.62	4:74:54.84	5:03:38.58	6:17:08.80	
(H)2.5)	-12:35:10.10	-12:47:14.12	-14:03:11.89	9:01:16.46	6:53:49.88	3:82:82.88	-2:83:61.31	3:50:24.61	3:64:47.77	5:69:43.64	-7:45:04.84	-10:44:12.81	-11:31:10.89	9:27:71.11	6:58:81.59	-5:94:44.66	2:06:12.12	2:09:21.29	2:04:28.28	2:91:30.26	3:19:32.92	3:96:56.56	6:52:79.29	6:11:10.77	
(H)3)	-8:46:10.01	-13:01:11.38	6:01:17.65	6:01:45.92	4:02:15.44	4:75:43.43	3:08:29.28	2:50:22.64	2:52:08.28	4:05:27.28	-11:04:13.89	-11:59:10.31	-10:55:10.23	-10:04:52.62	6:39:26.26	-4:72:46.46	4:14:44.44	-3:28:30.31	2:71:46.46	-1:02:12.12	-1:50:14.14	2:74:42.42	6:33:56.56	5:86:57.57	
(H)4)	7:27:18.73	-11:01:12.35	-9:08:49.69	6:42:46.66	4:27:44.25	-4:08:49.49	-4:76:15.15	3:71:17.17	1:31:12.12	3:44:12.12	-10:88:19.89	-13:44:89.89	6:01:34.34	6:04:94.94	5:54:45.45	-4:06:16.16	7:83:17.17	6:09:69.69	5:12:25.25	1:04:11.11	-1:18:12.12	1:37:18.18	3:05:56.56	7:79:72.72	
(H)5)	5:20:42.42	-15:21:16.16	-16:19:08.08	6:03:27.27	6:52:37.37	2:26:26.26	2:96:26.26	3:36:26.26	2:37:27.27	3:31:27.27	-11:51:21.21	-14:56:18.18	-13:09:48.48	6:04:94.94	5:54:45.45	-4:06:16.16	4:49:84.84	5:15:37.37	6:04:17.17	-1:08:18.18	-1:18:12.12	1:30:18.18	3:05:56.56	3:13:53.53	
(H)6)	8:31:18.86	-17:02:10.10	-11:07:18.74	6:23:38.38	-3:27:26.26	-1:17:03.03	6:09:33.33	-1:56:24.24	3:81:61.61	6:26:61.61	-8:01:01.01	-15:01:11.54	-10:35:14.24	-13:79:57.57	9:18:18.18	9:18:18.18	6:09:69.69	6:09:69.69	5:89:14.14	3:33:14.14	2:66:36.36	4:94:84.84	-1:82:87.87	6:55:16.16	
(H)7)	7:99:49.97	-12:02:10.10	-17:02:10.10	8:50:22.22	6:14:42.42	-1:14:42.42	5:90:22.22	1:39:73.73	3:23:51.51	-6:41:11.32	-12:27:11.32	-11:01:12.12	-13:12:12.12	-11:17:17.17	9:18:18.18	9:18:18.18	6:09:69.69	6:09:69.69	6:09:69.69	6:09:69.69	6:09:69.69	6:09:69.69	6:09:69.69	6:09:69.69	
(H)8)	-11:02:09.09	9:44:11.09	9:39:67.67	6:99:55.55	6:69:76.76	3:26:04.04	0:51:01.01	1:69:00.00	2:56:57.57	6:07:86.86	-11:34:55.55	-16:03:16.16	-18:16:16.16	-19:19:19.19	-18:19:19.19	-14:19:19.19	6:09:69.69	6:09:69.69	6:09:69.69	6:09:69.69	6:09:69.69	6:09:69.69	6:09:69.69	6:09:69.69	
(H)9)	-10:45:11.11	-14:01:11.11	-13:32:11.11	8:64:47.47	3:31:44.44	4:94:47.47	4:07:17.17	0:11:51.51	4:07:53.53	6:04:47.47	7:86:10.83	-10:22:12.12	-16:70:12.12	-14:47:12.12	-15:36:12.12	-13:44:12.12	-11:59:11.24	6:09:69.69	6:09:69.69	6:09:69.69	6:09:69.69	6:09:69.69	6:09:69.69	6:09:69.69	
(H)10)	6:06:07.09	-10:29:19.19	-12:54:11.11	8:13:22.22	4:47:34.34	-7:21:41.41	-7:48:89.89	3:99:27.27	4:59:12.12	7:26:55.55	6:76:12.12	16:04:16.16	16:04:16.16	16:04:16.16	16:04:16.16	16:04:16.16	16:04:16.16	16:04:16.16	16:04:16.16	16:04:16.16	16:04:16.16	16:04:16.16	16:04:16.16	16:04:16.16	
(H)11)	1:02:04.04	-16:79:19.19	-17:30:15.15	8:09:73.73	7:09:57.57	4:14:44.44	6:09:29.29	4:10:42.42	16:02:96.96	16:09:17.17	4:25:07.07	8:02:16.16	10:03:77.77	7:09:69.69	6:09:69.69	6:09:69.69	6:09:69.69	6:09:69.69	6:09:69.69	6:09:69.69	6:09:69.69	6:09:69.69	6:09:69.69	6:09:69.69	
(H)12)	6:02:02.02	-16:04:16.16	-16:03:15.15	8:25:10.10	16:05:11.11	16:05:11.11	16:05:11.11	16:05:11.11	16:05:11.11	16:05:11.11	16:05:11.11	16:05:11.11	16:05:11.11	16:05:11.11	16:05:11.11	16:05:11.11	16:05:11.11	16:05:11.11	16:05:11.11	16:05:11.11	16:05:11.11	16:05:11.11	16:05:11.11	16:05:11.11	
(H)13)	13:20:14.27	-18:03:14.24	-17:44:17.42	17:40:14.24	-13:44:13.24	6:15:07.07	4:05:41.41	5:54:42.42	-12:29:12.12	-12:29:12.12	-12:29:12.12	-12:29:12.12	-12:29:12.12	-12:29:12.12	-12:29:12.12	-12:29:12.12	-12:29:12.12	-12:29:12.12	-12:29:12.12	-12:29:12.12	-12:29:12.12	-12:29:12.12	-12:29:12.12	-12:29:12.12	
(H)14)	-11:43:14.27	5:15:15.15	-18:55:15.15	-17:16:17.17	-15:26:17.17	6:34:44.44	5:41:58.58	8:78:17.17	6:72:42.42	-11:57:12.12	-13:58:12.12	-17:38:12.12	-14:14:17.17	-11:09:16.16	-14:16:16.16	-16:09:16.16	-16:09:16.16	-16:09:16.16	-16:09:16.16	-16:09:16.16	-16:09:16.16	-16:09:16.16	-16:09:16.16	-16:09:16.16	
(H)15)	11:99:40.40	4:15:15.15	-16:06:10.25	-14:10:10.67	6:72:73.73	-7:43:51.51	-11:57:73.73	8:04:11.48	8:32:89.89	-10:02:07.07	-10:01:07.07	-17:00:17.00	-17:00:17.00	-17:00:17.00	-17:00:17.00	-17:00:17.00	-17:00:17.00	-17:00:17.00	-17:00:17.00	-17:00:17.00	-17:00:17.00	-17:00:17.00	-17:00:17.00	-17:00:17.00	
(H)16)	-18:05:15.64	-13:02:16.28	-14:20:16.28	6:27:27.27	4:77:57.57	-3:59:06.06	5:69:41.41	8:04:10.77	-11:16:11.21	-11:16:11.21	-12:30:11.21	-14:02:11.21	-14:02:11.21	-14:02:11.21	-14:02:11.21	-14:02:11.21	-14:02:11.21	-14:02:11.21	-14:02:11.21	-14:02:11.21	-14:02:11.21	-14:02:11.21	-14:02:11.21	-14:02:11.21	
(H)17)	-16:69:13.22	-10:18:48.88	-9:39:12.09	-11:09:12.38	-11:24:03.03	6:57:41.01	-5:89:45.89	-7:89:14.14	-1:54:27.27	-1:54:27.27	-1:54:27.27	-1:54:27.27	-1:54:27.27	-1:54:27.27	-1:54:27.27	-1:54:27.27	-1:54:27.27	-1:54:27.27	-1:54:27.27	-1:54:27.27	-1:54:27.27	-1:54:27.27	-1:54:27.27	-1:54:27.27	
(H)18)	-16:83:18.99	-18:44:18.38	-11:16:12.66	-11:56:12.66	-11:32:10.88	-11:32:10.88	-11:32:10.88	-11:32:10.88	-11:32:10.88	-11:32:10.88	-11:32:10.88	-11:32:10.88	-11:32:10.88	-11:32:10.88	-11:32:10.88	-11:32:10.88	-11:32:10.88	-11:32:10.88	-11:32:10.88	-11:32:10.88	-11:32:10.88	-11:32:10.88	-11:32:10.88	-11:32:10.88	
(H)19)	-16:68:18.94	-18:54:14.74	-14:39:14.03	-17:65:18.99	-12:26:12.26	-12:85:74.74	-7:33:74.74	6:11:14.14	-1:44:18.18	-1:44:18.18	-1:44:18.18	-1:44:18.18	-1:44:18.18	-1:44:18.18	-1:44:18.18	-1:44:18.18	-1:44:18.18	-1:44:18.18	-1:44:18.18	-1:44:18.18	-1:44:18.18	-1:44:18.18	-1:44:18.18	-1:44:18.18	
(H)20)	6:19:36.36	-11:40:10.29	-10:49:15.15	-18:17:18.69	-18:29:16.69	-15:77:15.15	-15:39:16.69	-16:01:16.69	-17:39:13.13	-17:39:13.13	-17:39:13.13	-17:39:13.13	-17:39:13.13	-17:39:13.13	-17:39:13.13	-17:39:13.13	-17:39:13.13	-17:39:13.13	-17:39:13.13	-17:39:13.13	-17:39:13.13	-17:39:13.13	-17:39:13.13	-17:39:13.13	
(H)21)	-17:11:15.29	-13:56:15.14	-19:21:17.81	-18:07:18.24	-15:06:12.24	-11:83:12.27	-15:02:16.15	-18:06:13.27	-10:50:94.94	-10:46:13.11	-18:21:12.12	-17:24:14.66	-11:57:08.86	-7:25:11.11	-5:83:75.75	-8:54:13.56	-17:73:15.26	-10:97:19.79	-11:55:14.17	-14:49:14.14	-11:19:11.55	-16:86:12.22	-14:14:13.13	-19:30:71.71	
(H)22)	-13:09:12.12	-13:50:15.14	-13:00:15.14	-16:15:14.14	-13:17:14.14	-18:07:19.83	-19:20:17.39	-18:59:19.83	-18:21:18.09	-19:31:18.09	-18:21:18.09	-18:21:18.09	-18:21:18.09	-18:21:18.09	-18:21:18.09	-18:21:18.09	-18:21:18.09	-18:21:18.09	-18:21:18.09	-18:21:18.09	-18:21:18.09	-18:21:18.09	-18:21:18.09	-18:21:18.09	
(H)23)	-10:50:18.46	-19:03:10.62	-15:29:16.29	-18:44:13.34	-13:38:13.33	-11:16:12.06	-11:72:15.15	-10:39:71.71	-12:20:14.65	-15:46:17.88	-19:03:18.91	-18:29:16.16	-18:43:18.88	-18:37:19.72	-18:55:14.14	-13:39:13.51	-12:39:08.85	6:25:76.76	7:49:81.81	6:77:74.74	7:07:74.74	6:87:10.63	-13:99:18.64	-17:96:17.83	
Freq(H)	6:89:94.94	Pin(H)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Gain	(H)207(9)7.5)	(H)197(9)2.5)	(H)307(9)3.5)	(H)457(9)5.2)	(H)607(9)7.5)	(H)757(9)10.2)	(H)907(9)12.5)	(H)1057(9)15.2)	(H)1207(9)17.5)	(H)1357(9)20.2)	(H)1507(9)22.5)	(H)1657(9)25.2)	(H)1807(9)27.5)	(H)1957(9)30.2)	(H)2107(9)32.5)	(H)2257(9)35.2)	(H)2407(9)37.5)	(H)2557(9)40.2)	(H)2707(9)42.5)	(H)2857(9)45.2)	(H)3007(9)47.5)	(H)3157(9)50.2)	(H)3307(9)52.5)	(H)3457(9)55.2)	(H)3607(9)57.5)
(H)1)	4:77:31.71	3:33:33.33	3:86:33.33	5:53:77.77	6:27:77.77	8:85:11.11	12:11:17.18	18:49:18.75	18:49:18.75	18:49:18.75	18:49:18.75	18:49:18.75	18:49:18.75	18:49:18.75	18:49:18.75	18:49:18.75	18:49:18.75	18:49:18.75	18:49:18.75	18:49:18.75	18:49:18.75	18:49:18.75	18:49:18.75	18:49:18.75	
(H)2)	5:19:52.58	5:29:41.41	4:06:27.27	5:29:69.69	7:79:85.85	8:34:19.19	11:10:13.22	14:70:15.91	16:20:14.24	11:53:16.72	6:07:34.34	3:47:32.72	2:07:16.16	2:19:24.24	3:54:74.74	5:49:79.79	6:57:19.19	7:59:19.19	8:59:19.19	9:59:19.19	10:59:19.19	11:59:19.19	12:59:19.19	13:59:19.19	
(H)3)	3:09:21.21	2:31:18.18	2:34:59.59	6:09:15.15	7:95:10.10	13:69:15.15	19:17:17.17	25:01:21.21	31:01:21.21	3:41:15.15	1:34:13.13	1:05:08.08	0:22:12.12	0:37:12.12	1:13:13.13	3:22:40.40	4:44:61.61	6:02:12.12	7:15:15.15	8:24:24.24	9:29:29.29	10:34:34.34	11:39:39.39	12:44:44.44	
(H)4)	3:09:21.21	2:31:18.18	2:34:59.59	6:09:15.15	7:95:10.10	13:69:15.15	19:17:17.17	25:01:21.21	31:01:21.21	3:41:15.15	1:34:13.13	1:05:08.08	0:22:12.12	0:37:12.12	1:13:13.13	3:22:40.40	4:44:61.61	6:02:12.12	7:15:15.15	8:24:24.24	9:29:29.29	10:34:34.34	11:39:39.39	12:44:44.44	
(H)5)	4:47:14.74	2:53:14.14	3:29:59.59	8:41:16.69	10:50:16.69	15:02:16.69	19:24:16.69	23:46:16.69	28:08:16.69	3:24:16.69	1:04:16.69	0:07:25.25	0:17:17.17	0:24:16.69	0:49:16.69	1:34:16.69	2:29:16.69	3:24:16.69	4:19:16.69	5:14:16.69	6:09:16.69	7:04:16.69	8:00:16.69	8:55:16.69	







# Radiated Composite Gain Data of 6GHz

# Appendix B

(E157.1)	-63.9-72	-12.11-14.5	-10.23-16	-12.4-54	-13.12-12.76	-11.03-11.18	-14.75-17.57	-14.88-9.41	-7.19-7.98	-8.93-9.59	-6.29-7.6	-7.69-6.1	-6.72-5.1	-14.86-15.85	-16.89-13.42	-12.62-17.56	-19.39-15.84	-14.02-17.91	-17.95-13.38	-12.69-13.22	-9.39-7.95	-6.43-13.85	-13.93-24.34	-6.57-8.48		
(E157.2)	9.36-10.68	-12.91-15.01	-18.1-14.1	-13.63-11.65	-11.85-12.6	-12.67-17.7	-18.99-14.65	-18.89-17.62	-16.35-16.1	-14.88-13.33	-13.41-13.17	-12.49-13.34	9.55-10.35	-10.67-11.41	-12.52-14.79	-17.46-17.83	-18.83-18.35	-9.76-11.78	6.62-6.43	-12.26-18.66	-13.46-11.28	9.84-12.17	-18.48-15.33	-10.34-8.62	-16.24-10.63	
(E157.3)	-18.15-17.96	-15.91-15.25	-15.99-16.52	-18.53-17.62	-18.73-18.41	-16.42-19.2	-18.99-19.28	-17.66-16.63	-15.92-12.65	-14.26-13.11	-13.45-11.31	4.07-3.65	3.31-3.51	4.62-6.44	4.29-6.11	-11.31-10.37	-11.53-10.49	9.26-11.44	6.29-6.66	-11.55-12.08	-11.44-11.44	-11.94-11.74	-17.26-15.54	-16.24-10.63		
(E157.4)	-18.81-19.68	-15.42-14.1	-13.67-15.06	-14.34-14.31	-14.41-13.26	-13.18-13.9	-13.24-13.9	-14.58-14.93	-16.04-15.72	-14.81-13.01	-12.98-11.67	-11.51-11.11	-12.21-13.66	-15.13-15.76	-18.03-19.05	-17.29-15.56	-14.51-14.82	-14.96-15.74	-16.46-17.36	-15.9-15.06	-16.77-17.87	-17.39-18.58	-18.07-18.54	-18.78-18.14		
FreqID#	6.1752P04	ThetaRef: 3																								
Gain	(E157.1)	(E157.2)	(E157.3)	(E157.4)	(E157.5)	(E157.6)	(E157.7)	(E157.8)	(E157.9)	(E157.10)	(E157.11)	(E157.12)	(E157.13)	(E157.14)	(E157.15)	(E157.16)	(E157.17)	(E157.18)	(E157.19)	(E157.20)	(E157.21)	(E157.22)	(E157.23)	(E157.24)	(E157.25)	
(E157.1)	-18.13-18.29	-18.52-18.38	-14.68-15.4	-17.79-14.66	-11.86-10.67	-10.17-10.44	8.96-10.18	-11.08-12.06	-12.88-14.28	-15.68-17.19	-19.31-18.9	-18.44-17.36	-17.34-16.65	-14.22-12.87	-11.61-14.2	-12.62-12.33	-12.14-12.86	-12.76-12.48	-12.98-13.84	-14.53-14.14	-14.34-15.05	-15.31-15.56	-11.38-18.68	-18.78-17.48		
(E157.2)	-16.1-15.96	-14.19-14.42	-12.92-12.21	-13.59-12.71	-11.59-11.72	-11.59-11.72	-11.59-11.72	-11.59-11.72	-11.59-11.72	-11.59-11.72	-11.59-11.72	-11.59-11.72	-11.59-11.72	-11.59-11.72	-11.59-11.72	-11.59-11.72	-11.59-11.72	-11.59-11.72	-11.59-11.72	-11.59-11.72	-11.59-11.72	-11.59-11.72	-11.59-11.72	-11.59-11.72	-11.59-11.72	
(E157.3)	8.65-7.14	8.67-7.56	7.93-7.77	7.83-6.49	7.44-6.87	11.56-11.97	11.56-11.97	11.56-11.97	11.56-11.97	11.56-11.97	11.56-11.97	11.56-11.97	11.56-11.97	11.56-11.97	11.56-11.97	11.56-11.97	11.56-11.97	11.56-11.97	11.56-11.97	11.56-11.97	11.56-11.97	11.56-11.97	11.56-11.97	11.56-11.97	11.56-11.97	
(E157.4)	9.48-8.55	7.36-6.78	6.02-5.17	4.51-4.44	4.56-5.56	5.36-6.41	10.29-11.77	10.65-12.12	9.62-7.79	6.98-7.62	5.98-6.22	4.51-7.63	7.27-5.91	4.99-3.73	4.28-5.77	7.01-5.7	4.4-8.80	7.35-7.09	4.59-3.25	3.95-3.18	-18.71-28	-18.41-16.63	-11.63-8.89	-6.26-5.33	4.4-4.71	
(E157.5)	5.24-6.46	4.96-4.94	4.54-4.51	4.36-3.73	3.92-2.98	3.97-5.84	8.94-10.33	17.31-13.61	8.47-5.77	4.88-4.45	4.18-7.15	14.61-14.58	11.76-8.62	7.04-6.64	4.94-3.32	7.72-11.12	10.74-9.29	4.64-5.45	4.28-6.71	4.98-6.45	4.49-3.22	2.3-1.13	2.25-2.46	3.03-3.28		
(E157.6)	0.54-1.25	4.84-5.38	6.37-6.69	6.71-4.12	1.78-0.2	1.51-1.01	4.12-0.38	4.47-6.21	3.55-2.29	2.12-58	5.99-7.9	14.65-11.58	14.65-11.58	8.07-7.43	-1.6-16.09	7.86-10.23	18.34-14.05	4.65-2.87	3.41-5.24	4.97-2.09	-1.10-9.1	-1.73-2.38	-1.11-0.17	-0.02-0.41		
(E157.7)	0.14-1.17	3.17-3.03	4.79-5.04	5.98-5.59	-1.11-0.66	1.05-0.96	-1.14	4.39-2.14	-1.02-1.99	-3.96-4.46	-10.91-9.26	-17.43-17.17	-12.28-10.74	7.87-6.18	5.26-3.68	2.91-5.23	5.59-5.99	6.07-2.65	-1.11-1.93	-3.20	-3.12	-4.48	-0.95-1.33	-0.46-0.78	1.20-38	
(E157.8)	0.17-1.92	-3.19-3.54	-3.77-3.15	-3.9-3.36	-1.53-1.37	3.03-3.2	2.07-0.62	2.29-1.96	2.07-2.78	3.13-3.78	5.63-5.36	-11.30-3.4	8.99-7.24	8.19-10.79	8.14-3.03	0.56-1.18	-1.88-7.1	4.56-1.52	2.25-1.22	-1.88-2.59	1.90-2.25	-1.77-0.52	-0.45-0.82	-0.45-0.82	1.67-0.64	
(E157.9)	0.3-1.26	-3.87-3.82	-3.09-1.43	0.79-1.21	2.92-0.69	2.75-3.4	2.16-1.17	-1.3-2.49	-1.51-2.44	3.2-2.45	2.04-2.57	4.48-2.64	-1.48-2.24	6.15-5.65	5.41-1.18	0.61-1.04	1.64-0.84	2.9-5.89	2.77-2.73	3.3-3.39	-3.02-1.6	2.44-2.23	0.58-1.26	1.86-1.48		
(E157.10)	1.68-0.53	-3.44-3.84	-3.30-3.04	0.33-0.46	0.27-1.71	2.82-0.71	1.92-2.73	5.77-3.53	1.53-0.36	4.5-7.05	2.65-1.14	0.02-0.39	0.31-1.1	2.1-2.96	-5.02-0.21	0.69-1.33	-1.13-4.11	-1.05-1.67	3.73-3.77	-4.03-4.27	4.53-3.37	4.59-7.99	2.21-0.44	2.11-1.98		
(E157.11)	3.29-1.33	-1.2-1.59	-4.33-4.62	1.06-1.96	1.45-1.4	3.15-2.1	2.31-1.05	-1.59-1.52	-0.95-1.52	0.2-0.54	-2.65-1.4	0.02-1.23	0.11-1.15	-1.12-0.99	-2.47-1.85	0.31-0.58	0.44-0.43	-1.22-0.86	8.85-5.15	-2.35-4.84	8.97-8.57	-10.68-9.39	3.27-2.64	3.43-3.58		
(E157.12)	2.89-1.95	-0.96-0.61	4.47-1.03	0.13-1.18	-0.83-0.74	0.28-1.31	2.82-0.71	1.92-2.73	5.77-3.53	1.53-0.36	4.5-7.05	2.65-1.14	0.02-0.39	0.31-1.1	2.1-2.96	-5.02-0.21	0.69-1.33	-1.13-4.11	-1.05-1.67	3.73-3.77	-4.03-4.27	4.53-3.37	4.59-7.99	2.21-0.44	2.11-1.98	
(E157.13)	2.35-1.95	-1.2-1.59	-4.33-4.62	1.06-1.96	1.45-1.4	3.15-2.1	2.31-1.05	-1.59-1.52	-0.95-1.52	0.2-0.54	-2.65-1.4	0.02-1.23	0.11-1.15	-1.12-0.99	-2.47-1.85	0.31-0.58	0.44-0.43	-1.22-0.86	8.85-5.15	-2.35-4.84	8.97-8.57	-10.68-9.39	3.27-2.64	3.43-3.58		
(E157.14)	2.35-1.95	-1.2-1.59	-4.33-4.62	1.06-1.96	1.45-1.4	3.15-2.1	2.31-1.05	-1.59-1.52	-0.95-1.52	0.2-0.54	-2.65-1.4	0.02-1.23	0.11-1.15	-1.12-0.99	-2.47-1.85	0.31-0.58	0.44-0.43	-1.22-0.86	8.85-5.15	-2.35-4.84	8.97-8.57	-10.68-9.39	3.27-2.64	3.43-3.58		
(E157.15)	2.35-1.95	-1.2-1.59	-4.33-4.62	1.06-1.96	1.45-1.4	3.15-2.1	2.31-1.05	-1.59-1.52	-0.95-1.52	0.2-0.54	-2.65-1.4	0.02-1.23	0.11-1.15	-1.12-0.99	-2.47-1.85	0.31-0.58	0.44-0.43	-1.22-0.86	8.85-5.15	-2.35-4.84	8.97-8.57	-10.68-9.39	3.27-2.64	3.43-3.58		
(E157.16)	2.35-1.95	-1.2-1.59	-4.33-4.62	1.06-1.96	1.45-1.4	3.15-2.1	2.31-1.05	-1.59-1.52	-0.95-1.52	0.2-0.54	-2.65-1.4	0.02-1.23	0.11-1.15	-1.12-0.99	-2.47-1.85	0.31-0.58	0.44-0.43	-1.22-0.86	8.85-5.15	-2.35-4.84	8.97-8.57	-10.68-9.39	3.27-2.64	3.43-3.58		
(E157.17)	2.35-1.95	-1.2-1.59	-4.33-4.62	1.06-1.96	1.45-1.4	3.15-2.1	2.31-1.05	-1.59-1.52	-0.95-1.52	0.2-0.54	-2.65-1.4	0.02-1.23	0.11-1.15	-1.12-0.99	-2.47-1.85	0.31-0.58	0.44-0.43	-1.22-0.86	8.85-5.15	-2.35-4.84	8.97-8.57	-10.68-9.39	3.27-2.64	3.43-3.58		
(E157.18)	2.35-1.95	-1.2-1.59	-4.33-4.62	1.06-1.96	1.45-1.4	3.15-2.1	2.31-1.05	-1.59-1.52	-0.95-1.52	0.2-0.54	-2.65-1.4	0.02-1.23	0.11-1.15	-1.12-0.99	-2.47-1.85	0.31-0.58	0.44-0.43	-1.22-0.86	8.85-5.15	-2.35-4.84	8.97-8.57	-10.68-9.39	3.27-2.64	3.43-3.58		
(E157.19)	2.35-1.95	-1.2-1.59	-4.33-4.62	1.06-1.96	1.45-1.4	3.15-2.1	2.31-1.05	-1.59-1.52	-0.95-1.52	0.2-0.54	-2.65-1.4	0.02-1.23	0.11-1.15	-1.12-0.99	-2.47-1.85	0.31-0.58	0.44-0.43	-1.22-0.86	8.85-5.15	-2.35-4.84	8.97-8.57	-10.68-9.39	3.27-2.64	3.43-3.58		
(E157.20)	2.35-1.95	-1.2-1.59	-4.33-4.62	1.06-1.96	1.45-1.4	3.15-2.1	2.31-1.05	-1.59-1.52	-0.95-1.52	0.2-0.54	-2.65-1.4	0.02-1.23	0.11-1.15	-1.12-0.99	-2.47-1.85	0.31-0.58	0.44-0.43	-1.22-0.86	8.85-5.15	-2.35-4.84	8.97-8.57	-10.68-9.39	3.27-2.64	3.43-3.58		
(E157.21)	2.35-1.95	-1.2-1.59	-4.33-4.62	1.06-1.96	1.45-1.4	3.15-2.1	2.31-1.05	-1.59-1.52	-0.95-1.52	0.2-0.54	-2.65-1.4	0.02-1.23	0.11-1.15	-1.12-0.99	-2.47-1.85	0.31-0.58	0.44-0.43	-1.22-0.86	8.85-5.15	-2.35-4.84	8.97-8.57	-10.68-9.39	3.27-2.64	3.43-3.58		
(E157.22)	2.35-1.95	-1.2-1.59	-4.33-4.62	1.06-1.96	1.45-1.4	3.15-2.1	2.31-1.05	-1.59-1.52	-0.95-1.52	0.2-0.54	-2.65-1.4	0.02-1.23	0.11-1.15	-1.12-0.99	-2.47-1.85	0.31-0.58	0.44-0.43	-1.22-0.86	8.85-5.15	-2.35-4.84	8.97-8.57	-10.68-9.39	3.27-2.64	3.43-3.58		
(E157.23)	2.35-1.95	-1.2-1.59	-4.33-4.62	1.06-1.96	1.45-1.4	3.15-2.1	2.31-1.05	-1.59-1.52	-0.95-1.52	0.2-0.54	-2.65-1.4	0.02-1.23	0.11-1.15	-1.12-0.99	-2.47-1.85	0.31-0.58	0.44-0.43	-1.22-0.86	8.85-5.15	-2.35-4.84	8.97-8.57	-10.68-9.39	3.27-2.64	3.43-3.58		
(E157.24)	2.35-1.95	-1.2-1.59	-4.33-4.62	1.06-1.96	1.45-1.4	3.15-2.1	2.31-1.05	-1.59-1.52	-0.95-1.52	0.2-0.54	-2.65-1.4	0.02-1.23	0.11-1.15	-1.12-0.99	-2.47-1.85	0.31-0.58	0.44-0.43	-1.22-0.86	8.85-5.15	-2.35-4.84	8.97-8.57	-10.68-9.39	3.27-2.64	3.43-3.58		
(E157.25)	2.35-1.95	-1.2-1.59	-4.33-4.62	1.06-1.96	1.45-1.4	3.15-2.1	2.31-1.05	-1.59-1.52	-0.95-1.52	0.2-0.54	-2.65-1.4	0.02-1.23	0.11-1.15	-1.12-0.99	-2.47-1.85	0.31-0.58	0.44-0.43	-1.22-0.86	8.85-5.15	-2.35-4.84	8.97-8.57	-10.68-9.39	3.27-2.64	3.43-3.58		
(E157.26)	2.35-1.95	-1.2-1.59	-4.33-4.62	1.06-1.96	1.45-1.4	3.15-2.1	2.31-1.05	-1.59-1.52	-0.95-1.52	0.2-0.54	-2.65-1.4	0.02-1.23	0.11-1.15	-1.12-0.99	-2.47-1.85	0.31-0.58	0.44-0.43	-1.22-0.86	8.85-5.15	-2.35-4.84</						



# Radiated Composite Gain Data of 6GHz

# Appendix B

(Hz)	-11.74-12.26	-12.06-11.48	-12.09-10.66	-10.33-10.40	-9.07-9.98	-9.44-8.88	-7.96-9.96	-7.17-7.21	-6.86-8.69	-6.80-7.03	-7.36-7.82	-8.29-9.07	-10.72-11	-11.84-13.72	-14.53-18.38	-16.71-17.66	-16.69-15.28	-14.35-12.71	-10.97-10.79	-10.61-10.77	-10.58-10.85	-11.93-12.27	-11.10-13.6	-10.12-12.68	
(Hz)	8.7716-8.6	9.55-10.7	-10.20-10.07	8.79-9.2	9.34-8.01	8.72-9.53	-8.01-7.73	8.50-9.45	7.95-7.71	6.57-6.71	5.96-5.86	6.19-7.12	8.64-10.53	12.50-14.7	-17.89-18.93	-18.51-19.01	-16.88-15.02	-12.63-11.1	-11.04-11.3	-14.53-14.9	-14.68-15.5	-16.86-18.44	-13.63-12.44	-11.24-12.03	
(Hz)	9.0717-8	4.54-4.6	4.54-4.6	5.34-5.2	5.34-5.2	5.34-5.2	5.34-5.2	5.34-5.2	5.34-5.2	5.34-5.2	5.34-5.2	5.34-5.2	5.34-5.2	5.34-5.2	5.34-5.2	5.34-5.2	5.34-5.2	5.34-5.2	5.34-5.2	5.34-5.2	5.34-5.2	5.34-5.2	5.34-5.2	5.34-5.2	
(Hz)	4.99-3.07	-2.73-2.33	-3.16-3.79	-7.67	1.26-2.56	-5.73-5.69	-5.431	3.30-3.28	1.93-2.27	-2.33-3.8	-6.04-63	-13.72-11.29	9.74-6.62	8.61-8.09	9.11-11.4	-15.31-10.3	-16.69-14.28	-15.77-17.8	-17.97-17.9	-18.72-14.6	-10.38-24	-7.91-6.88	8.67-8.63	-10.23-7.48	
(Hz)	6.11-3.36	-1.94-3.16	-1.94-3.16	4.97-2.84	1.49-2.45	-2.33-3.1	-4.21-3.7	3.99-2.61	-1.21	-1.52-1.12	-12.74-17.2	17.37-10.71	17.45-6.84	5.94-5.96	7.63-9.9	8.95-10.73	-14.71-18.85	-17.65-16.2	-17.47-17.2	-12.57-15.9	6.36-6.44	5.91-5.87	5.41-5.44	-10.37-10.2	
(Hz)	8.76-2.46	4.63-5.1	2.02-3.11	4.17-3.34	-2.63-1.83	-2.28-2.05	-2.67-2.3	-2.71-2.3	-1.49-1.04	-0.92-3.2	4.27-6.41	-11.52-18.4	-18.93-11.66	-4.87-2.21	-10.19-8.8	-16.71-55	6.47-18	-15.27-16.07	-16.34-10.7	7.22-6.03	2.54-2.9	3.9-3.04	4.2-1.2	6.44-6.25	
(Hz)	6.81-6.91	4.93-4.51	2.57-1.16	2.32-2.41	-1.85-1.31	-0.721-0.19	-5.23-6.13	3.56-2.41	-1.49-1.58	-0.52-1.34	-13.33-6.88	-11.66-18.1	-18.61-16.1	-1.34-1.3	-5.28-6.3	6.24-3.89	2.57-1.6	-12.99-11.9	-12.99-11.9	-12.99-11.9	-12.99-11.9	-12.99-11.9	-12.99-11.9	-12.99-11.9	-12.99-11.9
(Hz)	2.84-1.72	1.28-1.43	3.77-2.98	2.46-3.69	3.76-1.51	0.54-1.11	3.78-4.56	2.29-6.69	0.07-0.87	4.99-1.96	-1.98-1.79	1.79-2.38	6.06-6.96	3.21-2.64	5.41-1.3	4.05-0.95	0.80-0.7	4.02-10.48	-12.82-8.57	3.98-1.81	1.79-2.44	5.28-7.7	4.63-6.08	0.68-0.62	
(Hz)	0.45-3.38	8.22-6.94	4.98-3.98	4.86-2.25	7.92-6.29	2.27-2.46	-1.82-2.45	0.28-1.3	1.79-1.96	-1.76-1.73	-1.74-8	0.57-0.88	0.071-1.9	-1.97-2.1	-3.04-7.4	-5.29-2.67	-2.88-4.3	-7.02-10.33	8.01-4.54	-2.79-2.48	-3.67-6.4	-12.84-7	-2.75-5.1	1.77-1.84	
(Hz)	2.73-0.09	8.11-4.6	4.33-3.99	2.45-9.97	1.77-1.84	3.12-1.7	4.39-1.3	0.37-1.2	1.59-2.54	0.83-0.58	0.01-0.25	1.62-1	0.02-1.47	3.26-3.53	-1.18-0.97	4.50-0.73	1.63-1.57	-1.09-0.44	-10.35-6.99	2.93-2.95	3.30-3.61	15.29-19.7	1.68-0.1	1.51-0.2	
(Hz)	2.96	3.67-4.12	5.36-1.17	10.67-10.69	3.3-2.3	2.65-0.5	4.24-3.4	0.82-0.29	0.55-0.01	-1.41-0.9	-1.20-2.3	1.84-2.4	0.64-1.27	4.73-0.77	-1.69-1.5	1.24-1.31	1.55-0.85	5.49-1.87	17.77-6.53	-1.28-3.56	2.77-2.29	8.84-1.7	1.28-2.1	1.03-1.4	
(Hz)	0.13-2.65	4.85-4.81	5.34-2.27	-7.84-9.4	3.95-1.23	1.88-2.3	3.96-5.44	-1.23-1.15	2.54-0.48	0.51-0.51	0.20-2.3	0.77-1.01	-1.15	5.54-0.48	0.51-0.51	3.15-3.78	-10.69-1.87	-10.69-1.87	-10.69-1.87	-10.69-1.87	-10.69-1.87	-10.69-1.87	-10.69-1.87	-10.69-1.87	-10.69-1.87
(Hz)	4.22-6.98	7.69-7.13	7.02-3.32	5.27-11.27	-4.76-6.04	1.93-1.44	6.91-7.9	3.42-4.65	0.48-0.23	0.25-0.56	1.61-1.62	4.83-6.28	10.46-6.38	10.46-6.38	10.46-6.38	10.46-6.38	10.46-6.38	10.46-6.38	10.46-6.38	10.46-6.38	10.46-6.38	10.46-6.38	10.46-6.38	10.46-6.38	
(Hz)	8.07-12.78	-7.95-11.6	-3.32-2.54	2.87-8.86	6.04-1.38	-1.13-1.6	2.94-4.1	8.09-6.7	0.84-0.27	0.21-0.15	0.30-0.15	0.30-0.15	0.30-0.15	0.30-0.15	0.30-0.15	0.30-0.15	0.30-0.15	0.30-0.15	0.30-0.15	0.30-0.15	0.30-0.15	0.30-0.15	0.30-0.15	0.30-0.15	
(Hz)	8.07-8.4	5.87-4.5	5.87-4.5	4.62-2.7	4.62-2.7	2.12-3.36	4.53-5.75	3.09-2.44	2.59-1.11	0.20-0.52	0.67-1.1	-0.71-3.38	2.62-4.71	-10.29-4.83	-8.64-0.1	-5.68-1.9	2.22-2.29	-14.29-7.3	-16.84-0.3	-10.70-10.6	-5.10-3.92	5.69-1.25	-19.81-10.9	-10.76-14.2	
(Hz)	8.98-8.54	5.87-4.5	5.87-4.5	-1.6-0.7	-1.23-6.49	4.21-4.97	2.82-2.29	2.10-2.23	-2.66-2.48	0.46-0.19	1.2-3.33	-1.77-1.06	-1.51-1.61	6.65-7.35	3.71-11.8	-7.03-8.2	-2.21-5.65	3.74-8.2	-11.10-11.6	-13.21-11.9	4.54-7.1	-13.78-10.29	-17.8-8.1	8.11-17.57	
(Hz)	7.48-6.87	3.95-6.09	4.04-3.1	3.94-5.81	4.52-5.66	4.83-3.22	-2.49-2.65	-0.84-1.06	0.17-0.53	-1.93-3.52	-1.61-1.24	-2.20-2.3	2.42-3.27	8.73-8.56	-11.05-4.66	-16.51-23.3	-14.44-5.74	8.9-5.69	-16.69-11.69	-3.69-1.6	-12.56-11.2	4.89-7.3	4.82-7.25	-10.47-13.4	
(Hz)	6.04-6.6	8.98-8.9	8.69-8.65	8.72-11.9	8.2-6.54	5.99-6.42	6.94-4.1	2.70-1.66	-1.14-1.22	2.97-3.5	-1.93-0.53	-1.93-0.53	-1.93-0.53	-1.93-0.53	-1.93-0.53	-1.93-0.53	-1.93-0.53	-1.93-0.53	-1.93-0.53	-1.93-0.53	-1.93-0.53	-1.93-0.53	-1.93-0.53	-1.93-0.53	
(Hz)	9.31-9.89	-12.16-14.1	-11.93-11.23	-11.41-11.19	-12.06-14.51	-10.33-9.6	4.51-4.13	4.79-5.84	7.23-7.86	6.91-6.63	4.67-2.58	-8.20-1.05	12.74-13.7	-15.31-11.3	-8.60-7.92	-8.98-12.72	-5.19-5.03	7.16-7.19	-5.62-6.41	-10.05-11.1	-12.23-8.2	6.57-1.9	8.69-9.07	6.06-7.98	
(Hz)	-16.62-10.53	-15.98-19.22	-18.03-17.94	-18.07-13.2	-10.57-9.68	-8.80-7.7	-10.57-9.68	-8.80-7.7	-10.57-9.68	-8.80-7.7	-10.57-9.68	-8.80-7.7	-10.57-9.68	-8.80-7.7	-10.57-9.68	-8.80-7.7	-10.57-9.68	-8.80-7.7	-10.57-9.68	-8.80-7.7	-10.57-9.68	-8.80-7.7	-10.57-9.68	-8.80-7.7	-10.57-9.68
(Hz)	-13.21-11.16	-10.23-12.78	-13.58-13.69	-13.72-12.62	-13.58-14.06	-12.43-11.46	-10.96-9.23	8.14-7.99	8.52-5.6	-0.91-1.34	4.76-5.27	7.28-10.67	-11.19-11.78	-13.54-10.8	-7.52-8.68	-7.81-8.49	-14.97-13.78	-17.77-12.96	-10.81-10.61	-10.23-11.66	-10.57-11.67	-10.57-11.67	-10.57-11.67	-10.57-11.67	
(Hz)	-18.29-18.96	-17.11-15.29	-11.05-11.04	9.19-8.53	-8.26-3.28	-7.94-3.9	7.55-7.62	8.13-8.97	8.52-11.8	-12.22-11.06	-10.07-11.27	-11.19-11.78	-13.45-11.6	-14.97-15.95	-12.70-13.26	-10.32-7.8	9.06-8.27	-8.77-7.89	-7.67-1.16	8.50-7.15	-10.07-12.68	-15.95-9.11			
Freq(Hz)	6.9599(9.57)	Phi(9.57)	Phi(9.57)	Phi(9.57)	Phi(9.57)	Phi(9.57)	Phi(9.57)	Phi(9.57)	Phi(9.57)	Phi(9.57)	Phi(9.57)	Phi(9.57)	Phi(9.57)	Phi(9.57)	Phi(9.57)	Phi(9.57)	Phi(9.57)	Phi(9.57)	Phi(9.57)	Phi(9.57)	Phi(9.57)	Phi(9.57)	Phi(9.57)	Phi(9.57)	
Gain	(9.57)	(9.57)	(9.57)	(9.57)	(9.57)	(9.57)	(9.57)	(9.57)	(9.57)	(9.57)	(9.57)	(9.57)	(9.57)	(9.57)	(9.57)	(9.57)	(9.57)	(9.57)	(9.57)	(9.57)	(9.57)	(9.57)	(9.57)	(9.57)	
(Hz)	-14.26-13.84	-13.15-12.14	-13.71-11.61	-10.03-10.08	-10.24-11.38	-12.24-13.42	-12.22-13.82	-16.04-17.45	-18.32-17.98	-19.03-18.27	-18.65-16.27	-18.47-18.79	-15.33-12.82	-12.34-9.18	-8.98-2.4	-8.71-6.1	-11.01-12.02	-12.26-12.68	-13.74-15.38	-18.16-18.6	-17.88-17.83	-18.08-17.73	-15.62-16.07	-16.03-15.64	
(Hz)	-12.77-11.21	-12.80-12.08	-10.71-11.51	-11.81-11.17	-12.19-14.16	-14.37-13.56	-15.59-15.17	-15.44-15.24	-15.95-14.88	-14.22-12.93	-11.60-11.43	-11.67-12.61	-15.33-18.03	-11.11-11.03	-11.11-11.03	-10.61-12.94	-15.78-16.68	-17.33-17.43	-13.20-15.18	-18.91-18.7	-17.28-18.54	-17.23-15.09	-15.29-12.03	-16.03-15.68	
(Hz)	8.879-11.4	9.49-9.35	8.99-10.67	10.33-12.94	-16.36-19.19	-19.25-16.63	-17.52-16.53	-12.93-9.65	8.79-7.51	5.96-6.59	5.60-6.59	6.01-8.35	-10.76-11.59	-11.57-10.73	-8.53-7.76	8.63-11.44	-17.77-18.14	-18.37-14.42	-15.17-16.46	-18.12-19.01	-16.92-12.62	-11.10-10.31	9.47-10.21	8.41-8.44	
(Hz)	-12.09-12.25	-11.88-9.31	8.91-9.81	-11.02-11.21	-15.17-17.15	-18.02-16.47	-14.52-12.92	8.79-6.32	4.64-6.27	7.06-9.2	-12.09-13.49	-12.09-13.49	-12.09-13.49	-12.09-13.49	-12.09-13.49	-12.09-13.49	-12.09-13.49	-12.09-13.49	-12.09-13.49	-12.09-13.49	-12.09-13.49	-12.09-13.49	-12.09-13.49	-12.09-13.49	
(Hz)	-10.02-13.88	-19.61-13.84	-12.10-12.02	-11.66-13.66	-18.42-13.07	-10.99-13.16	-13.07-12.1	9.63-7.02	6.2-6.23	5.95-5.98	7.44-8.8	9.16-8.57	-11.92-16.8	-11.92-16.8	-11.92-16.8	-11.92-16.8	-11.92-16.8	-11.92-16.8	-11.92-16.8	-11.92-16.8	-11.92-16.8	-11.92-16.8	-11.92-16.8	-11.92-16.8	
(Hz)	7.74-9.49	15.56-18.19	-13.61-11.04	-13.41-13.16	-17.41-18.24	-17.91-13.99	9.97-9.2	-10.26-11.37	-10.67-10.07	7.48-8.83	8.36-8.35	8.14-8.44	-11.92-16.8	-11.92-16.8	-11.92-16.8	-11.92-16.8	-11.92-16.8	-11.92-16.8	-11.92-16.8	-11.92-16.8	-11.92-16.8	-11.92-16.8	-11.92-16.8	-11.92-16.8	
(Hz)	8.4-8.69	6.98-7.21	8.41-8.17	-11.21-15.53	-18.67-18.06	-18.41-23.48	8.6-8.11	8.88-11.08	-12.29-12.68	-14.26-13.17	-15.16-15.02	-14.01-18.26	10.08-10.96	-11.50-12.64	-13.18-14.27	-16.33-14.26	-17.68-14.16	-11.86-13.17	-16.06-12.94	-10.19-6.57	8.81-2.1	-12.52-15.62	-17.89-18.14	-10.82-6.65	
(Hz)	6.67-8.44	3.98-3.91	4.26-6.11	8.49-16.83	-8.58-14.51	-11.15-11.74	-13.81-16.53	-14.63-19.28	-17.89-18.47	-14.21-15.37	-18.01-15.36	-13.67-18.87	10.08-10.96	-11.50-12.64	-13.18-14.27	-16.33-14.26	-17.68-14.16	-11.86-13.17	-16.06-12.94	-10.19-6.57	8.81-2.1	-12.52-15.62	-17.89-18.14	-10.82-6.65	
(Hz)	-11.87-11.79	4.53-4.6	3.98-6.2	8.57-15.3																					



# Radiated Composite Gain Data of 6GHz

# Appendix B

Model	2.681-3.2	1.980-2.8	3.46-4.4	7.057-9.9	4.32-4.2	2.77-3.9	3.00-3.99	6.1-8.2	8.529-11	12.47-18.64	13.060-18	8.43-9.8	5.736-11	5.24-2.2	3.21-8.8	0.7-0.45	0.01-0.94	1.65-3.13	5.3-6.51	2.62-3.1	0.9-1.84	3.11-2.7	2.01-1.58	1.64-2.62	
(H42)	2.681-3.2	1.980-2.8	3.46-4.4	7.057-9.9	4.32-4.2	2.77-3.9	3.00-3.99	6.1-8.2	8.529-11	12.47-18.64	13.060-18	8.43-9.8	5.736-11	5.24-2.2	3.21-8.8	0.7-0.45	0.01-0.94	1.65-3.13	5.3-6.51	2.62-3.1	0.9-1.84	3.11-2.7	2.01-1.58	1.64-2.62	
(H52)	3.14-2.28	-1.29-0.47	-1.40-1.29	6.0-8.2	7.77-5.36	2.91-2.2	2.02-3.3	4.34-8.28	7.15-6.87	8.33-10.7	-10.85-8.13	-2.50-2.13	4.21-0.41	4.18-1.49	-5.37-6.06	3.31-0.71	0.91-1.49	1.75-6.03	2.02-4.83	3.2-0.4	0.88-3.22	5.1-1.36	0.66-6.86	2.16-8.22	
(H62)	3.47-2.33	0.43-0.73	1.03-1.4	-1.45-3.1	-4.82-2.02	-6.17-2.44	-2.36-3.28	-7.36-9.3	7.31-6.72	8.41-10.15	-10.85-8.13	-2.50-2.13	4.21-0.41	4.18-1.49	-5.37-6.06	3.31-0.71	0.91-1.49	1.75-6.03	2.02-4.83	3.2-0.4	0.88-3.22	5.1-1.36	0.66-6.86	2.16-8.22	
(H72)	2.59-9.06	0.88-7.3	1.44-6.2	0.79-3.43	3.77-3.23	0.96-1.1	0.1-0.8	-3.36-5.53	-4.85-3.34	-4.75-1.2	-7.85-8.97	-2.50-2.13	0.23-0.78	-1.09-1.17	-2.73-4.3	-1.20-0.8	-0.60-2.3	0.33-0.33	-1.53-0.41	-0.71-2.5	0.1-1.73	2.08-1.43	0.03-0.34	3.71-3.96	
(H82)	1.26-0.46	0.51-1.1	0.86-0.68	0.48-0.49	-1.47-1.47	-1.07-0.26	0.91-0.65	-1.8-1.3	-4.65-3.4	-4.75-1.2	-7.85-8.97	-2.50-2.13	0.23-0.78	-1.09-1.17	-2.73-4.3	-1.20-0.8	-0.60-2.3	0.33-0.33	-1.53-0.41	-0.71-2.5	0.1-1.73	2.08-1.43	0.03-0.34	3.71-3.96	
(H92)	0.19-0.34	-1.25-1.68	-0.30-7.8	0.92-0.2	-2.45-3.89	-1.84-2.3	1.48-1.9	-1.17-0.89	3.91-4.25	4.47-3.94	-18.6-0.61	0.091-0.64	1.33-0.6	0.5-1.2	-5.41-6.45	-0.4-1.62	5.19-3.36	4.78-1.47	-1.03-1.66	0.92-2.5	2.70-2.84	0.61-0.66	1.27-0.16	0.66-1.78	
(H102)	0.96-0.56	0.47-6.7	0.32-0.64	0.33-0.25	-1.88-1.25	1.18-6	2.40-2.69	1.53-1.48	0.09-0.56	-2.48-1.42	-18.6-0.61	0.091-0.64	1.33-0.6	0.5-1.2	-5.41-6.45	-0.4-1.62	5.19-3.36	4.78-1.47	-1.03-1.66	0.92-2.5	2.70-2.84	0.61-0.66	1.27-0.16	0.66-1.78	
(H112)	0.85-0.58	0.27-0.63	-0.84-0.6	0.12-0.11	-0.57-0.21	0.15-1.08	0.74-0.88	0.05-0.43	0.89-0.74	-7.52-8.87	-7.65-55	1.89-36	0.63-19	-0.33-0.46	-1.83-2.29	0.33-0.99	3.66-12.46	6.21-3.84	-0.38-0.63	2.03-7.8	1.07-0.52	2.25-0.34	2.23-0.11	0.95-0.2	
(H122)	0.99-0.78	0.07-0.44	0.01-0.6	0.14-0.87	-1.13-0.22	-2.43-3.4	-1.57-1.62	-1.57-1.62	0.89-0.74	-7.52-8.87	-7.65-55	1.89-36	0.63-19	-0.33-0.46	-1.83-2.29	0.33-0.99	3.66-12.46	6.21-3.84	-0.38-0.63	2.03-7.8	1.07-0.52	2.25-0.34	2.23-0.11	0.95-0.2	
(H132)	0.67-0.88	0.04-0.8	0.01-0.7	0.04-0.8	0.38-0.26	-2.42-1.4	-3.41-2.91	-3.86-7.18	0.95-0.72	0.46-0.85	-8.52-3.33	-2.97-2.48	-3.08-3.3	-1.36-1.2	-6.53-6.47	0.82-1.29	-7.27-6.84	-4.93-2.91	-3.86-0.81	0.81-0.8	-3.9-4.19	0.62-0.21	1.29-2.5	1.29-2.5	-3.47-0.3
(H142)	0.60-0.39	1.56-0.17	0.02-0.29	0.15-0.55	1.90-1.36	3.32-1.48	5.11-6.13	3.89-3.24	3.98-3.39	4.37-5.64	4.39-3.44	10.26-9.89	4.2-0.41	15.48-14.68	4.68-1.44	4.18-1.91	11.12-12.14	5.17-0.41	3.71-4.68	6.51-0.17	1.92-2.4	1.92-2.4	1.92-2.4	1.92-2.4	
(H152)	0.02-0.33	1.01-1.13	0.29-0.55	-1.46-1.87	-1.93-2.86	-4.66-7.4	6.93-4.3	2.18-1.42	2.71-4.1	5.77-10.1	-18.1-2.4	-18.7-11.1	11.95-8.84	0.96-11.8	-14.57-13	7.15-2.23	18.71-13.05	4.86-4.35	5.21-8.07	0.51-7.46	4.59-8.43	0.66-0.77	0.96-1.73	-1.98-1.55	
(H162)	3.22-1.04	-1.17-0.59	0.51-1.45	-1.29-1.16	2.29-0.55	7.41-7.91	7.15-66	5.27-5.34	5.27-5.34	6.93-4.3	2.18-1.42	-18.7-11.1	11.95-8.84	0.96-11.8	-14.57-13	7.15-2.23	18.71-13.05	4.86-4.35	5.21-8.07	0.51-7.46	4.59-8.43	0.66-0.77	0.96-1.73	-1.98-1.55	
(H172)	0.95-0.54	-3.76-2.38	-1.59-2.15	4.56-6.48	0.81-0.64	0.52-0.43	-10.07-12	4.25-7.38	8.26-10.43	-12.52-12.68	-16.81-12	-15.59-12.91	-12.87-12.93	-13.06-15.64	-13.44-9.68	-10.18-8.64	18.34-12.54	4.13-7.35	-1.59-1.33	-8.43-1	8.59-3.81	4.19-4.48	4.77-0.12	-7.31-11.4	
(H182)	0.23-0.27	-7.52-6.88	-7.02-6.43	5.46-6.71	-6.56-7.11	-11.37-11	-8.9-6.21	-4.28-5.88	8.9-14.29	-17.93-17.37	-17.37-17.31	-12.43-9.33	-9.17-13	-13.03-12.3	-14.29-19.01	6.4-10.96	-15.86-13	15.41-11.3	4.8-4.81	-8.43-6.1	-12.8-12.78	-10.59-13.9	0.56-10.36	-11.12-12.89	
(H192)	0.57-0.41	-5.16-4.64	-4.33-4.81	-6.1-6.4	-4.76-4.8	0.92-0.32	-11.52-10.45	-12.41-16.88	-11.16-14.2	-13.58-11.49	-11.52-11.37	-17.35-19.19	-18.17-13	-13.03-12.3	-14.29-19.01	6.4-10.96	-15.86-13	15.41-11.3	4.8-4.81	-8.43-6.1	-12.8-12.78	-10.59-13.9	0.56-10.36	-11.12-12.89	
(H202)	0.28-0.75	7.82-7.23	7.8-8.23	-1.8-1.84	-11.99-14.62	-18.33-17.71	-18.07-18.57	-17.47-18.38	-15.91-18.51	-18.36-17.38	-18.66-17.45	-14.4-11.71	-9.17-13	-13.03-12.3	-14.29-19.01	6.4-10.96	-15.86-13	15.41-11.3	4.8-4.81	-8.43-6.1	-12.8-12.78	-10.59-13.9	0.56-10.36	-11.12-12.89	
(H212)	0.14-13.29	-2.66-12.6	-10.87-32	9.58-10.44	0.76-9.61	-10.10-10.85	-11.48-12.39	-14.47-15.75	-17.65-17.81	-19.33-19	-19.11-17.06	-15.13-13.98	-12.83-11.67	-10.9-6.3	-8.45-8.26	-8.45-8.21	-9.81-9.76	9.87-10.5	-11.69-13.56	-16.11-18.21	-17.82-18.25	-18.79-18.24	-17.06-16.24	-14.05-13.72	
(H222)	0.15-0.11	0.15-0.11	0.15-0.11	0.15-0.11	0.15-0.11	0.15-0.11	0.15-0.11	0.15-0.11	0.15-0.11	0.15-0.11	0.15-0.11	0.15-0.11	0.15-0.11	0.15-0.11	0.15-0.11	0.15-0.11	0.15-0.11	0.15-0.11	0.15-0.11	0.15-0.11	0.15-0.11	0.15-0.11	0.15-0.11	0.15-0.11	
(H232)	0.72-1.51	0.57-1.2	0.72-1.51	0.81-1.28	0.91-1.28	0.91-1.28	1.13-1.24	1.13-1.24	1.13-1.24	1.13-1.24	1.13-1.24	1.13-1.24	1.13-1.24	1.13-1.24	1.13-1.24	1.13-1.24	1.13-1.24	1.13-1.24	1.13-1.24	1.13-1.24	1.13-1.24	1.13-1.24	1.13-1.24	1.13-1.24	
(H242)	0.47-10.68	-0.61-12.31	-13.23-13.86	-13.67-12.82	-14.08-12.18	-11.99-12.02	-13.71-10.68	-17.14-18.16	-17.84-16.75	-16.33-14.13	-12.89-10.34	-10.77-9.76	9.46-9.14	4.72-4.93	4.90-5.91	0.52-1.73	11.29-11.97	13.49-14.5	-15.27-17.72	-19.11-19.21	-18.91-18.67	-17.79-12.52	-13.71-12.92	-13.09-12.46	
(H252)	-0.78-1.01	-0.78-1.01	-0.78-1.01	-0.78-1.01	-0.78-1.01	-0.78-1.01	-0.78-1.01	-0.78-1.01	-0.78-1.01	-0.78-1.01	-0.78-1.01	-0.78-1.01	-0.78-1.01	-0.78-1.01	-0.78-1.01	-0.78-1.01	-0.78-1.01	-0.78-1.01	-0.78-1.01	-0.78-1.01	-0.78-1.01	-0.78-1.01	-0.78-1.01	-0.78-1.01	
(H262)	-1.28-1.23	-1.50-1.17	-1.50-1.17	-1.50-1.17	-1.50-1.17	-1.50-1.17	-1.50-1.17	-1.50-1.17	-1.50-1.17	-1.50-1.17	-1.50-1.17	-1.50-1.17	-1.50-1.17	-1.50-1.17	-1.50-1.17	-1.50-1.17	-1.50-1.17	-1.50-1.17	-1.50-1.17	-1.50-1.17	-1.50-1.17	-1.50-1.17	-1.50-1.17	-1.50-1.17	
(H272)	-11.27-16.59	-18.03-18.77	-14.57-14.26	-11.61-11.36	-8.21-8.11	-10.36-9.79	-7.69-6.57	-4.69-6.72	-7.11-7.07	-7.11-7.07	-7.11-7.07	-7.11-7.07	-7.11-7.07	-7.11-7.07	-7.11-7.07	-7.11-7.07	-7.11-7.07	-7.11-7.07	-7.11-7.07	-7.11-7.07	-7.11-7.07	-7.11-7.07	-7.11-7.07	-7.11-7.07	
(H282)	-8.6-7.3	-11.61-10.47	-15.82-17.01	-16.52-14.2	-15.66-14.1	-10.98-7.78	-6.97-6.26	-9.43-11.51	-11.18-11.35	-11.22-11.62	-16.66-17.52	-19.03-17.76	-18.98-18.65	-14.31-13.28	-14.29-14.21	-15.66-14.21	-10.53-10.67	0.26-12.33	-8.81-12.5	-10.95-10.7	-13.52-10.73	-13.66-11.34	0.19-8.67	-7.44-8.23	
(H292)	0.24-10.57	-12.35-18.85	-18.39-18.83	-18.12-16.44	-14.58-16.16	-13.41-14.87	-8.01-8.1	-10.91-14.23	-11.81-10.86	-11.18-11.08	-11.41-11.81	-10.21-10.63	-11.62-10.53	-7.54-7.16	9.95-8.61	-6.88-11.84	-12.68-10.81	9.17-11.96	-13.98-12.38	-13.14-10.89	-16.78-17.84	-13.59-11.9	-10.27-10.52	-7.44-8.23	
(H302)	-1.89-10.77	-11.01-13.24	-11.98-14.78	-18.39-18.12	-16.82-16.85	-16.82-16.85	-8.29-8.67	-12.31-16.81	-14.84-14.74	-9.87-9.36	-11.29-11.29	-9.80-11.69	-13.79-12.72	-11.63-8.67	6.18-7.9	-10.81-16.15	-18.15-15	-10.20-10.21	-9.46-11	-12.45-13.57	-17.59-16.41	-11.03-11.48	-16.47-18.12		
(H312)	0.86-0.95	-8.86-12.59	-10.44-18.41	-8.39-17.86	-17.86-18.23	-18.59-14.13	-12.1-15.64	-17.82-10.46	-8.86-11.24	-11.41-11.76	-14.44-11.76	-14.44-11.76	-14.44-11.76	-14.44-11.76	-14.44-11.76	-14.44-11.76	-14.44-11.76	-14.44-11.76	-14.44-11.76	-14.44-11.76	-14.44-11.76	-14.44-11.76	-14.44-11.76	-14.44-11.76	
(H322)	-1.19-12.78	-14.43-11.76	-13.81-25	-18.11-19.07	-17.44-18.31	-18.07-14.37	-14.26-19.18	-18.07-17.6	-12.61-17.74	-7.36-7.07	-7.36	-15.36-15.8	-16.23-8.85	8.86-7.4	3.4-29	-13.87-16.16	-18.17-19	-19.27-18.51	-18.26-13.33	-15.31-17.88	-15.31-14.9	-14.33-11.17	-12.23-12.59	-11.88-17.88	
(H332)	-0.82-10.22	-17.58-18.59	-18.14-17.86	-13.76-13.71	-10.51-11.54	-17.84-18.62	-17.81-11.48	-12.89-11.48	-8.27-10.11	9.71-8.86	9.71-8.86	9.71-8.86	9.71-8.86	9.71-8.86	9.71-8.86	9.71-8.86	9.71-8.86	9.71-8.86	9.71-8.86	9.71-8.86	9.71-8.86	9.71-8.86	9.71-8.86	9.71-8.86	
(H342)	-0.78-14.22	-14.34-16.85	-15.56-14.43	-13.21-13.17	-11.81-11.21	-13.83-11.31	-12.13-14.61	-11.95-11.21	-8.92-10.82	-11.12-11.82	-9.99-9.99	8.43-11.27	-16.26-12.59	9.3-10.89	0.8-1.5	-10.26-15.44	-11.26-11.96	-17.73-15.75	-16.03-14.52	-12.91-14.59	-17.86-14.6				



# Radiated Composite Gain Data of 6GHz

# Appendix B

Theta (deg)	0.0000	0.2513	-1.6218	-1.6213	-1.1322	-5.1102	-7.5724	0.3305	6.7510	6.4818	-5.8164	-2.8428	0.2108	0.9114	-17.6139	-2.3119	-2.0213	1.54339	4.7744	-1.48136	0.4169	0.5419	0.11621	-2.82142	
Theta (deg)	1.2302	-1.0245	-0.88113	0.88135	-1.3134	-2.8232	-6.3598	2.0474	3.78104	4.36919	-12.0217	-2.6165	0.9313	0.07123	-9.58181	-3.8134	-1.8238	-2.13329	4.67174	-0.48127	-1.63259	-0.8153	-1.02457	-2.57149	
Theta (deg)	0.83007	0.78052	1.59167	0.11185	-2.38248	-3.87159	-2.67103	2.51242	-3.72598	-7.29255	-9.65936	-1.28219	5.57171	-2.82482	-9.77165	-0.43153	-3.02038	-4.29142	-2.72138	1.88093	0.23125	2.77191	-0.49504	-2.75122	
Theta (deg)	0.39171	-0.89172	-0.50163	-1.43211	-1.04166	-1.1112	-3.33186	0.04118	7.09173	-15.48123	-9.92028	-0.84336	2.04037	-1.02132	-4.31148	-0.23127	-7.42055	-11.11178	6.81137	0.95022	0.71042	0.35119	0.34148	0.42139	
Theta (deg)	0.31139	-0.78126	0.18169	-1.23135	-0.72121	-0.25155	-4.93143	-3.35141	2.73175	-12.08113	-12.48176	-3.86144	5.68131	-1.88192	-14.17149	-1.59143	-6.14142	-5.94138	-12.29128	2.51142	-4.52173	-2.24028	-0.87138	-0.53141	
Theta (deg)	0.38019	-0.80034	0.24048	-1.32331	-0.97122	-0.68116	-4.87175	-1.68133	2.11617	-8.71103	-17.18166	9.73194	6.23144	-7.29114	-4.93172	-3.39122	-9.01165	-1.76107	-16.71171	-2.74104	-0.39133	-1.53139	-2.59122	-1.92175	
Theta (deg)	0.68093	-0.28004	-0.46048	-1.31307	-2.86129	-4.06164	-10.19175	-9.03174	-4.36138	-3.29153	-14.32186	-12.33124	-13.53191	-10.84132	-12.62142	-11.16167	-8.68101	-6.21155	-17.89138	-2.89127	-6.54127	-0.37183	-2.17171	-3.98135	
Theta (deg)	0.56118	0.88134	-1.37124	2.39126	-2.64121	5.38105	-18.19129	9.96122	-3.14126	4.09131	-9.57171	-18.62179	-14.64164	6.58114	-11.47162	-8.17124	-7.51147	-1.34129	-11.96138	-0.95124	-3.86168	-3.87196	-3.17122	-5.88171	
Theta (deg)	1.541255	-2.03121	3.72143	2.42122	2.54136	6.34103	-15.38154	-7.83123	2.36123	3.98143	-10.36152	-19.08169	-14.21165	7.54181	-9.18117	-8.81158	-15.63123	-1.44147	-15.23146	-0.91163	-4.48116	-3.51157	-4.65181	-5.11133	
Theta (deg)	0.60102	5.98142	6.26178	7.33169	-7.18143	-12.04137	-14.91189	-16.49181	-6.52154	6.37153	-17.42139	-17.17182	-15.72188	-7.91138	-10.21634	-12.17192	-16.48126	-2.36159	-12.59111	-5.21146	-8.91148	-6.61188	-10.89173	-13.34146	
Theta (deg)	1.591995	7.48147	8.91181	10.37173	15.69144	14.88178	13.22184	19.91179	13.78193	12.92197	-17.71106	15.01158	-10.92185	11.24189	11.33196	13.39187	9.85126	5.69184	7.97185	-11.38193	10.89119	3.08147	4.77186	-10.12150	
Theta (deg)	0.82161	8.73139	8.91185	10.91145	18.59184	18.75187	18.42103	18.791818	18.42181	-18.71181	-13.43189	-14.01161	11.11161	-18.62188	-18.29122	-12.61127	-7.21129	-10.03108	-7.51123	-11.23185	9.93124	10.95127	5.93154	-5.68102	
Theta (deg)	0.74169	4.85174	8.421129	12.49115	13.05116	17.31189	18.01172	17.191192	18.71189	-19.01189	-18.29118	-18.79178	18.23179	13.841131	-12.41125	-9.91134	-6.43170	-11.11119	-11.97104	9.98113	12.18115	16.69115	13.26108	7.07162	
Theta (deg)	12.96135	-14.11109	-14.11109	-16.79143	-15.71119	-14.63115	-15.28197	-16.57117	-18.81833	-17.42179	-15.85149	-13.95142	-10.88146	-10.27105	-10.67102	-10.75102	-10.661183	-12.72145	-18.59139	-18.48119	-18.17181	-17.25134	-11.69125	-11.69125	
Phi (deg)	0.995094	Phi (deg)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
Phi (deg)	0.910751	Phi (deg)	0.910751	Phi (deg)	0.910751	Phi (deg)	0.910751	Phi (deg)	0.910751	Phi (deg)	0.910751	Phi (deg)	0.910751	Phi (deg)	0.910751	Phi (deg)	0.910751	Phi (deg)	0.910751	Phi (deg)	0.910751	Phi (deg)	0.910751	Phi (deg)	0.910751
Phi (deg)	-14.76144	-14.06134	-11.64101	-10.06197	8.81193	8.87110	-12.461219	-11.71109	-11.641246	-12.67132	-16.78175	-18.31172	-15.86137	-12.68122	-12.52128	-13.911408	-14.19133	-14.511629	-19.23175	-19.071831	-18.791855	-19.09188	-18.631156	-14.631356	
Phi (deg)	-16.211497	-14.79118	-16.091175	-11.481112	-12.241506	-18.11881	-18.511833	-18.791782	-15.161247	-12.441239	-14.371633	-17.781586	-13.271113	-16.421022	9.66132	-11.991408	-10.391109	9.641105	-12.241235	-13.911428	-15.011622	-16.47127	-16.891785	-16.891782	
Phi (deg)	9.39183	-10.26137	8.72182	7.82186	9.571106	-11.781235	-13.741495	-12.321425	-11.391688	-10.901328	-15.811773	-13.331181	-10.20847	8.66116	7.16185	8.34138	-10.641325	-13.971377	-16.601179	-17.661877	-17.661877	-14.921144	-14.921144	-14.921144	
Phi (deg)	0.448252	7.131273	7.371873	9.291232	-14.311792	-16.221616	-12.821624	-11.791245	-11.511878	-14.81181	-18.791793	-18.341921	-18.93189	-18.311771	-15.711229	8.69178	8.87171	7.50176	-10.241835	-15.091558	-18.711855	-13.791702	8.84185	-13.791702	
Phi (deg)	12.71127	-10.45108	-10.22108	-12.38118	-17.75137	-14.83167	-18.48104	13.89158	4.27172	7.76184	-13.59115	-18.09187	17.44163	11.74115	-18.71156	-15.64178	-17.91152	10.57181	9.2619	13.111858	18.57179	18.291734	10.75116	-18.291734	
Phi (deg)	14.54116	-11.93169	4.95174	5.85181	-13.23108	-17.68137	-18.91151	-11.91843	-9.31149	-10.73124	-13.87178	-17.68178	-18.79178	-17.68178	-17.76174	-11.85175	-14.78185	-18.341297	-12.31178	-10.53197	-12.71105	-15.15117	-12.981103	-15.82142	
Phi (deg)	-12.251154	-10.52156	4.86143	7.32146	-0.421817	-17.611584	-15.51191	4.291745	-11.251146	-10.091108	-16.791348	-19.321167	-17.67178	-13.44100	-14.11106	-13.99187	-18.91153	-15.41164	-10.12107	-13.39116	-14.43139	-12.37127	-17.12146	-17.12146	
Phi (deg)	0.92151	-10.81102	7.53143	8.43148	-0.89143	-12.691782	-15.621543	-14.071376	-13.991356	-12.081137	-14.44169	-16.791387	-18.17138	-18.821129	9.86875	-13.14115	-18.20116	8.85939	-11.13121	-15.32178	-18.71179	8.45143	8.19842	-11.76184	
Phi (deg)	0.451017	-14.81136	-17.51106	8.82149	10.44148	-17.59181	-17.51197	-19.271139	-17.821131	-8.03143	-11.89117	-17.341101	-10.081446	-8.13154	-7.10112	-17.86192	-16.051147	-11.51161	-13.11165	-19.081787	-14.91192	8.58937	-11.221133	-15.041137	
Phi (deg)	0.831159	-11.41188	-10.59125	9.39842	-8.881192	-11.661941	-18.671818	-16.99153	-14.59152	-15.111318	-8.59174	-16.44174	-13.821139	-10.29139	-5.25149	-18.91159	-17.821145	-16.51144	-14.849158	-18.69156	-15.311016	-15.431244	-11.141127	-11.141127	
Phi (deg)	-14.631781	-18.43197	-18.21184	9.41972	-11.31121	-16.651162	-9.59169	-11.571161	-12.51883	-9.171074	-14.421558	-12.071162	-12.391161	-2.461265	2.24136	-14.421171	-12.991127	-18.38148	-16.771124	-14.511484	-17.341181	-13.771137	-15.571165	-11.691261	
Phi (deg)	18.191878	-17.291803	-17.611823	-13.941164	-16.581131	-16.931436	-9.59169	-10.431179	-17.491133	-11.731144	-18.10142	-11.10159	-15.191447	7.84138	2.82184	-14.15107	-8.161136	-16.461187	-16.021187	-17.31148	-17.591182	-14.611739	-14.611739	-14.611739	
Phi (deg)	-17.561825	-13.91148	-14.8811751	-14.461152	-18.791466	-17.311918	-11.21156	-11.791174	-17.821164	-18.021173	-18.64198	-16.64198	-11.84198	-11.84198	-11.84198	-11.84198	-11.84198	-11.84198	-11.84198	-11.84198	-11.84198	-11.84198	-11.84198	-11.84198	
Phi (deg)	-18.31881	-13.91147	-12.32171	-13.451809	-18.831469	-17.671182	-17.831775	-18.711782	-17.931775	-18.371175	-18.611782	-18.371175	-18.371175	-18.371175	-18.371175	-18.371175	-18.371175	-18.371175	-18.371175	-18.371175	-18.371175	-18.371175	-18.371175	-18.371175	
Phi (deg)	18.911656	-9.21142	-10.04187	8.641102	-12.141175	-18.391183	-18.71134	-14.61186	-10.561142	-11.121142	-12.841142	-11.191102	-14.29139	-18.55194	-8.13166	-10.53133	6.041181	-10.421143	-10.831422	-16.96196	-14.291102	-17.741121	-11.861119	-12.881787	
Phi (deg)	11.571144	9.831154	-13.81165	-10.271133	-11.88103	-19.79106	-18.441328	-11.741135	-14.141136	-10.561136	-10.521147	-19.011408	-4.74119	-4.61119	-1.861192	-11.9711218	-11.7011218	-11.7011218	-11.7011218	-11.7011218	-11.7011218	-11.7011218	-11.7011218	-11.7011218	
Phi (deg)	-18.961183	-16.081472	-18.761903	-14.27186	-18.71148	-14.27186	-18.111834	-18.811161	-17.97195	-10.071141	-13.811209	-16.21186	-4.48115	-5.75128	-1.791135	-18.761165	-13.151075	-18.091125	-14.241449	-18.541193	-13.061134	-4.591166	-13.41129	-13.41129	
Phi (deg)	12.34189	-18.81184	-17.831837	-17.791121	-18.841171	-12.271121	-15.841188	-18.311662	-13.35185	-11.84126	9.41124	-14.031169	-17.991158	-11.991158	-6.401133	-9.341138	-11.291168	-12.721165	-18.191189	-18.021174	-7.911926	8.041188	-15.271139	-15.271139	
Phi (deg)	-18.94189	-10.581647	-15.86184	-13.471122	-12.231062	-10.741116	-12.591112	-13.961125	-11.36157	8.661122	8.611277	-13.8211925	-18.11033	-11.78123	-18.97166	-18.611561	-7.0711379	-8.871124	2.82129	-16.44155	-12.49139	-16.44	-8.78137	9.781951	
Phi (deg)	11.571183	-18.51146	-11.57171	8.91172	-11.57171	-11.57171	-11.57171	-11.57171	-11.571																



Antenna Pattern of 2.4GHz&5GHz

Appendix C

Total Gain Data

Freq(Hz)	2.45GHz	TotalGain_1	(0°/0°/0°)	(0°/15°/0°)	(0°/30°/0°)	(0°/45°/0°)	(0°/60°/0°)	(0°/75°/0°)	(0°/90°/0°)	(0°/105°/0°)	(0°/120°/0°)	(0°/135°/0°)	(0°/150°/0°)	(0°/165°/0°)	(0°/180°/0°)	(0°/195°/0°)	(0°/210°/0°)	(0°/225°/0°)	(0°/240°/0°)	(0°/255°/0°)	(0°/270°/0°)	(0°/285°/0°)	(0°/300°/0°)	(0°/315°/0°)	(0°/330°/0°)	(0°/345°/0°)
Gain	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°	0°/180°/0°
(H15)	1.261154	-1.781182	-1.781186	-1.110460	0.168616	0.244022	0.190701	0.012123	-0.368526	-0.854103	-1.441770	-1.981753	-2.501577	-3.000000	-3.467325	-3.892435	-4.275395	-4.616355	-4.916355	-5.166355	-5.366355	-5.516355	-5.616355	-5.666355	-5.666355	-5.616355
(H30)	0.891125	-1.211136	-1.211141	-0.892227	0.200466	0.560509	0.560509	0.300604	0.224427	0.056116	-0.141772	-0.200223	-0.238273	-0.242628	-0.238273	-0.242628	-0.238273	-0.242628	-0.238273	-0.242628	-0.238273	-0.242628	-0.238273	-0.242628	-0.238273	-0.242628
(H45)	0.680779	-0.821125	-0.821130	-0.680779	0.020466	0.820509	0.820509	0.300604	0.224427	0.056116	-0.141772	-0.200223	-0.238273	-0.242628	-0.238273	-0.242628	-0.238273	-0.242628	-0.238273	-0.242628	-0.238273	-0.242628	-0.238273	-0.242628	-0.238273	-0.242628
(H60)	0.220475	-0.650880	-0.650917	0.541115	1.722000	2.161833	1.671122	0.542625	-1.171200	-2.571928	-3.951477	-4.985450	-5.605758	-5.935476	-6.092617	-6.160000	-6.130000	-6.070000	-5.980000	-5.860000	-5.720000	-5.570000	-5.420000	-5.280000	-5.150000	-5.030000
(H75)	0.550478	-0.790880	-0.791071	1.382224	1.722000	2.161833	1.711798	1.540556	-0.649168	-2.961410	-4.461421	-5.470124	-6.074665	-6.312678	-6.347176	-6.240000	-6.000000	-5.650000	-5.220000	-4.730000	-4.200000	-3.650000	-3.090000	-2.530000	-2.000000	-1.500000
(H90)	1.130114	-0.980828	0.591141	1.812466	2.422455	1.980849	0.490517	-1.692527	-4.271571	-6.954656	-9.687619	-11.979129	-13.584358	-14.200000	-13.750000	-13.150000	-12.430000	-11.600000	-10.670000	-9.650000	-8.550000	-7.390000	-6.190000	-5.000000	-3.800000	-2.600000
(H105)	1.341135	-1.010874	1.061196	1.862227	2.162324	1.801444	0.570415	-1.191236	-3.670405	-6.570405	-9.670405	-12.000000	-13.500000	-14.000000	-13.400000	-12.600000	-11.600000	-10.400000	-9.000000	-7.500000	-6.000000	-4.500000	-3.000000	-1.500000	-0.500000	0.000000
(H120)	2.001129	-1.581108	1.403131	0.751149	2.031177	2.211187	1.300558	0.431175	-3.221581	-7.841122	-10.901220	-13.601220	-15.000000	-15.000000	-14.800000	-14.400000	-13.700000	-12.800000	-11.700000	-10.400000	-9.000000	-7.600000	-6.200000	-4.900000	-3.600000	-2.400000
(H135)	3.341296	-2.211438	1.643136	0.931143	1.850101	1.761109	0.950106	0.560203	-3.811556	-8.681511	-12.101511	-14.801511	-16.200000	-16.200000	-15.800000	-15.100000	-14.200000	-13.100000	-11.800000	-10.400000	-9.000000	-7.600000	-6.200000	-4.900000	-3.600000	-2.400000
(H150)	6.151678	-4.981144	2.871145	0.390668	1.321186	2.003125	2.003125	1.312065	-3.120260	-6.481126	-9.681126	-12.501126	-14.801126	-15.200000	-14.801126	-14.100000	-13.200000	-12.100000	-10.800000	-9.400000	-8.000000	-6.600000	-5.200000	-3.900000	-2.600000	-1.400000
(H165)	7.591179	-5.881444	4.921265	-1.411619	0.411811	2.090110	3.222644	3.222644	-3.920238	-7.691122	-11.340238	-14.001122	-15.601122	-15.601122	-15.000000	-14.100000	-13.000000	-11.800000	-10.400000	-9.000000	-7.600000	-6.200000	-4.900000	-3.600000	-2.400000	-1.200000
(H180)	8.831883	-7.761879	6.461488	2.011628	1.332444	2.092322	3.052388	3.052388	-4.209104	-8.380238	-12.100238	-14.800238	-16.200000	-16.200000	-15.600000	-14.700000	-13.600000	-12.400000	-11.000000	-9.600000	-8.200000	-6.800000	-5.400000	-4.100000	-2.800000	-1.600000
(H195)	10.331441	-9.181449	7.181448	0.950182	0.950182	0.950182	0.950182	0.950182	-3.341222	-7.681122	-11.341122	-14.001122	-15.601122	-15.601122	-15.000000	-14.100000	-13.000000	-11.800000	-10.400000	-9.000000	-7.600000	-6.200000	-4.900000	-3.600000	-2.400000	-1.200000
(H210)	9.881893	-8.531687	6.531784	2.490138	2.490138	2.490138	2.490138	2.490138	-4.101092	-8.371092	-12.031092	-14.701092	-16.100000	-16.100000	-15.500000	-14.600000	-13.500000	-12.300000	-10.900000	-9.500000	-8.100000	-6.700000	-5.300000	-4.000000	-2.700000	-1.500000
(H225)	7.031219	-6.991020	5.731020	0.610979	1.131079	1.511079	1.511079	1.511079	-2.441428	-5.691428	-8.941428	-11.601428	-13.001428	-13.001428	-12.400000	-11.500000	-10.400000	-9.200000	-7.800000	-6.400000	-5.000000	-3.600000	-2.300000	-1.000000	0.000000	0.000000
(H240)	3.341296	-2.211438	1.643136	0.931143	1.850101	1.761109	0.950106	0.560203	-3.811556	-8.681511	-12.101511	-14.801511	-16.200000	-16.200000	-15.800000	-15.100000	-14.200000	-13.100000	-11.800000	-10.400000	-9.000000	-7.600000	-6.200000	-4.900000	-3.600000	-2.400000
(H255)	1.261154	-1.781182	-1.781186	-1.110460	0.168616	0.244022	0.190701	0.012123	-0.368526	-0.854103	-1.441770	-1.981753	-2.501577	-3.000000	-3.467325	-3.892435	-4.275395	-4.616355	-4.916355	-5.166355	-5.366355	-5.516355	-5.616355	-5.666355	-5.666355	-5.616355
(H270)	0.891125	-1.211136	-1.211141	-0.892227	0.200466	0.560509	0.560509	0.300604	0.224427	0.056116	-0.141772	-0.200223	-0.238273	-0.242628	-0.238273	-0.242628	-0.238273	-0.242628	-0.238273	-0.242628	-0.238273	-0.242628	-0.238273	-0.242628	-0.238273	-0.242628
(H285)	0.680779	-0.821125	-0.821130	-0.680779	0.020466	0.820509	0.820509	0.300604	0.224427	0.056116	-0.141772	-0.200223	-0.238273	-0.242628	-0.238273	-0.242628	-0.238273	-0.242628	-0.238273	-0.242628	-0.238273	-0.242628	-0.238273	-0.242628	-0.238273	-0.242628
(H300)	0.220475	-0.650880	-0.650917	0.541115	1.722000	2.161833	1.671122	0.542625	-1.171200	-2.571928	-3.951477	-4.985450	-5.605758	-5.935476	-6.092617	-6.160000	-6.130000	-6.070000	-5.980000	-5.860000	-5.720000	-5.570000	-5.420000	-5.280000	-5.150000	-5.030000
(H315)	0.550478	-0.790880	-0.791071	1.382224	1.722000	2.161833	1.711798	1.540556	-0.649168	-2.961410	-4.461421	-5.470124	-6.074665	-6.312678	-6.347176	-6.240000	-6.000000	-5.650000	-5.220000	-4.730000	-4.200000	-3.650000	-3.090000	-2.530000	-2.000000	-1.500000
(H330)	1.130114	-0.980828	0.591141	1.812466	2.422455	1.980849	0.490517	-1.692527	-4.271571	-6.954656	-9.687619	-11.979129	-13.584358	-14.200000	-13.750000	-13.150000	-12.430000	-11.600000	-10.670000	-9.650000	-8.550000	-7.390000	-6.190000	-5.000000	-3.800000	-2.600000
(H345)	1.341135	-1.010874	1.061196	1.862227	2.162324	1.801444	0.570415	-1.191236	-3.670405	-6.570405	-9.670405	-12.000000	-13.500000	-14.000000	-13.400000	-12.600000	-11.600000	-10.400000	-9.000000	-7.500000	-6.000000	-4.500000	-3.000000	-1.500000	-0.500000	0.000000
(H360)	2.001129	-1.581108	1.403131	0.751149	2.031177	2.211187	1.300558	0.431175	-3.221581	-7.841122	-10.901220	-13.601220	-15.000000	-15.000000	-14.800000	-14.400000	-13.700000	-12.800000	-11.700000	-10.400000	-9.000000	-7.600000	-6.200000	-4.900000	-3.600000	-2.400000
(H375)	3.341296	-2.211438	1.643136	0.931143	1.850101	1.761109	0.950106	0.560203	-3.811556	-8.681511	-12.101511	-14.801511	-16.200000	-16.200000	-15.800000	-15.100000	-14.200000	-13.100000	-11.800000	-10.400000	-9.000000	-7.600000	-6.200000	-4.900000	-3.600000	-2.400000
(H390)	6.151678	-4.981144	2.871145	0.390668	1.321186	2.003125	2.003125	1.312065	-3.120260	-6.481126	-9.681126	-12.501126	-14.801126	-15.200000	-14.801126	-14.100000	-13.200000	-12.100000	-10.800000	-9.400000	-8.000000	-6.600000	-5.200000	-3.900000	-2.600000	-1.400000
(H405)	7.591179	-5.881444	4.921265	-1.411619	0.411811	2.090110	3.222644	3.222644	-3.920238	-7.691122	-11.340238	-14.001122	-15.601122	-15.601122	-15.000000	-14.100000	-13.000000	-11.800000	-10.400000	-9.000000	-7.600000	-6.200000	-4.900000	-3.600000	-2.400000	-1.200000
(H420)	8.831883	-7.761879	6.461488	2.011628	1.332444	2.092322	3.052388	3.052388	-4.209104	-8.380238	-12.100238	-14.800238	-16.200000	-16.200000	-15.600000	-14.700000	-13.600000	-12.400000	-11.000000	-9.600000	-8.200000	-6.800000	-5.400000	-4.100000	-2.800000	-1.600000
(H435)	10.331441	-9.181449	7.181448	0.950182	0.950182	0.950182	0.950182	0.950182	-3.341222	-7.681122	-11.341122	-14.001122	-15.601122	-15.601122	-15.000000	-14.100000	-13.000000	-11.800000	-10.400000	-9.000000	-7.600000	-6.200000	-4.900000	-3.600000	-2.400000	-1.200000
(H450)	9.881893	-8.531687	6.531784	2.490138	2.490138	2.490138	2.490138	2.490138	-4.101092	-8.371092	-12.031092	-14.701092	-16.100000	-16.100000	-15.500000	-14.600000	-13.500000	-12.300000	-10.900000	-9.500000	-8.100000	-6.700000	-5.300000	-4.000000	-2.700000	-1.500000
(H465)	7.031219	-6.991020	5.731020	0.610979	1.131079	1.511079	1.511079	1.511079	-2.441428	-5.691428	-8.941428	-11.601428	-13.001428	-13.001428	-12.400000	-11.500000	-10.400000	-9.200000	-7.800000	-6.400000	-5.000000	-3.600000	-2.300000	-1.000000	0.000000	0.000000
(H480)	3.341296	-2.211438	1.643136	0.931143	1.850101	1.761109	0.950106	0.560203	-3.811556	-8.681511	-12.101511	-14.801511	-16.200000	-16.200000	-15.800000	-15.100000	-14.200000	-13.100000	-11.800000	-10.400000	-9.000000	-7.600000	-6.200000	-4.900000	-3.600000	-2.400000
(H495)	1.261154																									



# Antenna Pattern of 2.4GHz&5GHz

# Appendix C

	(225)	(226)	(227)	(228)	(229)	(230)	(231)	(232)	(233)	(234)	(235)	(236)	(237)	(238)	(239)	(240)	(241)	(242)	(243)	(244)	(245)	(246)	(247)	(248)	(249)	(250)																																																																																																																																																																																																																																																																																																																																																								
(r225)	2.95077	2.22180	-1.63240	2.93348	4.30825	-8.94194	-11.49119	-11.79120	7.84833	-4.98120	-3.89286	-2.51229	-2.31250	9.92037	-3.99453	-6.09545	-4.51138	-2.19202	2.15028	3.50381	-3.93036	-3.41335	-3.09922	2.25171	2.46124																																																																																																																																																																																																																																																																																																																																																									
(r250)	1.77722	-3.06124	-1.34115	-1.05226	3.33570	-8.98174	-10.40843	-6.58562	5.36447	-2.67156	-1.14701	-0.49330	0.60111	-1.31171	-2.07314	-1.88125	-2.69205	-1.99159	-1.62131	-0.74362	-0.33036	0.86138	-1.59185	-1.08728	-1.41147																																																																																																																																																																																																																																																																																																																																																									
(r255)	0.60104	-1.06127	-1.49238	2.90329	-3.86838	-3.08408	-3.63238	-4.23647	5.54459	-5.67646	-3.58262	-2.34522	-2.21177	-1.66129	-1.04113	-1.36143	-2.36130	0.33140	1.16228	1.60199	-0.60188	-0.33081	1.19165	-1.01472	-1.10472																																																																																																																																																																																																																																																																																																																																																									
(r260)	1.03072	0.30150	-1.11116	0.88647	-1.04182	-2.46189	-0.79102	-3.19723	9.02929	-5.88077	-6.01172	-10.05110	9.77116	-4.00174	-1.25149	-2.30287	-2.11123	0.27143	1.70126	2.16225	1.89180	1.77173	1.20120	1.60086																																																																																																																																																																																																																																																																																																																																																										
(r265)	1.41007	0.27102	0.21126	-1.41084	-6.46027	1.04084	1.36120	0.58157	-3.82677	-7.64489	-8.07102	-11.71745	-6.29702	-7.71717	1.61141	-1.03610		0.24123	2.80203	3.10273	3.70124	1.99178	2.27181	2.01120	1.88235																																																																																																																																																																																																																																																																																																																																																									
(r270)	0.68124	2.25129	2.96120	-1.36031	0.09036	1.38022	3.30051	3.07132	-1.86147	-6.70488	-8.83159	-7.98176	6.82296	-8.09166	-2.75153	0.12100	-0.09104	1.08021	2.97273	2.80234	3.47024	3.11196	2.88028	2.87099																																																																																																																																																																																																																																																																																																																																																										
(r275)	-1.29320	-5.24724	-7.73470	2.64105	-4.62102	0.68791	2.06152	0.93746	-3.34611	-1.29048	-10.42673	-7.36554	9.74096	-10.29107	0.90160	0.70070	0.10027	0.90095	1.07731	1.08244	1.22024	1.22024	1.22024	1.22024	1.22024	1.22024																																																																																																																																																																																																																																																																																																																																																								
(r280)	-1.95446	-5.80517	-7.96344	3.13021	-2.23180	-1.12017	2.79152	3.53236	-4.89079	-6.81689	-7.86624	-5.78137	4.99648	-7.01273	-2.27221	0.64153	-2.49289	2.07089	0.67705	0.50040	0.34043	0.33081	0.36046	0.36046	0.36046	0.36046																																																																																																																																																																																																																																																																																																																																																								
(r285)	1.19155	-1.67132	6.40172	-7.77147	-5.05304	-1.63277	4.87426	-3.48159	2.49728	-6.86084	-8.29884	6.59047	-5.50647	-6.52516	-4.64133	-1.31181	-1.68931	3.84342	3.30289	3.50206	3.92026	3.68138	3.96155	4.01020	4.01020	4.01020																																																																																																																																																																																																																																																																																																																																																								
(r290)	0.69930	6.13756	6.26047	6.43741	-2.34020	1.34242	2.62212	0.86185	-7.91728	-10.39302	-7.57085	-7.00496	6.58030	-3.98436	-4.94034	-6.48428	-3.86330	-4.63817	6.15919	6.40298	6.41021	6.41021	6.41021	6.41021	6.41021	6.41021	6.41021																																																																																																																																																																																																																																																																																																																																																							
(r295)	5.98166	-1.93156	4.21446	5.11526	3.22611	3.20377	2.98195	3.53085	-1.57162	6.47446	6.47446	6.47446	6.47446	6.47446	6.47446	6.47446	6.47446	6.47446	6.47446	6.47446	6.47446	6.47446	6.47446	6.47446	6.47446	6.47446	6.47446	6.47446																																																																																																																																																																																																																																																																																																																																																						
(r300)	7.02142	-1.29150	3.01608	5.71526	1.42038	3.27437	5.14071	6.61332	8.79178	6.34386	5.32517	6.04146	6.66463	8.63101	8.74457	5.53439	6.29048	3.83021	2.26384	1.65419	1.07171	0.60182	0.40020	0.40020	0.40020	0.40020	0.40020																																																																																																																																																																																																																																																																																																																																																							
(r305)	4.04127	-2.06137	3.09780	8.40248	2.77078	1.67323	3.33184	1.54480	4.44614	3.21421	-4.59739	4.93438	3.41473	3.33843	4.21282	3.19239	2.28112	2.21107	1.89894	-1.76813	0.10123	0.01273	0.01273	0.01273	0.01273	0.01273	0.01273																																																																																																																																																																																																																																																																																																																																																							
(r310)	3.38127	0.56170	8.82042	-7.85733	2.38027	1.32143	-2.169318	4.44131	-4.87475	6.41710	6.41710	6.41710	6.41710	6.41710	6.41710	6.41710	6.41710	6.41710	6.41710	6.41710	6.41710	6.41710	6.41710	6.41710	6.41710	6.41710	6.41710	6.41710																																																																																																																																																																																																																																																																																																																																																						
(r315)	6.87156	-4.09452	-5.29491	-7.29442	4.82029	-2.09604	2.50435	-3.96457	7.74498	-14.24127	8.30138	7.07702	6.89894	7.75930	-10.98703	7.31336	3.20751	-4.40245	-0.90205	-0.09101	2.50128	2.18024	1.79139	1.31199	1.06240	1.06240	1.06240																																																																																																																																																																																																																																																																																																																																																							
(r320)	0.77163	4.01644	9.39109	-11.29152	-1.159435	-4.04446	-5.60560	-5.69420	5.00680	-10.46133	-11.05417	5.61363	-5.83850	-5.58949	-8.67029	-7.95043	1.17143	0.52010	0.09203	-1.32232	0.80684	-1.08024	-1.36024	-1.36024	-1.36024	-1.36024	-1.36024																																																																																																																																																																																																																																																																																																																																																							
(r325)	6.09499	-3.19361	-3.64101	-11.35110	-7.16441	-5.20491	-7.60550	-5.41682	-6.10556	-7.64180	-7.53120	-8.90386	-10.19730	8.82196	-8.12745	-1.31040	-2.87031	1.37010	0.19279	2.79155	2.10040	-2.37497	-2.76717	-2.76717	-2.76717	-2.76717	-2.76717																																																																																																																																																																																																																																																																																																																																																							
(r330)	-1.129175	2.54831	-8.49148	-8.74967	-8.87037	-10.63124	-8.89737	-6.76633	-3.78727	-5.45799	-7.60193	-8.70149	-10.05605	-8.23676	-6.39642	-9.60739	-2.81819	-7.16134	0.61670	-3.86840	-1.47008	-2.14261	-1.35034	0.46671																																																																																																																																																																																																																																																																																																																																																										
(r335)	3.50429	8.05724	-9.29122	8.72661	6.73703	-7.11648	-6.95740	-8.83942	-6.91648	-7.20108	-10.26876	-5.57333	-3.65292	3.21143	-5.19515	-6.25932	-8.12940	-10.02900	3.46707	-6.83105	-12.36935	-8.03755	-4.75291	-4.75291	-4.75291	-4.75291																																																																																																																																																																																																																																																																																																																																																								
(r340)	1.64339	6.00982	-10.66103	-11.72111	-6.73029	-9.23986	-8.55924	-7.29765	-4.30100	-9.31088	-10.56116	-11.00124	-9.74908	8.84435	-8.79546	-3.80781	-6.64968	-10.23268	-4.29138	4.99788	-4.64649	-2.57686	-2.60145	-2.60145	-2.60145	-2.60145	-2.60145	-2.60145																																																																																																																																																																																																																																																																																																																																																						
(r345)	1.05101	-10.09462	-6.65039	4.88644	4.45740	-10.56110	-11.74129	-11.07118	-10.17174	-7.63481	-6.50609	-4.26401	-3.54823	-2.90200	-2.42048	-2.69315	3.74410	4.25434	-4.29376	-3.79448	-4.29178	-2.96226	-2.80452	-2.80452	-2.80452	-2.80452	-2.80452	-2.80452																																																																																																																																																																																																																																																																																																																																																						
(r350)	0.84193	0.72189	8.91187	6.46552	8.91189	-7.46649	-8.77648	-5.90658	-4.86158	-4.86158	-4.86158	-4.86158	-4.86158	-4.86158	-4.86158	-4.86158	-4.86158	-4.86158	-4.86158	-4.86158	-4.86158	-4.86158	-4.86158	-4.86158	-4.86158	-4.86158	-4.86158	-4.86158	-4.86158																																																																																																																																																																																																																																																																																																																																																					
Frequency																																																																																																																																																																																																																																																																																																																																																																																		
Gain	(r350)	(r355)	(r360)	(r365)	(r370)	(r375)	(r380)	(r385)	(r390)	(r395)	(r400)	(r405)	(r410)	(r415)	(r420)	(r425)	(r430)	(r435)	(r440)	(r445)	(r450)	(r455)	(r460)	(r465)	(r470)	(r475)	(r480)	(r485)	(r490)	(r495)	(r500)	(r505)	(r510)	(r515)	(r520)	(r525)	(r530)	(r535)	(r540)	(r545)	(r550)	(r555)	(r560)	(r565)	(r570)	(r575)	(r580)	(r585)	(r590)	(r595)	(r600)	(r605)	(r610)	(r615)	(r620)	(r625)	(r630)	(r635)	(r640)	(r645)	(r650)	(r655)	(r660)	(r665)	(r670)	(r675)	(r680)	(r685)	(r690)	(r695)	(r700)	(r705)	(r710)	(r715)	(r720)	(r725)	(r730)	(r735)	(r740)	(r745)	(r750)	(r755)	(r760)	(r765)	(r770)	(r775)	(r780)	(r785)	(r790)	(r795)	(r800)	(r805)	(r810)	(r815)	(r820)	(r825)	(r830)	(r835)	(r840)	(r845)	(r850)	(r855)	(r860)	(r865)	(r870)	(r875)	(r880)	(r885)	(r890)	(r895)	(r900)	(r905)	(r910)	(r915)	(r920)	(r925)	(r930)	(r935)	(r940)	(r945)	(r950)	(r955)	(r960)	(r965)	(r970)	(r975)	(r980)	(r985)	(r990)	(r995)	(r1000)	(r1005)	(r1010)	(r1015)	(r1020)	(r1025)	(r1030)	(r1035)	(r1040)	(r1045)	(r1050)	(r1055)	(r1060)	(r1065)	(r1070)	(r1075)	(r1080)	(r1085)	(r1090)	(r1095)	(r1100)	(r1105)	(r1110)	(r1115)	(r1120)	(r1125)	(r1130)	(r1135)	(r1140)	(r1145)	(r1150)	(r1155)	(r1160)	(r1165)	(r1170)	(r1175)	(r1180)	(r1185)	(r1190)	(r1195)	(r1200)	(r1205)	(r1210)	(r1215)	(r1220)	(r1225)	(r1230)	(r1235)	(r1240)	(r1245)	(r1250)	(r1255)	(r1260)	(r1265)	(r1270)	(r1275)	(r1280)	(r1285)	(r1290)	(r1295)	(r1300)	(r1305)	(r1310)	(r1315)	(r1320)	(r1325)	(r1330)	(r1335)	(r1340)	(r1345)	(r1350)	(r1355)	(r1360)	(r1365)	(r1370)	(r1375)	(r1380)	(r1385)	(r1390)	(r1395)	(r1400)	(r1405)	(r1410)	(r1415)	(r1420)	(r1425)	(r1430)	(r1435)	(r1440)	(r1445)	(r1450)	(r1455)	(r1460)	(r1465)	(r1470)	(r1475)	(r1480)	(r1485)	(r1490)	(r1495)	(r1500)	(r1505)	(r1510)	(r1515)	(r1520)	(r1525)	(r1530)	(r1535)	(r1540)	(r1545)	(r1550)	(r1555)	(r1560)	(r1565)	(r1570)	(r1575)	(r1580)	(r1585)	(r1590)	(r1595)	(r1600)	(r1605)	(r1610)	(r1615)	(r1620)	(r1625)	(r1630)	(r1635)	(r1640)	(r1645)	(r1650)	(r1655)	(r1660)	(r1665)	(r1670)	(r1675)	(r1680)	(r1685)	(r1690)	(r1695)	(r1700)	(r1705)	(r1710)	(r1715)	(r1720)	(r1725)	(r1730)	(r1735)	(r1740)	(r1745)	(r1750)	(r1755)	(r1760)	(r1765)	(r1770)	(r1775)	(r1780)	(r1785)	(r1790)	(r1795)	(r1800)	(r1805)	(r1810)	(r1815)	(r1820)	(r1825)	(r1830)	(r1835)	(r1840)	(r1845)	(r1850)	(r1855)	(r1860)	(r1865)	(r1870)	(r1875)	(r1880)	(r1885)	(r1890)	(r1895)	(r1900)	(r1905)	(r1910)	(r1915)	(r1920)	(r1925)	(r1930)	(r1935)	(r1940)	(r1945)	(r1950)	(r1955)	(r1960)	(r1965)	(r1970)	(r1975)	(r1980)	(r1985)	(r1990)	(r1995)	(r2000)	(r2005)	(r2010)	(r2015)	(r2020)	(r2025)	(r2030)	(r2035)	(r2040)	(r2045)	(r2050)	(r2055)	(r2060)	(r2065)	(r2070)	(r2075)	(r2080)	(r2085)	(r2090)	(r2095)	(r2100)	(r2105)	(r2110)	(r2115)	(r2120)	(r2125)	(r2130)	(r2135)	(r2140)	(r2145)	(r2150)	(r2155)	(r2160)	(r2165)	(r2170)	(r2175)	(r2180)	(r2185)	(r2190)	(r219





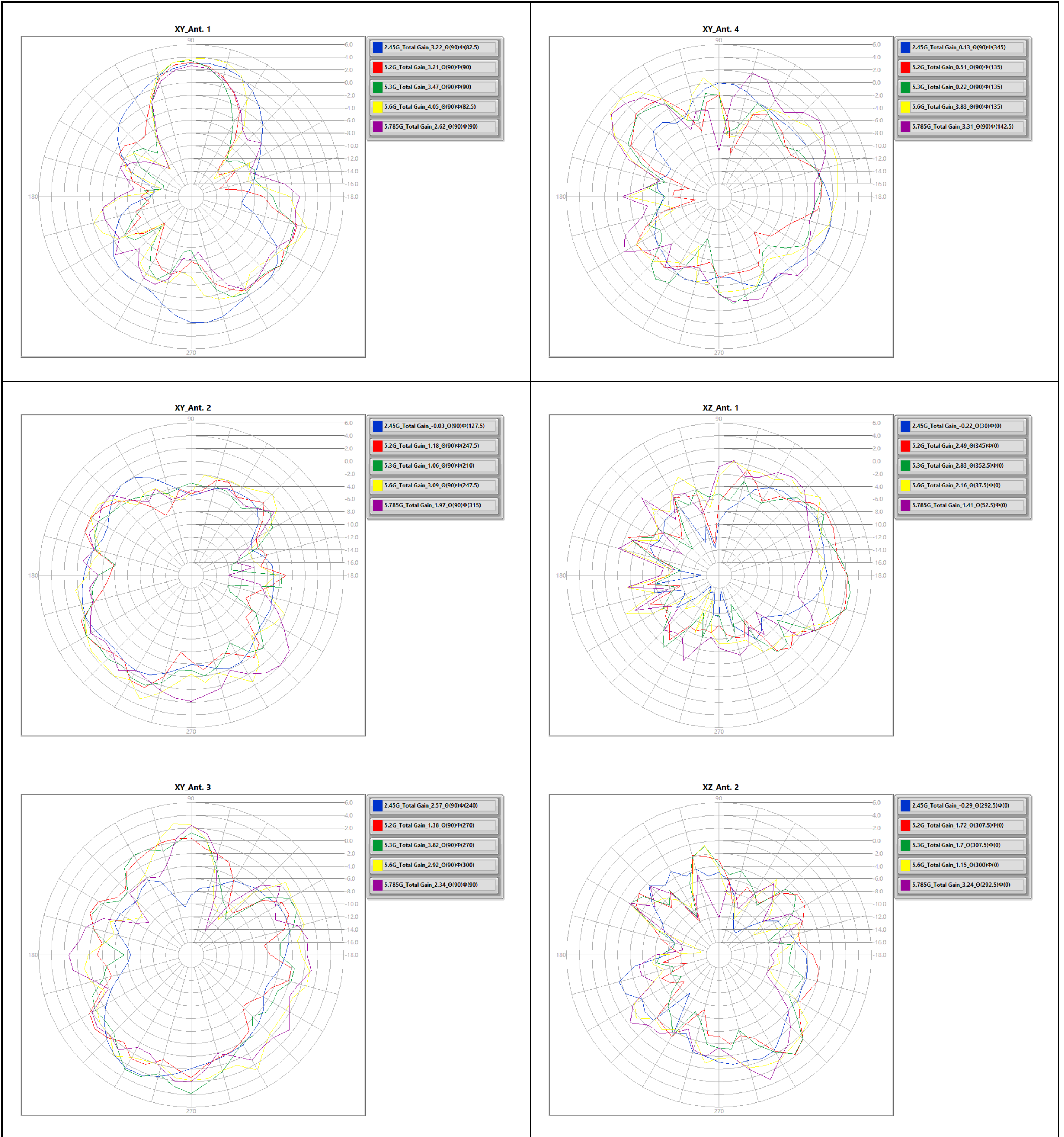
# Antenna Pattern of 2.4GHz&5GHz

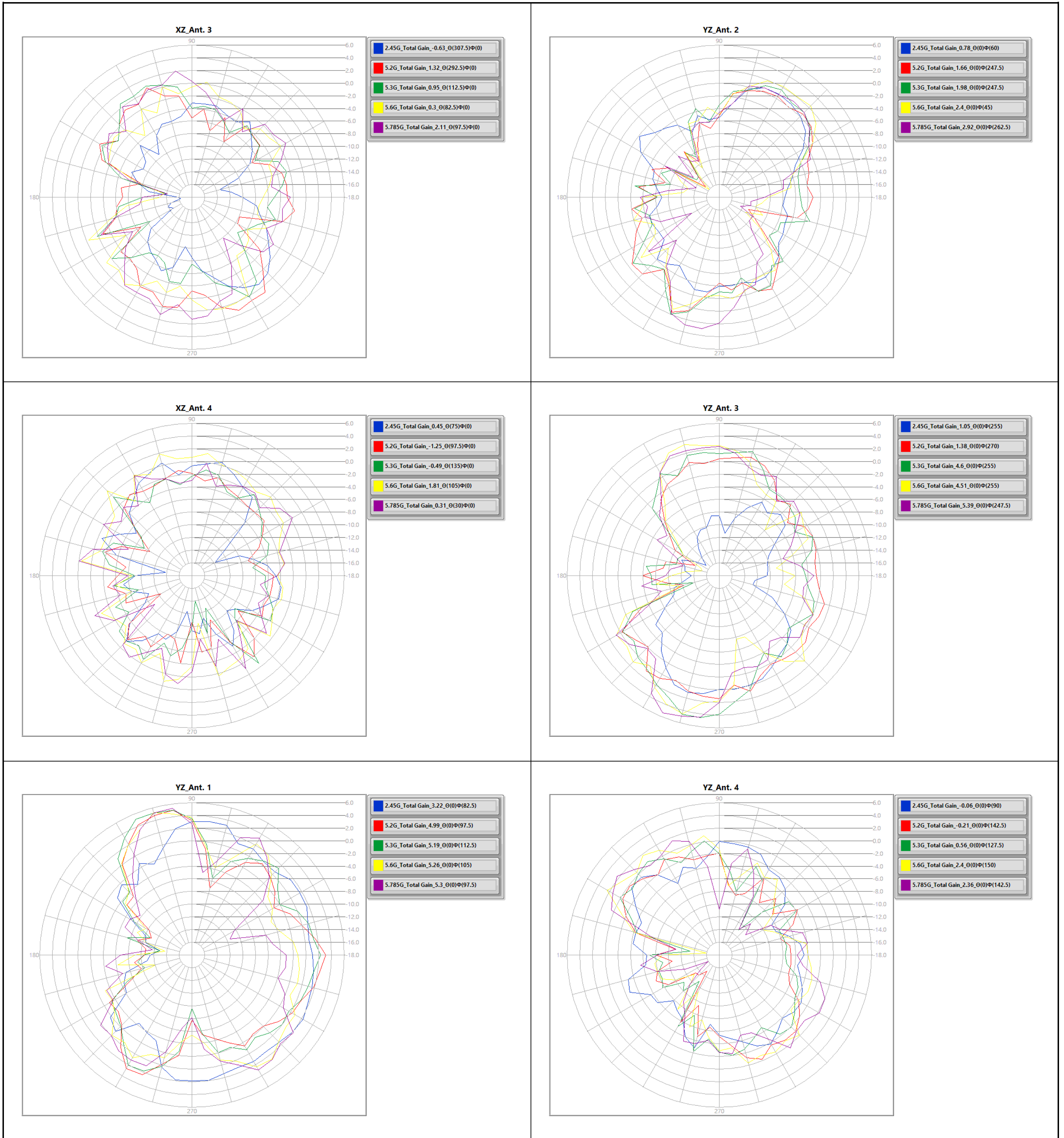
# Appendix C

Phi(125)	Theta(428)	Theta(491)	Theta(532)	Theta(565)	Theta(611)	Theta(643)	Theta(690)	Theta(733)	Theta(780)	Theta(823)	Theta(866)	Theta(909)	Theta(952)	Theta(995)	Theta(1038)	Theta(1081)	Theta(1124)	Theta(1167)	Theta(1210)	Theta(1253)	Theta(1296)	Theta(1339)	Theta(1382)	Theta(1425)	Theta(1468)	Theta(1511)	Theta(1554)	Theta(1597)	Theta(1640)	Theta(1683)	Theta(1726)	Theta(1769)	Theta(1812)	Theta(1855)	Theta(1898)	Theta(1941)	Theta(1984)	Theta(2027)	Theta(2070)	Theta(2113)	Theta(2156)	Theta(2199)	Theta(2242)	Theta(2285)	Theta(2328)	Theta(2371)	Theta(2414)	Theta(2457)	Theta(2500)	Theta(2543)	Theta(2586)	Theta(2629)	Theta(2672)	Theta(2715)	Theta(2758)	Theta(2801)	Theta(2844)	Theta(2887)	Theta(2930)	Theta(2973)	Theta(3016)	Theta(3059)	Theta(3102)	Theta(3145)	Theta(3188)	Theta(3231)	Theta(3274)	Theta(3317)	Theta(3360)	Theta(3403)	Theta(3446)	Theta(3489)	Theta(3532)	Theta(3575)	Theta(3618)	Theta(3661)	Theta(3704)	Theta(3747)	Theta(3790)	Theta(3833)	Theta(3876)	Theta(3919)	Theta(3962)	Theta(4005)	Theta(4048)	Theta(4091)	Theta(4134)	Theta(4177)	Theta(4220)	Theta(4263)	Theta(4306)	Theta(4349)	Theta(4392)	Theta(4435)	Theta(4478)	Theta(4521)	Theta(4564)	Theta(4607)	Theta(4650)	Theta(4693)	Theta(4736)	Theta(4779)	Theta(4822)	Theta(4865)	Theta(4908)	Theta(4951)	Theta(4994)	Theta(5037)	Theta(5080)	Theta(5123)	Theta(5166)	Theta(5209)	Theta(5252)	Theta(5295)	Theta(5338)	Theta(5381)	Theta(5424)	Theta(5467)	Theta(5510)	Theta(5553)	Theta(5596)	Theta(5639)	Theta(5682)	Theta(5725)	Theta(5768)	Theta(5811)	Theta(5854)	Theta(5897)	Theta(5940)	Theta(5983)	Theta(6026)	Theta(6069)	Theta(6112)	Theta(6155)	Theta(6198)	Theta(6241)	Theta(6284)	Theta(6327)	Theta(6370)	Theta(6413)	Theta(6456)	Theta(6499)	Theta(6542)	Theta(6585)	Theta(6628)	Theta(6671)	Theta(6714)	Theta(6757)	Theta(6800)	Theta(6843)	Theta(6886)	Theta(6929)	Theta(6972)	Theta(7015)	Theta(7058)	Theta(7101)	Theta(7144)	Theta(7187)	Theta(7230)	Theta(7273)	Theta(7316)	Theta(7359)	Theta(7402)	Theta(7445)	Theta(7488)	Theta(7531)	Theta(7574)	Theta(7617)	Theta(7660)	Theta(7703)	Theta(7746)	Theta(7789)	Theta(7832)	Theta(7875)	Theta(7918)	Theta(7961)	Theta(8004)	Theta(8047)	Theta(8090)	Theta(8133)	Theta(8176)	Theta(8219)	Theta(8262)	Theta(8305)	Theta(8348)	Theta(8391)	Theta(8434)	Theta(8477)	Theta(8520)	Theta(8563)	Theta(8606)	Theta(8649)	Theta(8692)	Theta(8735)	Theta(8778)	Theta(8821)	Theta(8864)	Theta(8907)	Theta(8950)	Theta(8993)	Theta(9036)	Theta(9079)	Theta(9122)	Theta(9165)	Theta(9208)	Theta(9251)	Theta(9294)	Theta(9337)	Theta(9380)	Theta(9423)	Theta(9466)	Theta(9509)	Theta(9552)	Theta(9595)	Theta(9638)	Theta(9681)	Theta(9724)	Theta(9767)	Theta(9810)	Theta(9853)	Theta(9896)	Theta(9939)	Theta(9982)	Theta(10025)	Theta(10068)	Theta(10111)	Theta(10154)	Theta(10197)	Theta(10240)	Theta(10283)	Theta(10326)	Theta(10369)	Theta(10412)	Theta(10455)	Theta(10498)	Theta(10541)	Theta(10584)	Theta(10627)	Theta(10670)	Theta(10713)	Theta(10756)	Theta(10799)	Theta(10842)	Theta(10885)	Theta(10928)	Theta(10971)	Theta(11014)	Theta(11057)	Theta(11100)	Theta(11143)	Theta(11186)	Theta(11229)	Theta(11272)	Theta(11315)	Theta(11358)	Theta(11401)	Theta(11444)	Theta(11487)	Theta(11530)	Theta(11573)	Theta(11616)	Theta(11659)	Theta(11702)	Theta(11745)	Theta(11788)	Theta(11831)	Theta(11874)	Theta(11917)	Theta(11960)	Theta(12003)	Theta(12046)	Theta(12089)	Theta(12132)	Theta(12175)	Theta(12218)	Theta(12261)	Theta(12304)	Theta(12347)	Theta(12390)	Theta(12433)	Theta(12476)	Theta(12519)	Theta(12562)	Theta(12605)	Theta(12648)	Theta(12691)	Theta(12734)	Theta(12777)	Theta(12820)	Theta(12863)	Theta(12906)	Theta(12949)	Theta(12992)	Theta(13035)	Theta(13078)	Theta(13121)	Theta(13164)	Theta(13207)	Theta(13250)	Theta(13293)	Theta(13336)	Theta(13379)	Theta(13422)	Theta(13465)	Theta(13508)	Theta(13551)	Theta(13594)	Theta(13637)	Theta(13680)	Theta(13723)	Theta(13766)	Theta(13809)	Theta(13852)	Theta(13895)	Theta(13938)	Theta(13981)	Theta(14024)	Theta(14067)	Theta(14110)	Theta(14153)	Theta(14196)	Theta(14239)	Theta(14282)	Theta(14325)	Theta(14368)	Theta(14411)	Theta(14454)	Theta(14497)	Theta(14540)	Theta(14583)	Theta(14626)	Theta(14669)	Theta(14712)	Theta(14755)	Theta(14798)	Theta(14841)	Theta(14884)	Theta(14927)	Theta(14970)	Theta(15013)	Theta(15056)	Theta(15099)	Theta(15142)	Theta(15185)	Theta(15228)	Theta(15271)	Theta(15314)	Theta(15357)	Theta(15400)	Theta(15443)	Theta(15486)	Theta(15529)	Theta(15572)	Theta(15615)	Theta(15658)	Theta(15701)	Theta(15744)	Theta(15787)	Theta(15830)	Theta(15873)	Theta(15916)	Theta(15959)	Theta(16002)	Theta(16045)	Theta(16088)	Theta(16131)	Theta(16174)	Theta(16217)	Theta(16260)	Theta(16303)	Theta(16346)	Theta(16389)	Theta(16432)	Theta(16475)	Theta(16518)	Theta(16561)	Theta(16604)	Theta(16647)	Theta(16690)	Theta(16733)	Theta(16776)	Theta(16819)	Theta(16862)	Theta(16905)	Theta(16948)	Theta(16991)	Theta(17034)	Theta(17077)	Theta(17120)	Theta(17163)	Theta(17206)	Theta(17249)	Theta(17292)	Theta(17335)	Theta(17378)	Theta(17421)	Theta(17464)	Theta(17507)	Theta(17550)	Theta(17593)	Theta(17636)	Theta(17679)	Theta(17722)	Theta(17765)	Theta(17808)	Theta(17851)	Theta(17894)	Theta(17937)	Theta(17980)	Theta(18023)	Theta(18066)	Theta(18109)	Theta(18152)	Theta(18195)	Theta(18238)	Theta(18281)	Theta(18324)	Theta(18367)	Theta(18410)	Theta(18453)	Theta(18496)	Theta(18539)	Theta(18582)	Theta(18625)	Theta(18668)	Theta(18711)	Theta(18754)	Theta(18797)	Theta(18840)	Theta(18883)	Theta(18926)	Theta(18969)	Theta(19012)	Theta(19055)	Theta(19098)	Theta(19141)	Theta(19184)	Theta(19227)	Theta(19270)	Theta(19313)	Theta(19356)	Theta(19399)	Theta(19442)	Theta(19485)	Theta(19528)	Theta(19571)	Theta(19614)	Theta(19657)	Theta(19700)	Theta(19743)	Theta(19786)	Theta(19829)	Theta(19872)	Theta(19915)	Theta(19958)	Theta(20001)	Theta(20044)	Theta(20087)	Theta(20130)	Theta(20173)	Theta(20216)	Theta(20259)	Theta(20302)	Theta(20345)	Theta(20388)	Theta(20431)	Theta(20474)	Theta(20517)	Theta(20560)	Theta(20603)	Theta(20646)	Theta(20689)	Theta(20732)	Theta(20775)	Theta(20818)	Theta(20861)	Theta(20904)	Theta(20947)	Theta(20990)	Theta(21033)	Theta(21076)	Theta(21119)	Theta(21162)	Theta(21205)	Theta(21248)	Theta(21291)	Theta(21334)	Theta(21377)	Theta(21420)	Theta(21463)	Theta(21506)	Theta(21549)	Theta(21592)	Theta(21635)	Theta(21678)	Theta(21721)	Theta(21764)	Theta(21807)	Theta(21850)	Theta(21893)	Theta(21936)	Theta(21979)	Theta(22022)	Theta(22065)	Theta(22108)	Theta(22151)	Theta(22194)	Theta(22237)	Theta(22280)	Theta(22323)	Theta(22366)	Theta(22409)	Theta(22452)	Theta(22495)	Theta(22538)	Theta(22581)	Theta(22624)	Theta(22667)	Theta(22710)	Theta(22753)	Theta(22796)	Theta(22839)	Theta(22882)	Theta(22925)	Theta(22968)	Theta(23011)	Theta(23054)	Theta(23097)	Theta(23140)	Theta(23183)	Theta(23226)	Theta(23269)	Theta(23312)	Theta(23355)	Theta(23398)	Theta(23441)	Theta(23484)	Theta(23527)	Theta(23570)	Theta(23613)	Theta(23656)	Theta(23699)	Theta(23742)	Theta(23785)	Theta(23828)	Theta(23871)	Theta(23914)	Theta(23957)	Theta(24000)	Theta(24043)	Theta(24086)	Theta(24129)	Theta(24172)	Theta(24215)	Theta(24258)	Theta(24301)	Theta(24344)	Theta(24387)	Theta(24430)	Theta(24473)	Theta(24516)	Theta(24559)	Theta(24602)	Theta(24645)	Theta(24688)	Theta(24731)	Theta(24774)	Theta(24817)	Theta(24860)	Theta(24903)	Theta(24946)	Theta(24989)	Theta(25032)	Theta(25075)	Theta(25118)	Theta(25161)	Theta(25204)	Theta(25247)	Theta(25290)	Theta(25333)	Theta(25376)	Theta(25419)	Theta(25462)	Theta(25505)	Theta(25548)	Theta(25591)	Theta(25634)	Theta(25677)	Theta(25720)	Theta(25763)	Theta(25806)	Theta(25849)	Theta(25892)	Theta(25935)	Theta(25978)	Theta(26021)	Theta(26064)	Theta(26107)	Theta(26150)	Theta(26193)	Theta(26236)	Theta(26279)	Theta(26322)	Theta(26365)	Theta(26408)	Theta(26451)	Theta(26494)	Theta(26537)	Theta(26580)	Theta(26623)	Theta(26666)	Theta(26709)	Theta(26752)	Theta(26795)	Theta(26838)	Theta(26881)	Theta(26924)	Theta(26967)	Theta(27010)	Theta(27053)	Theta(27096)	Theta(27139)	Theta(27182)	Theta(27225)	Theta(27268)	Theta(27311)	Theta(27354)	Theta(27397)	Theta(27440)	Theta(27483)	Theta(27526)	Theta(27569)	Theta(27612)	Theta(27655)	Theta(27698)	Theta(27741)	Theta(27784)	Theta(27827)	Theta(27870)	Theta(27913)	Theta(27956)	Theta(28000)	Theta(28043)	Theta(28086)	Theta(28129)	Theta(28172)	Theta(28215)	Theta(28258)	Theta(28301)	Theta(28344)	Theta(28387)	Theta(28430)	Theta(28473)	Theta(28516)	Theta(28559)	Theta(28602)	Theta(28645)	Theta(28688)	Theta(28731)	Theta(28774)	Theta(28817)	Theta(28860)	Theta(28903)	Theta(28946)	Theta(28989)	Theta(29032)	Theta(29075)	Theta(29118)	Theta(29161)	Theta(29204)	Theta(29247)	Theta(29290)	Theta(29333)	Theta(29376)	Theta(29419)	Theta(29462)	Theta(29505)	Theta(29548)	Theta(29591)	Theta(29634)	Theta(29677)	Theta(29720)	Theta(29763)	Theta(29806)	Theta(29849)	Theta(29892)	Theta(29935)	Theta(29978)	Theta(30021)	Theta(30064)	Theta(30107)	Theta(30150)	Theta(30193)	Theta(30236)	Theta(30279)	Theta(30322)	Theta(30365)	Theta(30408)	Theta(30451)	Theta(30494)	Theta(30537)	Theta(30580)	Theta(30623)	Theta(30666)	Theta(30709)	Theta(30752)	Theta(30795)	Theta(30838)	Theta(30881)	Theta(30924)	Theta(30967)	Theta(31010)	Theta(31053)	Theta(31096)	Theta(31139)	Theta(31182)	Theta(31225)	Theta(31268)	Theta(31311)	Theta(31354)	Theta(31397)	Theta(31440)	Theta(31483)	Theta(31526)	Theta(31569)	Theta(31612)	Theta(31655)	Theta(31698)	Theta(31741)	Theta(31784)	Theta(31827)	Theta(31870)	Theta(31913)	Theta(31956)	Theta(32000)	Theta(32043)	Theta(32086)	Theta(32129)	Theta(32172)	Theta(32215)	Theta(32258)	Theta(32301)	Theta(32344)	Theta(32387)	Theta(32430)	Theta(32473)	Theta(32516)	Theta(32559)	Theta(32602)	Theta(32645)	Theta(32688)	Theta(32731)	Theta(32774)	Theta(32817)	Theta(32860)	Theta(32903)	Theta(32946)	Theta(32989)	Theta(33032)	Theta(33075)	Theta(33118)	Theta(33161)	Theta(33204)	Theta(33247)	Theta(33290)	Theta(33333)	Theta(33376)	Theta(33419)	Theta(33462)	Theta(33505)	Theta(33548)	Theta(33591)	Theta(33634)	Theta(33677)	Theta(33720)	Theta(33763)	Theta(33806)	Theta(33849)	Theta(33892)	Theta(33935)	Theta(33978)	Theta(34021)	Theta(34064)	Theta(34107)	Theta(34150)	Theta(34193)	Theta(34236)	Theta(34279)	Theta(34322)	Theta(34365)	Theta(34408)	Theta(34451)	Theta(34494)	Theta(34537)	Theta(34580)	Theta(34623)	Theta(34666)	Theta(34709)	Theta(34752)	Theta(34795)	Theta(34838)	Theta(34881)	Theta(34924)	Theta(34967)	Theta(35010)	Theta(35053)	Theta(35096)	Theta(35139)	Theta(35182)	Theta(35225)	Theta(35268)	Theta(35311)	Theta(35354)	Theta(35397)	Theta(35440)	Theta(35483)	Theta(35526)	Theta(35569)	Theta(35612)	Theta(35655)	Theta(35698)	Theta(35741)	Theta(35784)	Theta(35827)	Theta(35870)	Theta(35913)	Theta(35956)	Theta(36000)	Theta(36043)	Theta(36086)	Theta(36129)	Theta(36172)	Theta(36215)	Theta(36258)	Theta(36301)	Theta(36344)	Theta(36387)	Theta(36430)	Theta(36473)	Theta(36516)	Theta(36559)	Theta(36602)	Theta(36645)	Theta(36688)	Theta(36731)	Theta(36774)	Theta(36817)	Theta(36860)	Theta(36903)	Theta(36946)	Theta(36989)	Theta(37032)	Theta(37075)	Theta(37118)	Theta(37161)	Theta(37204)	Theta(37247)	Theta(37290)	Theta(37333)	Theta(37376)	Theta(37419)	Theta(37462)	Theta(37505)	Theta(37548)	Theta(37591)	Theta(37634)	Theta(37677)	Theta(37720)	Theta(37763)	Theta(37806)	Theta(37849)	Theta(37892)	Theta(37935)	Theta(37978)	Theta(38021)	Theta(38064)	Theta(38107)	Theta(38150)	Theta(38193)	Theta(38236)	Theta(38279)	Theta(38322)	Theta(38365)	Theta(38408)	Theta(38451)	Theta(38494)	Theta(38537)	Theta(38580)	Theta(38623)	Theta(38666)	Theta(38709)	Theta(38752)	Theta(38795)	Theta(38838)	Theta(38881)	Theta(38924)	Theta(38967)	Theta(39010)	Theta(39053)	Theta(39096)	Theta(39139)	Theta(39182)	Theta(39225)	Theta(39268)	Theta(39311)	Theta(39354)	Theta(39397)	Theta(39440)	Theta(39483)	Theta(39526)	Theta(39569)	Theta(39612)	Theta(39655)	Theta(39698)	Theta(39741)	Theta(39784)	Theta(39827)	Theta(39870)	Theta(39913)	Theta(39956)	Theta(40000)	Theta(40043)	Theta(40086)	Theta(40129)	Theta(40172)	Theta(40215)	Theta(40258)	Theta(40301)	Theta(40344)	Theta(40387)	Theta(40430)	Theta(40473)	Theta(40516)	Theta(40559)	Theta(40602)	Theta(40645)	Theta(40688)	Theta(40731)	Theta(40774)	Theta(40817)	Theta(40860)	Theta(40903)	Theta(40946)	Theta(40989)	Theta(41032)	Theta(41075)	Theta(41118)	Theta(41161)	Theta(41204)	Theta(41247)	Theta(41290)	Theta(41333)	Theta(41376)	Theta(41419)	Theta(41462)	Theta(41505)	Theta(41
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E1 (XY plane) –  $\Theta(90)\Phi(0-360)$   
 E2 (XZ plane) –  $\Theta(0-180)\Phi(0)$  and  $\Theta(0-180)\Phi(180)$   
 E3 (YZ plane) –  $\Theta(0-180)\Phi(90)$  and  $\Theta(0-180)\Phi(270)$















Antenna Pattern of 6GHz

Appendix D

(H20)	4.8177	1.5614	1.5070	1.3807	0.0202	2.3966	0.0000	7.7941	4.5046	1.3884	2.0000	-0.3507	-0.7693	-0.4673	4.9618	-5.2305	-0.8431	-0.4381	-13.8051	7.2945	-5.4712	-2.5407	-3.9239	6.4595	6.4114	-4.2502											
(H25)	0.3307	1.8007	0.6812	0.2601	0.6550	2.9614	-4.8154	3.7937	2.8313	7.8501	14.7620	-9.0248	-0.6848	-2.2439	7.6994	1.7691	5.4131	-0.0111	8.4712	4.7038	3.9824	-2.8442	-5.8199	1.3029	4.8054	4.4717	-1.8247										
(H30)	0.2907	1.1614	-0.1130	-1.3319	-1.6323	-3.3448	-3.5421	-2.0713	-2.0540	-7.1510	-14.2416	-15.1610	9.5670	7.6203	-6.7652	8.9012	-5.4208	8.9121	-8.4710	-3.5076	-3.4380	-0.3419	-7.3043	-0.5897	1.8020	6.9045	-0.8045										
(H35)	1.1461	-0.6048	-0.4613	-1.2511	-3.2454	-6.7461	-5.5174	-4.2147	-5.1713	-6.3367	-11.7911	-11.9510	7.0944	-8.2284	-8.9048	5.5910	-2.1121	8.8176	3.4919	4.9249	-6.2413	-2.8463	-5.6047	-2.1346	-4.7748	-3.4319	-0.8045										
(H40)	0.8951	-3.4129	-1.4726	-4.1115	-6.2954	-8.6860	-7.5842	-5.7710	-7.8351	-7.0543	-12.1050	-13.8118	-11.7210	10.7312	8.8202	-10.9812	-8.7983	-7.2845	-3.9341	-6.7652	-6.4523	-3.4631	-1.3935	-6.3881	1.8210	-6.3881	0.8045										
(H45)	0.9304	-4.9847	-2.6246	-5.2646	-8.0310	-13.4011	-12.8355	-4.9942	-2.2816	-5.7374	-10.4112	-14.5815	9.5136	-7.9574	-8.4772	6.4911	9.1196	-13.8518	-10.7039	4.9847	-6.1570	-8.9841	-2.6022	4.9372	-2.0258	9.7610	-0.8045										
(H50)	0.3149	-4.9843	-1.4141	-3.7946	-6.1124	-9.0276	-10.5374	-11.4211	-10.2486	-8.2043	-9.3510	-10.7412	7.7145	-6.0355	-6.2323	-11.6514	-12.5510	-11.1912	9.1836	1.3945	-6.3043	-6.2442	4.9372	-7.0258	1.8210	-6.3881	0.8045										
(H55)	0.1938	-5.7053	-0.6979	-3.7069	-10.9131	-15.2210	-14.8215	-10.5914	-16.3515	-15.6713	-13.7122	-11.3448	8.1164	-5.8319	-5.9879	-9.0642	-7.6919	8.8493	-10.1543	8.9283	-8.2766	-5.6641	-6.3881	5.7458	1.8210	-6.3881	0.8045										
(H60)	-1.5711	-10.8118	-2.4281	-8.6949	-8.8045	-9.2810	-10.4810	-11.3103	-11.7812	-7.5214	-8.6218	-8.1618	8.2843	-8.5912	-7.6419	8.0248	-5.9112	-6.7180	-8.0248	9.1765	-4.8712	-10.0110	-10.4810	-10.4810	1.8210	-6.3881	0.8045										
(E00)	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792									
(E05)	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792									
(E10)	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792								
(E15)	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792							
(E20)	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792						
(E25)	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792					
(E30)	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792				
(E35)	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792			
(E40)	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792		
(E45)	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792		
(E50)	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	
(E55)	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	
(E60)	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792
(E65)	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792
(E70)	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792
(E75)	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792
(E80)	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792
(E85)	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792
(E90)	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792
(E95)	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792
(E100)	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792	6.4792

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

