



Antenna Composite Gain Test Report

FCC ID	2ADZRBGW321
Equipment	BGW320-505
Brand Name	NOKIA
Model Name	BGW320-505
Applicant	Nokia Shanghai Bell Co. Ltd. No. 388, Ningqiao Rd. Pilot Free Trade Zone Shanghai , China 201206
Manufacturer	Nokia Shanghai Bell Co. Ltd. No. 388, Ningqiao Rd. Pilot Free Trade Zone Shanghai , China 201206
Sample Received	Jul. 06, 2022
Start Test Date	Jul. 07, 2022
Final Test Date	Jul. 08, 2022

Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory

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



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1. Operation Mode and Antenna Information

Antenna Position	RF Port		Brand Name	Model Name	Ant. Type	Connector	Modes of Operation
	2.4GHz	5GHz					
2G5GLAnt1	4	1	Airgain	N2430ARJYW Rev A-PK1-L-G1X165BUR2	PCB	I-PEX	2.4GHz, 5GHz UNII 1~2A
2G5GLAnt2	3	2	Airgain	N2430ARHYN Rev A-PK1-L-Y1X140BUR2	PCB	I-PEX	2.4GHz, 5GHz UNII 1~2A
2G5GLAnt3	2	3	Airgain	N2435ARHYN Rev A-PK1-L-B1X155BU	PCB	I-PEX	2.4GHz, 5GHz UNII 1~2A
2G5GLAnt4	1	4	Airgain	N2420ARHYW Rev A-PK1-L-A1X195BU	PCB	I-PEX	2.4GHz, 5GHz UNII 1~2A
5GH Ant1	-	1	Airgain	N5X20QSYN Rev A-PK1-L-B50UR2	PCB	I-PEX	5GHz UNII 2C~3
5GH Ant2	-	2	Airgain	N5X20QSYE Rev A-PK1-L-A55UR2	PCB	I-PEX	5GHz UNII 2C~3
5GH Ant3	-	3	Airgain	N5X20QSYN Rev A-PK1-L-Y1X190BU	PCB	I-PEX	5GHz UNII 2C~3
5GH Ant4	-	4	Airgain	N5X20QSYE Rev A-PK1-L-G1X160BU	PCB	I-PEX	5GHz UNII 2C~3

Note:

2.4GHz and 5GHz UNII 1, 2A Operation Mode (4TX/4RX)

2G5GLAnt1~4 can be used as transmitting/receiving antenna.

2G5GLAnt1~4 could transmit/receive simultaneously.

5GHz UNII 2C, 3 Operation Mode (4TX/4RX)

5G Ant1~5G Ant4 can be used as transmitting/receiving antenna.

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

2. Test Frequency

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

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



3. Testing Location

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

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
Radiated	05CH03-HY	Rex Liao	23.5-24.5 / 50-55	Jul. 07, 2022 ~ Jul. 08, 2022

Note:

Testing Site Information

Brand Name: TDK

Dimension: 11m*6m*6m

Characteristic: Fully Anechoic Chamber

4. Test Facility and Configuration

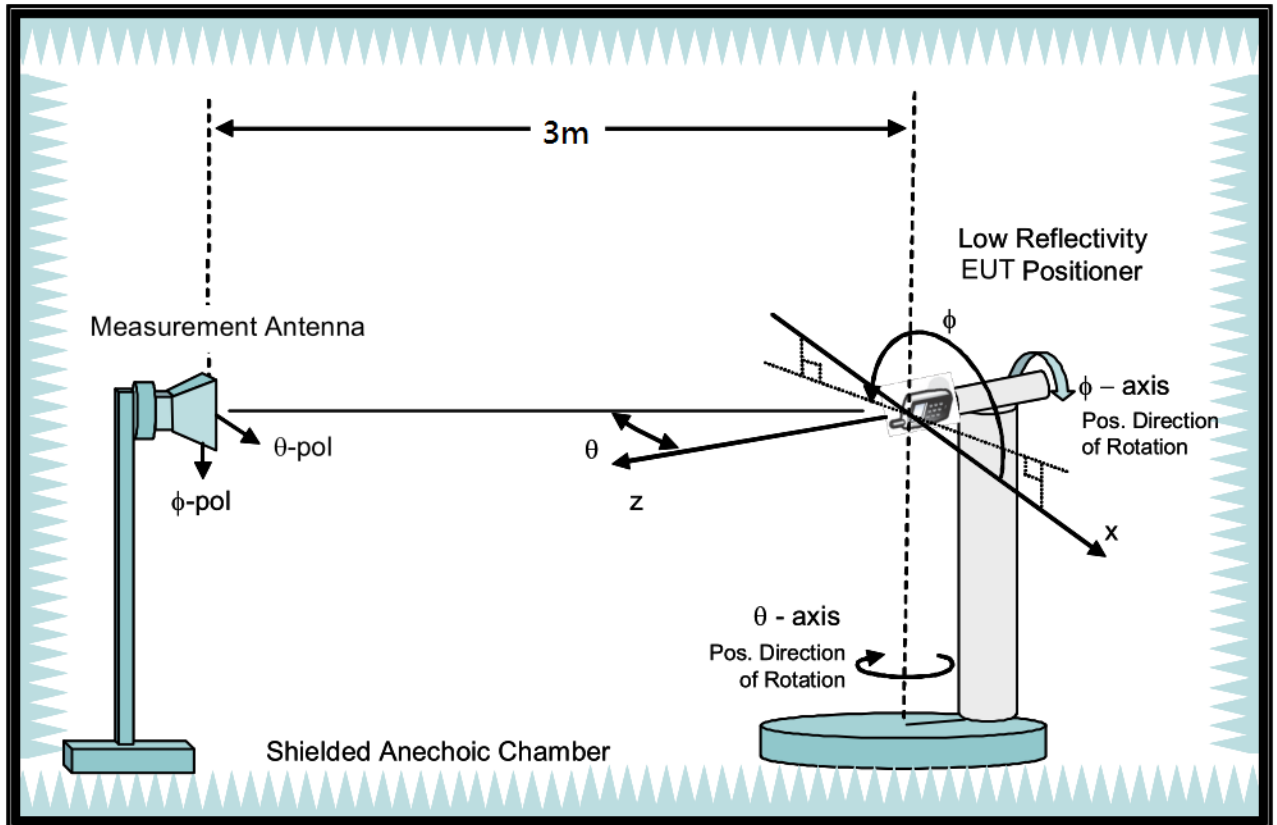
Test configuration: Reference to CITA OTA distributed-axes system configuration.

Chamber: Fully Anechoic Chamber.

Measurement antenna: Dual Polarization Horn antenna

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

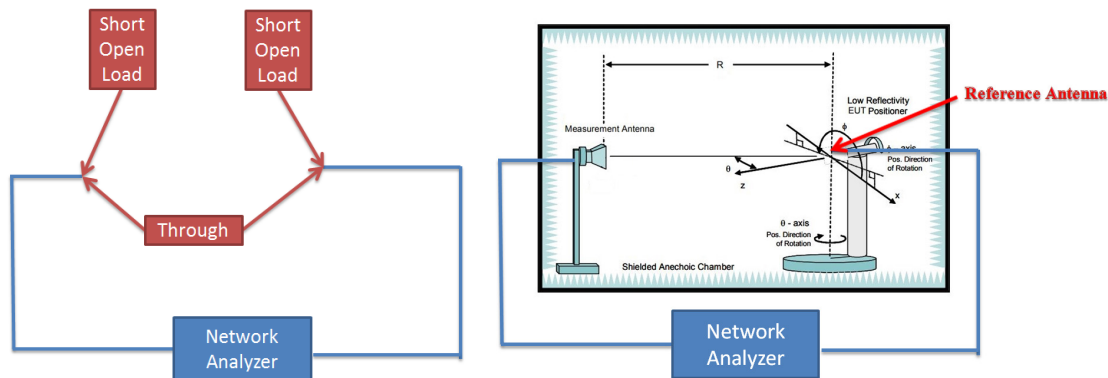
#Reference to CTIA “ctia-test-plan-for-wireless-device-over-the-air-performance-ver-3-7-1”



5. Reference Calibration

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

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



Frequency (MHz)	2400	2450	2500	5150	5200	5300	5600	5750	5800	5900	6000	6500	7000	7500
G reading (dB)	-31.4	-31.4	-31.3	-31.3	-31	-30.7	-30.1	-30.5	-30.5	-30.8	-31.3	-32.8	-34.4	-35.4
Reference gain (dBi)	10.2	10.4	10.6	12.4	12.8	13.4	13.4	13.3	13.3	13.1	13.2	12.3	11.7	11.1
Factor (dB)	41.34	41.55	41.68	43.24	43.56	43.68	43.79	43.91	43.99	44.43	44.49	45.24	46.12	46.31

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 10 degree from 0 to 350 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

For 2.4GHz/5GHz UNII 1, 2A

DG_1SS max value position

Frequency (Hz)	2.45G	5.2G	5.3G
Ant. 1 (dBi)	-5.26	-7.48	-4.24
Ant. 2 (dBi)	2.31	3.45	-1.2
Ant. 3 (dBi)	3.09	1.12	-0.08
Ant. 4 (dBi)	-10.99	-14.94	-5.11
DG [1SS] (dBi)	5.01	4.16	3.61
Polarization	Phi	Phi	Theta
$\Theta(^{\circ})$	20	30	30
$\Phi(^{\circ})$	350	180	220

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

DG_1SS max value position calculation

Frequency (Hz)	2.45G	5.2G	5.3G
Ant. 1 [$10^{(G/20)}$]	$10^{(-5.26/20)}$	$10^{(-7.48/20)}$	$10^{(-4.24/20)}$
Ant. 2 [$10^{(G/20)}$]	$10^{(2.31/20)}$	$10^{(3.45/20)}$	$10^{(-1.2/20)}$
Ant. 3 [$10^{(G/20)}$]	$10^{(3.09/20)}$	$10^{(1.12/20)}$	$10^{(-0.08/20)}$
Ant. 4 [$10^{(G/20)}$]	$10^{(-10.99/20)}$	$10^{(-14.94/20)}$	$10^{(-5.11/20)}$
Ant. 1 [$10^{(G/20)}$] value	0.546	0.423	0.614
Ant. 2 [$10^{(G/20)}$] value	1.305	1.488	0.871
Ant. 3 [$10^{(G/20)}$] value	1.427	1.138	0.991
Ant. 4 [$10^{(G/20)}$] value	0.282	0.179	0.555
Sum All Antenna [Amax]	3.56	3.227	3.031
DG [$10 \cdot \log(A_{max}^2/N_{ant})$]	5.01	4.16	3.61

Note:

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

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



For 5GHz UNII 2C, 3

DG_1SS max value position

Frequency (Hz)	5.6G	5.785G
Ant. 1 (dBi)	-2.19	-4.78
Ant. 2 (dBi)	-1.07	0.9
Ant. 3 (dBi)	-3.31	1.01
Ant. 4 (dBi)	-0.48	-7.19
DG [1SS] (dBi)	4.32	4.21
Polarization	Theta	Theta
Θ (°)	50	50
Φ (°)	320	130

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

DG_1SS max value position calculation

Frequency (Hz)	5.6G	5.785G
Ant. 1 [10 ^{^(G/20)}]	10 ^{^(-2.19/20)}	10 ^{^(-4.78/20)}
Ant. 2 [10 ^{^(G/20)}]	10 ^{^(-1.07/20)}	10 ^{^(0.9/20)}
Ant. 3 [10 ^{^(G/20)}]	10 ^{^(-3.31/20)}	10 ^{^(1.01/20)}
Ant. 4 [10 ^{^(G/20)}]	10 ^{^(-0.48/20)}	10 ^{^(-7.19/20)}
Ant. 1 [10 ^{^(G/20)}] value	0.777	0.577
Ant. 2 [10 ^{^(G/20)}] value	0.884	1.109
Ant. 3 [10 ^{^(G/20)}] value	0.683	1.123
Ant. 4 [10 ^{^(G/20)}] value	0.946	0.437
Sum All Antenna [Amax]	3.291	3.246
DG [10*log(Amax ² /Nant)]	4.32	4.21

Note:

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

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



8. Summary of Test Result

For 2.4GHz/5GHz UNII 1, 2A

Frequency (Hz)	2.45G	5.2G	5.3G
Ant. 1 Max Gain (dBi)	2.7	2.45	2.78
Ant. 2 Max Gain (dBi)	4.27	3.45	2.83
Ant. 3 Max Gain (dBi)	3.57	2.34	2.4
Ant. 4 Max Gain (dBi)	2.86	2.92	3.38
Ant. 1 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/80/30	Theta/90/200	Theta/90/200
Ant. 2 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Phi/110/150	Phi/30/180	Theta/40/80
Ant. 3 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Phi/40/350	Theta/40/250	Theta/70/280
Ant. 4 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/50/10	Theta/120/260	Theta/120/260
Max Gain (dBi)	4.27	3.45	3.38
DG [1SS] (dBi)	5.01	4.16	3.61
DG [2SS] (dBi)	4.27	3.45	3.38
DG [4SS] (dBi)	4.27	3.45	3.38

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.
4. Directional Gain (4SS) = Directional Gain (1SS) – 6dB. If directional gain is less than max gain, use max gain as directional gain.



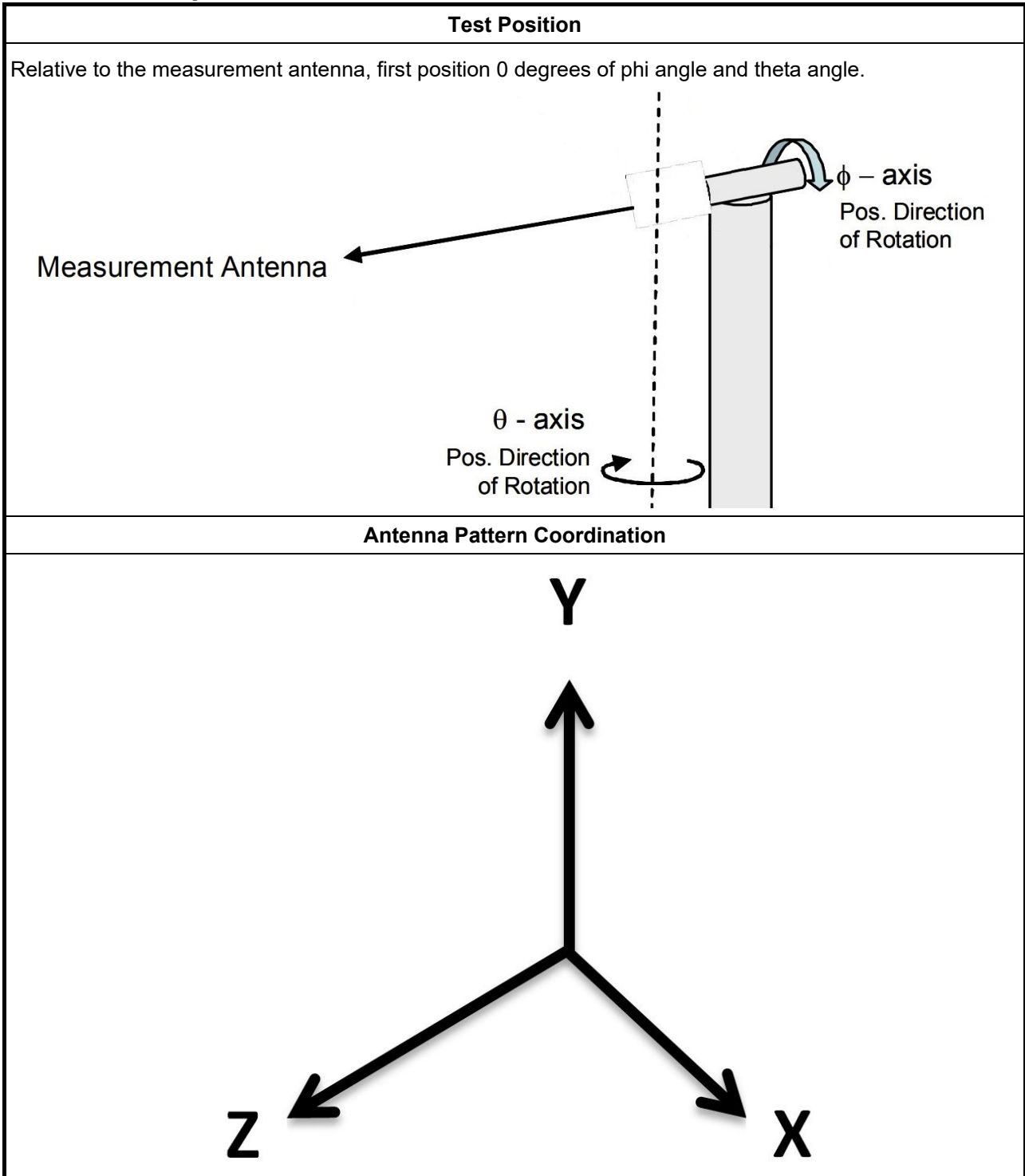
For 5GHz UNII 2C, 3

Frequency (Hz)	5.6G	5.785G
Ant. 1 Max Gain (dBi)	2.16	2.63
Ant. 2 Max Gain (dBi)	2.5	3.69
Ant. 3 Max Gain (dBi)	3.24	2.05
Ant. 4 Max Gain (dBi)	2.18	2.44
Ant. 1 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Phi/60/200	Phi/50/220
Ant. 2 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Theta/80/320	Theta/90/300
Ant. 3 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Phi/50/70	Phi/50/70
Ant. 4 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Theta/80/240	Theta/80/280
Max Gain (dBi)	3.24	3.69
DG [1SS] (dBi)	4.32	4.21
DG [2SS] (dBi)	3.24	3.69
DG [4SS] (dBi)	3.24	3.69

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.
4. Directional Gain (4SS) = Directional Gain (1SS) – 6dB. If directional gain is less than max gain, use max gain as directional gain.

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-1292	1GHz~18GHz	Aug. 04, 2021	Aug. 03, 2022
Dual Polarization Horn Antenna	Sporton	S0209DP	S0209DP-001	2GHz~9GHz	N.C.R.	N.C.R.
ENA Series Network Analyzer	AGILENT	E5071C	MY46419201	100kHz~8.5GHz	Feb. 21, 2022	Feb. 20, 2023
VNA Calibration Kit	TS RF	TS85033E-F	-	DC~9GHz	N.C.R.	N.C.R.
Multi-axis positioner	Sporton	MAPS01	MAPS01-001	Theta / Phi axis	N.C.R.	N.C.R.
Test Software	SPORTON	SENSE-RDG	V1.0.8	-	N.C.R.	N.C.R.

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

NCR means Non-Calibration required.



11. Test Results

Please refer to the appendix.

Appendix A – Radiated Composite Gain of 2.4GHz, 5GHz U-NII 1 and U-NII 2A.....Page 16
Appendix B – Radiated Composite Gain of 5GHz U-NII 2C and U-NII 3.....Page 24
Appendix C – Antenna Pattern of 2.4GHz, 5GHz U-NII 1 and U-NII 2A.....Page 29
Appendix D – Antenna Pattern of 5GHz U-NII 2C and U-NII 3..... Page 34
Appendix E – Test Photos..... Page 38



Freq(Hz)	2.45G	5.2G	5.3G
Ant. 1 Max Gain (dBi)	2.7	2.45	2.78
Ant. 2 Max Gain (dBi)	4.27	3.45	2.83
Ant. 3 Max Gain (dBi)	3.57	2.34	2.4
Ant. 4 Max Gain (dBi)	2.86	2.92	3.38
Ant. 1 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Theta/80/30	Theta/90/200	Theta/90/200
Ant. 2 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Phi/110/150	Phi/30/180	Theta/40/80
Ant. 3 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Phi/40/350	Theta/40/250	Theta/70/280
Ant. 4 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Theta/50/10	Theta/120/260	Theta/120/260
Max Gain (dBi)	4.27	3.45	3.38
DG [1SS] (dBi)	5.01	4.16	3.61
DG [2SS] (dBi)	4.27	3.45	3.38
DG [4SS] (dBi)	4.27	3.45	3.38



Radiated Composite Gain Data of 2.4GHz, 5GHz U-NII 1 and U-NII 2A

Appendix A

DG 1SS Result

Freq(Hz)	2.45GPol.	Phi-	Phi+	Phi+	Phi+	Phi+	Phi+	Phi+	Phi+	Phi+	Phi+	Phi+	Phi+	Phi+	Phi+	Phi+	Phi+	Phi+	
DG(dB)	Phi(0)/Phi(10)	Phi(20)/Phi(30)	Phi(40)/Phi(50)	Phi(60)/Phi(70)	Phi(80)/Phi(90)	Phi(100)/Phi(110)	Phi(120)/Phi(130)	Phi(140)/Phi(150)	Phi(160)/Phi(170)	Phi(180)/Phi(190)	Phi(200)/Phi(210)	Phi(220)/Phi(230)	Phi(240)/Phi(250)	Phi(260)/Phi(270)	Phi(280)/Phi(290)	Phi(300)/Phi(310)	Phi(320)/Phi(330)	Phi(340)/Phi(350)	
4.49434	3.992/61	3.992/61	3.992/61	3.992/61	3.992/61	3.992/61	3.992/61	3.992/61	3.992/61	3.992/61	3.992/61	3.992/61	3.992/61	3.992/61	3.992/61	3.992/61	3.992/61	3.992/61	3.992/61
4.683/95	3.32/63	2.09/32	-1.36/-3.41	-5.17/-4.45	-2.18/-0.79	0.58/1.07	1.52/2.44	2.94/3.33	3.71/3.14	3.15/2.43	1.47/0.23	-1.32/-3.37	-3.91/-2.45	-1.38/-0.03	1.27/2.15	3.06/3.99	4.54/4.67	4.54/4.67	4.54/4.67
4.984/35	3.67/2.78	1.91/0.05	-1.64/-3.77	-6.67/-7.13	-5.39/-3.28	-2.14/-0.52	0.59/1.28	2.16/3.05	2.82/2.84	2.71/2.29	1.77/0.07	-0.74/-3.04	-4.43/-2.93	-0.70/0.8	2.13/2.88	3.41/4.28	4.68/5.01	4.68/5.01	4.68/5.01
4.773/93	3.08/2.28	0.71/-1.32	-2.86/-3.58	-4.24/-5.54	-2.62/3.32	-4.07/-2.41	-0.84/1.26	2.62/3.32	3.46/3.35	2.81/2.22	1.80/0.76	-0.06/-2.04	-3.85/-3.21	-0.48/1.33	2.56/3.4	3.92/4.09	4.69/4.81	4.69/4.81	4.69/4.81
4.023/29	2.69/1.57	0.05/1.5	-2.29/-3.23	-4.26/-6.07	-7.36/-6.05	-3.71/-1.74	-0.49/0.53	1.46/2.7	2.82/2.72	1.94/2.12	1.72/1.2	0.92/-2.09	-4.88/-3.79	-1.71/0.34	2.23/2.1	3.86/4.23	4.34/2.26	4.34/2.26	4.34/2.26
4.274/22	2.18/1.48	0.1/-1.57	-2.52/-3.73	-5.2/-5.73	-5.38/-4.1	-2.73/-0.93	-0.66/0.05	1.52/2.46	2.06/1.9	1.61/2.49	2.18/2.12	0.77/-1.71	-3.68/-5.6	-2.62/-0.16	1.86/2.71	3.16/3.69	3.33/2.93	3.33/2.93	3.33/2.93
1.81/1.69	1.66/1.33	-1.32/-1.91	-2.41/-3.48	-5.31/-7.4	-6.67/4.66	-3.5/-1.35	-0.20/0.52	-0.20/0.52	1.21/2.28	0.91/1.39	1.51/1.11	0.18/-3.37	-5.07/-1.53	0.84/2.25	3.02/2.49	2.85/1.74	2.85/1.74	2.85/1.74	2.85/1.74
1.46/2.14	1.34/0.18	-1.1/-1.89	-1.83/-2.56	-4.17/-8.33	-11.23/-7.18	-3.45/-1	0.13/-0.5	-1.96/-0.67	-0.55/-0.62	-0.54/0.33	0.84/1	1.07/-1.1	-6.16/-8.71	-5.97/4.52	-2.06/-0.02	1.38/2.1	1.55/1.16	1.55/1.16	1.55/1.16
0.39/0.95	0.87/-1.59	-2.47/-2.58	-3.14/-4.7	-6.04/-8.19	-8.98/-5.69	-2.18/-0.14	0.35/-0.52	-1.88/-1.35	-1.93/-2.8	-2.3/-1.66	-0.63/0.09	-1.3/-3.59	-6.61/-6.06	-3.93/-2.47	-1.25/-0.87	0.11/0.38	1.18/0.76	1.18/0.76	1.18/0.76
0.03/0.11	0.66/-1.54	-3.67/-3.19	-3.86/-5.77	-0.17/-2.05	-5.95/-5.46	-5.25/-2.5	-0.09/0.82	-3.45/-4.32	-3.47/-1.61	-1.44/-1.85	-4.6/-5.9	-0.32/-0.25	-0.41/1.79	-4.44/-1.79	0.01/1.83	1.56/0.54	1.56/0.54	1.56/0.54	1.56/0.54
-0.85/-0.69	0/-3.13	-4.53/-3.29	-3.04/-4.07	-4.3/-4.11	-3.95/-0.94	1.27/1.64	1.47/2.03	2.22/0.78	-0.43/-1.9	-2.6/-2.72	-1.56/-1.69	-2.46/-4.12	-5.8/-8.09	-5.55/-2.68	-1.24/-0.96	-0.58/0.39	0.97/0.9	0.97/0.9	0.97/0.9
-1.59/-2.54	-1.25/-1.8	-3.2/-4.24	-4.23/-4.02	-3.6/-3.54	-1.6/-0.24	1.37/2.23	2.67/3.05	3.06/1.97	0.95/-0.77	-3.68/-4.52	-3.19/-2.77	-3.44/-3.98	-4.79/-5.45	-5.84/-4.08	-0.94/0.56	0.88/1.73	-0.55/-0.5	-0.55/-0.5	-0.55/-0.5
-1.46/-3.41	-4.61/4.68	-3.84/2.08	-1.36/-1.09	-1.76/-2.76	-2.21/-1.29	0.15/1.56	1.94/1.71	2.29/1.85	-0.1/-3.46	-6.95/6.35	-4.97/4.8	-5.18/3.72	-1.54/1.04	-4.13/4.98	-1.54/1.04	0.22/1.24	-0.13/0.57	-0.13/0.57	-0.13/0.57
-1.83/-2.52	-2.26/-2.65	-1.82/-1.39	-1.28/-1.18	-1.71/-3.12	-3.47/-2.69	-1.16/-0.23	0.46/0.76	1.62/1.35	0.42/-1.05	-2.61/-3.4	-3.95/-4.95	-4.85/-3.22	-2.25/-2.26	-3.47/-3.91	-1.27/1.28	2.65/1.68	-0.3/-2.01	-0.3/-2.01	-0.3/-2.01
-3.57/-2.92	-2.06/-2.44	-2.17/-1.16	-1.1/-1.74	-2.42/-3.43	-3.37/-2.29	-0.89/0.73	1.75/2.24	2.51/2.45	2.1/0.6	-2.34/-3.8	-4.53/-4.24	-3.48/-3.04	-2.96/-4.36	-4.73/-4.49	-2.5/1.9	1.45/0.6	-0.58/-2.8	-0.58/-2.8	-0.58/-2.8
-3.28/-3.54	-3.41/-4.03	-4.44/-3.83	-3.91/-4.63	-5.16/-5.84	-4.73/-3.24	-0.95/0.81	1.62/1.75	1.27/0.43	0.17/-1	-2.09/-2.98	-3.93/-4.03	-3.68/-3.69	-4.36/-5.44	-7.24/-7.57	-4/-2.58	-1.6/-1.44	-2.05/-2.82	-2.05/-2.82	-2.05/-2.82
-3.49/-4.03	-4.86/-5.33	-5.97/-5.56	-4.68/-4.12	-4.43/-4.06	-2.77/-1.52	-0.71/0.01	0.18/0.18	1.02/1.32	-4.49/-4.4	-5.86/-5.94	-6/-5.87	-6.22/-6.71	-7.17/-7.37	-5.77/-3.97	-2.94/-2.64	-2.94/-2.64	-2.94/-2.64	-2.94/-2.64	-2.94/-2.64
-5.68/-5.82	-6.37/-6.45	-6.08/-5.75	-5.33/-4.95	-4.53/-5.01	-6.54/-6.45	-4.87/-4.66	-5.96/-6.79	-7.65/-6.94	-6.75/-7.34	-7.81/-8.29	-8.27/-7.8	-8.42/-8.69	-8.4/-8.71	-8.59/-8.19	-6.47/-6.61	-5.6/-5.37	-5.33/-5.28	-5.33/-5.28	-5.33/-5.28
-6.89/-6.61	-6.71/-6.94	-7.01/-7.06	-7.53/-7.81	-8.55/-9.11	-8.62/-10.43	-10.66/-10.45	-9.58/-8.3	-7.99/-7.67	-7.52/-7.06	-6.51/-6.8	-7.24/-7.21	-7.64/-8.03	-7.76/-7.66	-6.99/-6.36	-5.82/-5.98	-6.25/-6.82	-7.14/-7.39	-7.14/-7.39	-7.14/-7.39



Radiated Composite Gain Data of 2.4GHz, 5GHz U-NII 1 and U-NII 2A

Appendix A

Θ(60°)	-3.79/-1.11	1.91/2.08	2.08/2.31	2.61/2.09	2.11/1.14	-0.24/-1.08	-1.45/-1.91	-0.88/-0.41	-1.03/-2.05	-1.72/-3.26	-1.37/1.55	0.49/0.34	1.02/0.36	-0.47/1.16	1.95/2.19	1.17/-0.18	-1.82/-1.93	-0.51/-0.95
Θ(70°)	-0.71/-0.02	2.42/2.83	2.73/3.07	3.48/2.77	2.25/1.35	1.14/0.04	-1.17/-1.15	0.93/0.11	0.58/-0.43	0-1.57	0.63/1.19	-0.48/1.69	2.29/-1.08	-1.17/0.6	3.18/3.48	2.13/0.28	-0.54/-0.86	0.02/1.18
Θ(80°)	0.62/-0.32	1.72/2.33	2.29/2.42	2.37/1.94	1.39/0.01	-0.08/-0.4	0.75/-0.54	-0.43/-1.3	0.86/0.42	1.86/-0.7	-0.34/2.25	1.09/2.71	2.8/0.37	-0.46/0.21	2.52/2.29	2.18/0.57	0.9/0.82	1.67/2.43
Θ(90°)	0.08/0.5	1.18/1.31	1.56/2.75	2.83/2.42	1.53/0.69	0.52/0.8	0.13/-0.86	1.1/-0.11	1.51/0.79	0.93/0.61	1.22/2.59	2.21/3.48	2.92/1.47	0.02/0.01	1.37/1.84	0.63/-1.15	-1.42/-0.15	0.83/1.21
Θ(100°)	-0.06/-0.75	0.59/0.57	0.5/-0.6	-1.55/0.16	-0.03/-0.32	-0.4/-0.35	-1.03/-1.56	-0.11/-0.53	2.49/1.91	1.45/1.8	0.4/1.49	2.19/0.25	-0.66/-0.63	0.76/-2.24	-4.44/2.59	-3.5/-3.4	-0.95/-1.01	1.03/-1.63
Θ(110°)	-0.06/-0.65	-0.8/-1.28	-0.39/-0.71	-1.07/-0.96	-0.91/-0.96	-0.52/-1.16	-2.25/-1.79	0.47/-1.1	1.31/-0.35	1.14/0.74	-0.67/0.85	2.01/1.8	-1.52/1.17	0.63/-3.13	-0.72/-1.9	-1.09/-2.52	-4.49/-4.63	0.51/-1.11
Θ(120°)	-1.81/-2.15	-2.57/-2.5	-3.15/-2.43	-3.84/-3.43	-2.42/-1.59	-1.9/-3.13	-2.13/-1.12	-0.88/-0.35	1.07/-0.73	0.89/-1.06	-3.6/-1.6	-0.76/-0.28	-2.86/-0.81	1.36/-5.19	-0.83/-2.11	-2.43/-3.96	-6.5/-2.01	-1.68/-2.19
Θ(130°)	-3.74/-4.11	-5/-5.43	-4.17/-4.42	-4.69/-4.34	-2.21/-1.26	-1.44/-1.18	-0.35/-1.57	-2.34/-3.34	-3.36/-4.02	-3.56/-3.38	-4.56/-6.2	-1.36/-5.79	-6.81/-0.22	0.18/-4.26	-1.56/-2.46	-2.19/-7.11	-6.08/-3.37	-3.03/-3.22
Θ(140°)	-3.55/-4.3	-5.52/-8.19	-8.63/-6.79	-4.85/-3.19	-3.11/-2	-0.85/-0.98	0.29/1.62	1.7/0	-1.9/-3.12	-4.32/-4.19	-5.44/-4.51	-4.53/-4.93	-1.32/0.72	-0.6/-6.08	-4.54/-2.78	-3.64/-4.45	-7.64/-6.98	-9/-6.43
Θ(150°)	-4.89/-5.02	-7.07/-9.93	-10.32/-6.2	-3.98/-2.84	-2.33/-3.06	-3.18/-3.7	-3/-2.39	-2.99/-2.24	-3.32/-5.55	-5.51/-3.27	-2.77/-3.8	-5.54/-5.25	-4.01/-2.03	-2.21/-2.92	-3.6/-3.21	-4.26/-4.51	-6.25/-6.68	-7.82/-6.07
Θ(160°)	-9.38/-7.75	-5.96/-4.8	-5.03/-5.01	-5.7/-6.03	-4.41/-4.15	-4.34/-4.36	-4.31/-5.31	-5.62/-4	-2.93/-2.48	-2.05/-3.02	-4.53/-6.6	-9.02/-8.02	-7.71/-5.95	-6.69/-8.33	-8.14/-5.97	-6.03/-7.45	-8.45/-8.24	-7.84/-8
Θ(170°)	-9.32/-9.5	-9.37/-7.89	-7.95/-7.58	-7.12/-6.37	-5.57/-5.34	-4.63/-4.02	-3.71/-4.66	-5.34/-7.56	-9.25/-10.47	-9.46/-7.87	-6.27/-5.42	-5.09/-4.25	-4.16/-5.44	-6.81/-6.91	-6.26/-5.28	-4.76/-5	-6.99/-10.13	-12.29/-11.29
Θ(180°)	-6.15/-6.13	-5.74/-6.4	-7.97/-7.38	-7.3/-8.12	-9.02/-9.17	-10.13/-11.21	-10.18/-9.68	-9.48/-8.59	-7.8/-6.92	-6.14/-5.35	-4.67/-4.12	-4.53/-5.38	-6.31/-6.62	-6.63/-6.46	-6.85/-6.97	-7.54/-7.3	-7/7.22	-7.21/-6.41



Radiated Composite Gain Data of 2.4GHz, 5GHz U-NII 1 and U-NII 2A

Appendix A

Gain Result

Freq(Hz)	2.4GPol.	PhiAnt. 1	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	
Gain	Phi(0°)Phi(10°)	Phi(20°)Phi(30°)	Phi(40°)Phi(50°)	Phi(60°)Phi(70°)	Phi(80°)Phi(90°)	Phi(100°)Phi(110°)	Phi(120°)Phi(130°)	Phi(140°)Phi(150°)	Phi(160°)Phi(170°)	Phi(180°)Phi(190°)	Phi(200°)Phi(210°)	Phi(220°)Phi(230°)	Phi(240°)Phi(250°)	Phi(260°)Phi(270°)	Phi(280°)Phi(290°)	Phi(300°)Phi(310°)	Phi(320°)Phi(330°)	Phi(340°)Phi(350°)			
Theta(0°)	-4.93/4.03	-2.57/3.45	-2.66/3.59	-4.61/5.49	-6.29/7.71	-8.86/10.51	-13.04/14.64	-12.92/10.25	-7.94/6.48	-5.35/4.5	-4.2/5.31	-4.55/4.93	-5.83/6.28	-8.04/10.36	-9.61/17.41	-19/16.53	-13.07/9.86	-7.34/5.46			
Theta(10°)	-4.78/4.62	-5.04/3.4	-3.01/3.74	-4.8/6.49	-8.9/11.12	-12.38/13.69	-14.81/18.24	-17.12/10.21	-7.08/5.32	-5.53/5.06	-3.4/3.52	-4.31/4.27	-6.63/7.87	-7.54/7.2	-9.31/11.4	-10.94/11.6	-10.36/8.93	-7.04/5.54			
Theta(20°)	-4.84/4.48	-4.73/4.88	-6.34/5.92	-8.89/13.26	-18.55/17.52	-14.13/13.14	-16.17/17.5	-15.71/12.72	-9.61/4.12	-5.02/4.59	-3.72/3.85	-4.14/4.59	-5.5/6.47	-8.05/8.2	-7.32/7.87	-7.99/8.11	-8/7.59	-6.16/5.26			
Theta(30°)	-5.04/7.05	-7.34/7.49	-8.99/13.08	-17.59/16.07	-12.68/11.45	-12.27/14.21	-14.6/18.33	-16.47/9.21	-5.41/3.62	-4.62/3.8	-5.71/5.54	-5.58/5.18	-6.68/6.22	-5.79/6.49	-6.07/5.75						
Theta(40°)	-7.43/9.55	-13.47/13.89	-15.34/13.17	-10.3/9.17	-9.57/11.73	-16.27/18.79	-18.24/16.75	-16.2/14.41	-9.66/5.86	-6.13/6.42	-7.21/7.01	-5.8/5.35	-6.85/6.03	-5.78/5.1	-5.01/6.62	-6.46/7.56	-7.66/5.64	-6.93/7.19			
Theta(50°)	-9.87/16.18	-15.36/12.27	-13.35/12.01	-9.69/9.35	-9.81/11.75	-18.42/18.83	-18.28/12.48	-14.52/17.29	-8.52/6.17	-6.65/7.22	-7/4.91	-3.55/3.14	-5.88/8.41	-7.78/5.43	-3.8/3.58	-4.2/5.74	-9.39/8.08	-8.64/10.05			
Theta(60°)	-12.85/18.22	-17.07/13.43	-11.8/11.05	-10.82/10.16	-9.33/11.42	-14.99/17.93	-13.29/7.22	-10.79/7.35	-6.72/11.62	-5.24/5.87	-8.69/7.12	-18.73/14.44	-9.08/4.82	-3.08/3.17	-5.54/9.8						
Theta(70°)	-15.84/14.77	-18.88/15.07	-14.07/14.87	-14.48/11.94	-10.47/15.17	-17.66/13.82	-7.33/4.36	-4.97/11.12	-17.44/10.72	-9.92/12.62	-14.5/10.85	-8.73/8.09	-8.05/8.9	-10.95/15.55	-18.97/19.22	-12.81/7.81	-6.71/7.23	-9.43/10.96			
Theta(80°)	-18.6/13.98	-14.62/19.28	-17.8/14.44	-16.31/17.64	-16.81/18.23	-17.43/9.35	-5.67/4.03	-5.07/9.75	-19.02/12.79	-11.64/18.7	-18.53/12.51	-9.76/10.09	-13.76/15.49	-12.56/9.7	-9.06/10.25	-12.18/16.28	-12.22/9.16	-8.48/14.53			
Theta(90°)	-18.92/10.63	-9.05/15.78	-17.99/12.81	-12.5/18.56	-18.42/18.34	-16.81/9.5	-4.92/3.52	-12.97/18.08	-18.36/17.18	-12.97/18.08	-11.4/11.47	-18.55/18.13	-13.55/13.66	-11.35/8.75	-8.99/15.62	-18.08/9.15	-8.61/13.88				
Theta(100°)	-17.93/15.13	-8.66/15.18	-19.11/13.88	-9.88/12.84	-18.73/18.12	-15.29/9.04	-6.05/5.25	-5.51/5.61	-6.2/11.29	-11.85/11.22	-12.39/18.97	-10.19/9.22	-9.3/10.24	-9.59/12.97	-16.38/13.31	-12.25/16.93	-17.88/10.6	-7.86/8.65			
Theta(110°)	-15.98/16.6	-8.32/7.6	-10.23/15.75	-18.29/19.12	-18.62/17.29	-11.87/7.97	-5.28/4.41	-3.73/5.44	-4.33/6.28	-6.94/10.05	-19.29/12.93	-6.84/6.02	-5.93/5.77	-6.5/9.38	-15.84/18.04	-15.7/14.21	-9.86/12.98	-9.79/9.84			
Theta(120°)	-9.74/16.3	-15.37/11.91	-9.76/10.74	-15.74/19.04	-18.12/18.94	-15.56/11	-17.43/15.08	-3.84/3.32	-5.69/4.48	-5.69/4.48	-10.66/10.06	-4.04/3.9	-4.71/6.85	-18.43/12.9	-7.08/7.18	-9.25/9.1					
Theta(130°)	-8.82/7.92	-7.89/8.2	-7.52/5.82	-5.51/6.49	-7.96/10.31	-9.67/8.25	-7.58/8.01	-7.67/9.14	-8.85/8.55	-13.5/15	-14.11/13.95	-9.37/7.04	-5.72/4.74	-5.02/6.73	-10.05/15.33	-11.94/5.66	-3.9/6.24	-11.89/17.07			
Theta(140°)	-12.52/10.62	-9.66/11.1	-7.87/5.07	-3.81/3.84	-4.67/5.97	-6.84/7.09	-6.72/4.81	-3.99/3.75	-3.68/3.63	-4.53/7.52	-14.8/18.93	-13.09/8.57	-5.98/4.51	-4.81/7.8	-11.66/15.44	-7.57/10.09	-1.89/5.04	-8.82/15			
Theta(150°)	-9.82/9.96	-11.31/12.88	-12.49/9.78	-7.42/6.22	-5.94/5.44	-12.67/13.32	-11.28/10.1	-7.42/6.9	-4.64/6.8	-11.76/13.77	-4.58/13.4	-4.64/6.8	-8.55/5	-4.77/5.92	-4.81/7.18	-9.79/10.75					
Theta(160°)	-7.83/6.85	-6.47/6.46	-6.63/6.3	-5.19/3.78	-2.63/1.96	-1.63/2.21	-3.17/4.37	-5.85/7.56	-9.8/10.62	-13.99/18.21	-13.7/10.17	-8.13/6.61	-5.8/5.58	-6.35/8.19	-12.5/18.46	-13.02/9.17	-8.27/8.73	-10.03/8.86			
Theta(170°)	-7.32/3.38	-6.09/9.51	-5.74/5.8	-5/5.2	-4.6/4.08	-3.96/4.54	-5.76/7.3	-9.12/13.99	-17.95/17.48	-19.06/19.44	-19.21/17.68	-15.02/13.05	-12.75/12.93	-14.65/18.33	-17.69/18.89	-16.46/14.18	-12.02/10.4	-9.62/25.5			
Theta(180°)	-6.91/6.46	-7.48/7.76	-9.21/9.89	-10.63/11.18	-11.96/12.81	-14.09/15.5	-18.22/19.08	-18.08/18.05	-17.49/17.4	-18.84/19.42	-16.96/17.23	-18.33/19.05	-18.53/18.65	-16.09/13.41	-11.71/10.95	-10.41/10.53	-10.09/9.91	-9.43/7.88			
Freq(Hz)	2.4GPol.	ThetaAnt. 1	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	
Gain	Phi(0°)Phi(10°)	Phi(20°)Phi(30°)	Phi(40°)Phi(50°)	Phi(60°)Phi(70°)	Phi(80°)Phi(90°)	Phi(100°)Phi(110°)	Phi(120°)Phi(130°)	Phi(140°)Phi(150°)	Phi(160°)Phi(170°)	Phi(180°)Phi(190°)	Phi(200°)Phi(210°)	Phi(220°)Phi(230°)	Phi(240°)Phi(250°)	Phi(260°)Phi(270°)	Phi(280°)Phi(290°)	Phi(300°)Phi(310°)	Phi(320°)Phi(330°)	Phi(340°)Phi(350°)			
Theta(0°)	-6.63/4.39	-15.86/15.53	-15.86/12.73	-10.04/7.68	-5.94/4.69	-3.85/3.47	-3.43/5.6	-4.2/4.77	-8.36/11.19	-5.98/4.12	-4.12/4.49	-12.96/10.68	-8.56/7.32	-4.12/4.9	-4.69/3.79	-3.08/5.23	-5.4/8.41				
Theta(10°)	-15.72/13.96	-12.15/9.99	-8.31/6.87	-5.59/4.39	-3.55/2.81	-1.9/1.67	-1.41/1.9	-1.7/2.19	-2.74/4.62	-6.73/6.42	-8.8/12.16	-13.89/12.57	-10.66/11.68	-9.21/11.1	-8.8/8.08	-6.72/7.11	-8.01/7.49	-12.52/16.65			
Theta(20°)	-7.92/7.24	-6.12/5.16	-4.27/3.47	-2.36/2.35	-2.46/3.03	-3.17/3.05	-2.58/2.05	-1.53/1.33	-1.4/1.84	-2.66/4.16	-18.89/12.94	-10.28/10.47	-10.16/11.52	-11.35/14.56	-18.99/12.94	-12.9/12.86	-13.21/14.78	-14.49/10.97			
Theta(30°)	-3.87/3.5	-2.89/1.73	-0.99/1	-1.52/2.47	-3.35/3.83	-4.15/4.28	-4.89/4.43	-3.27/2.91	-1.95/3.1	-5.28/5.71	-5.65/6.07	-7.53/6.76	-10.22/16.33	-18.64/11.94	-12.36/6.52	-8.14/8.28	-5.12/5.59				
Theta(40°)	-3.07/2.21	-1.45/0.21	0.73/0.48	-0.91/4.4	-1.25/0.88	-2.02/2.05	-2.62/2.34	-4.91/4.4	-2.96/2.35	-2.06/3.2	-3.72/4.53	-5.44/7.46	-10.26/11.98	-11.86/10.19	-11.61/4.58	-3.55/4.02	-4.06/3.94				
Theta(50°)	-3.25/2	-1.56/0.98	-0.9/0.75	-1.11/1.03	-0.88/2.07	-1.8/0.63	-0.44/1.6	-2.46/3.5	-4.73/4.87	-2.81/2.54	-3.18/3.26	-4.24/4.97	-6.73/9.01	-8.67/8.72	-8.77/6.86	-3.15/2.84	-1.56/1.04	-1.3/2.41			
Theta(60°)	-0.6/0.7	0.17/1.19	-0.7/1.06	-0.86/0.7	-1.49/1.98	-2.03/1.1	-0.31/0.33	-0.82/1.68	-4.63/5.03	-3.71/2.17	-2.2/2.77	-4.22/3.36	-5.03/6.57	-11.35/14	-11.5/5.74	-4.27/2.06	-0.59/0.86	0.74/0.9			
Theta(70°)	0.72/1.23	2.51/2.45	0.9/0.68	0.85/0.71	0.08/0.67	-1.51/1.7	-1.51/1.78	-0.96/0.35	-2.84/3.68	-2.58/2.51	-2.74/4.07	-6.09/3.79	-3.13/3.03	-4.6/6.8	-6.99/3.79	-3.13/3.03	-1.61/0.16	0.92/0.95			
Theta(80°)	-0.6/0.01	2.12/7	0.64/1.42	1.68/1.85	1.79/0.43	-0.43/0.96	0.28/0.8	1.09/1.31	-1.29/3.26	-2.4/1.73	-1.47/3.32	-1.71/1.97	-4.91/6.12	-7.71/5.06	-2.56/1.45	-0.27/1.02	-0.30/2.2	1.08/0.55			
Theta(90°)	-2.64/1.71	0.17/0.56	-1.78/1.05	-1.39/0.91	-0.02/0.06	-0.55/0.29	0.45/1.08	1.35/1.65	0.29/0.75	-1.01/1.11	-2.25/3.42	-4.38/5.91	-6.57/8.29	-7.18/5.24	-3.85/2.72	-1.39/0.52	-1.45/1.34	0.25/0.47			
Theta(100°)	-5.03/4.63	-2.34/1.04	-3.47/3.11	-2.47/2.66	-3.8/2.89	1.38/1.8	-2.47/2.66	1.38/1.8	-2.47/2.66	1.38/1.8	-2.47/2.66	1.38/1.8	-2.47/2.66	1.38/1.8	-2.47/2.66	1.38/1.8	-2.47/2.66	1.38/1.8	-2.47/2.66		
Theta(110°)	-3.92/4.03	-1.57/0.56	-2.98/3.63	-2.78/2.84	-3.41/5.99	-10.39/10.49	-4.81/2.26	-2.05/0.71	-1.33/3.18	-0.78/2.25	-2.35/5.49	-4.74/1.33	-2.94/2.38	-5.01/5.92	-4.54/3.6	-1.87/4.63	-9.21/4.82	-1.67/1.51			
Theta(120°)	-2.94/3.16	-1.34/0.01	-1.77/2.36	-0.81/2.58	-3.22/4.11	-4.96/4.5	-4.02/4.9	-4.28/1.97	-3.95/5.48	-3.37/6.02	-4.27/5.48	-4.91/7.74	-4.79/7.47	-17.05/7.66	-3.42/2.25	-0.37/2.41	-4.71/2.16	-1.13/1.21			
Theta(130°)	-3.69/3.19	-1.45/0.29	-1.31/3.55	-2.47/1.68	-2.1/2.05	-1.54/0.38	0.05/0.21	-0.05/1.59	-5.36/7.41	-1.52/5.68	-3.93/5.47	-9.16/4.69	-3.33/2.52	-4.94/8.85	-3.49/4.85	-3.33/2.52	-2.09/1.6	-2.35/4.18			
Theta(140°)	-7.2/4.85	-3.72/2.15	-1.7/2.62	-1.97/2.6	-1.76/1.01	-0.29/0.06	-0.33/1.12	-3.18/7.53	-13.69/7.76	-3.96/3.07	-3.59/6.68	-13.2/18.35	-10.05/9.04	-6.11/5.17	-6.23/9.34	-9.34/9.4	-2.79/2.32	-5.38/9.55			
Theta(150°)	-17.72/13.62	-11/9.28	-8.27/7.56	-8.89/6.06	-5.34/4.4	-3.68/4.54	-4.64/4.94	-7.9/4.97	-2.98/1.72	-2.17/3.48	-6.84/12.31	-19.02/12.42	-8.53/7.71	-7.82/9.6	-12.94/10.42	-7.36/6.37	-5.69/7.12	-10.19/17.65			
Theta(160°)	-15.15/16.27	-14.55/11.97	-10.6/10.43	-9.75/9.53	-3.19/3.09	-8.62/7.07	-5.37/4.21	-3.89/3.77	-3.94/3.3	-4.8/6.41	-6.2/10.49	-9.62/11.91	-11.49/9.5	-8.62/11.71	-13.23/10.73	-9.62/11.71	-13.23/10.73	-16.31/15.01			
Theta(170°)	-15.65/12.12	-8.9/7.45	-5.54/4.71	-4.02/3.51	-3.34/3.24	-3.56/4.29	-4.4/5.27	-5.84/6.79	-7.42/9.06	-10.77/11.62	-13.75/15.76	-16.24/14.99	-11.85/12.18	-13.63/12.33	-13.02/14.28	-16.93/18.94	-17.88/18.19	-18.32/17.61			
Theta(180°)	-1																				



Radiated Composite Gain Data of 2.4GHz, 5GHz U-NII 1 and U-NII 2A

Appendix A

θ (60°)	-7.73/-3.74	-1.39/-4.22	-6.63/-2.06	-3.11/-5.03	-3.52/-2.1	-1.9/-3.39	-5.67/-9.39	-6.39/-4.96	-5.37/-6.7	-6.24/-6.6	-2.81/-0.21	-0.78/-2.85	-2.44/-5.26	-14.62/-17.56	-11.26/-7.54	-5.15/-6.14	-15.06/-18.95	-8.01/-5.39
θ (70°)	-2.17/-0.7	0.93/-1.71	-5.07/-19	-0.52/-1.75	-1.01/-0.28	-0.11/-1.62	-4.74/-5.88	-3.48/-2.92	-3.03/-2.93	-3.65/-2.37	1.03/1.63	-1.58/-2.67	-2.81/-8.26	-17.3/-15.7	-8.3/-7.98	-5.74/-4.47	-5.85/-13.41	-6.54/-14.9
θ (80°)	-3.16/-1.98	-1.14/-1.38	-1.11/0.93	-1.68/-1.67	-0.17/0.35	0.72/0.38	0.52/-3.19	-1.09/-0.97	-0.17/0.35	0.72/0.38	0.47/1.2	-0.2/-0.57	-0.5/-8.84	-11.33/-9.98	-3.72/-5.04	-7.28/-4.18	-5.17/-6.78	-5.37/-4.52
θ (90°)	-3.46/-1.53	-0.06/-1.72	-2.29/1.91	0.88/0.17	0.34/0.7	1.33/1.77	1.26/-1.97	-0.41/-0.23	0.71/0.02	-0.45/0.19	2.78/2.19	0.43/-1.82	-1.38/-5.48	-9.45/-7.63	-5.48/-5.41	-7.4/-7.74	-6.73/-10.26	-4.44/-3.93
θ (100°)	-3.93/-3.61	-1.35/-1.21	-1.74/-0.94	-0.91/0.41	0.85/1.82	2.07/2.02	0.61/-0.34	-0.37/-0.1	1.01/0.76	-0.79/0.26	1.80/1.3	-0.53/-4.53	-5.2/-8.91	-7.97/-13.69	-9.91/-9.04	-10.1/-8.57	-4.54/-6.23	-5.1/-7.41
θ (110°)	-4.33/-5.13	-2.75/-3.19	-2.31/-0.62	-0.99/-0.87	-0.04/0.56	1.63/1.36	0.05/-0.12	-0.29/0.44	2.21/0.17	1.21/0.17	0.66/-0.96	-1.78/-6.09	-2.81/-10.5	-11.51/-14.05	-12.05/-16.85	-13.78/-11.86	-11.34/-11.58	-7.61/-9.2
θ (120°)	-5.51/-5.58	-3.46/-4.77	-4.55/-3.31	-1.11/-1.27	-1.66/-0.24	1.01/0.44	1.14/1.55	0.47/0.81	0.38/0.75	-1.79/-3.15	-2.4/-4.18	-9.02/-19.27	-18.37/-17.97	-18.81/-15.72	-17.11/-12.33	-18.75/-14.82	-11.41/-7.57	-7.01/-8.64
θ (130°)	-5.74/-9.08	-7.03/-6.73	-7.67/-6.97	-4.03/-2.38	-1.02/-0.24	-0.41/0.01	1.51/0.7	0.74/0.08	-0.94/-5.64	-8.52/-7.26	-6.77/-8.07	-11.71/-18.58	-17.67/-18.21	-17.34/-17.18	-18.01/-18.56	-18.81/-17.9	-13.62/-9.57	-14.25/-10.53
θ (140°)	-4.48/-6.21	-8.24/-10.68	-11.58/-10.89	-5.76/-3.94	-1.74/-4.1	1.23/0.99	1.01/1.37	-1.74/-4.1	-1.02/-9.13	-10.05/-6.85	-8.34/-7.45	-14.92/-19.32	-16.61/-18.38	-14.92/-19.32	-16.61/-17.95	-11.37/-7.09	-8.04/-9.49	-18.71/-9.52
θ (150°)	-7.78/-7.75	-9.07/-13.63	-12.93/-9.49	-8.21/-6	-5.31/-4.55	-3.31/-4.22	-4.92/-4.67	-5.89/-5.19	-6.71/-8.08	-7.17/-4.88	-4.93/-8.59	-14.57/-14.95	-18.78/-14.55	-18.13/-19.24	-13.44/-11.31	-18.62/-13.31	-17.83/-13.14	-9.19/-8.62
θ (160°)	-16.04/-12.04	-9.35/-9.35	-14.84/-18.61	-18.48/-15.76	-9.24/-8.48	-8.69/-8.29	-8.46/-10.35	-13.54/-10.5	-6.52/-4.52	-4.47/-7.44	-9.71/-14.94	-18.34/-14.75	-18.87/-14.77	-13.85/-15.84	-18.27/-18.37	-19.34/-18.89	-17.3/-18.13	-18.52/-15.48
θ (170°)	-13.41/-14.52	-14.2/-9.67	-8.81/-9.46	-11.25/-13.04	-14.23/-14.46	-18.63/-17.94	-11.46/-9.83	-12.46/-15.39	-14.83/-16.45	-10.8/-16.1	-19.03/-16.97	-10.8/-16.1	-18.78/-18.47	-18.84/-18.79	-18.78/-18.47	-17.9/-18.13	-19.26/-16.55	-18.71/-15.48
θ (180°)	-10.35/-10.5	-10.05/-10.07	-11.03/-12.73	-14.29/-15.98	-16.97/-17.66	-17.69/-18.09	-17.98/-19.3	-18.51/-18.61	-19.46/-17.05	-14.53/-11.23	-8.95/-9.11	-12.53/-17.55	-18.33/-18.35	-19.54/-17.04	-18.62/-18.03	-16.51/-13.23	-12.09/-11.75	-11.41/-11.04
Freq(Hz)	2.45GPol	PhiAnt. 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gain	Φ(0°)Φ(10°)	Φ(20°)Φ(30°)	Φ(40°)Φ(50°)	Φ(60°)Φ(70°)	Φ(80°)Φ(90°)	Φ(100°)Φ(110°)	Φ(120°)Φ(130°)	Φ(140°)Φ(150°)	Φ(160°)Φ(170°)	Φ(180°)Φ(190°)	Φ(200°)Φ(210°)	Φ(220°)Φ(230°)	Φ(240°)Φ(250°)	Φ(260°)Φ(270°)	Φ(280°)Φ(290°)	Φ(300°)Φ(310°)	Φ(320°)Φ(330°)	Φ(340°)Φ(350°)
θ (0°)	2.56/2.48	1.56/0.36	0.22/-2.92	-4.3/-5.98	-6.35/-5.41	-3.61/-1.95	-0.70/-1.7	0.68/0.91	0.91/0.77	0.39/-0.17	-0.94/0.24	-1.71/-4.01	-4.52/-4.87	-5.34/-4.25	-2.48/-1.13	0.22/1.32	2.06/2.08	2.29/2.73
θ (10°)	2.16/1.61	0.96/1.03	-1.11/-3.72	-5.39/-6.12	-6.01/-6.11	-3.7/-2.49	-1.4/-0.68	0.62/0.96	2.03/0.41	0.57/-0.54	-1.83/-3.4	-3.29/-4.42	-4.94/-3.81	-2.2/-0.56	0.75/1.75	2.3/2.81	2.88/2.72	
θ (20°)	1.72/0.75	0.18/-1.06	-1.5/-5.14	-6.82/-6.53	0.76/0.31	-5.37/-4.7	-3.78/-2.5	1.39/0.17	-0.23/1.14	-1.15/-3.76	-0.67/-1.4	-1.15/-3.76	-3.88/-6.07	-6.72/-5.09	0.64/1.54	2.13/2.38	2.48/2.31	
θ (30°)	0.57/-0.05	-0.99/-2.79	-5.03/-8.13	-9.01/-8.31	-8.11/-8.64	-9.17/-7.89	-5.22/-2.9	0.64/0.81	1.83/1.01	1.65/0.6	-0.68/-2.29	-3.31/-6.03	-8.98/-6.88	-3.58/-1.22	0.19/1.24	1.39/1.32	1.33/1.16	
θ (40°)	-0.4/-0.84	-1.28/-2.72	-4.82/-8.1	-9.97/-11.36	-13.34/-17.51	-18.48/-11.19	-5.56/-2.26	-0.19/0.8	0.81/1.8	1.31/3.9	0.74/1.63	0.07/-1.4	-2.81/-6.64	-13.17/-12.97	-0.46/0.42	0.51/0.21	-0.28/-0.39	
θ (50°)	-3.51/-2.49	-2.66/-3.27	-4.3/-5.9	-6.35/-7.78	-7.17/1.72	-9.93/-7.93	-4.31/1.29	1.46/1.3	1.21/1.68	-4.63/-1.75	0.35/-1.38	-0.77/-1.72	-1.61/1.33	-10.45/-5.5	-0.33/-1.9	-1.03/-1.52	-2.82/-3.11	
θ (60°)	-4.06/-3.84	-3.47/-5.1	-6.26/-6.45	-5.88/-6.18	-7.82/-10.14	-10.11/-7.13	4.5/-2.26	-0.13/1.28	1.87/1.3	1.54/1.23	1.45/1.45	0.84/-0.78	-2.93/-6.47	-11.48/-13.26	-9.69/-7.59	-6.11/-5.01	-3.36/-4.26	-2.96/-4.66
θ (70°)	-4.52/-2.58	-2.49/-4.96	-6.17/-6.57	-5.34/-5.32	-6.96/-10.56	-17.63/-9.56	-3.21/-2.26	-1.35/-1.03	0.09/1.07	0.53/0.72	1.44/1.6	1.87/0.81	-0.26/-3.55	-1.93/-17.73	-10.33/-16.6	-8.72/-8.29	-6.64/-5.97	-6.67/-7.17
θ (80°)	-6.98/-5.11	-4.01/-7.79	-9.41/9.74	-7.94/-7.94	-8.48/-10.3	-10.55/-6.71	-0.65/-0.39	-0.17/-0.01	0.06/-0.34	-0.76/-1.28	-1.41/-1.36	-4.09/-6.57	-13.67/-18.47	-14.74/-11.08	-9.04/-7.61	-7.33/-8.31	-9.08/-6.67	
θ (90°)	-9.44/-8.46	-5.07/-9.39	-18.03/-12.17	-10.32/-11.44	-10.11/-7.65	-5.54/-3.14	-1.05/0.21	0.76/0.57	0.12/1.36	-1.74/-2.66	-3.75/-3.38	-3.51/-3.91	-6.84/-11.68	-18.92/-17.48	-18.82/-14.74	-11.22/-8.72	-6.28/-5.2	-6.37/-9.36
θ (100°)	-11.51/-6.71	-7.42/-16.76	-17.76/-10.56	-9.46/-8.74	-7.68/-0.54	-2.89/-1.01	0.83/1.57	2.46/1.67	0.06/-1.81	-3.04/-2.98	-3.09/-2.6	-3.28/-2.68	-14.48/-19.23	-15.38/-16.1	-18.73/-16.61	-13.68/-10.12	-10.41/-9.59	
θ (110°)	-18.47/-18.23	-15.61/-17.49	-15.71/17.49	-6.25/-6.12	3.97/3.17	1.89/0.3	-3.15/-1.1	0.78/2.4	-1.9/-4.58	-5.95/-5.92	-12.19/-17.42	-6.76/-10.71	-12.19/-17.42	-6.76/-10.71	-12.19/-17.42	-6.76/-10.71	-12.19/-17.42	-6.76/-10.71
θ (120°)	-15.81/-17.76	-18.82/-16.35	-16.22/-9.76	-6.99/-5.4	-4.73/-3.86	-2.55/-1.03	0.78/1.84	2.37/2.69	2.72/1.77	0.56/-1.69	-6.78/-9.44	-10.89/-13.06	-18.27/-11.18	-7.37/-7.81	-11.74/-18.15	-9.41/-5.11	-4.57/-6.96	-11.31/-3
θ (130°)	-15.11/-16.63	-9.25/-2.64	-6.34/-9.79	-12.95/-10.37	-2.73/2.84	-8.06/-6.41	-4.79/-3.23	-1.83/-0.9	0.39/1.84	2.73/2.84	2.45/0.53	-2.13/-3.23	-5.04/-8.93	-11.2/-7.93	-6.03/-7.33	-13.16/-13.23	-8.99/-6.67	-7.23/-7.97
θ (140°)	-17.85/-13.48	-7.03/-4.78	-4.14/-5.31	-8.53/-10.45	-9.04/-7.51	-6.23/-4.85	-3.66/-2.34	-0.63/1.3	2.34/2.55	2.08/0.77	-1.18/-2.63	-5.67/-7.13	-6.81/7.13	-10.16/-18.89	-18.24/-9.39	-8.04/-7.56	-8.59/-12.51	
θ (150°)	-18.12/-16.17	-9.6/-2.7	-5.81/7.3	-10.63/-13.2	1.79/1.17	-9.15/-6.96	-4.22/-2.41	-0.44/1.15	1.30/4.2	-0.74/-2.01	-5.71/7.6	-8.1/-8.38	-8.95/-10.8	-11.59/-13.03	-9.13/-9.87	-8.27/-7.59	-9.26/-13.07	
θ (160°)	-17.88/-18.43	-18.35/-13.74	-13.36/-15.19	-17.98/-17.81	-19.18/-18.55	-13.6/-9.59	-6.93/-4.08	-2.87/-1.28	-0.99/-1.17	-1.82/-2.49	-4.04/-5.11	-8.75/-11.42	-12.31/-12.54	-13.19/-12.05	-14.56/-14.39	-13.45/-11.73	-10.49/-10.61	-11.87/-13.32
θ (170°)	-18.91/-18.17	-18.57/-18.49	-18.07/-19.23	-19.69/-18.04	-18.66/-18.53	-18.99/-14.99	-11.86/-9.59	-8.46/-8.04	-8.02/-8.04	-9.05/-9.98	-10.26/-12.04	-12.72/-11.88	-11.59/-11.3	-11.11/-12.05	-13.26/-15.22	-17.13/-18.25	-17.21/-18.52	-19.24/-19.27
θ (180°)	-15.04/-17.21	-18.51/-18.48	-18.05/-18.79	-19.17/-16.67	-18.61/-16.77	-15.68/-15.19	-14.73/-14.36	-14.28/-14.86	-14.99/-14.78	-13.56/-12.3	-10.48/-10.88	-10.92/-9.92	-13.44/-13.64	-11.59/-12.6	-10.48/-11.42	-11.59/-12.6	-13.44/-13.64	-14.71/-15.64
Freq(Hz)	2.45GPol	ThetaAnt. 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gain	Φ(0°)Φ(10°)	Φ(20°)Φ(30°)	Φ(40°)Φ(50°)	Φ(60°)Φ(70°)	Φ(80°)Φ(90°)	Φ(100°)Φ(110°)	Φ(120°)Φ(130°)	Φ(140°)Φ(150°)	Φ(160°)Φ(170°)	Φ(180°)Φ(190°)	Φ(200°)Φ(210°)	Φ(220°)Φ(230°)	Φ(240°)Φ(250°)	Φ(260°)Φ(270°)	Φ(280°)Φ(290°)	Φ(300°)Φ(310°)	Φ(320°)Φ(330°)	Φ(340°)Φ(350°)
θ (0°)	-3.06/-1.93	-1.07/-0.17	0.74/1.17	1.44/1.49	1.29/0.88	0.28/0.1	-0.63/-3.02	-4.7/-6.05	-6.16/-4.62	-2.85/-1.47	-0.59/0.34	0.83/1.11	1.42/0.9	0.86/1.29	-0.13/-0.79	-1.93/-0.88	-1.92/-4.27	-3.99/-4.02
θ (10°)	-2.87/-1.73	-0.93/-0.2	0.40/0.87	1.06/1.04	0.86/0.6	0.16/-0.38	-1.2/6.5	-4.3/-5.9	-6.44/-5.67	-4.13/-2.69	-1.6/-0.5	0.38/0.84	1.24/1.01	0.69/1.55	0.72/0.45	-2.18/-4.32	-6.43/-7	-4.73/-3.82
θ (20°)	-4.01/-2.75	-1.69/-0.96	-0.76/-0.55	-0.89/-1.18	-1.47/-1.44	-1.51/1.64	-0.21/2.88	-7.7/-8.56	-7.91/6.27	-3.71/2.29	-0.84/0.35	1.01/0.8	0.33/2.41	-4.57/-6.4	-9.83/-10.2	-4.57/-6.4	-9.83/-10.2	-6.37/-9.87
θ (30°)	-6.45/-5.08	-3.56/-2.65	-2.91/-3.67	-5.44/-6.86	-6.26/-4.81	-3.49/-3.06	-3.08/-4.03	-5.21/-6.84	-9.37/-12.13	-12.28/-11	-7.59/-4.7	-2.47/-0.97	-0.09/0.27	-0.28/-1.2	-1.62/-3.28	-6.19/-9.46	-14.82/-16.65	-12.75/-11.99
θ (40°)	-10.06/-9.77	-4.47/-3.39	-4.51/-5.72	-10.11/-19.47	-13.29/-8.54	-6.27/-5.19	-5.17/-4.33	-6.85/-8.02	-9.71/-12.39	-13.75/-12.42	-9.68/-5.35	-2.52/-0.69	0.66/0.25	0.12/-0.24	-0.93/-2	-3.4/-4.68	-10.21/-13.17	-17.93/-16.2
θ (50°)	-11.92/-7.35	-3.75/-2.99	-2.76/-5.42	-10.18/-17.51	-13.81/-10.09	-8.39/-7.82	-8.06/-9.37	-11.33/-12.18	-16.2/-15.45	-12.26/-12.43	-10.11/-5.83	-2.54/-0.98	-0.3/-0.09	-0.44/-0.92	-1.31/-2.09	-3.45/-4.5	-6.08/-10.56	-14.88/-17.83
θ (60°)	-15.28/-9.38	-5.33/-4.37	-7.33/-12.88	-14.91/-10.93	-8.33/-7.07	-11.85/-16.39	-14.85/-9.02	-6.62/-6.67	-18.23/-18.91	-19.02/-12.58	-11.85/-16.39	-4.62/-1.96	-1.52/-2.73	-4.36/-6.48	-8.28/-8.24	-9.96/-11.23	-14.45/-17.64	
θ (70°)	-12.96/-12.06	-10.04/-8.55	-11.52/-13.76	-10.98/-8.34	-7.42/-7.13	-8.06/-8.76	-9.47/-13.62	-18.78/-18.01	-14.9/-9.93	-10.73/-11.67	-9.22/-6.35	-2.51/-1.19	-1.19/-1.65	-2.75/-3.73	-3.71/-3.73	-4.29/-6.09	-8.78/-10.75	-13.61/-14.63
θ (80°)	-10.76/-14.94	-16.81/-10.48	-11.51/-10.33	-9.74/-9.05	-9.95/-11.52	-15.27/-18.47	-9.97/-18.58	-13.43/-13.4	-10.29/-5.85	-6.11/-7.18	-8.91/-9.25	-5.16/-3.6	-3.23/-3.9	-5.44/-4.97	-4.38/-4.26	-4.73/-6.35	-8.03/-9.56	-9.01/-10.16
θ (90°)	-10.58/-16.93	-17.73/-9.92	-8.07/-9.08	-11.11/-12.84	-8.95/-6.57	-13.58/-10.7	-10.67/-11.83	-10.98/-10.01	-8.95/-6.57	-6.69/-6.63	-1							



Radiated Composite Gain Data of 2.4GHz, 5GHz U-NII 1 and U-NII 2A

Appendix A

Freq(Hz)	ThetaAnt. 2	Phi(0°)Phi(10°)	Phi(20°)Phi(30°)	Phi(40°)Phi(50°)	Phi(60°)Phi(70°)	Phi(80°)Phi(90°)	Phi(100°)Phi(110°)	Phi(120°)Phi(130°)	Phi(140°)Phi(150°)	Phi(160°)Phi(170°)	Phi(180°)Phi(190°)	Phi(200°)Phi(210°)	Phi(220°)Phi(230°)	Phi(240°)Phi(250°)	Phi(260°)Phi(270°)	Phi(280°)Phi(290°)	Phi(300°)Phi(310°)	Phi(320°)Phi(330°)	Phi(340°)Phi(350°)
5.3GPol	ThetaAnt. 2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Gain	Phi(0°)Phi(10°)	Phi(20°)Phi(30°)	Phi(40°)Phi(50°)	Phi(60°)Phi(70°)	Phi(80°)Phi(90°)	Phi(100°)Phi(110°)	Phi(120°)Phi(130°)	Phi(140°)Phi(150°)	Phi(160°)Phi(170°)	Phi(180°)Phi(190°)	Phi(200°)Phi(210°)	Phi(220°)Phi(230°)	Phi(240°)Phi(250°)	Phi(260°)Phi(270°)	Phi(280°)Phi(290°)	Phi(300°)Phi(310°)	Phi(320°)Phi(330°)	Phi(340°)Phi(350°)	
Theta(0°)	-12.61/-12.08	-12.28/-11.93	-12.27/-11.79	-12.15/-14.21	-18.51/-17.72	-15.81/-12.19	-9.99/-8.13	-6.43/-4.8	-2.99/-2.15	-2.42/-2.73	-3.91/-5.77	-9.62/-17.4	-18.41/-19.31	-19.08/-18.27	-18.47/-18.53	-18.85/-18.05	-17.64/-16.16	-14.43/-12.36	
Theta(10°)	-13.1/-14.27	-14.84/-14.38	-12.17/-10.37	-10.14/-11.6	-14.39/-18.42	-18.2/-12.03	-9.05/-7.59	-7.26/-7.32	-8.11/-9.98	-12.32/-15.58	-15.93/-15.12	-14.42/-14.56	-15.88/-16.55	-16.27/-15.27	-14.43/-14.53	-14.68/-16.2	-16.75/-15.5	-14.58/-13.62	
Theta(20°)	-10.81/-11.03	-11.74/-12.57	-18.01/-16.73	-18.04/-18.09	-18.25/-19.23	-16.45/-17.57	-16.04/-16.56	-15.85/-15.21	-16.77/-17.65	-16.53/-13.67	-15.53/-12.41	-13.21/-14.54	-15.44/-16.76	-18.77/-18.13	-16.93/-14.18	-13.48/-13.63	-13.61/-13.08	-12.31/-11.83	
Freq(Hz)	5.3GPol	ThetaAnt. 2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Gain	Phi(0°)Phi(10°)	Phi(20°)Phi(30°)	Phi(40°)Phi(50°)	Phi(60°)Phi(70°)	Phi(80°)Phi(90°)	Phi(100°)Phi(110°)	Phi(120°)Phi(130°)	Phi(140°)Phi(150°)	Phi(160°)Phi(170°)	Phi(180°)Phi(190°)	Phi(200°)Phi(210°)	Phi(220°)Phi(230°)	Phi(240°)Phi(250°)	Phi(260°)Phi(270°)	Phi(280°)Phi(290°)	Phi(300°)Phi(310°)	Phi(320°)Phi(330°)	Phi(340°)Phi(350°)	
Theta(0°)	-4.04/-2.26	-1.02/-0.25	0.1/-0.13	0.41/-0.9	-1.64/-2.28	-3.64/-5.92	-9.04/-15.11	-18.42/-15.24	-9.96/-6.33	-4/-2.41	-1.05/-0.36	0.150/0.46	0.520/1.4	-0.56/-1.86	-3.47/-5.9	-8.78/-12.59	-19.49/-17.04	-9.74/-6.71	
Theta(10°)	-4.24/-2.62	-1.10/-0.1	0.74/-0.7	0.850/0.64	0.27/-0.22	-1.12/-2.24	-3.47/-5.41	-8.15/-11.07	-12.22/-9.13	-5.81/-3.34	-1.76/-0.73	-0.21/-0.17	-0.55/-1.55	-2.86/-4.14	-5.96/-7.59	-7.95/-8.74	-8.91/-8.01	-6.76/-5.81	
Theta(20°)	-7.1/-4.98	-2.45/-0.25	0.61/-1.2	1.050/0.74	0.17/-0.57	-1.5/-2.15	-2.63/-2.76	-3.73/-5.18	-8.4/-12.91	-10.59/-5.84	-3.07/-1.28	-0.67/-1.11	-2.2/-3.06	-2.72/-2.92	-2.89/-3.07	-3.69/-4.87	-6.14/-7.65	-9.75/-9.36	
Theta(30°)	-8.35/-4.48	-2.13/0	0.851/1.44	1.711/1.44	0.64/-0.49	-1.44/-1.5	-1.0/-0.84	-0.82/-2.1	-5.01/-12.29	-15.15/-6.46	-2.63/-1.47	-1.2/-1.9	-2.84/-3.99	-4.13/-3.06	-1.91/-2.02	-2.29/-3.21	-5.7/6.5	-11.98/-13.28	
Theta(40°)	-13.31/-4.67	-1.110/8.7	1.190/6.1	0.491/1.48	2.831/0.12	0.73/-0.79	-1.6/-0.89	0.19/-0.43	-3.16/-8.38	-12.79/-11.24	-5.74/-4.16	-3.53/-5.67	-10.85/-13.79	-7.56/-4.61	-3.06/-3.77	-4.22/-4.58	-5.98/-7.64	-11.71/-17.19	
Theta(50°)	-12.28/-5.5	-1.780/18	0.31/-0.73	-0.250/8.1	0.91/-0.14	-2.01/-3.19	-3.09/-1.09	-0.2/0.06	-2.23/-6.73	-10.88/-15.2	-15.4/-9.97	-10.22/-14.9	-15.95/-8.16	-5.05/-3.04	-3.56/-4.49	-5.1/-8.66	-10.27/-15.12	-19.1/-17.87	
Theta(60°)	-17.97/-4.2	-1.58/-0.04	-1.02/-3.29	-1.87/-0.89	-1.04/-1.87	-3.33/-4.61	-1.2/-1.8	-0.82/-2.39	-4.39/-7.09	-1.04/-1.76	-8.82/-11.24	-1.21/-1.8	-12.04/-8.7	-5.6/-6.01	-7.12/-11.77	-17.18/-17.7	-14.36/-18.3		
Theta(70°)	-10/-12.23	-4.05/-1.62	-2.25/-6.17	-3.52/-1.23	-1.21/-1.44	-1.77/-2.79	-2.26/-0.95	0.33/-0.08	-1.68/-5.93	-18.39/-16.06	-15.86/-16.65	-18.25/-9.9	-7.03/-12.43	-7.76/-7.05	-7.65/-5.44	-7.48/-14.9	-18.34/-13.34	-12.61/-6.62	
Theta(80°)	-12.74/-15.97	-5.39/-3.1	-5.73/-5.48	-5.08/-4.4	-4.11/-4.25	-4.6/-5.36	-3.9/-2.22	-3.04/-3.81	-3.45/-3.69	-1.77/-11.67	-16.33/-18.98	-15.91/-6.83	-8.19/-11.62	-14.21/-14.25	-13.25/-12.51	-8.46/-14.79	-18.62/-12.99	-9.91/-10.95	
Theta(90°)	-10.36/-13.92	-9.6/0.1	-4.86/-7.89	-7.15/-5.08	-4.52/-4.16	-5.81/-7.48	-7.74/-4.02	-3.51/-4.04	-5.36/-7.51	-14.63/-18.16	-18.45/-19.17	-14.22/-13.74	-14.51/-6.87	-9.72/-17.21	-17.19/-10.93	-17.19/-10.93	-12.39/-8.12		
Theta(100°)	-9.31/-13.83	-13.98/-10.74	-8.11/-9.84	-10.95/-10	-9.02/-10.41	-11.79/-11.43	-8.06/-6.8	-7.63/-6.04	-3.26/-4.05	-11.28/-17.88	-18.2/-12.42	-7.99/-9.74	-8.14/-7.95	-10.05/-19.19	-18.32/-17.6	-19.05/-13.92	-10.53/-11.53	-10.03/-15.65	
Theta(110°)	-11.43/-17.83	-17.77/-11.46	-10.03/-14.23	-12.41/-7.91	-7.18/-9.03	-11.59/-19.93	-19.07/-17.63	-11.94/-10.42	-9.15/-8.6	-13.57/-19.06	-18.77/-13.05	-11.02/-9.95	-5.64/-5.13	-9.13/-11.99	-7.99/-16.14	-9.16/-17.68	-18.83/-16.85	-12.74/-13.3	
Theta(120°)	-14.34/-17.1	-18.43/-17.92	-13.28/-13.39	-18.6/-14	-15.57/-12.12	-18.6/-14	-19.28/-18.48	-19.46/-11.89	-18.34/-17.52	-18.4/-15.77	-13.58/-19.04	-18.51/-7.7	-5.71/-11.03	-13.69/-19.04	-18.51/-7.7	-18.91/-12.87	-11.51/-9.46	-13.99/-13.3	
Theta(130°)	-12.17/-13.31	-14.5/-19.05	-16.78/-18.49	-17.97/-13.18	-8.43/-6.98	-7.86/-8.23	-7.96/-10.3	-14.87/-18.74	-18.28/-12.84	-9.45/-9.21	-14.64/-18.84	-17.5/-17.54	-17.96/-13.41	-9.61/-11.44	-17.12/-9.19	-13.46/-19.63	-16.66/-15.73	-10.18/-11.44	
Theta(140°)	-16.89/-11.88	-11.27/-16.31	-13.64/-9.84	-10.43/-9.33	-9.06/-7.88	-7.1/-7.23	-7.1/-5.25	-16.66/-17.98	-13.05/-12.84	-10.46/-10.92	-14.88/-18.53	-11.02/-9.84	-9.47/-13.27	-15.2/-14.61	-16.56/-18.28	-17.88/-17.73	-18.83/-17.5	-18.73/-17.5	
Theta(150°)	-17.14/-15.05	-18.51/-17.75	-17.42/-11.2	-9.08/-8.63	-10.52/-11.25	-15.57/-11.55	-6.95/-6.38	-5.43/-7.98	-10.16/-13.55	-16.95/-14.87	-13.51/-10.14	-7.46/-7.9	-9.43/-9.25	-6.68/-6.68	-5.48/-9.5	-19.22/-19.69			
Theta(160°)	-12.99/-14.09	-13.56/-10.39	-8.05/-6.71	-6.63/-7.02	-6.83/-6.06	-5.15/-4.74	-4.86/-5.56	-6.49/-5.97	-5.93/-6.92	-8.02/-11.22	-17.09/-18.51	-18.14/-16.1	-13.28/-12.25	-13.21/-18.52	-17.56/-11.82	-9.17/-10.63	-17.05/-16.52	-18.77/-14.73	
Theta(170°)	-17.77/-19.08	-18.89/-18.33	-17.29/-11.88	-9.09/-7.24	-5.77/-4.54	-3.72/-3.49	-4.04/-3.58	-7.12/-9.7	-13.58/-18.13	-18.42/-18.97	-18.99/-17.1	-14.75/-13.06	-11.46/-12.81	-15.78/-14.14	-16.67/-14.77	-13.41/-14.1	-19.37/-17.88	-17.52/-17.52	
Theta(180°)	-17.77/-18.31	-18.59/-17.42	-15.19/-12.72	-11.72/-11.26	-12.03/-13.74	-14.72/-15.98	-18.41/-18.69	-19.35/-18.72	-17.21/-18.95	-17.31/-18.25	-15.82/-14.49	-13.54/-12.4	-10.41/-8.57	-17.11/-15.59	-15.97/-18.32	-17.41/-19.09	-17.41/-19.09	-17.41/-19.09	
Freq(Hz)	2.45GPol	PhiAnt. 3	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Gain	Phi(0°)Phi(10°)	Phi(20°)Phi(30°)	Phi(40°)Phi(50°)	Phi(60°)Phi(70°)	Phi(80°)Phi(90°)	Phi(100°)Phi(110°)	Phi(120°)Phi(130°)	Phi(140°)Phi(150°)	Phi(160°)Phi(170°)	Phi(180°)Phi(190°)	Phi(200°)Phi(210°)	Phi(220°)Phi(230°)	Phi(240°)Phi(250°)	Phi(260°)Phi(270°)	Phi(280°)Phi(290°)	Phi(300°)Phi(310°)	Phi(320°)Phi(330°)	Phi(340°)Phi(350°)	
Theta(0°)	1.81/1.23	0.01/0.38	-1.43/-3.51	-0.79/-2.05	-1.87/-15.53	1.88/1.55	0.8/-0.13	0.81/0.3	1.88/1.99	-1.43/-1.42	-1.83/-1.58	-0.82/-0.13	-2.08/-0.92	-1.14/-3.79	-6.08/-10.92	-1.21/0.64	-0.30/0.64	1.66/1.52	
Theta(10°)	2.1/1.45	0.630/1	-1.58/-3.59	-6.61/-11.33	-18.31/-15.79	-8.4/-5.14	2.16/0.64	0.30/0.82	1.15/1.22	1.22/1.2	0.08/-0.65	-1.54/-3.96	-7.12/-12.36	-18.18/-14.33	-7.88/4.31	-1.91/0.39	1.02/1.86	2.22/4.3	
Theta(20°)	2.77/2.07	1.1/1.4	-0.8/-2.68	-4.7/-3.4	-13.48/-18.85	-13.09/-9.39	-5.09/-2.29	-1.06/-0.5	-0.15/0.1	0.14/0.02	-0.18/-0.96	-1.55/-3.76	-6.49/-11.47	-17.88/-13.61	-7.38/4.25	-1.87/0.05	1.3/2.42	2.95/3.09	
Theta(30°)	3.16/2.35	1.530/8.88	-0.41/-1.88	-3.36/-5.59	-8.97/-11.48	-1.96/-1.99	-1.32/-0.84	-0.84/-1.19	-1.06/-1.47	-1.06/-1.56	-5.5/-11.23	-4.24/-3.4	-1.150/4.27	-1.16/2.78	-1.150/4.27	-1.16/2.78	3.3/3.54		
Theta(40°)	3.25/2.72	2.020/8.88	-0.33/-1.63	-2.96/-5.19	-8.43/-12.33	-14.04/-13.26	-11.31/-8.46	-5.96/4.4	-2.76/-1.92	-1.88/-2.08	-2.03/-2.06	-2.64/-4.05	-5.9/-10.76	-19.35/-14.61	-7.91/-3.98	-1.190/0.2	1.88/2.43	3.25/3.57	
Theta(50°)	3.08/2.78	2.350/9.6	-0.15/-2.08	-4.64/-6.83	-15.44/-17.89	-14.92/-12.68	-11.42/-10.12	-8.6/-0.08	-5.34/-4.43	-4.07/-3.94	-4.13/-3.57	-3.6/-8.1	-6.13/-9.77	-18.31/-18.1	-11.72/-4.58	-1.790/0.8	1.62/2.64	3.17/3.22	
Theta(60°)	3.14/2.87	1.910/3	-1.910/3	-5.32/-8.15	-13.17/-18.65	-16.84/-13.31	-6.01/-5.15	-5.46/-11.69	-13.11/-11.69	-17.34/-6.59	-6.01/-5.15	-5.46/-11.69	-13.11/-11.69	-17.34/-6.59	-6.01/-5.15	-5.46/-11.69	-13.11/-11.69	-17.34/-6.59	
Theta(70°)	3.2/2.86	1.540/4.1	-1.15/-1.97	-2.71/-4.9	-8.64/-14.76	-17.67/-18.67	-18.25/-16.43	-9.94/-8.03	-9.47/-9.87	-8.74/-7.56	-8.74/-7.56	-8.74/-7.56	-8.74/-7.56	-8.74/-7.56	-8.74/-7.56	-8.74/-7.56	-8.74/-7.56	-8.74/-7.56	
Theta(80°)	2.39/2.06	1.31/-3.6	-0.79/-1.41	-2.75/-6.37	-12.13/-18.2	-19.19/-18.88	-17.84/-13.39	-8.48/-6.97	-8.4/-10.77	-13.21/-12.09	-10.24/-11.26	-10.09/-7.47	-7.47/-9.68	-16.49/-16.13	-6.46/-2.12	0.1/1.1	1.79/1.94	2.92/2.41	
Theta(90°)	2.31/4.8	0.16/1.09	-1.34/-2.08	-4.11/-8.38	-12.57/-12.53	-13.58/-15.89	-17.81/-15.26	-10.46/-7.59	-11.82/-11.45	-13.32/-13.48	-15.81/-10.58	-11.82/-11.45	-13.32/-13.48	-15.81/-10.58	-11.82/-11.45	-13.32/-13.48	-15.81/-10.58	-11.82/-11.45	
Theta(100°)	2.29/0.89	-0.13/-1.19	-1.65/-2.75	-5.82/-10.14	-10.44/-10.61	-14.41/-17.55	-14.84/-11.47	-8.23/-7.76	-9.26/-9.83	-9.39/-11.12	-11.66/-11.05	-13.88/-16.46	-11.66/-9.56	-10.22/-13.53	-6.17/-1.13	1.67/2.72	3.2/3.73	2.98/2.9	
Theta(110°)	2.05/0.3	-0.72/-1.77	-3.35/-6.23	-7.4/-5.89	-4.33/-5.59	-10.01/-19.16	-18.11/-11.21	-7.87/-8.08	-12.08/-9.37	-7.82/-12.25	-18.11/-17.13	-17.41/-17.91	-15.9/-9.97	-8.14/-9.35	-6.89/-2.31	0.92/3.1	2.27/1.94	2.42/2.57	
Theta(120°)	0.68/0.5	-2.48/-3.92	-5.67/-7.22	-6.07/-4.42	-6.11/-10.21	-10.93/-13.59	-18.11/-12.54	-10.83/-16.56	-16.11/-10.47	-10.93/-13.59	-18.11/-12.54	-10.83/-16.56	-16.11/-10.47	-10.93/-13.59	-1				



Radiated Composite Gain Data of 2.4GHz, 5GHz U-NII 1 and U-NII 2A

Appendix A

Theta	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10	3.20	3.30	3.40	3.50	3.60	3.70	3.80	3.90	4.00	4.10	4.20	4.30	4.40	4.50	4.60	4.70	4.80	4.90	5.00	5.10	5.20	5.30	5.40	5.50	5.60	5.70	5.80	5.90	6.00	6.10	6.20	6.30	6.40	6.50	6.60	6.70	6.80	6.90	7.00	7.10	7.20	7.30	7.40	7.50	7.60	7.70	7.80	7.90	8.00	8.10	8.20	8.30	8.40	8.50	8.60	8.70	8.80	8.90	9.00	9.10	9.20	9.30	9.40	9.50	9.60	9.70	9.80	9.90	10.00
Gain	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10	3.20	3.30	3.40	3.50	3.60	3.70	3.80	3.90	4.00	4.10	4.20	4.30	4.40	4.50	4.60	4.70	4.80	4.90	5.00	5.10	5.20	5.30	5.40	5.50	5.60	5.70	5.80	5.90	6.00	6.10	6.20	6.30	6.40	6.50	6.60	6.70	6.80	6.90	7.00	7.10	7.20	7.30	7.40	7.50	7.60	7.70	7.80	7.90	8.00	8.10	8.20	8.30	8.40	8.50	8.60	8.70	8.80	8.90	9.00	9.10	9.20	9.30	9.40	9.50	9.60	9.70	9.80	9.90	10.00



Radiated Composite Gain Data of 2.4GHz, 5GHz U-NII 1 and U-NII 2A

Appendix A

Theta	-7.48/-11.15	-10.41/-12.12	-18.7/-15.3	-10.12/-10.57	-11.6/-17.96	-17.98/-17.28	-19.2/-12.32	-9.02/-6.21	-4.51/-5.68	-13.79/-15.2	-12.24/-10.75	-13.74/-19.06	-8.94/-3.15	-3.23/-5.72	-8.47/-8.92	-8.53/-9.17	-7.98/-8.55	-8.17/-5.99																		
Phi	Phi(0°)	Phi(30°)	Phi(45°)	Phi(60°)	Phi(75°)	Phi(90°)	Phi(105°)	Phi(120°)	Phi(135°)	Phi(150°)	Phi(165°)	Phi(180°)	Phi(195°)	Phi(210°)	Phi(225°)	Phi(240°)	Phi(255°)	Phi(270°)	Phi(285°)	Phi(300°)	Phi(315°)	Phi(330°)	Phi(345°)	Phi(350°)												
Gain	-17.59/-15.23	-10.53/-7.68	-7.7/-8.1	-9.42/-8.6	-7.32/-7.73	-11.1/-15.43	-15.62/-14.55	-9.76/-8.02	-11.83/-17.84	-16.47/-10.86	-10.37/-9.48	-9.45/-9.21	-6.96/-4.43	-5.2/-7.6	-8.96/-9.17	-9.07/-12.6	-18.49/-11.06	-9.02/-15.96																		
Theta	-17.93/-18.06	-15.04/-14.37	-17.23/-18.77	-18.04/-17.93	-18.92/-17.47	-18.79/-18.73	-15.55/-13.48	-14.72/-16.74	-16.7/-11.98	-9.84/-8.84	-7.91/-6.51	-6.72/-7.24	-7.91/-7.67	-7.57/-8.31	-8.14/-7.6	-7.25/-8.94	-10.64/-15.65	-18/-18.32																		
Theta	-17.12/-13.08	-11.95/-11.7	-13.67/-12.03	-12.93/-12.57	-12.3/-11.72	-13.94/-16.85	-17.86/-18.44	-17.63/-16.83	-14.09/-11.3	-9.78/-9.58	-9.12/-7.63	-6.87/-7.15	-7.75/-8.13	-7.94/-9.02	-12.13/-15.78	-18/-17.79	-18.51/-18.58	-18.16/-18.97																		
Freq(Hz)	5.3GPol.	PhiAnt. 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																		
Gain	Phi(0°)	Phi(30°)	Phi(45°)	Phi(60°)	Phi(75°)	Phi(90°)	Phi(105°)	Phi(120°)	Phi(135°)	Phi(150°)	Phi(165°)	Phi(180°)	Phi(195°)	Phi(210°)	Phi(225°)	Phi(240°)	Phi(255°)	Phi(270°)	Phi(285°)	Phi(300°)	Phi(315°)	Phi(330°)	Phi(345°)	Phi(350°)												
Theta	-15.85/-16.3	-13.02/-10.29	-7.59/-5.95	-5.23/-4.27	-4.27/-3.86	-3.52/-3.75	-5.2/-5.86	-6.7/-8.64	-12.51/-18.08	-17.51/-17.96	-16.01/-11.62	-8.94/-6.99	-5.97/-5.44	-4.99/-4.8	-4.81/-5.43	-5.42/-6.53	-9.65/-11.34	-11.36/-15.72																		
Theta	-19.62/-15.73	-19.33/-19.19	-16.22/-11.69	-8.88/-5.72	-5.91/-5.68	-5.79/-4.96	-5.39/-6.27	-6.98/-7.18	-7.99/-8.89	-10.75/-10.9	-9/-5.75	-3.85/-2.49	-1.71/-1.32	-1.21/-1.72	-1.51/-2.63	-4/-6.03	-7.44/-9.83	-13.09/-17.72																		
Theta	-19.22/-19.14	-17.26/-15.51	-12.55/-8.64	-6.81/-6.09	-5.67/-5.65	-5.4/-6.08	-7.01/-6.14	-12.55/-6.29	-7.91/-9.73	-13.67/-12.51	-7.6/-5.64	-4.69/-3.79	-3.15/-3.2	-3.17/-3.29	-3.71/-4.75	-5.78/-6.21	-7.8/-12.04	-12.21/-15.28																		
Theta	-11.1/-8.79	-11.62/-14	-14.01/-12.1	-8.73/-6.48	-4.56/-2.84	-3.17/-4.4	-4.57/-4.85	-6.3/-7.25	-7.74/-9.32	-13.16/-13.64	-8.52/-5.25	-4.55/-4.8	-5.68/-6.29	-7.22/-8.19	-10.21/-11.88	-12.61/-14.55	-19.17/-18.15	-18.62/-14.23																		
Theta	-14.23/-12.17	-13.21/-16.74	-11.77/-7.47	-4.9/-2.96	-2.89/-4.84	-6.57/-5.94	-5.21/-6.06	-7.24/-9.19	-10.37/-13.65	-19.14/-16.71	-8.93/-6.27	-5.69/-6.88	-7.17/-8.63	-9.23/-10.89	-12.47/-16.09	-17.35/-18.53	-18.86/-18.15	-18.86/-15.52																		
Theta	-13.25/-11.67	-18.26/-17.33	-12.65/-8.51	-5.11/-4.55	-6.31/-7.99	-6.42/-5.57	-6.3/-7.83	-9.77/-14.52	-15.34/-15.72	-13.81/-16.47	-10.26/-8.43	-7.29/-4.7	-5.68/-11.62	-17.99/-10.72	-11.82/-12.45	-18.42/-18.99	-17.3/-13.4	-12.85/-19.32																		
Theta	-17.18/-12.77	-13.16/-18.57	-17.71/-7.48	-5.9/-5.89	-5.54/-4.8	-4.55/-2.89	-3.88/-7.61	-10.4/-9.73	-18.7/-19.49	-11.43/-12.67	-16.44/-17.78	-8.84/-5.95	-9.32/-18.67	-12.59/-10.71	-11.53/-14.29	-11.76/-11.86	-11.83/-9.8	-7.6/-11.53																		
Theta	-12.93/-15.2	-17.73/-13.25	-18.3/-13.57	-7.16/-6.59	-7.46/-6.12	-4.21/-3.98	-4.71/-8.49	-19.37/-18.29	-17.63/-16.95	-10.38/-18.98	-13.73/-14.85	-11.82/-10.96	-18.5/-12	-5.81/-6.97	-9.16/-12.82	-9.44/-9.49	-7.76/-7.71	-8.12/-7.81																		
Theta	-8.35/-11.05	-19.62/-19.05	-18.66/-11.55	-7.79/-7.94	-11.07/-10.15	-9.9/-5.62	-16.29/-7.58	-19.14/-18.97	-16.29/-18.3	-10.31/-14.21	-16.54/-19	-14.73/-16.04	-18.92/-8.58	-4.12/-3.72	-4.49/-8.02	-10.99/-10.43	-5.43/-8.84	-10.51/-8.84																		
Theta	-10.52/-13	-18.28/-11.58	-12.12/-12.42	-11.5/-12.67	-11.73/-11.37	-12.31/-11.31	-7.92/-7.12	-15.46/-18.53	-18.38/-16.88	-14.59/-18.92	-16.47/-18.58	-19.14/-15.49	-17.66/-16.59	-9.18/-12.56	-11.31/-9.43	-10.2/-6.87	-8.74/-8.21	-9.15/-7.43																		
Theta	-16.61/-10.73	-7.99/-18.01	-17.99/-9.9	-12.37/-15.93	-18.98/-16.81	-10.97/-13.26	-16.97/-17.83	-18.88/-18.41	-18.41/-17.65	-14.85/-18.59	-18.45/-16.2	-11.44/-10.81	-18.44/-18.58	-12.73/-14.63	-14/-16	-16.06/-11.61	-7.89/-8.07	-7.95/-12.84																		
Theta	-10.97/-15.41	-11.8/-17.56	-16.07/-14.49	-15.9/-18.64	-17.76/-18.81	-18.96/-13.54	-14.77/-16.53	-16.48/-18.99	-18.38/-16.42	-11.02/-14.5	-17.14/-17.32	-12.17/-18.95	-10.85/-18.84	-18.24/-18.89	-17.54/-16.31	-12.13/-7.75	-8.34/-13.71	-12.09/-13.72																		
Theta	-15.98/-18.72	-10.37/-12.05	-14.35/-15.15	-18.79/-14.84	-18.58/-18.32	-18.89/-17.35	-19.03/-18.47	-18.77/-19.08	-16.33/-17.35	-8.18/-12.61	-18.27/-16.39	-17.12/-9.04	-11.45/-10.76	-4.94/-4.47	-4.58/-8.85	-9.58/-9.47	-7.37/-6.17	-18.96/-10.7																		
Theta	-8.26/-12.28	-16.62/-17.61	-16.27/-15.66	-10.39/-9.84	-15.99/-19.26	-17.65/-17.24	-13.98/-17.77	-11.84/-18.64	-18.81/-10.38	-10.4/-13.1	-12.99/-18	-11.47/-18.38	-10.39/-11.52	-6.72/-6.17	-4.65/-5.57	-6.94/-18.32	-15.99/-8.31	-17.96/-6.7																		
Theta	-17.93/-12.38	-10.63/-18.73	-18.86/-18.82	-17.74/-19.32	-19.06/-11.74	-12.94/-15.65	-18.86/-8.85	-17.94/-13.56	-10.43/-15.56	-9.22/-8.66	-14.29/-9.55	-17.99/-12.17	-10.43/-15.55	-9.44/-6.99	-7.85/-10.34	-12.11/-14.53	-15.43/-7.98	-11.62/-13.51																		
Theta	-9.15/-8.42	-11.27/-11.35	-12.28/-10.65	-9.71/-15.56	-17.94/-16.19	-17.4/-17.21	-16.28/-16.32	-17.63/-14.54	-8.69/-8.43	-7.51/-10.26	-14.84/-19.11	-17.79/-16.23	-16.92/-15.39	-10.92/-9.29	-11.03/-11.05	-12.81/-18.79	-17.13/-19.08	-13.24/-10.33																		
Theta	-5.46/-8.3	-10.32/-9.99	-9.81/-12.01	-17.47/-19.07	-18.26/-18.21	-17.42/-17.26	-19.47/-16.67	-14.16/-17.25	-18.8/-16.73	-16.67/-16.54	-18.74/-17.84	-13.49/-11.91	-14.26/-17.21	-15.41/-13.49	-11.33/-10.86	-9.3/-7.56	-9.02/-7.4	-4.17/-4.52																		
Theta	-5.8/-11.04	-15.82/-15.06	-16.04/-16.47	-18.79/-17.49	-18.76/-19.24	-17.9/-15.98	-11.45/-9.62	-8.79/-6.91	-7.76/-10.6	-13.71/-15.12	-15.89/-16.23	-15.64/-17.34	-18.44/-18.77	-16.31/-11.53	-8.68/-7.29	-4.92/-4.09	-3.88/-4.05																			
Theta	-18.89/-17.83	-16.71/-16.94	-16.54/-15.31	-12.68/-11.31	-12.96/-15.17	-14.23/-10.67	-10.47/-10.51	-9.69/-8.91	-8.73/-9.78	-11.26/-14.57	-18.02/-18.85	-18.08/-16.59	-14.45/-12.17	-10.04/-7.88	-6.9/-7.29	-6.45/-5.78	-5.8/-7.73	-10.25/-14.94																		
Freq(Hz)	5.3GPol.	ThetaAnt. 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																		
Gain	Phi(0°)	Phi(10°)	Phi(20°)	Phi(30°)	Phi(40°)	Phi(50°)	Phi(60°)	Phi(70°)	Phi(80°)	Phi(90°)	Phi(100°)	Phi(110°)	Phi(120°)	Phi(130°)	Phi(140°)	Phi(150°)	Phi(160°)	Phi(170°)	Phi(180°)	Phi(190°)	Phi(200°)	Phi(210°)	Phi(220°)	Phi(230°)	Phi(240°)	Phi(250°)	Phi(260°)	Phi(270°)	Phi(280°)	Phi(290°)	Phi(300°)	Phi(310°)	Phi(320°)	Phi(330°)	Phi(340°)	Phi(350°)
Theta	-3.98/-4.47	-4.73/-6.32	-7.1/7.68	-9.31/-12.95	-18.86/-18.49	-14.99/-13.28	-10.31/-7.85	-6.08/-5.59	-5.03/-4.07	-4.16/-4.75	-5.28/-6.55	-7.24/-8.83	-11.53/-14.98	-18.21/-18.8	-14.42/-11.34	-9.01/-6.7	-6.03/-5.37	-5.57/-4.45																		
Theta	-7.69/-7.1	-6.65/-7.27	-6.48/-6.86	-9.72/-13.92	-17.77/-18.22	-18.43/-12.22	-10.22/-8.61	-6.69/-5.48	-4.42/-3.6	-3.03/-3.08	-3.61/-3.9	-4.26/-5.73	-7.95/-11.36	-13.98/-16.05	-11.09/-9.27	-7.43/-5.58	-5.55/-5.53	-5.87/-7.06																		
Theta	-14.55/-14.98	-12.72/-12.95	-13.25/-14.4	-17.99/-19.07	-18.41/-16.02	-14.38/-11.73	-9.46/-8.53	-7.24/-5.75	-4.19/-3.89	-3.64/-4.45	-4.98/-4.48	-3.73/-4.18	-5.21/-6.82	-9.52/-12.76	-16.46/-17.72	-19.15/-18.85	-14.48/-14.3	-13.53/-14.29																		
Theta	-18.57/-15.53	-13.96/-10.29	-8.16/-6.26	-7.06/-8.73	-12.24/-16.49	-17.17/-16.81	-15.96/-15.24	-19.17/-16.39	-9.18/-7.53	-7.26/-6.25	-4.89/-3.61	-5.11/-6.98	-7.84/-7.84	-6.61/-6.57	-8.76/-9.18	-8.3/-9.15	-9.3/-12.49	-17.9/-19.27																		
Theta	-7.45/-6.01	-4.87/-3.97	-3.72/-2.67	-3.54/-7.94	-10.23/-13.38	-12.22/-10.1	-9.98/-16.05	-13.82/-10.76	-10.12/-8.68	-9.16/-11.52	-7.99/-5.09	-5.69/-8.07	-9.43/-10.26	-11.59/-10.98	-8.52/-7.34	-8.95/-8.74	-4.69/-5.79	-7.54/-12.34																		
Theta	-4.14/-3.86	-4.39/-4.36	-2.78/-1.29	-2.39/-5.15	-7.71/-9.95	-9/-8.46	-7.92/-7.22	-6.53/-6.84	-7.67/-10.58	-9.31/-14.24	-9/-10.29	-12.46/-8.49	-8.66/-9.27	-7.36/-6.92	-6.73/-5.69	-5.85/-5.15	-2.61/-1.98	-1.87/-3.89																		
Theta	-4.18/-5.7	-4.27/-1.9	0.55/0.01	-1.21/-2.83	-4.57/-7.77	-10.53/-9.37	-9.13/-9.41	-10.61/-9.32	-5.68/-9.91	-8.28/-7.71	-7.46/-8.95	-12.67/-9.51	-9.18/-5.7	-4.5/-4.02	-3.65/-2.64	-3.84/-4.7	-3.27/-1.01	1.08/0.14																		
Theta	-5.44/-3.85	-2.39/-1.2	0.49/-1.82	-2.5/-5.19	-6.56/-10.25	-10.07/-9.49	-11.32/-14.4	-10.86/-14.02	-7.14/-11.22	-2.53/-7.37	-8.2/-8.83	-5.58/-1.49	-2.45/-5.89	-4.52/-4.07	-2.3/-1.72	-1.03/-2.98	-3.43/-0.83	0.41/-1.15																		
Theta	-0.82/-2.57	-1.32/-2.23	0.23/-3.35	-2.35/-4.49	-8.61/-16.77	-14.12/-14.91	-11/-10.46	-8.51/-18.48	-5.29/-12.67	-1.56/-5.69	-5.97/-1.6	-3.21/-0.37	-1.86/-1.8	-0.68/-1.05	-2.27/-1.72	0.25/-0.8	-0.05/-1.6	-0.62/-2.1																		
Theta	-1.35/-1.27	-2.15/-2.36	-1.86/-3.48	-2.21/-4.52	-6.19/-9.39	-9.61/-7.29	-9.66/-11.5	-5.97/-13.51	-4.04/-4.61	-2.19/-6.62	-6.64/-3.36	-2.65/-2.03	-1.31/-2.37	-0.11/-0.8	-1.55/-0.64	-0.83/-0.86	-3.87/-0.54	0.64/-1.14																		
Theta	-3.38/-2.38	-2.77/-5.11	-3.2/-5.61	-10.15/-9.19	-12.51/-16.23	-11.96/-13.03	-17.35/-17.94	-7.16/-13.84	-3.59/-4.93	-1.4/-1.37	-7.35/-2.15	-3.81/-2.18	-4.75/-2.1	0.24/-0.72	-4.93/-3.07	-2.37/-2.57	-1.12/-2.69	-1.12/-2.69																		
Theta	-2.13/-3.03	-3.38/-4.7	-3.15/-7.04	-8.03/-9.72	-12.04/-11.98	-10.49/-9.98	-10.67/-16.75	-8.92/-10.69	-5.32/-6.81	-1.16/-5.52	-12.33/-4.17	-1.94/-1.56	-4.53/-0.17	1.25/-2.41	-0.8/-1	-1.68/-0.13	-3.3/-4.57	0.45/-1.4																		
Theta	-3.8/-3.61	-8.29/-7.65	-10.65/-7.94	-15.73/-15.66	-19/-14.24	-17.99/-18.5	-15.04/-11.13	-8.9/-6.69	-2.29/-9.5	0.21/-6.2	-18.93/-3.87	-1.91/-0.82	-3.76/0.29	3.38/-4.57	1.3/-3.32	-0.96/-6.52	-11.1/-3.46	-1.08/-2.48																		
Theta	-7.26/-8.84	-18.16/-12.92	-6.17/-5.83	-10.48/-19.6	-15.22/-14.6	-14.88/-12.56	-18.96/-18.28	-16.94/-18.45	-14.13/-8.07	-5.62/-14.8	-10.74/-8.88	-1.16/-4.17	-8.34/-1.26	1.75/-6																						



Freq(Hz)	5.6G	5.785G
Ant. 1 Max Gain (dBi)	2.16	2.63
Ant. 2 Max Gain (dBi)	2.5	3.69
Ant. 3 Max Gain (dBi)	3.24	2.05
Ant. 4 Max Gain (dBi)	2.18	2.44
Ant. 1 Polarization/ θ ($^{\circ}$)/ ϕ ($^{\circ}$)	Phi/60/200	Phi/50/220
Ant. 2 Polarization/ θ ($^{\circ}$)/ ϕ ($^{\circ}$)	Theta/80/320	Theta/90/300
Ant. 3 Polarization/ θ ($^{\circ}$)/ ϕ ($^{\circ}$)	Phi/50/70	Phi/50/70
Ant. 4 Polarization/ θ ($^{\circ}$)/ ϕ ($^{\circ}$)	Theta/80/240	Theta/80/280
Max Gain (dBi)	3.24	3.69
DG [1SS] (dBi)	4.32	4.21
DG [2SS] (dBi)	3.24	3.69
DG [4SS] (dBi)	3.24	3.69



Radiated Composite Gain Data of 5GHz U-NII 2C and U-NII 3

Appendix B

DG 1SS Result

Freq(Hz)	5.6GPol	Phi-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
DG(dB)	Phi(0°)Phi(10°)	Phi(20°)Phi(30°)	Phi(40°)Phi(50°)	Phi(60°)Phi(70°)	Phi(80°)Phi(90°)	Phi(100°)Phi(110°)	Phi(120°)Phi(130°)	Phi(140°)Phi(150°)	Phi(160°)Phi(170°)	Phi(180°)Phi(190°)	Phi(200°)Phi(210°)	Phi(220°)Phi(230°)	Phi(240°)Phi(250°)	Phi(260°)Phi(270°)	Phi(280°)Phi(290°)	Phi(300°)Phi(310°)	Phi(320°)Phi(330°)	Phi(340°)Phi(350°)
5.6GPol	Phi(0°)Phi(10°)	Phi(20°)Phi(30°)	Phi(40°)Phi(50°)	Phi(60°)Phi(70°)	Phi(80°)Phi(90°)	Phi(100°)Phi(110°)	Phi(120°)Phi(130°)	Phi(140°)Phi(150°)	Phi(160°)Phi(170°)	Phi(180°)Phi(190°)	Phi(200°)Phi(210°)	Phi(220°)Phi(230°)	Phi(240°)Phi(250°)	Phi(260°)Phi(270°)	Phi(280°)Phi(290°)	Phi(300°)Phi(310°)	Phi(320°)Phi(330°)	Phi(340°)Phi(350°)
Theta(0°)	1.1182	2.1224	2.5266	2.6616	0.381033	-1.271315	-5.681664	-5.451458	-2.551048	0.99205	2.6229	2.81265	1.91072	-0.6114	-2.691471	-5.71527	-4.941363	-2.181036
Theta(20°)	-1.64132	-0.01107	1.6204	1.98163	1.33057	-0.011074	-2.771449	-4.61365	-1.73007	1.47189	2.06196	1.43081	0.111087	-2.68132	-6.461998	-9.411477	-6.41481	-2.131168
Theta(30°)	-3.071064	0.871143	1.71194	2.271168	1.081029	-1.961178	-1.741241	-2.691225	-0.98056	0.67051	0.94172	2.11124	0.021104	-0.82114	-2.471541	-8.691638	-3.641301	-1.511177
Theta(40°)	-0.45081	1.25213	2.06181	1.38117	1.22051	-1.181236	-2.891322	-2.84128	-1.50131	0.74143	2.71141	3.78124	0.511108	-2.021414	-4.181265	-3.81766	-4.451303	-1.381111
Theta(50°)	-0.43063	1.21148	1.97225	2.5226	1.9102	-2.931497	-5.31542	-5.181288	-1.13102	-0.811108	3.621412	3.16247	1.53025	-1.811243	-2.7113	-3.31593	-6.451333	-1.41096
Theta(60°)	0.611124	1.24189	1.76085	1.27195	1.76145	0.671156	-5.11389	-3.411353	0.51131	0.4523	4.32165	2.29165	-0.181099	-1.811176	-3.291491	-5.551781	-6.521491	-1.34028
Theta(70°)	-0.64058	1.02101	0.1101	-0.26034	0.691032	-1.011211	-3.931752	-4.611263	0.1707	0.78244	3.52314	2.27194	0.831065	-2.111237	-1.431369	-4.581823	-8.74152	-2.261124
Theta(80°)	-0.05104	-0.511049	-1.631079	0.53062	-0.461194	-3.111374	-3.861889	-5.151429	-1.521095	-0.53184	1.72049	0.871023	-0.021069	-2.541299	-1.051094	-4.481717	-7.151621	-1.761152
Theta(90°)	-1.851066	0.121088	-0.941188	-1.31053	-2.431278	-1.161121	-4.241316	-2.811739	-4.131333	-3.751075	-1.161121	1.481014	-0.871058	-0.14101	-1.181144	-2.991829	-8.781552	-4.291198
Theta(100°)	-0.271045	-1.451197	-1.871176	-0.811119	-3.261376	-4.91318	-4.21811	-6.691686	-4.061261	-1.821066	-0.671176	-2.412	-1.15105	-2.771488	-4.721488	-4.951542	-6.661506	-4.051102
Theta(110°)	-2.041019	-1.831218	-1.971189	-1.761223	-1.861197	-2.291216	-5.741621	-2.541753	-4.571396	-3.811137	-0.361282	-3.31156	-4.22126	-4.721633	-5.351713	-7.331788	-6.671731	-6.331295
Theta(120°)	-0.81085	-2.331176	-1.821268	-2.751258	-2.481198	-1.821123	-5.531426	-4.011456	-5.211249	-5.531426	-2.691228	-4.43108	-1.271324	-7.281976	-6.32166	-7.451733	-4.57104	-6.71205
Theta(130°)	0.2512	-2.881368	-2.381296	-4.561275	-0.961203	-5.171704	-9.821926	-6.541675	-3.651306	-6.641401	-2.641449	-7.791229	-0.5116	-3.35167	-6.191571	-10.471484	-6.231471	-3.1312
Theta(140°)	-1.21129	-2.231235	-3.581332	-3.91415	-3.761421	-5.87139	-4.18184	-6.911532	-4.981512	-6.721607	-3.71435	-4.821197	0.181163	-5.27182	-4.471254	-4.891809	-8.481814	-6.271721
Theta(150°)	-2.311145	-2.611337	-3.041351	-4.51659	-8.53181	-3.041351	-6.871919	-7.581634	-3.791208	-7.88157	-3.791208	-6.681633	-5.54147	-4.681633	-5.281612	-6.471513	-6.471513	-6.471513
Theta(160°)	-6.651533	-3.681282	-3.481519	-5.98186	-7.951739	-5.9215	-6.361666	-6.66174	-8.17173	-7.131689	-6.93155	-3.881275	-3.611525	-7.46147	-7.621651	-6.91693	-6.431497	-5.561632
Theta(170°)	-9.37134	-7.331653	-6.381688	-7.781742	-6.57153	-4.95187	-6.941926	-11.021125	-10.021799	-7.581743	-7.281466	-5.99162	-7.591844	-9.541981	-8.621947	-8.771723	-6.551668	-6.631805
Theta(180°)	-10.41107	-11.141016	-11.311016	-10.591017	-7.91764	-10.591017	-11.961249	-11.831063	-11.181271	-12.591125	-11.281008	-9.991533	-9.681904	-7.251835	-10.9182	-9.851103	-10.531014	-10.31936
5.785GPol	Theta-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
DG(dB)	Phi(0°)Phi(10°)	Phi(20°)Phi(30°)	Phi(40°)Phi(50°)	Phi(60°)Phi(70°)	Phi(80°)Phi(90°)	Phi(100°)Phi(110°)	Phi(120°)Phi(130°)	Phi(140°)Phi(150°)	Phi(160°)Phi(170°)	Phi(180°)Phi(190°)	Phi(200°)Phi(210°)	Phi(220°)Phi(230°)	Phi(240°)Phi(250°)	Phi(260°)Phi(270°)	Phi(280°)Phi(290°)	Phi(300°)Phi(310°)	Phi(320°)Phi(330°)	Phi(340°)Phi(350°)
Theta(0°)	-1.12162	-4.061539	-6.531599	-8.861197	-4.43131	2.22157	3.11285	2.261097	0.134	2.22157	3.11285	2.261097	0.134	2.22157	3.11285	2.261097	0.134	2.22157
Theta(20°)	-0.471225	-4.61736	-7.131573	-4.27118	-0.091125	1.65172	2.32124	3.071263	2.16135	-0.141201	-4.91652	-6.411533	-3.61173	-0.091125	1.731206	2.571257	2.42181	1.171052
Theta(30°)	-1.491329	-5.551689	-7.7219	-6.481304	-0.95177	1.63126	2.42101	1.59147	1.19102	-1.151146	-7.281212	-7.75157	-2.721208	-0.39159	0.32116	-0.26138	-0.23177	-0.23177
Theta(40°)	-4.191426	-5.21489	-4.911268	-2.081067	0.52115	1.27164	2.08155	1.78136	-1.81137	-1.341297	-3.04134	-3.951288	-1.551009	-1.811753	1.60151	1.60151	-0.81187	-2.151296
Theta(50°)	-1.821361	-2.41202	-2.851269	-1.991099	0.661227	2.24131	1.081277	2.67116	0.641211	-2.951116	-1.851258	-1.531044	-0.011089	1.54155	0.73141	2.21368	3.52129	0.141061
Theta(60°)	-0.121165	-1.121136	-2.51289	-2.461231	-0.91056	1.84194	0.5112	2.39106	1.151168	-2.87139	-0.511063	-1.111033	0.53161	1.74161	1.61162	4.32196	0.621039	0.621039
Theta(70°)	-0.951047	-0.160105	-0.690153	-0.06126	2.4404	0.03055	1.92138	1.32191	-1.82108	1.72179	0.5311	-0.62107	-0.40190	1.27129	2.17285	3.35102	0.631037	0.631037
Theta(80°)	-1.31005	0.49109	-0.71064	-1.371092	-0.491095	0.59211	1.51224	2.95143	1.70126	0.611234	0.7408	-1.071	-0.65101	0.46106	0.45147	2.221	3.33141	1.56106
Theta(90°)	-1.161174	-1.681085	-0.691145	-2.71179	-1.84116	-0.25031	1.32012	0.77135	-0.621162	1.82196	0.04109	1.67112	1.68136	1.82196	3.05282	3.13263	0.58198	0.58198
Theta(100°)	-2.721104	-4.011268	-1.581195	-1.681168	-2.681334	-0.91092	-0.89119	0.991045	-0.541088	-1.091182	-0.431243	-2.101	1.111025	0.5116	1.2408	2.25044	1.87178	0.311174
Theta(110°)	-1.031046	-2.691209	-3.041493	-3.021304	-1.961074	-3.221273	-3.111419	-2.261311	-1.371032	-2.051094	-2.711077	-0.111028	-0.111028	0.111028	0.86109	-0.111028	-0.111028	-0.661017
Theta(120°)	-3.661338	-4.471369	-2.941326	-3.241342	-2.541106	-0.791164	-2.91125	0.721234	-1.721096	-1.141288	-3.011583	-7.421314	-2.21371	-2.661345	-2.251466	-2.891322	-1.051176	-2.59136
Theta(130°)	-2.931369	-3.581425	-5.421432	-2.821225	-4.421051	-5.281561	-1.041135	-3.331351	-2.71111	-1.051182	-1.711052	-4.51695	-3.57194	-1.341282	-2.64126	-4.551199	-3.451109	-3.451109
Theta(140°)	-2.11156	-3.841487	-6.11676	-3.91351	-2.71346	-3.11403	-1.951416	-3.881328	-1.951416	-5.251354	-8.02105	-4.511332	-4.511332	-1.891559	-7.621506	-5.561198	-2.511071	-2.511071
Theta(150°)	-2.441246	-3.341537	-5.821601	-3.961236	-1.94198	-1.43113	-2.281174	-2.571368	-3.21305	-2.791333	-2.21334	-4.47164	-6.651758	-6.391294	-5.13177	-0.341259	-4.47164	-5.921579
Theta(160°)	-0.941252	-3.631382	-4.091372	-3.551452	-3.321416	-5.54136	-2.05116	-5.261474	-5.081581	-5.421527	-7.121947	-1.121947	-1.121947	-1.121947	-1.121947	-1.121947	-1.121947	-4.691264
Theta(170°)	-6.741504	-6.08167	-7.971769	-7.031623	-5.241487	-7.49113	-1.951187	-6.881328	-3.81543	-9.51102	-10.31108	-9.191945	-10.181666	-2.881227	-5.311541	-4.841496	-5.97173	-5.97173
Theta(180°)	-9.661533	-8.811551	-8.131839	-7.311597	-6.031338	-4.63161	-4.931564	-5.97161	-6.511775	-8.64198	-10.221036	-11.851208	-12.04101	-9.02136	-8.32167	-5.59152	-6.621721	-8.991961
5.785GPol	Theta-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
DG(dB)	Phi(0°)Phi(10°)	Phi(20°)Phi(30°)	Phi(40°)Phi(50°)	Phi(60°)Phi(70°)	Phi(80°)Phi(90°)	Phi(100°)Phi(110°)	Phi(120°)Phi(130°)	Phi(140°)Phi(150°)	Phi(160°)Phi(170°)	Phi(180°)Phi(190°)	Phi(200°)Phi(210°)	Phi(220°)Phi(230°)	Phi(240°)Phi(250°)	Phi(260°)Phi(270°)	Phi(280°)Phi(290°)	Phi(300°)Phi(310°)	Phi(320°)Phi(330°)	Phi(340°)Phi(350°)
Theta(0°)	0.65171	2.83136	3.33103	3.021251	1.341033	-2.291529	-8.071059	-8.61521	-2.611071	0.55114	2.39266	2.95294	2.66204	1.25101	-2.441459	-6.39159	-9.021609	-3.31099
Theta(20°)	0.75165	2.07132	2.53183	2.86127	1.85108	-0.61272	-5.131714	-2.47139	2.1727	-3.42116	2.42107	2.52107	1.511098	-0.231162	-3.821642	-9.51973	-7.081452	-2.481049
Theta(30°)	-1.01102	1.44276	3.49136	3.56136	3.42103	0.55115	-3.711703	-7.011543	-3.271135	0.42168	2.38282	2.96249	1.821015	0.051126	-3.381679	-10.73108	-7.181357	-1.551023
Theta(40°)	-1.55047	2.44375	3.72191	1.61142	1.231049	0.251047	-2.111375	-4.881341	-1.88024	2.04115	3.05261							



Radiated Composite Gain Data of 5GHz U-NII 2C and U-NII 3

Appendix B

Gain Result

Freq(Hz)	5.6GPol.	PhiAnt. 1	Phi(0°)	Phi(10°)	Phi(20°)	Phi(30°)	Phi(40°)	Phi(50°)	Phi(60°)	Phi(70°)	Phi(80°)	Phi(90°)	Phi(100°)	Phi(110°)	Phi(120°)	Phi(130°)	Phi(140°)	Phi(150°)	Phi(160°)	Phi(170°)	Phi(180°)	Phi(200°)	Phi(210°)	Phi(220°)	Phi(230°)	Phi(240°)	Phi(250°)	Phi(260°)	Phi(270°)	Phi(280°)	Phi(290°)	Phi(300°)	Phi(310°)	Phi(320°)	Phi(330°)	Phi(340°)	Phi(350°)	
Gain	Phi(0°)Phi(10°)	Phi(20°)Phi(30°)	Phi(40°)Phi(50°)	Phi(60°)Phi(70°)	Phi(80°)Phi(90°)	Phi(100°)Phi(110°)	Phi(120°)Phi(130°)	Phi(140°)Phi(150°)	Phi(160°)Phi(170°)	Phi(180°)Phi(190°)	Phi(200°)Phi(210°)	Phi(220°)Phi(230°)	Phi(240°)Phi(250°)	Phi(260°)Phi(270°)	Phi(280°)Phi(290°)	Phi(300°)Phi(310°)	Phi(320°)Phi(330°)	Phi(340°)Phi(350°)																				
Theta(0°)	-3.61/2.5	-2.05/1.87	-1.78/2.04	-2.19/2.82	-4.15/5.1	-6.85/9.94	-13.01/8.84	-6.09/4.22	-2.97/2.15	-1.68/1.42	-1.12/1.81	-1.99/6.05	-6.37/4.58	-9.07/12.21	-14.12/14.59	-11.99/8.65	-6.37/4.58																					
Theta(10°)	-2.95/2.52	-2.87/2.93	-3.39/4.1	-4.02/3.72	-5.07/6.08	-6.41/8.88	-11.81/11.4	-9.77/8.01	-6.38/4.66	-3.48/2.62	-2.21/2.18	-2.43/3	-3.45/4.4	-5.94/6.59	-8.31/14.33	-19/16.59	-11.64/7.57	-5.47/3.97																				
Theta(20°)	-3.59/4.14	-3.94/3.28	-2.79/2.5	-3.1/2.84	-2.82/5.01	-7.07/6.78	-7.91/8.73	-7.41/5.88	-4.61/2.87	-2.22/1.97	-1.32/0.88	-1.26/2.3	-3.03/3.52	-5.39/8.6	-10.96/16.67	-18.46/17.96	-14.92/9.71	-5.83/4.23																				
Theta(30°)	-3.63/4.06	-2.57/1.71	-1.34/1.43	-2.17/3.43	-4.71/6.8	-8.71/9.94	-9.31/7.17	-5.33/3.56	-1.93/0.28	-0.10/0.05	0.06/1.01	-2.4/3.6	-4.84/6.44	-7.51/9.14	-11.79/11.79	-9.04/6.58	-4.52/3.1																					
Theta(40°)	-2.33/2.13	-1.55/1.19	-1.61/2	-2.53/3.05	-2.52/3.17	-6.23/8.78	-11.49/11.88	-6.82/4.55	-2.25/0.29	0.74/0.22	0.74/1.45	1.10/51	-1.17/2.25	-3.22/6.21	-7.64/7.22	-7.73/10.16	-10.38/7.55	-4.33/2.59																				
Theta(50°)	-2.9/2.34	-0.96/0.63	-1.24/1.42	-1.54/2.2	-1.97/3.38	-6.32/7.19	-12.13/14.99	-8.59/4.37	-1.16/0.34	-0.35/0.52	1.14/1.77	1.21/0.17	-0.03/0.96	-3.52/4.25	-5.77/7.82	-8.83/10.52	-10.44/7.44	-4.4/3.56																				
Theta(60°)	-1/1.46	-0.32/1.16	-1.02/1.77	-1.41/2.62	-0.98/1.4	-4.94/7.8	-10.24/10.52	-4.02/1.29	-0.98/1.14	0.42/1.29	2.16/1.78	1.28/1.35	-0.03/0.57	-5.21/10.23	-13.92/8.12	-13.92/8.12	-2.54/1.71																					
Theta(70°)	-1.2/0.99	-1.01/1.97	-2.66/1.72	-0.94/0.79	-1.28/4.52	-7.46/11.1	-14.11/19.16	-15.19/8.02	-1.41/0.09	-0.64/1.07	1.41/1.14	0.78/0.73	0.23/1.72	-4.64/3.92	-5.18/11.74	-14.06/17.76	-14.06/8	-3.9/2.19																				
Theta(80°)	-0.32/0.47	0.14/0.89	-2.25/1.27	-0.13/0.06	-1.28/4.42	-6.62/7.82	-8.75/17.89	-17.73/7.61	-2.52/1.8	-1.5/1.8	-0.12/0.86	-0.67/1	-1.69/3.75	-6.05/6.89	-5.03/11.12	-16.29/12.52	-10.18/6.29	-3/0.74																				
Theta(90°)	-0.45/0.75	0.03/0.59	-0.23/0.63	0.61/0.78	-4.02/1.3	-1.64/1.19	-8.78/12.07	-4.02/1.3	-1.64/1.19	-8.78/12.07	-4.02/1.3	-1.64/1.19	-8.78/12.07	-4.02/1.3	-1.64/1.19	-8.78/12.07	-4.02/1.3	-1.64/1.19	-8.78/12.07																			
Theta(100°)	-0.61/0.6	0.83/0.98	-0.66/0.04	0.95/0.23	-0.43/2.17	-6.79/3.81	-6.56/10.14	-13.98/10.75	-8.25/5.66	-6.16/5.79	-4.86/6.06	-6.65/7.23	-3.19/3.07	-5.5/8.07	-10.94/10.81	-9.87/9.29	-6.02/5.6	-3.70/3.3																				
Theta(110°)	0.33/0.4	0.34/0.19	-0.72/0.19	0.26/0.05	-0.94/2.68	-3.71/3.49	-0.86/1.99	-15.71/9.97	-9.69/9.43	-7.01/8.86	-9.32/16.09	-10.09/8.19	-11.56/13.61	-18.52/13.58	-13.76/11.07	-8.72/6.66	-5.66/0.94																					
Theta(120°)	0.09/0.56	0.25/0.18	-0.22/0.65	-1.28/1.49	-1.4/0.84	-1.46/2.99	-5.71/10.83	-10.68/12.75	-14.25/10.29	-11.66/15.82	-14.55/14.31	-17.83/13.29	-10.78/13.29	-17.83/13.29	-13.15/10.1	-9.71/7.26	-5.48/2.25																					
Theta(130°)	-0.51/0.08	-0.28/1.48	-1.43/2.28	-2.57/2.15	-2.85/4.26	-6.87/10.38	-15.49/18.42	-14.82/11.26	-10.86/11.54	-18.38/17.45	-18.66/18.56	-18.9/15.56	-11.65/9.92	-10.16/16.36	-18.35/14.25	-18.45/15.75	-16.56/7.7	-5.46/2.53																				
Theta(140°)	-0.68/0.47	0.96/0.37	-1.17/1.98	-3.04/5.48	-7.94/9.11	-11.07/11.02	-11.37/17.97	-15.61/11.79	-7.87/7.82	-14.03/18.85	-18.86/17.28	-17.52/18.31	-13.41/15.76	-14.88/16.41	-12.19/10.22	-13.51/12.1	-9.1/11.55	-7.08/3.72																				
Theta(150°)	-4.05/0.88	-0.03/0.08	-0.96/3.48	-0.96/3.48	-12.64/12.97	-16.07/11.98	-12.73/12.26	-12.73/11.98	-12.73/11.98	-12.73/11.98	-12.73/11.98	-12.73/11.98	-12.73/11.98	-12.73/11.98	-12.73/11.98	-12.73/11.98	-12.73/11.98	-12.73/11.98	-12.73/11.98																			
Theta(160°)	-6.24/4.17	-2.88/3.12	-4.01/4.97	-6.29/8.43	-11.1/15.39	-15.23/10.89	-12.03/13.78	-11.44/11.33	-14.07/12.72	-12.49/13.45	-16.4/18.66	-16.49/16.26	-14.03/12.49	-13.18/13.89	-14.86/12.93	-10.56/10.53	-11.07/9.58	-8.15/7.02																				
Theta(170°)	-11.07/10.56	-8.59/7.06	-6.69/6.51	-6.85/7.16	-7.86/9	-11.08/11.99	-12.71/17.55	-17.94/17.75	-18.36/18.93	-18.77/18.55	-18.71/18.99	-19.13/17.48	-18.75/17.52	-16.84/14.93	-14.38/16.09	-16.89/17.01	-16.67/14.95	-13.19/12.22																				
Theta(180°)	-14.83/15.18	-16.64/16.17	-14.57/11.92	-12.31/14.05	-10.12/10.9	-17.6/18.88	-19.25/16.55	-18.52/15.49	-17.34/18.94	-18.99/18.56	-17.47/16.05	-15.31/14.72	-15.17/13.27	-11.32/12.49	-14.95/16.14	-17.66/18.14	-17.78/17.23	-17.11/15.34																				
Freq(Hz)	5.6GPol.	ThetaAnt. 1	Phi(0°)	Phi(10°)	Phi(20°)	Phi(30°)	Phi(40°)	Phi(50°)	Phi(60°)	Phi(70°)	Phi(80°)	Phi(90°)	Phi(100°)	Phi(110°)	Phi(120°)	Phi(130°)	Phi(140°)	Phi(150°)	Phi(160°)	Phi(170°)	Phi(180°)	Phi(200°)	Phi(210°)	Phi(220°)	Phi(230°)	Phi(240°)	Phi(250°)	Phi(260°)	Phi(270°)	Phi(280°)	Phi(290°)	Phi(300°)	Phi(310°)	Phi(320°)	Phi(330°)	Phi(340°)	Phi(350°)	
Gain	Phi(0°)Phi(10°)	Phi(20°)Phi(30°)	Phi(40°)Phi(50°)	Phi(60°)Phi(70°)	Phi(80°)Phi(90°)	Phi(100°)Phi(110°)	Phi(120°)Phi(130°)	Phi(140°)Phi(150°)	Phi(160°)Phi(170°)	Phi(180°)Phi(190°)	Phi(200°)Phi(210°)	Phi(220°)Phi(230°)	Phi(240°)Phi(250°)	Phi(260°)Phi(270°)	Phi(280°)Phi(290°)	Phi(300°)Phi(310°)	Phi(320°)Phi(330°)	Phi(340°)Phi(350°)																				
Theta(0°)	-7.57/10.41	-13.35/16.45	-15.36/10.85	-7.68/5.91	-4.93/2.63	-1.08/1.12	-1.36/1.32	-1.08/1.12	-1.36/1.32	-1.08/1.12	-1.36/1.32	-1.08/1.12	-1.36/1.32	-1.08/1.12	-1.36/1.32	-1.08/1.12	-1.36/1.32	-1.08/1.12	-1.36/1.32																			
Theta(10°)	-5.47/8.71	-12.54/14.74	-11.73/9.52	-8.94/6.87	-5.65/6.83	-5.49/3.9	-3.2/3.39	-3.77/4.33	-4.93/5.57	-6.21/8.26	-12.9/16.16	-13.08/10.59	-7.94/7.07	-5.17/3.04	-3.11/3.26	-2.1/1.28	-1.39/1.91	-2.72/3.48																				
Theta(20°)	-5.66/10.51	-14.36/12.06	-12.6/12.69	-11.15/14.4	-6.66/14.4	-5.74/4.45	-4.92/5.57	-5.82/4.82	-5.97/10.28	-16.41/17.85	-19.01/16.51	-11.63/10.68	-9.21/6.88	-5.53/5.07	-4.4/4.12	-3.18/2.56	-3.08/3.81																					
Theta(30°)	-8.61/15.23	-14.85/14.28	-15.14/11.35	-8.74/8.33	-8.54/5.63	-4.19/4.66	-3.07/3.37	-3.71/10.61	-7.17/5.54	-13.84/16.43	-12.98/8.46	-6.53/5.58	-5.35/7.08	-8.01/6.53	-4.59/4.24	-4.53/3.86	-4.03/4.62																					
Theta(40°)	-10.07/15.7	-17.98/15.57	-15.10/14.5	-9.82/11.68	-9.83/7.98	-9.99/9.77	-5.85/5.32	-4.83/4.2	-6.26/7.18	-9.65/12.27	-17.43/13.95	-9.84/7.12	-5.24/4.32	-6.47/4.85	-5.72/3.33	-1.93/2.94	-4.33/5.89																					
Theta(50°)	-7.56/12.57	-17.35/15.48	-11.7/9.23	-8.73/9.24	-10.76/12.13	-14.12/15.33	-9.34/6.81	-5.03/5.72	-5.58/6.32	-7.29/13.87	-18.98/19.39	-16.3/10.61	-6.35/5.06	-6.64/5.35	-6.67/5.56	-2.19/4.18	-4.98/6.88																					
Theta(60°)	-10.87/14.19	-18.02/14.68	-16.8/11.88	-9.89/9.71	-8.04/6.53	-9.54/13.58	-9.87/6.5	-5.09/7.53	-7.94/8.31	-7.83/15.52	-18.11/19.09	-18.45/9.6	-6.96/5.2	-5.43/5.51	-7.08/7.66	-2.21/3.12	-5.78/8.18																					
Theta(70°)	-7.57/10.66	-19.39/15.06	-13.07/13.84	-14.96/11.79	-8.97/10.93	-13.69/13.22	-11.67/11.65	-7.37/9.08	-13.69/18.52	-14.87/17.64	-16.44/13.81	-14.45/10.38	-6.76/7.84	-4.78/4.1																								



Antenna Pattern of 2.4GHz, 5GHz U-NII 1 and U-NII 2A

Appendix C

Total Gain Data

Freq(Hz)	2.45GPol.	TotalAnt. 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gain	Φ(0°)Φ(10°)	Φ(20°)Φ(30°)	Φ(40°)Φ(50°)	Φ(60°)Φ(70°)	Φ(80°)Φ(90°)	Φ(100°)Φ(110°)	Φ(120°)Φ(130°)	Φ(140°)Φ(150°)	Φ(160°)Φ(170°)	Φ(180°)Φ(190°)	Φ(200°)Φ(210°)	Φ(220°)Φ(230°)	Φ(240°)Φ(250°)	Φ(260°)Φ(270°)	Φ(280°)Φ(290°)	Φ(300°)Φ(310°)	Φ(320°)Φ(330°)	Φ(340°)Φ(350°)
θ(0°)	-3.39/3.65	-2.37/3.19	-2.46/-3.09	-3.52/-3.44	-3.10/-2.93	-2.66/-2.69	-2.95/-3.23	-3.65/-3.69	-3.56/-3.59	-3.59/-3.66	-4.02/-5.04	-3.96/-3.91	-3.97/-3.76	-3.88/-3.83	-3.04/-4.27	-4.53/-3.56	-2.67/-3.94	-3.25/-3.68
θ(10°)	-4.44/-4.14	-4.27/-2.54	-1.89/-2.02	-2.17/-2.30	-2.44/-2.21	-1.53/-1.41	-1.22/-1.80	-1.58/-1.55	-1.38/-1.95	-3.08/-2.68	-2.30/-2.96	-3.86/-3.67	-5.18/-6.36	-5.28/-5.72	-6.03/-6.42	-5.33/-5.79	-6.02/-5.14	-5.96/-5.22
θ(20°)	-3.10/-2.63	-2.36/-2.01	-2.17/-1.51	-1.48/-2.01	-2.53/-2.88	-2.84/-2.64	-2.39/-1.93	-1.37/-1.03	-0.79/0.18	-0.67/-1.36	-1.75/-2.37	-3.19/-3.59	-4.22/-5.29	-6.38/-7.70	-7.03/-7.36	-6.77/-6.86	-6.86/-5.29	-5.56/-2.23
θ(30°)	-1.41/-1.91	-1.56/-0.71	-0.35/-0.74	-1.41/-2.28	-1.41/-2.28	-3.53/-3.86	-4.27/-4.26	-3.07/-2.00	-0.12/-0.26	-0.07/-0.43	-2.48/-2.61	-2.60/-2.59	-3.28/-4.08	-4.58/-6.15	-6.47/-5.55	-5.64/-3.36	-3.80/-4.28	-2.56/-2.66
θ(40°)	-1.71/-1.47	-1.19/-0.03	0.84/-0.25	-1.02/-1.04	-0.65/-0.54	-1.86/-1.96	-2.50/-2.19	-4.60/-3.99	-2.12/-0.75	-0.62/-1.84	-2.02/-2.04	-1.63/-1.91	-2.63/-3.68	-4.46/-4.29	-4.19/-5.04	-3.78/-2.81	-2.13/-1.74	-2.25/-2.26
θ(50°)	-2.39/-1.84	-1.38/-0.67	-0.66/-0.44	-0.55/-0.43	-0.36/-1.63	-1.71/-0.56	-0.37/-1.26	-2.20/-3.32	-3.21/-2.46	-1.31/-1.27	-1.67/-1.00	-0.87/-1.30	-3.27/-5.69	-5.19/-3.76	-2.60/-1.91	-0.63/-1.04	-0.90/-0.26	-0.56/-1.72
θ(60°)	-0.35/-0.62	0.25/-1.34	-0.38/-0.23	-0.26/-0.23	-0.83/-1.51	-1.82/-1.01	-1.00/-0.48	-1.17/-1.26	-3.69/-3.03	-1.40/-0.63	-1.32/-1.41	-3.40/-5.41	-1.02/-1.10	-0.62/-0.43	-0.71/-2.96	-1.02/-1.22	1.07/-1.13	
θ(70°)	0.81/1.34	2.54/2.53	1.04/0.80	0.98/0.94	0.45/-0.52	-1.41/-1.44	-0.50/-0.13	0.49/-0.00	-2.69/-2.90	-1.84/-2.11	-2.46/-3.24	-2.51/-1.43	-2.98/-4.71	-6.54/-7.07	-5.87/-3.67	-2.69/-1.78	-0.44/0.62	1.30/1.22
θ(80°)	-0.53/-0.16	2.19/2.73	0.70/1.53	1.75/1.90	1.85/0.49	-0.34/-0.37	1.26/2.03	2.03/1.64	-1.22/-2.80	-1.91/-1.64	-1.39/-2.83	-1.08/-1.35	-4.38/-5.64	-6.48/-3.78	-1.68/-0.91	0.00/-0.06	-0.03/0.69	1.54/0.68
θ(90°)	-2.54/-1.19	0.66/0.66	-1.68/-0.77	2.34/2.01	0.04/0.12	-0.45/0.20	1.56/2.37	0.93/-0.67	0.04/0.12	-0.93/-0.67	-1.85/-2.72	-0.39/-4.84	-6.30/-7.86	-6.24/-6.66	-3.14/-1.75	-0.69/-0.39	-0.37/0.67	0.78/-0.28
θ(100°)	-4.81/-4.26	-1.43/-0.88	-3.35/-2.76	-1.75/-2.26	-2.38/-2.57	-3.07/-2.84	-0.97/-1.18	2.19/2.52	1.62/-1.68	-1.43/-1.49	-1.48/-2.67	-4.35/-2.06	-2.95/-3.76	-3.80/-4.78	-6.69/-6.82	-7.98/-10.92	-6.20/-3.17	-0.64/-1.60
θ(110°)	-6.78/-3.80	-0.74/0.22	-2.23/-3.37	-2.66/-2.74	-3.28/-5.68	-8.06/-6.04	-2.03/-0.19	0.20/0.55	0.43/-1.45	0.16/-1.58	-2.26/-4.77	-2.65/-0.06	-1.17/-0.74	-2.68/-4.30	-4.23/-3.45	-1.69/-1.48	-6.51/-4.20	-1.05/-0.91
θ(120°)	-2.12/-2.95	-1.17/0.28	-1.13/-1.77	-0.67/-2.48	-3.08/-4.07	-4.63/-6.62	-2.49/-1.98	-1.04/0.42	-0.67/-2.80	-2.49/-1.88	-4.07/-4.18	-2.67/-2.14	-0.30/-0.49	-1.39/-2.40	-2.67/-2.45	-1.99/-2.04	-0.72/-0.56	
θ(130°)	-2.53/-1.93	-0.56/0.36	-0.38/-1.53	-0.72/-0.44	-1.10/-1.45	-0.92/0.28	0.74/0.46	0.64/-0.89	-3.75/-4.93	-6.56/-5.20	-3.53/-4.89	-6.54/-6.06	-4.99/-4.34	-3.60/-2.58	-2.62/-4.48	-2.77/-0.80	0.11/-0.32	-1.89/-3.96
θ(140°)	-6.08/-3.80	-2.73/-1.35	-0.76/-0.66	0.22/-0.17	0.03/0.19	0.58/0.73	-0.56/-2.23	-3.27/-2.21	-1.23/-1.74	-3.27/-3.43	-10.13/-8.14	-4.54/-3.20	-2.40/-3.28	-5.14/-3.36	-5.34/-1.48	0.69/-0.46	-3.76/-6.46	
θ(150°)	-9.17/-8.41	-8.14/-7.71	-6.88/-5.52	-4.14/-3.13	-2.62/-1.88	-1.87/-2.73	-0.77/0.43	-4.57/-3.74	-2.54/-1.43	-1.86/-3.00	-5.51/-8.06	-6.84/-4.92	-3.11/-2.55	-4.90/-2.67	-1.91/-3.47	-6.98/-9.94		
θ(160°)	-7.09/-6.38	-5.84/-5.38	-5.17/-4.77	-3.89/-2.76	-1.65/-0.79	-0.10/-0.09	-0.50/-1.05	-1.78/-1.92	-2.33/-2.38	-4.31/-6.13	-9.31/-8.91	-6.48/-4.81	-3.91/-2.62	-3.93/-6.22	-8.30/-9.68	-7.99/-7.25	-7.07/-8.19	-9.11/-7.92
θ(170°)	-6.72/-5.35	-4.26/-3.60	-2.63/-2.21	-1.77/-1.26	-0.91/-0.63	-0.75/-1.40	-2.02/-1.36	-4.17/-6.03	-7.05/-8.48	-10.17/-10.96	-12.66/-13.60	-12.58/-10.90	-9.27/-9.53	-11.10/-11.36	-11.75/-12.99	-13.68/-12.93	-11.02/-9.73	-9.07/-7.71
θ(180°)	-6.13/-5.67	-6.20/-6.12	-6.48/-6.16	-6.26/-6.40	-6.72/-7.39	-8.55/-10.42	-11.87/-12.23	-12.03/-11.81	-11.12/-11.97	-13.00/-14.04	-14.22/-14.64	-15.75/-15.22	-12.89/-11.70	-10.27/-8.98	-8.05/-8.04	-7.27/-7.56	-7.65/-7.98	-8.03/-7.01
5.2GPol.	TotalAnt. 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gain	Φ(0°)Φ(10°)	Φ(20°)Φ(30°)	Φ(40°)Φ(50°)	Φ(60°)Φ(70°)	Φ(80°)Φ(90°)	Φ(100°)Φ(110°)	Φ(120°)Φ(130°)	Φ(140°)Φ(150°)	Φ(160°)Φ(170°)	Φ(180°)Φ(190°)	Φ(200°)Φ(210°)	Φ(220°)Φ(230°)	Φ(240°)Φ(250°)	Φ(260°)Φ(270°)	Φ(280°)Φ(290°)	Φ(300°)Φ(310°)	Φ(320°)Φ(330°)	Φ(340°)Φ(350°)
θ(0°)	-4.69/-4.07	-4.44/-4.27	-3.96/3.21	-4.47/3.32	-4.46/4.97	-5.21/5.25	-4.46/4.36	-4.50/4.91	-4.57/4.34	-5.13/4.72	-5.49/5.55	-5.49/5.55	-4.80/4.67	-4.58/4.82	-5.01/3.59	-5.01/3.59	-4.58/4.82	-5.14/3.38
θ(10°)	-7.30/-5.89	-5.97/-7.03	-6.49/-6.12	-4.94/-4.58	-3.89/-4.23	-4.04/-3.33	-3.45/-3.96	-3.95/-3.94	-4.48/-4.93	-4.86/-5.28	-5.09/-4.82	-5.45/-6.55	-6.94/-6.40	-6.57/-6.00	-5.72/5.89	-6.44/-6.05	-5.36/-5.96	-6.52/-6.44
θ(20°)	-6.78/-7.21	-8.00/-8.23	-6.36/-8.78	-8.66/-7.16	-5.66/-3.83	-2.64/-2.21	-3.59/-4.04	-4.69/-6.16	-5.79/-6.89	-6.30/-5.92	-5.73/-5.44	-6.05/-7.35	-6.34/-6.07	-6.75/-6.62	-7.75/-8.73	-10.07/-9.29	-7.99/-7.21	
θ(30°)	-5.32/-2.98	-3.19/-4.35	-6.67/-11.87	-11.57/-7.17	-3.68/-2.00	-1.89/-3.69	-4.75/-5.21	-5.68/-6.54	-6.75/-6.89	-7.34/-6.18	-5.64/-4.64	-5.11/-5.31	-4.89/-3.93	-4.45/-4.20	-4.78/-5.40	-8.43/-12.49	-11.53/-8.89	
θ(40°)	-6.43/-3.50	-1.65/-2.92	-8.67/-11.64	-2.63/0.51	1.50/1.90	1.31/-0.32	-6.41/-5.49	-5.21/-7.19	-8.04/-7.63	-6.28/-3.70	-4.64/-9.18	-5.19/-9.29	-9.90/-7.72	-5.96/-4.11	-4.69/-3.97	-5.21/-7.90	-10.83/-10.98	
θ(50°)	-4.74/-1.31	0.09/-1.00	-9.16/-5.56	-0.08/1.47	1.19/0.24	0.59/-0.36	-2.06/-2.98	-5.52/-5.17	-4.77/-8.05	-10.24/-6.21	-2.60/-2.00	-5.91/-7.75	-4.89/-4.44	-7.95/-5.56	-5.48/-4.07	-2.13/-3.13	-5.77/-6.70	-6.94/-5.56
θ(60°)	-6.10/-1.38	1.18/-2.70	-8.17/-1.32	-0.46/-2.43	-3.50/-3.44	-2.63/-3.03	-4.48/-3.49	-4.15/-5.37	-2.54/-4.84	-6.84/-5.56	-0.07/0.24	-2.37/-4.27	-0.59/-3.07	-6.31/-7.24	-6.46/-6.86	-6.58/-2.90	-6.60/-14.25	-6.04/-4.75
θ(70°)	-1.35/-0.51	2.23/0.24	-4.88/0.04	0.08/-2.71	-2.20/-1.75	-2.67/-3.38	-3.50/-3.11	-2.13/-3.41	-4.11/-3.08	1.70/0.23	-5.51/-1.92	-2.72/-4.89	-1.10/-4.41	-5.50/-2.47	-2.72/-4.35	-5.50/-2.47	-2.58/-9.72	-6.05/-2.82
θ(80°)	-3.42/-3.24	-0.66/-0.62	-0.98/-1.88	-0.46/-2.25	-0.75/-1.33	0.04/-1.03	-4.88/-1.60	-1.30/-2.35	0.46/-4.18	-2.92/-0.92	2.03/1.26	-0.94/0.06	0.98/-3.22	-4.46/-4.70	-2.39/-3.49	-5.02/-4.17	-4.57/-5.24	-3.77/-3.76
θ(90°)	-3.41/-3.31	0.39/-0.04	-1.69/-1.22	0.51/-0.73	-0.79/-0.64	0.74/1.27	0.38/-0.58	0.22/-0.43	1.25/-1.56	0.51/1.03	2.57/0.94	-2.54/-2.92	-2.12/-4.12	-7.39/-6.01	-2.01/-4.61	-7.94/-6.16	-6.57/-6.68	-3.40/-3.32
θ(100°)	-3.46/-3.84	-1.11/-1.42	-0.73/-0.17	-0.80/-0.23	0.97/-1.58	0.43/0.41	-0.51/-1.31	1.34/1.68	0.72/0.31	-1.25/-0.99	-0.80/-1.57	-2.73/-4.33	-5.05/-3.27	-7.53/-6.97	-7.53/-6.97	-5.32/-6.37	-2.31/-6.59	
θ(110°)	-3.53/-2.65	-2.48/-0.91	-2.19/-0.44	-0.85/-2.34	-1.59/-1.49	1.08/1.43	0.52/1.12	0.43/1.38	1.65/0.06	2.09/0.73	0.16/-1.49	-2.58/-9.46	-8.23/-10.31	-9.54/-11.75	-9.48/-12.63	-15.08/-7.28	-11.12/-8.28	-4.03/-6.49
θ(120°)	-3.48/-4.15	-3.05/-2.48	-3.40/-2.83	-0.40/-0.13	-1.50/-2.37	-0.44/1.37	2.21/2.02	0.06/0.09	0.94/-0.46	-1.03/-1.37	-0.94/-1.95	-5.46/-10.36	-10.99/-13.02	-14.26/-12.82	-15.90/-8.34	-10.11/-13.19	-12.95/-5.67	-3.30/-4.20
θ(130°)	-3.68/-5.63	-4.82/-3.84	-4.23/-5.79	-3.88/-1.87	-1.70/-3.68	-0.42/-0.40	1.77/0.58	-1.70/-3.68	0.77/2.39	-4.92/-6.67	-9.76/-13.50	-10.68/-15.07	-10.68/-15.07	-14.34/-15.21	-11.55/-8.75	-14.61/-8.75	-6.56/-6.62	
θ(140°)	-4.22/-9.39	-4.93/-5.39	-6.27/-7.76	-5.04/-3.00	-2.44/-1.41	-0.15/0.14	1.37/1.41	1.27/0.02	-1.76/-2.87	-5.59/-7.69	-7.63/-6.57	-5.95/-3.20	-10.32/-14.16	-8.95/-9.18	-9.33/-12.13	-9.76/-5.62	-5.36/-5.91	-11.60/-7.20
θ(150°)	-6.57/-5.72	-6.36/-7.16	-9.12/-8.61	-7.82/-6.69	-5.52/-4.98	-4.27/-4.16	-3.94/-3.60	-4.67/-5.00	-5.95/-5.39	-4.87/-4.98	-5.38/-4.76	-6.44/-7.71	-11.26/-13.85	-15.95/-15.60	-8.79/-9.46	-14.69/-12.52	-11.13/-7.33	-8.30/-7.60
θ(160°)	-13.56/-11.03	-8.10/-7.41	-8.68/-11.55	-15.44/-13.93	-6.88/-6.38	-9.07/-7.25	-6.00/-5.37	-10.54/-7.95	-4.58/-4.58	-16.72/-10.98	-13.65/-13.44	-12.26/-15.40	-13.28/-14.78	-15.16/-12.48	-14.99/-15.42	-15.16/-12.48	-11.86/-12.64	
θ(170°)	-13.93/-12.95	-13.76/-11.15	-10.92/-10.64	-11.42/-12.11	-10.62/-9.05	-8.83/-9.50	-8.75/-8.78	-9.93/-14.07	-14.91/-14.91	-15.91/-14.64	-10.52/-8.00	-7.45/-8.98	-11.06/-12.54	-14.32/-13.50	-15.14/-14.47	-15.08/-15.27	-14.73/-15.17	-14.47/-15.68
θ(180°)	-12.53/-12.11	-12.48/-13.14	-14.52/-14.55	-13.37/-12.14	-12.10/-12.02	-13.66/-14.20	-12.19/-12.56	-14.25/-15.41	-14.61/-13.31	-13.39/-12.79	-12.01/-12.69	-13.35/-12.80	-13.37/-14.55	-12.96/-11.79	-10.78/-11.53	-13.01/-11.42	-10.93/-10.99	-12.99/-13.37
5.3GPol.	TotalAnt. 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gain	Φ(0°)Φ(10°)	Φ(20°)Φ(30°)	Φ(40°)Φ(50°)	Φ(60°)Φ(70°)														



Antenna Pattern of 2.4GHz, 5GHz U-NII 1 and U-NII 2A

Appendix C

θ (60°)	-2.24/-1.53	1.03/2.08	1.38/-0.89	-0.58/-0.43	-0.96/-1.36	-1.44/-0.56	0.75/1.66	1.46/0.93	0.79/1.39	1.51/1.32	-0.20/-1.90	-3.89/-5.67	-4.37/-3.80	-4.79/-4.16	-5.42/-5.76	-6.55/-5.15	-2.16/-1.79	-1.92/-1.45
θ (70°)	-3.72/-4.39	-1.48/-0.28	-0.49/-2.48	-1.75/-0.81	-1.03/-0.60	0.21/0.24	0.85/2.44	3.39/2.48	1.25/-0.42	-0.22/0.84	-0.67/-0.84	-1.57/-3.52	-1.22/-2.14	-3.67/-5.62	-5.74/-4.94	-6.97/-5.38	-3.28/-3.87	-3.80/-2.55
θ (80°)	-7.68/-10.59	-3.53/-1.73	-3.43/-3.58	-3.91/-3.79	-3.47/-4.10	-0.00/0.01	-0.38/-1.16	1.32/0.11	-0.47/-0.27	-1.74/-3.19	-0.76/-3.19	-7.82/-4.54	-10.76/-12.99	-11.97/-11.68	-7.82/-6.76	-4.49/-4.41	-5.15/-5.60	-
θ (90°)	-8.86/-8.71	-5.55/-4.36	-3.90/-5.22	-6.42/-4.74	-4.31/-3.67	-3.70/-3.85	-2.89/-0.41	0.33/-0.47	-1.14/-0.30	1.46/0.28	-2.04/-2.53	-4.44/-3.50	0.04/-2.36	-9.82/-11.86	-10.75/-12.48	-8.99/-13.02	-8.12/-5.12	-5.98/-4.70
θ (100°)	-8.86/-12.59	-12.15/-8.92	-7.05/-9.05	-9.86/-6.86	-5.83/-7.74	-7.35/-4.58	-3.72/-3.26	-3.86/-3.81	1.09/-1.09	-2.47/-5.37	-3.14/-4.14	-4.19/-4.05	-6.76/-13.22	-9.76/-14.29	-8.59/-7.57	-6.13/-9.01	-8.13/-9.01	-7.21/-9.72
θ (110°)	-9.96/-13.20	-7.75/-9.36	-8.04/-12.84	-11.55/-6.99	-6.21/-9.60	-5.40/-4.83	-5.08/-6.84	-5.40/-4.04	-2.41/-0.39	-0.03/-0.44	-6.89/-4.56	-6.65/-5.35	-13.23/-9.37	-10.59/-11.39	-	-	-	-
θ (120°)	-12.67/-14.59	-12.68/-15.15	-12.24/-11.34	-10.93/-7.77	-6.49/-6.48	-6.33/-5.85	-5.24/-3.99	-5.29/-5.43	-3.97/-3.30	-3.34/-1.57	-1.71/-1.93	-1.17/-3.60	-6.53/-8.39	-10.74/-15.76	-11.62/-6.13	-15.59/-12.02	-8.51/-6.84	-11.29/-10.85
θ (130°)	-9.97/-8.80	-8.60/-8.68	-7.39/-8.06	-9.55/-9.52	-5.49/-3.20	-2.62/-1.98	-1.30/-1.17	0.18/0.48	-1.29/-3.22	-3.91/-4.92	-8.86/-7.12	-5.75/-7.79	-9.37/-6.20	-7.75/-10.58	-14.80/-7.62	-10.14/-15.74	-14.07/-13.96	-9.17/-9.85
θ (140°)	-14.67/-10.82	-10.10/-12.88	-11.30/-8.90	-9.84/-8.72	-8.55/-6.75	-4.79/-4.02	-3.64/-1.46	0.01/0.12	-0.76/-0.52	-1.58/-4.05	-6.62/-7.10	-11.59/-12.22	-14.13/-14.80	-9.65/-11.82	-8.93/-6.94	-12.12/-12.22	-15.38/-15.76	-15.92/-14.90
θ (150°)	-14.57/-13.28	-12.71/-11.05	-9.49/-7.17	-6.49/-7.15	-8.07/-9.98	-12.01/-10.03	-5.76/-3.66	-2.54/-2.63	-2.60/-2.30	-3.07/-3.79	-4.86/-5.24	-7.20/-8.18	-7.09/-7.56	-8.59/-8.09	-6.15/-5.49	-6.26/-8.15	-13.18/-15.34	-15.92/-15.63
θ (160°)	-9.79/-9.96	-9.86/-8.08	-6.66/-5.54	-5.56/-6.26	-6.54/-5.77	-4.79/-4.02	-3.54/-3.65	-3.45/-2.34	-1.21/-0.90	-1.36/-2.15	-3.71/-5.54	-9.05/-13.69	-12.12/-11.47	-12.21/-15.38	-14.98/-10.98	-8.73/-9.91	-14.32/-13.33	-13.07/-10.37
θ (170°)	-11.83/-13.03	-13.40/-12.91	-11.01/-8.05	-6.57/-5.88	-5.21/-4.37	-11.37/-13.94	-4.18/-5.34	-2.85/-3.64	-0.73/-0.96	-1.57/-1.99	-11.57/-10.74	-10.12/-11.28	-13.01/-13.78	-10.99/-12.01	-14.85/-13.52	-12.80/-11.84	-	-
θ (180°)	-10.01/-10.29	-10.92/-11.34	-12.38/-11.75	-10.81/-10.44	-11.10/-12.66	-12.58/-12.83	-14.05/-14.49	-14.25/-13.61	-13.75/-15.24	-13.84/-12.37	-11.73/-11.23	-11.31/-11.91	-12.40/-11.50	-9.72/-8.11	-8.89/-9.68	-11.54/-12.36	-12.10/-12.11	-11.26/-10.89
Freq(Hz)	2.45GPol.	TotalAnt. 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gain	Φ(0°)Φ(10°)	Φ(20°)Φ(30°)	Φ(40°)Φ(50°)	Φ(60°)Φ(70°)	Φ(80°)Φ(90°)	Φ(100°)Φ(110°)	Φ(120°)Φ(130°)	Φ(140°)Φ(150°)	Φ(160°)Φ(170°)	Φ(180°)Φ(190°)	Φ(200°)Φ(210°)	Φ(220°)Φ(230°)	Φ(240°)Φ(250°)	Φ(260°)Φ(270°)	Φ(280°)Φ(290°)	Φ(300°)Φ(310°)	Φ(320°)Φ(330°)	Φ(340°)Φ(350°)
θ (0°)	2.03/1.79	2.11/2.02	2.18/2.09	2.07/1.99	1.55/1.25	0.89/0.93	1.02/1.52	1.90/1.92	1.97/2.03	2.04/2.10	2.14/2.33	2.44/2.15	2.04/1.86	1.78/1.17	0.96/1.51	1.50/1.46	1.37/1.73	1.75/1.58
θ (10°)	2.29/2.05	1.87/2.20	1.91/1.82	1.64/1.56	1.21/0.62	0.20/-0.01	0.37/0.58	0.87/1.17	1.20/1.26	1.43/1.89	1.78/2.00	2.23/2.04	1.96/2.03	1.78/1.90	1.94/1.90	1.75/1.96	2.22/2.32	2.30/2.46
θ (20°)	2.96/2.64	2.22/1.94	1.87/1.45	1.46/1.02	-0.09/0.19	-0.46/0.10	1.32/1.32	1.99/1.93	1.99/1.85	1.94/2.21	1.99/1.85	1.94/2.21	2.22/2.03	1.94/2.21	2.22/2.03	2.22/2.03	2.22/2.03	2.22/2.03
θ (30°)	3.33/2.86	2.38/2.12	1.38/0.69	0.48/0.00	-0.89/-2.36	-3.67/-5.20	-5.32/-4.29	-2.97/-1.87	-1.24/-0.70	-0.62/0.11	0.26/0.56	0.91/0.93	1.11/1.28	1.37/1.59	1.80/1.67	2.13/2.07	2.54/3.05	3.38/3.57
θ (40°)	3.41/3.08	2.66/1.83	1.04/0.44	-0.03/-0.83	-2.08/-3.93	-5.73/-7.99	-9.61/-8.10	-5.72/-3.81	-2.58/-1.75	-1.68/-1.78	-1.40/-1.08	-1.01/-0.94	-0.34/-0.39	-0.39/0.23	0.74/1.43	1.40/1.79	2.52/2.63	3.29/3.60
θ (50°)	3.20/3.09	2.85/1.76	1.09/0.07	-1.32/-2.90	-4.67/-4.52	-7.23/-7.74	-9.00/-10.68	-4.00/-3.42	-3.92/-3.03	-2.35/-1.62	-2.35/-1.62	-4.00/-3.42	-2.35/-1.62	-4.00/-3.42	-2.35/-1.62	-4.00/-3.42	-2.35/-1.62	-4.00/-3.42
θ (60°)	3.26/3.13	2.36/0.89	-0.60/-1.89	-3.63/-5.60	-7.40/-8.77	-9.66/-10.37	-11.86/-11.85	-9.95/-7.67	-7.49/-8.01	-7.05/-6.34	-5.70/-4.63	-4.95/-4.63	-5.19/-4.59	-3.22/-1.93	-1.26/-0.91	-0.44/0.77	2.01/2.15	3.01/3.18
θ (70°)	3.12/3.00	1.71/0.53	-0.97/-1.70	-2.03/-3.61	-5.97/-8.08	-11.09/-13.74	-15.05/-13.58	-8.77/-5.71	-6.97/-8.81	-6.32/-6.85	-6.08/-4.54	-5.88/-4.65	-5.75/-4.64	-3.54/-2.06	-1.02/0.78	-0.49/0.21	1.52/2.91	3.54/3.43
θ (80°)	2.42/2.10	1.40/0.05	-0.51/-0.91	-1.98/-3.51	-11.00/-15.32	-12.00/-11.04	-15.18/-15.86	-8.86/-8.62	-12.00/-11.04	-7.75/-7.18	-6.47/-6.81	-4.61/-3.12	-1.44/0.20	1.14/1.60	2.10/2.23	3.12/3.24	-	-
θ (90°)	2.41/1.58	0.27/-0.98	-0.97/-1.59	-3.41/-6.96	-10.48/-10.12	-10.29/-11.87	-13.99/-12.87	-9.77/-6.56	-7.01/-8.94	-12.10/-11.85	-9.77/-5.17	-4.39/-5.92	-7.80/-9.16	-8.10/-5.19	-1.96/0.71	2.54/2.96	3.07/2.98	2.94/2.78
θ (100°)	2.42/0.94	0.04/-0.13	-1.44/-3.27	-5.30/-8.93	-9.42/-9.18	-10.53/-12.34	-13.57/-10.12	-7.56/-7.14	-8.44/-9.32	-8.94/-9.56	-6.83/-6.01	-4.74/-6.87	-9.41/-9.01	-7.21/-5.17	-1.82/1.03	2.90/3.57	3.44/3.03	3.19/3.08
θ (110°)	2.14/0.37	-0.50/-1.68	-3.22/-5.99	-6.93/-5.29	-4.11/-5.34	-9.48/-15.74	-15.12/-10.99	-7.53/-9.70	-10.34/-8.38	-9.88/-10.83	-6.31/-9.40	-7.72/-7.54	-2.80/0.04	2.18/2.86	2.61/2.36	2.61/2.36	2.61/2.36	2.61/2.36
θ (120°)	0.78/-0.41	-2.19/-3.56	-5.40/-6.88	-5.59/-3.99	-4.18/-5.90	-9.15/-15.38	-15.53/-11.53	-10.13/-14.03	-11.46/-8.25	-10.12/-11.77	-13.12/-12.75	-5.23/-3.93	-6.23/-7.97	-7.97/-7.07	-3.76/-1.00	1.10/2.44	2.18/0.91	0.90/1.22
θ (130°)	-0.16/-1.57	-3.49/-5.98	-7.51/-8.37	-7.51/-6.32	-5.81/-5.55	-8.20/-10.70	-13.48/-15.53	-14.01/-11.98	-8.69/-9.02	-11.85/-10.80	-8.43/-6.25	-3.55/-3.72	-4.85/-5.36	-7.39/-6.67	-3.67/-1.31	0.55/1.82	2.27/1.42	0.40/0.12
θ (140°)	-2.07/-2.68	-4.24/-6.69	-8.44/-8.09	-7.15/-6.69	-6.48/-6.84	-7.52/-9.24	-11.69/-12.76	-12.90/-12.85	-13.28/-11.25	-9.90/-8.28	-6.48/-4.70	-1.41/-0.42	-5.30/-5.22	-3.54/-2.22	-1.41/-0.26	0.09/0.70	1.22/2.09	-
θ (150°)	-3.44/-3.93	-5.23/-7.05	-8.04/-9.33	-10.38/-10.87	-10.61/-10.35	-9.83/-10.47	-10.88/-9.10	-9.09/-9.89	-12.07/-12.50	-13.15/-11.78	-10.80/-8.53	-6.74/-7.14	-4.08/-3.74	-2.18/-2.03	-2.38/-2.18	-1.22/-2.03	-2.23/-3.03	-
θ (160°)	-6.07/-6.92	-8.90/-10.46	-12.41/-14.72	-15.08/-12.77	-11.94/-11.34	-10.44/-9.26	-8.94/-8.72	-8.51/-9.27	-10.58/-11.57	-12.75/-12.91	-11.54/-10.36	-8.19/-8.48	-6.52/-8.41	-8.75/-9.97	-7.55/-6.88	-6.42/-5.84	-4.98/-5.29	-
θ (170°)	-10.50/-11.94	-13.99/-13.94	-12.91/-11.91	-11.03/-9.94	-9.31/-9.04	-9.77/-10.79	-11.99/-12.59	-13.17/-13.54	-13.40/-12.76	-12.06/-9.90	-8.45/-8.90	-8.86/-10.30	-11.14/-10.40	-10.27/-10.82	-10.62/-10.56	-9.70/-9.37	-	-
θ (180°)	-14.21/-14.17	-12.84/-11.64	-10.22/-9.52	-6.66/-9.82	-12.87/-10.19	-11.80/-12.63	-12.74/-12.39	-11.80/-10.93	-9.05/-11.40	-8.43/-8.20	-8.61/-9.40	-10.59/-11.43	-11.95/-12.88	-12.43/-13.46	-	-	-	-
Freq(Hz)	5.2GPol.	TotalAnt. 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gain	Φ(0°)Φ(10°)	Φ(20°)Φ(30°)	Φ(40°)Φ(50°)	Φ(60°)Φ(70°)	Φ(80°)Φ(90°)	Φ(100°)Φ(110°)	Φ(120°)Φ(130°)	Φ(140°)Φ(150°)	Φ(160°)Φ(170°)	Φ(180°)Φ(190°)	Φ(200°)Φ(210°)	Φ(220°)Φ(230°)	Φ(240°)Φ(250°)	Φ(260°)Φ(270°)	Φ(280°)Φ(290°)	Φ(300°)Φ(310°)	Φ(320°)Φ(330°)	Φ(340°)Φ(350°)
θ (0°)	-0.20/-0.05	-0.22/0.20	-0.13/0.41	0.49/0.21	-0.66/-0.58	-0.57/-0.83	-1.12/-1.19	-0.86/-0.75	-0.57/-0.42	-0.16/-0.16	-0.07/-0.17	-0.13/-0.52	-0.72/-0.50	-0.55/-0.36	-0.25/-0.25	-0.51/-0.34	-0.49/-0.80	-
θ (10°)	-1.21/-1.04	-1.22/-1.16	-1.29/-0.96	-1.02/-1.17	-1.58/-1.85	-1.66/-1.74	-1.63/-1.03	-0.25/0.23	-0.16/-0.05	0.00/0.32	0.24/0.09	0.21/0.08	0.17/-0.41	-0.85/-1.38	-1.43/-1.11	-0.68/-0.58	-1.36/-1.64	-1.45/-1.27
θ (20°)	0.28/0.07	-0.81/-1.02	-1.03/-1.75	-2.45/-2.78	-2.88/-2.01	-1.53/-1.96	-2.35/-1.44	-0.45/-0.05	-0.30/-0.09	0.69/1.23	1.30/1.43	1.21/1.17	0.63/-0.07	-1.38/-1.95	-2.10/-2.88	-2.52/-2.02	-1.43/-1.00	-0.31/0.29
θ (30°)	1.07/0.53	-0.01/0.45	-1.67/-3.83	-4.66/-3.63	-6.69/0.64	-1.86/-0.84	-1.37/-1.26	-0.69/0.66	1.48/1.77	2.04/2.49	-0.94/-1.17	1.31/1.05	0.34/0.80	2.18/1.99	1.02/0.58	0.47/-0.30	-0.60/-0.43	-0.11/1.12
θ (40°)	0.25/0.51	-0.22/-1.87	-4.84/-7.10	-7.06/-5.94	-4.31/-3.26	-3.18/-2.97	-3.71/-3.49	-4.13/-2.78	-0.83/1.78	2.20/2.61	1.73/2.29	3.24/3.48	3.10/2.41	1.54/0.19	-0.80/-0.43	-0.46/-0.14	-0.54/-0.67	-
θ (50°)	-0.20/0.55	-0.62/-2.14	-2.64/-4.00	-4.92/-4.29	-1.89/-3.34	-6.50/-8.74	-6.14/-5.18	-5.02/-3.75	-1.05/1.47	1.24/1.08	1.13/1.49	2.19/2.56	1.61/1.52	1.37/1.67	1.43/0.74	0.20/-0.72	-0.38/-0.34	0.16/-0.90
θ (60°)	-0.72/-0.30	-1.24/-2.76	-3.89/-6.02	-4.65/-4.67	-3.29/-3.63	-1.09/-11.24	-0.33/-6.09	-4.65/-4.67	-1.03/0.69	1.26/0.31	-0.03/-0.46	1.30/0.63	1.95/2.02	1.72/1.55	1.95/2.02	0.34/0.44	-0.52/-1.70	-
θ (70°)	-2.12/-1.82	-2.12/-3.27	-2.60/-2.78	-1.28/-2.12	-4.60/-9.48	-15.80/-15.55	-10.65/-7.37	-5.56/-6.40	-4.97/-0.69	-0.42/-2.44	-3.88/-2.66	-3.24/-2.07	0.21/0.79	0.20/0.85	2.37/2.55	0.89/0.13	-0.02/-0.53	-2.05/-2.99
θ (80°)	-2.47/-0.84	-1.28/-2.67	-2.39/-4.28	-6.35/-5.65	-5.70/-8.47	-10.75/-9.04	-8.15/-9.72	-9.87/-10.26	-9.46/-3.85	-3.41/-3.14	-6.61/-5.68	-2.59/-0.94	0.43/-0.92	-0.00/-0.20	0.69/0.96	0.78/0.15	0.91/0.69	-0.17/-2.18
θ (90°)	-2.35/-2.23	-2.63/-4.21	-2.32/-2.45	-6.13/-6.63	-6.28/-10.87	-13.84/-15.90	-11.87/-8.34	-10.19/-14.14	-9.03/-6.04	-6.28/-4.00	-4.50/-5.66	-2.39/-0.99	-2.05/-6.83	-3.09/-0.46	-2.05/-0.46	-0.93/-0.46	-0.93/-2.58	-

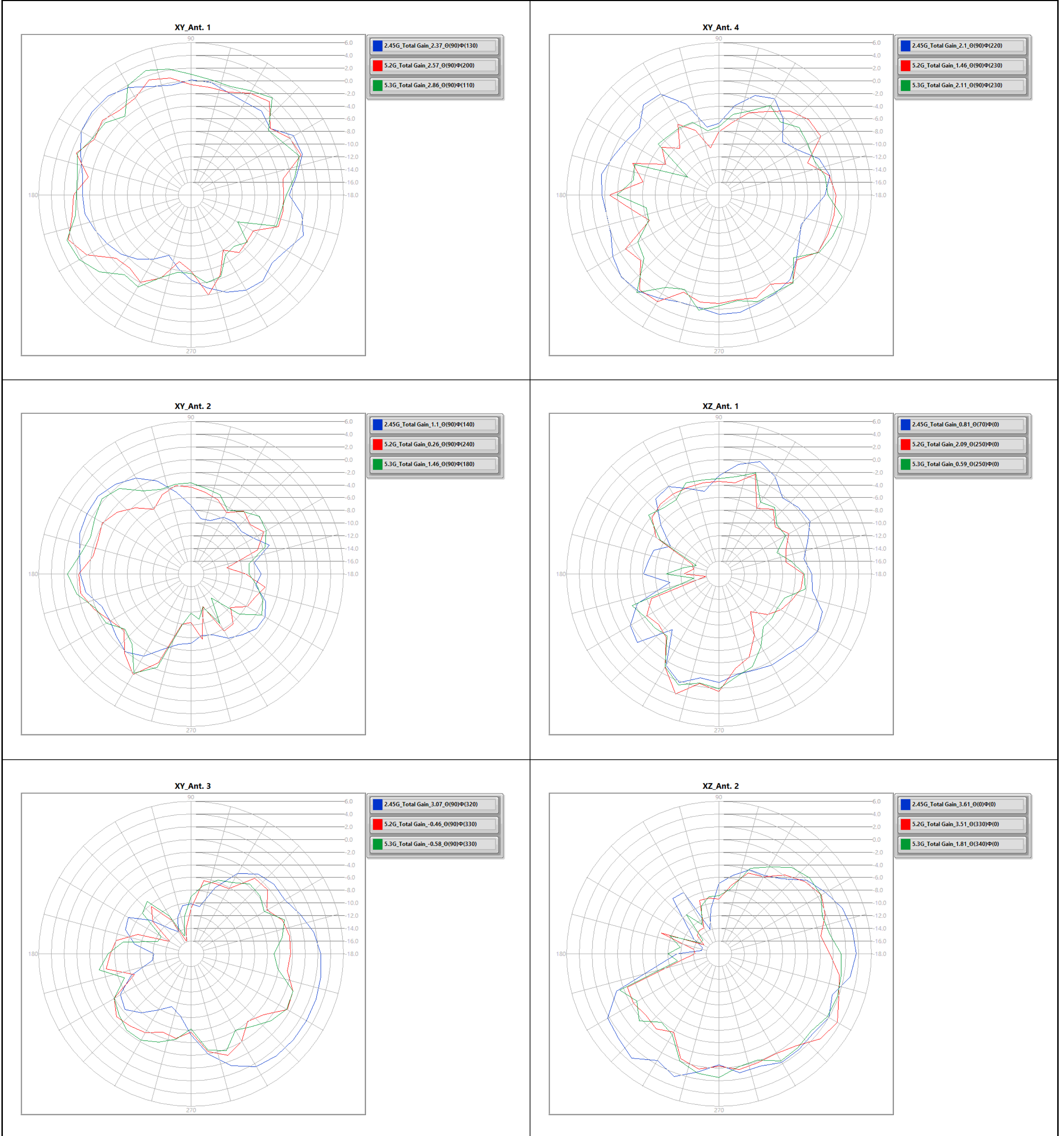


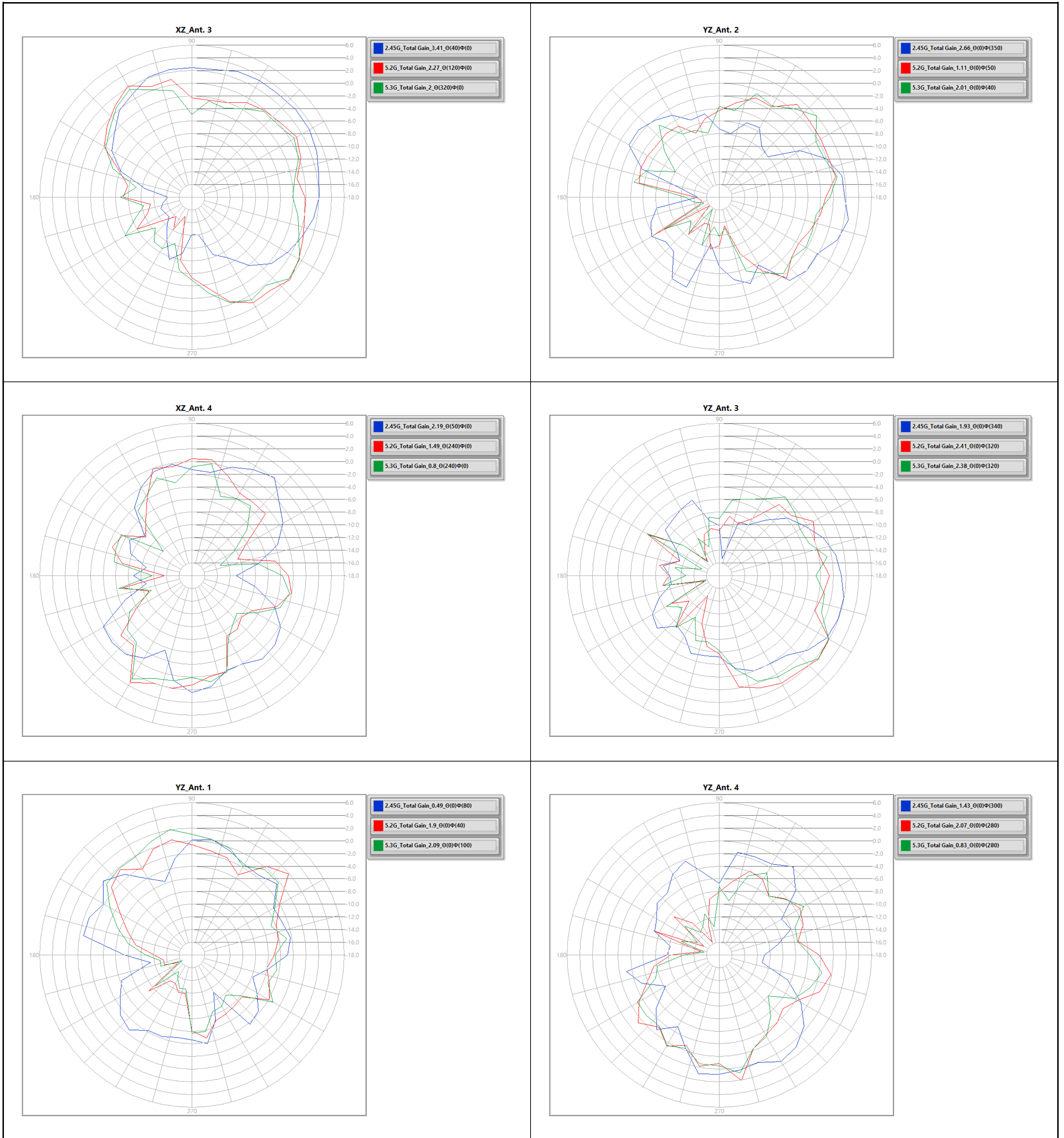
Antenna Pattern of 2.4GHz, 5GHz U-NII 1 and U-NII 2A

Appendix C

θ(160°)	-4.65/-7.71	-7.21/-5.28	-5.87/-6.97	-8.50/-7.49	-5.93/-7.00	-10.46/-13.74	-13.05/-11.71	-7.21/-5.45	-7.93/-10.72	-10.82/-8.94	-9.04/-9.02	-8.73/-7.47	-6.10/-4.29	-4.85/-5.96	-5.33/-5.23	-5.29/-6.45	-7.45/-5.16	-2.52/-4.04
θ(170°)	-6.87/-9.72	-8.49/-8.93	-12.30/-15.32	-14.98/-15.11	-15.54/-15.05	-15.08/-11.71	-9.23/-7.65	-8.06/-8.27	-7.49/-6.64	-6.88/-7.37	-7.51/-6.27	-6.45/-6.92	-7.61/-7.33	-6.92/-7.54	-7.60/-6.39	-4.79/-5.23	-3.81/-3.18	-3.71/-4.83
θ(180°)	-13.69/-12.06	-11.09/-10.93	-12.44/-11.14	-11.61/-11.45	-11.50/-10.34	-11.57/-13.40	-12.35/-10.13	-9.33/-9.24	-8.06/-7.29	-7.62/-8.53	-8.68/-7.28	-6.52/-6.64	-6.86/-6.72	-6.19/-5.95	-6.40/-6.34	-6.55/-5.71	-5.73/-6.66	-10.34/-13.42
Freq(Hz)	5.3G/Pol	TotalAnt 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gain	Φ(0°)Φ(10°)	Φ(20°)Φ(30°)	Φ(40°)Φ(50°)	Φ(60°)Φ(70°)	Φ(80°)Φ(90°)	Φ(100°)Φ(110°)	Φ(120°)Φ(130°)	Φ(140°)Φ(150°)	Φ(160°)Φ(170°)	Φ(180°)Φ(190°)	Φ(200°)Φ(210°)	Φ(220°)Φ(230°)	Φ(240°)Φ(250°)	Φ(260°)Φ(270°)	Φ(280°)Φ(290°)	Φ(300°)Φ(310°)	Φ(320°)Φ(330°)	Φ(340°)Φ(350°)
θ(0°)	-3.71/-4.19	-4.13/-4.86	-4.27/-3.72	-3.80/-3.72	-4.12/-3.71	-3.22/-3.29	-4.03/-3.73	-3.37/-3.84	-4.32/-3.90	-3.96/-4.55	-4.93/-5.37	-5.00/-4.80	-4.90/-4.98	-4.79/-4.63	-4.36/-4.44	-3.84/-3.60	-4.46/-4.39	-4.55/-4.10
θ(10°)	-7.42/-6.54	-6.42/-7.00	-6.04/-5.63	-6.27/-5.11	-5.64/-5.44	-5.56/-4.21	-4.16/-4.27	-3.82/-3.24	-2.84/-2.47	-2.35/-2.42	-2.51/-1.72	-1.04/-0.80	-0.78/-0.91	-0.99/-1.56	-1.06/-1.78	-2.37/-2.79	-3.38/-4.16	-5.12/-6.70
θ(20°)	-13.28/-13.57	-11.41/-11.03	-9.88/-7.62	-6.49/-5.88	-5.44/-5.27	-4.88/-5.03	-5.05/-4.16	-3.24/-3.00	-2.65/-2.88	-3.19/-3.82	-3.09/-2.01	-1.17/-0.97	-1.05/-1.63	-2.26/-2.83	-3.48/-4.54	-5.58/-5.98	-6.96/-10.01	-9.81/-11.75
θ(30°)	-10.38/-7.96	-9.62/-8.75	-7.16/-5.25	-4.80/-4.45	-3.88/-2.66	-3.00/-4.16	-4.27/-4.47	-6.08/-6.75	-5.39/-5.32	-6.27/-5.52	-3.33/-1.34	-1.81/-2.74	-3.62/-3.99	-3.89/-4.29	-6.41/-7.31	-6.93/-8.05	-8.87/-11.45	-15.23/-13.05
θ(40°)	-6.62/-5.07	-4.28/-3.75	-3.09/-1.43	-1.16/-1.76	-2.15/-4.38	-5.52/-4.53	-3.96/-5.65	-6.38/-6.89	-7.23/-7.48	-8.74/-10.37	-5.42/-2.63	-2.68/-4.42	-5.14/-6.36	-7.24/-7.92	-7.05/-6.80	-8.36/-8.31	-4.53/-5.54	-7.23/-10.63
θ(50°)	-3.64/-3.19	-4.22/-4.15	-2.35/-0.54	-0.53/-1.83	-3.94/-5.85	-4.51/-3.77	-4.02/-4.50	-4.84/-6.16	-6.98/-9.42	-7.99/-12.20	-6.57/-6.25	-6.14/-3.18	-3.91/-7.28	-7.00/-5.41	-5.56/-4.86	-5.62/-4.97	-2.46/-1.68	-1.54/-3.77
θ(60°)	-3.97/-4.92	-3.74/-1.81	0.61/0.72	0.06/-1.09	-2.02/-3.03	-3.57/-2.01	-2.75/-5.41	-7.49/-6.51	-5.47/-9.46	-6.57/-6.51	-6.94/-8.42	-7.34/-4.36	-6.24/-5.49	-3.87/-3.18	-2.99/-2.35	-3.19/-3.94	-2.70/-0.47	1.63/0.43
θ(70°)	-4.73/-3.54	-2.26/-0.94	0.55/-1.54	-1.22/-2.82	-3.98/-4.70	-3.21/-2.90	-3.85/-7.50	-10.29/-12.64	-6.77/-10.19	-1.87/-7.08	-7.13/-7.86	-4.65/-1.03	-2.34/-4.94	-2.11/-2.27	-1.49/-1.40	-0.44/-2.10	-2.07/-0.02	0.98/-0.30
θ(80°)	-0.11/-1.99	-1.26/-2.14	0.29/-2.74	-1.26/-2.87	-6.66/-9.29	-8.51/-5.14	-3.65/-6.78	-8.15/-15.71	-4.96/-11.62	-1.02/-5.12	-5.60/-1.52	-2.91/-0.25	-1.78/-0.97	0.94/0.83	-0.23/-0.81	0.56/-0.35	1.06/-0.85	-0.18/2.54
θ(90°)	-0.85/-0.99	-2.05/-1.87	-1.47/-2.96	-1.73/-3.90	-5.12/-7.26	-7.74/-5.84	-5.69/-6.77	-5.51/-12.32	-3.88/-4.36	-1.95/-6.37	-6.21/-3.23	-2.55/2.11	-1.21/-2.21	0.41/-0.52	-1.11/-0.10	-0.35/0.11	-2.65/0.15	1.07/1.71
θ(100°)	-3.17/-1.79	-1.63/-4.89	-3.06/-4.24	-8.11/-8.36	-11.63/-13.50	-8.43/-10.13	-14.15/-14.87	-6.88/-12.54	-3.45/-4.70	-1.21/-1.29	-7.03/-1.98	-3.12/-1.62	-4.57/-2.00	0.45/-0.55	-4.42/-2.85	-2.77/-2.94	-1.30/-1.49	-0.30/-2.29
θ(110°)	-1.60/-2.79	-2.80/-4.48	-2.93/-6.32	-7.37/-9.20	-11.01/-11.16	-9.91/-7.68	-9.24/-13.63	-8.22/-10.09	-5.11/-6.36	-0.73/-5.00	-11.09/-3.96	-1.55/1.60	-3.62/-0.11	1.30/-2.31	-0.71/-0.87	-1.31/0.56	-2.12/-4.07	0.69/-1.15
θ(120°)	-3.54/-3.48	-6.20/-6.30	-9.11/-7.18	-13.99/-12.22	-13.42/-12.81	-15.41/-14.88	-8.47/-6.45	-2.12/-8.84	0.80/-5.31	-15.58/-3.63	-1.78/-0.21	-3.08/0.62	3.98/-1.51	2.30/-2.25	-0.40/-4.74	-5.84/-1.60	-1.01/-1.87	
θ(130°)	-4.72/-7.22	-14.31/-11.65	-5.77/-5.40	-7.42/-9.40	-12.58/-13.32	-13.04/-11.29	-12.78/-15.01	-10.67/-15.53	-12.86/-6.06	-4.37/-10.86	-8.71/-8.38	-0.77/-4.01	-6.23/-1.48	2.33/-3.34	0.80/0.36	0.14/-8.11	-6.21/-4.65	-1.97/-2.77
θ(140°)	-12.04/-9.54	-8.24/-12.36	-14.84/-16.00	-15.24/-14.03	-14.51/-10.92	-11.16/-13.96	-16.14/-7.06	-4.61/-9.11	-9.77/-6.05	-4.72/-6.70	-12.67/-7.27	-7.17/-10.23	-3.22/2.68	1.27/-3.11	-2.12/-1.08	-3.82/-6.80	-13.31/-6.27	-8.50/-11.52
θ(150°)	-5.10/-5.44	-8.63/-10.02	-11.51/-9.75	-7.95/-11.69	-12.25/-13.94	-14.69/-14.63	-13.66/-10.33	-11.10/-7.96	-5.01/-6.59	-6.69/-7.57	-8.12/-9.48	-13.63/-14.05	-6.59/-1.44	-1.31/-3.08	-4.48/-5.61	-8.51/-14.42	-10.99/-10.25	-10.13/-6.88
θ(160°)	-5.27/-7.81	-8.16/-6.01	-6.06/-7.60	-11.19/-12.26	-11.84/-11.61	-13.57/-14.69	-15.39/-14.29	-10.84/-10.01	-13.03/-14.78	-11.22/-8.32	-8.55/-8.76	-7.69/-7.57	-7.49/-6.65	-7.38/-7.31	-6.06/-5.51	-5.81/-5.77	-7.05/-6.40	-3.45/-4.03
θ(170°)	-5.54/-10.24	-12.51/-12.82	-13.96/-14.75	-14.72/-14.72	-15.23/-15.59	-14.33/-11.47	-8.88/-7.93	-7.33/-6.17	-5.84/-5.52	-6.29/-7.12	-8.04/-7.53	-7.23/-7.12	-7.99/-8.59	-8.82/-8.13	-6.70/-5.22	-4.11/-3.77	-3.17/-3.58	-3.72/-3.91
θ(180°)	-11.77/-9.51	-8.67/-10.34	-11.42/-9.80	-8.67/-9.07	-10.89/-12.34	-11.13/-9.66	-9.86/-9.95	-9.30/-8.36	-7.70/-7.69	-7.86/-7.93	-7.77/-6.25	-5.45/-5.19	-5.71/-5.79	-5.89/-5.82	-5.67/-6.13	-5.83/-5.50	-5.52/-7.35	-9.41/-11.04

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







Antenna Pattern of 5GHz U-NII 2C and U-NII 3

Appendix D

Total Gain Data

Freq(Hz)	5.6GPol.	TotalAnt. 1	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Gain	Φ(0°)Φ(10°)	Φ(20°)Φ(30°)	Φ(40°)Φ(50°)	Φ(60°)Φ(70°)	Φ(80°)Φ(90°)	Φ(100°)Φ(110°)	Φ(120°)Φ(130°)	Φ(140°)Φ(150°)	Φ(160°)Φ(170°)	Φ(180°)Φ(190°)	Φ(200°)Φ(210°)	Φ(220°)Φ(230°)	Φ(240°)Φ(250°)	Φ(260°)Φ(270°)	Φ(280°)Φ(290°)	Φ(300°)Φ(310°)	Φ(320°)Φ(330°)	Φ(340°)Φ(350°)
θ(0°)	-2.14/-1.85	-1.74/-1.72	-1.59/-1.50	-1.11/-1.09	-1.51/-0.68	-1.13/-1.17	-0.81/-0.82	-1.11/-1.17	-0.84/-1.06	-1.10/-1.34	-1.37/-1.26	-1.38/-1.25	-1.43/-1.65	-1.09/-1.24	-1.47/-1.60	-1.47/-1.43	-2.02/-2.03	-2.01/-2.24
θ(10°)	-1.02/-1.58	-2.43/-2.65	-2.80/-3.00	-2.81/-2.01	-2.34/-2.94	-2.92/-2.70	-2.64/-2.75	-2.80/-2.78	-2.58/-2.08	-1.62/-1.57	-1.85/-2.01	-2.07/-2.30	-2.13/-2.52	-2.53/-1.45	-1.96/-2.93	-2.01/-1.15	-1.00/-0.87	-0.87/-0.71
θ(20°)	-1.49/-3.24	-3.56/-2.74	-2.36/-2.10	-2.47/-1.72	-1.32/-2.53	-3.77/-2.45	-1.84/-2.63	-2.98/-2.71	-2.16/-0.73	-0.69/-1.37	-1.19/-0.79	-1.19/-2.14	-2.47/-2.76	-3.88/-6.45	-4.44/-4.78	-4.23/-3.93	-2.90/-1.79	-1.23/-1.00
θ(30°)	-2.43/-3.74	-2.32/-1.48	-1.12/-1.01	-1.31/-1.21	-3.21/-3.17	-2.87/-3.53	-0.76/-0.41	-1.21/-1.84	-0.79/-0.85	-0.90/-1.47	-0.09/-0.15	-0.27/-0.29	-2.08/-3.74	-0.98/-1.47	-4.74/-4.63	-3.83/-3.54	-3.21/-2.00	-1.26/-0.78
θ(40°)	-1.65/-1.94	-1.45/-1.03	-1.27/-1.42	-1.79/-2.49	-1.78/-1.93	-4.70/-6.24	-4.80/-4.45	-2.06/-1.36	-0.80/-1.01	1.12/0.46	0.81/1.57	1.44/1.20	0.27/0.15	-0.74/-2.47	-3.66/-3.70	-3.60/-2.51	-1.35/-1.65	-1.32/-0.92
θ(50°)	-1.62/-1.95	-0.86/-0.49	-0.87/-0.75	-0.78/-1.42	-1.43/-2.84	-5.65/-6.57	-7.50/-6.20	-3.44/-1.98	0.18/1.19	0.45/0.68	1.18/1.80	1.29/0.57	0.88/0.47	-1.44/-1.75	-3.19/-4.67	-4.10/-3.61	-1.58/-2.50	-1.67/-1.90
θ(60°)	-0.57/-1.23	-0.25/-0.97	-2.10/-1.96	-1.23/-1.03	-1.84/-2.84	-3.65/-6.78	-7.04/-5.05	-4.10/-4.59	-0.18/1.61	1.03/1.38	2.20/1.82	2.20/1.82	1.33/1.69	-1.00/-1.82	-3.03/-5.75	-4.52/-3.59	-1.93/-1.93	-0.85/-0.83
θ(70°)	-0.30/-0.55	-0.95/-1.76	-2.28/-1.46	-0.77/-0.46	-0.60/-3.46	-6.06/-9.02	-10.49/-8.52	-6.71/-5.51	-0.81/0.37	-0.43/1.12	1.51/1.20	0.86/0.88	0.38/-1.16	-2.56/-2.44	-3.52/-8.00	-8.12/-6.52	-4.30/-2.62	-1.25/-1.04
θ(80°)	0.43/0.63	0.19/-0.82	-2.13/-1.17	-0.80/0.02	-1.18/-3.18	-5.23/-5.56	-8.20/-9.93	-9.34/-6.64	-2.29/-1.67	-1.42/-0.11	-0.06/-0.71	-1.60/-3.20	-4.20/-8.86	-4.17/-5.84	-8.10/-6.43	-2.50/-2.02	-2.13/-0.50	-2.13/-0.50
θ(90°)	-0.03/0.96	0.10/-0.49	-0.15/-0.57	0.68/0.91	-0.89/-1.17	-1.46/-1.76	-1.08/-1.57	-0.15/-0.74	-0.88/-1.17	-1.46/-1.28	-0.93/-1.17	-2.27/-2.45	-4.83/-4.42	-4.37/-8.39	-8.02/-4.49	-8.02/-4.49	-2.87/-0.10	-2.87/-0.10
θ(100°)	-0.39/1.14	0.92/-0.85	-0.58/0.02	1.07/0.32	-0.36/-2.06	-6.53/-3.66	-6.25/-9.19	-11.34/-10.03	-7.12/-5.25	-5.02/-4.83	-4.34/-5.26	-6.37/-6.90	-2.80/-2.67	-3.80/-6.05	-7.86/-10.08	-8.24/-8.42	-3.85/-4.81	-3.47/0.40
θ(110°)	0.39/0.64	0.44/0.06	-0.49/-0.13	0.32/0.01	-0.84/-2.57	-3.54/-3.08	-6.28/-7.08	-8.48/-12.88	-11.60/-6.80	-5.86/-6.37	-8.54/-13.04	-8.69/-7.02	-10.63/-11.79	-15.65/-12.14	-11.39/-10.24	-8.28/-6.44	-5.38/-0.66	-5.38/-0.66
θ(120°)	0.21/0.61	0.31/0.12	-0.14/-0.55	-0.85/0.86	-1.05/-0.70	-1.32/-2.75	-9.32/-9.68	-9.04/-6.27	-8.19/-9.84	-10.70/-9.95	-9.77/-12.17	-10.13/-12.07	-15.18/-16.27	-15.39/-12.14	-11.81/-9.11	-8.21/-5.55	-5.25/-1.82	-5.25/-1.82
θ(130°)	0.16/0.61	0.09/1.06	-1.08/-2.01	-2.23/-1.70	-2.56/-4.01	-6.04/-9.76	-11.24/-10.99	-12.19/-9.13	-7.05/-5.54	-8.32/-8.67	-10.29/-15.44	-14.68/-13.53	-10.92/-6.79	-8.17/-12.17	-14.44/-12.07	-15.69/-13.15	-10.42/-6.24	-3.86/-1.62
θ(140°)	0.00/0.84	1.23/0.46	-1.08/-1.87	-1.01/-8.59	-2.50/-3.43	-4.65/-5.15	-6.66/-7.97	-9.10/-8.59	-5.22/-3.21	-6.71/-15.37	-12.12/-11.51	-15.13/-15.19	-11.55/-9.96	-13.13/-14.38	-9.14/-9.09	-8.26/-6.83	-6.16/-2.48	-6.16/-2.48
θ(150°)	-2.42/-0.37	0.08/-0.03	-0.82/-2.82	-4.39/-6.05	-6.58/-7.10	-10.27/-12.15	-7.59/-8.41	-11.76/-7.68	-8.19/-9.94	-10.08/-8.51	-10.07/-14.57	-12.75/-11.69	-13.88/-9.80	-7.79/-10.15	-7.34/-6.61	-6.19/-5.17	-5.28/-4.02	-5.28/-4.02
θ(160°)	-4.21/-2.62	-2.03/-2.62	-3.63/-4.42	-5.34/-6.22	-6.18/-6.69	-8.18/-7.93	-7.29/-6.33	-5.02/-4.67	-6.64/-7.88	-8.61/-11.67	-14.54/-15.48	-13.88/-14.44	-12.03/-12.46	-10.44/-8.23	-7.36/-5.89	-5.30/-5.41	-5.09/-5.01	-5.09/-5.01
θ(170°)	-7.58/-7.48	-6.53/-5.74	-5.53/-5.91	-6.56/-6.46	-6.87/-6.72	-6.18/-6.13	-5.60/-7.03	-9.41/-11.52	-11.87/-13.61	-13.99/-13.77	-15.33/-15.95	-15.70/-14.64	-16.96/-14.81	-13.77/-13.26	-12.64/-13.85	-14.20/-11.80	-10.47/-10.93	-9.79/-8.81
θ(180°)	-12.32/-13.19	-14.58/-14.30	-13.28/-11.01	-10.92/-11.55	-8.49/-9.40	-13.46/-15.61	-15.51/-14.50	-9.91/-8.01	-9.33/-12.05	-15.17/-15.21	-14.85/-14.05	-13.72/-13.04	-13.37/-12.09	-9.85/-10.52	-12.25/-12.86	-13.06/-12.22	-11.31/-11.92	-12.17/-11.88
Freq(Hz)	5.785GPol.	TotalAnt. 1	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Gain	Φ(0°)Φ(10°)	Φ(20°)Φ(30°)	Φ(40°)Φ(50°)	Φ(60°)Φ(70°)	Φ(80°)Φ(90°)	Φ(100°)Φ(110°)	Φ(120°)Φ(130°)	Φ(140°)Φ(150°)	Φ(160°)Φ(170°)	Φ(180°)Φ(190°)	Φ(200°)Φ(210°)	Φ(220°)Φ(230°)	Φ(240°)Φ(250°)	Φ(260°)Φ(270°)	Φ(280°)Φ(290°)	Φ(300°)Φ(310°)	Φ(320°)Φ(330°)	Φ(340°)Φ(350°)
θ(0°)	-1.71/-1.58	-1.30/-0.90	-1.15/-1.03	-0.40/-0.22	-0.83/0.66	-1.30/-1.32	-1.38/-0.91	-1.15/-1.34	-1.04/-1.06	-0.94/-1.95	-1.05/-1.41	-1.27/-1.13	-1.26/-1.11	-1.61/-1.45	-1.81/-1.69	-1.61/-1.45	-1.92/-2.00	-1.92/-2.00
θ(10°)	-1.20/-1.63	-1.63/-1.48	-1.63/-1.26	-0.82/-0.51	-0.15/-0.34	-1.03/-1.07	-1.28/-1.81	-2.04/-1.72	-1.55/-1.80	-1.95/-1.69	-1.87/-1.97	-2.10/-2.43	-2.08/-1.83	-1.81/-1.06	-1.20/-1.07	-0.32/-0.45	-0.83/-0.92	-0.75/-0.94
θ(20°)	-1.10/-1.63	-1.10/-0.56	-0.11/0.04	0.45/1.16	1.75/1.62	1.32/1.16	0.68/0.86	-1.83/-1.36	-1.63/-1.78	-1.10/-1.67	-2.56/-2.33	-1.96/-2.38	-3.31/-3.97	-5.06/-5.47	-4.59/-5.14	-2.26/-1.43	-0.66/-1.17	-0.13/-0.50
θ(30°)	-2.38/-2.50	-1.92/-1.08	-0.82/-1.22	-1.24/-0.26	0.43/0.69	0.98/0.14	-0.13/-0.24	-1.42/-2.01	-2.46/-1.28	-0.62/-0.40	-0.45/-0.08	0.91/1.04	0.34/0.60	-2.06/-4.54	-6.06/-6.14	-4.00/-2.51	-2.24/-1.30	-0.56/-1.69
θ(40°)	-3.48/-2.98	-1.98/-2.39	-2.96/-2.90	-2.32/-0.61	0.43/0.79	0.41/0.24	-1.45/-1.99	-1.55/-1.43	-1.07/-1.08	0.41/0.18	1.23/1.62	2.07/2.23	1.92/0.97	-0.07/-1.36	-3.21/-4.56	-3.22/-1.51	-1.05/-0.96	-0.88/-1.66
θ(50°)	-4.04/-3.90	-3.04/-0.46	-4.26/-2.55	-1.31/-0.77	0.74/1.23	0.29/-1.27	-3.43/-4.57	-1.72/-2.15	-1.16/1.07	1.23/1.21	1.73/2.27	2.66/1.96	1.24/0.88	-0.03/-1.01	-3.32/-5.04	-3.49/-1.54	-0.76/-1.19	-1.26/-1.74
θ(60°)	-5.33/-5.02	-4.00/-5.58	-6.06/-2.77	-0.55/0.74	1.32/0.92	-0.75/-2.42	-4.03/-4.92	-2.72/-2.81	-1.52/0.76	1.03/1.05	1.51/1.81	1.25/1.58	1.72/1.20	-0.04/0.95	-2.04/-5.01	-5.10/-1.81	-0.57/-2.09	-1.85/-3.75
θ(70°)	-2.84/-3.00	-2.86/-3.47	-3.16/-1.25	-0.11/0.8	1.57/0.49	-2.04/-3.33	-6.48/-6.57	-4.02/-3.48	-1.54/0.11	0.10/0.53	0.54/0.90	0.54/0.90	-0.02/-1.86	-1.07/-1.86	-4.84/-5.87	-4.96/-3.55	-1.07/-1.81	-1.30/-1.76
θ(80°)	-2.86/-2.19	-0.76/-2.68	-1.96/-0.60	0.64/1.39	1.47/-1.19	-6.21/-9.38	-7.43/-10.87	-7.71/-4.65	-4.03/-1.48	-1.04/-0.35	0.24/-0.50	-0.84/-1.14	-1.41/-2.53	-2.97/-4.58	-5.10/-6.99	-7.16/-5.32	-1.51/-2.22	-3.35/-1.98
θ(90°)	-0.99/0.30	-0.71/0.20	-0.68/-1.07	0.51/1.18	-0.46/-2.36	-7.47/-8.62	-11.34/-13.91	-11.50/-8.05	-3.77/-1.75	-2.53/-1.41	-1.39/-1.33	-3.22/-3.26	-0.58/-0.57	-2.11/4.70	-5.45/-12.25	-8.91/-9.14	-3.25/-3.33	-2.08/-1.56
θ(100°)	-1.34/0.43	-0.12/0.54	-0.24/0.33	0.91/0.75	-0.24/-1.38	-0.40/-3.10	-3.94/-3.40	-3.55/-4.73	-1.07/-0.97	-1.94/-3.40	-3.55/-4.73	-4.15/-5.76	-13.28/-14.44	-7.28/-7.04	-4.25/-1.73	-2.84/-2.84	-2.82/-2.84	-2.92/-1.56
θ(110°)	-0.38/0.43	-0.76/0.54	-1.20/-0.40	0.34/0.41	-0.12/-3.20	-7.30/-5.57	-6.87/-10.11	-9.79/-11.29	-11.08/-7.45	-7.51/-6.78	-6.74/-7.37	-6.16/-13.51	-8.81/-5.79	-10.34/-12.66	-13.42/-12.06	-14.68/-6.92	-7.61/-3.50	-4.10/-1.35
θ(120°)	-0.42/-0.12	0.37/-0.40	-0.68/-1.32	-1.77/-0.79	-0.52/-2.56	-3.71/-4.70	-6.20/-7.34	-9.53/-11.98	-9.65/-7.31	-7.91/-7.42	-9.12/-9.38	-8.41/-12.77	-8.94/-11.24	-15.40/-15.91	-15.32/-13.91	-10.92/-7.13	-5.01/-4.11	-4.41/-1.30
θ(130°)	-0.59/0.66	-0.58/0.53	-1.87/-2.29	-2.38/-2.76	-3.08/-4.29	-2.38/-4.29	-8.82/-10.36	-8.85/-10.56	-9.96/-7.71	-10.79/-12.62	-10.90/-13.26	-12.74/-12.77	-10.49/9.88	-9.65/-13.04	-10.90/-13.96	-12.74/-10.93	-8.09/-5.19	-5.43/-0.44
θ(140°)	0.47/1.46	1.32/0.66	0.01/-1.09	-2.19/-3.14	-5.12/-8.74	-7.32/-9.16	-8.86/-9.64	-8.01/-8.08	-5.89/-3.89	-4.71/-10.82	-15.38/-13.22	-15.82/-16.10	-12.01/-12.21	-14.74/-15.87	-9.71/-9.78	-7.83/-11.32	-14.09/-8.78	-4.80/-1.54
θ(150°)	-1.23/0.87	1.56/0.22	-0.81/-1.69	-2.35/-3.43	-5.26/-6.10	-6.12/-8.51	-9.64/-9.24	-7.07/-5.26	-6.29/-7.91	-7.09/-7.71	-9.23/-8.28	-10.18/-15.57	-14.02/-10.92	-12.10/-9.50	-7.97/-11.92	-7.19/-4.74	-3.87/-4.46	-5.88/-2.45
θ(160°)	-2.42/-2.42	-1.43/-1.34	-2.70/-4.48	-5.55/-4.78	-8.24/-8.56	-11.17/-13.78	-10.20/-6.53	-8.45/-4.13	-5.12/-6.25	-5.12/-6.25	-9.94/-12.53	-15.08/-14.87	-15.25/-14.74	-9.48/-7.85	-5.94/-5.62	-5.94/-5.62	-4.10/-2.86	-4.10/-2.86
θ(170°)	-6.88/-6.56	-5.87/-4.63	-3.89/-4.15	-5.86/-6.66	-7.20/-6.97	-6.08/-6.09	-5.11/-7.49	-9.29/-10.23	-10.27/-10.43	-10.90/-11.40	-12.43/-13.60	-13.22/-15.63	-15.43/-15.22	-15.38/-14.49	-15.07/-14.74	-13.88/-12.11	-11.43/-8.41	-7.54/-7.53
θ(180°)	-12.88/-13.08	-13.43/-13.43	-12.92/-11.58	-10.91/-10.66	-8.82/-9.41	-11.85/-13.13	-13.37/-13.83	-12.01/-11.02	-10.92/-13.00	-14.30/-14.54	-14.57/-14.22	-13.35/-10.56	-10.37/-10.81	-9.89/-11.58	-13.47/-13.82	-13.46/-13.81	-13.45/-12.28	-11.75/-12.97
Freq(Hz)	5.6GPol.	TotalAnt. 2																



Antenna Pattern of 5GHz U-NII 2C and U-NII 3

Appendix D

θ(60°)	-1.03/-0.61	0.29/-0.13	0.51/1.46	1.55/0.87	1.07/1.29	0.42/-0.95	-1.67/0.49	1.46/-0.10	-1.22/-4.87	-3.86/-0.42	0.64/-1.33	-3.57/-4.13	-4.23/-3.48	-3.23/-4.37	-4.37/-2.81	-2.61/-2.02	-3.11/-7.11	-2.96/-2.34
θ(70°)	-1.60/-1.19	0.06/-1.55	-0.63/-0.44	0.11/0.42	0.29/-1.03	-2.53/-2.11	-5.31/-1.94	-0.19/-0.76	-1.92/-4.67	-2.08/-0.66	0.26/-2.04	-3.72/-3.12	-2.12/-1.18	-2.02/-3.95	-6.07/-4.31	-5.12/-6.77	-5.58/-5.28	-4.73/-3.03
θ(80°)	-2.46/-1.13	-3.86/-2.44	-2.03/-5.15	-4.31/-3.10	-2.75/-2.43	-5.84/-5.53	-5.54/-4.60	-2.93/-3.17	-2.75/-5.60	-2.40/0.08	0.30/-2.48	-3.64/-2.77	-1.68/-1.13	-3.00/-4.54	-4.11/-2.97	-6.18/-4.55	-5.40/-7.53	-4.51/-3.18
θ(90°)	-6.41/-4.99	-4.66/-3.27	-4.37/-5.72	-5.55/-4.06	-5.87/-6.10	-10.83/-12.59	-6.37/-10.73	-6.22/-4.95	-5.57/-6.48	-2.03/1.83	-0.22/-2.55	-2.13/-1.15	-0.28/-1.42	-2.57/-6.31	-6.59/-3.50	-6.33/-7.44	-10.84/-8.85	-8.74/-7.94
θ(100°)	-7.57/-6.53	-7.75/-6.88	-9.10/-10.88	-10.96/-6.86	-7.84/-6.69	-9.02/-10.19	-7.80/-12.42	-10.70/-8.49	-8.71/-5.61	-5.06/0.75	-0.57/-2.96	-2.92/-1.99	-3.05/-3.23	-4.44/-7.17	-6.44/-7.88	-6.81/-9.76	-13.32/-12.51	-12.34/-12.89
θ(110°)	-10.93/-8.10	-12.83/-11.54	-14.12/-11.63	-11.69/-7.73	-8.87/-13.99	-12.62/-11.02	-12.75/-8.36	-9.09/-8.68	-8.57/-5.66	-3.26/0.83	1.38/-2.23	-4.53/-3.77	-2.08/-2.24	-5.94/-4.48	-3.51/-8.42	-8.91/-12.69	-10.34/-12.16	-10.02/-11.81
θ(120°)	-8.12/-9.94	-11.44/-11.82	-15.20/-15.09	-14.54/-10.24	-10.09/-12.48	-12.22/-9.51	-7.80/-8.21	-6.74/-5.79	-5.83/-5.19	-3.67/-1.30	0.51/-1.60	-2.44/-1.04	-0.95/-3.36	-8.80/-6.12	-4.12/-11.81	-12.19/-12.84	-15.33/-15.48	-8.20/-9.74
θ(130°)	-6.51/-13.95	-8.44/-15.39	-14.73/-15.67	-15.00/-12.94	-10.95/-12.58	-10.08/-14.75	-12.45/-10.62	-7.84/-5.82	-4.09/-3.61	-3.54/-0.18	0.15/-3.78	-6.53/-3.40	-1.82/-1.78	-5.01/-5.73	-2.52/-6.91	-9.88/-6.97	-12.93/-7.70	-15.23/-12.89
θ(140°)	-7.19/-12.61	-15.37/-13.46	-11.20/-13.35	-13.51/-13.53	-10.87/-10.60	-10.60/-7.90	-8.84/-12.14	-6.64/-8.91	-11.02/-8.40	-5.86/-2.83	-4.38/-9.16	-14.57/-5.82	-4.06/-4.23	-8.79/-5.10	-0.95/-5.03	-14.57/-5.96	-8.26/-12.82	-7.66/-10.05
θ(150°)	-7.47/-10.68	-10.65/-9.65	-9.98/-9.16	-7.84/-9.12	-9.40/-9.22	-8.58/-8.55	-8.00/-4.85	-4.12/-6.34	-7.51/-10.53	-7.88/-2.92	-2.82/-4.97	-4.41/-4.48	-4.90/-6.60	-10.31/-8.18	-6.07/-8.56	-8.08/-11.06	-12.86/-12.88	-9.64/-7.92
θ(160°)	-12.99/-11.13	-15.64/-12.26	-9.58/-9.55	-10.52/-12.76	-12.57/-11.39	-10.76/-9.16	-5.76/-3.51	-2.99/-4.61	-7.53/-7.80	-7.34/-6.12	-4.00/-3.99	-5.22/-6.63	-7.11/-8.61	-8.92/-7.12	-6.08/-6.25	-11.20/-11.99	-10.54/-10.20	-11.92/-14.11
θ(170°)	-14.89/-15.40	-15.32/-15.54	-12.38/-12.25	-12.38/-13.07	-12.38/-11.68	-11.52/-10.30	-10.53/-10.54	-8.72/-8.02	-7.22/-7.29	-7.46/-8.36	-7.90/-5.57	-5.23/-5.89	-7.33/-9.30	-11.09/-12.70	-10.94/-8.83	-5.99/-5.98	-5.82/-6.84	-9.22/-13.34
θ(180°)	-15.77/-15.60	-14.92/-13.89	-15.31/-15.30	-15.47/-14.50	-15.48/-15.35	-15.17/-14.69	-14.91/-15.08	-13.01/-11.90	-12.39/-13.22	-13.91/-13.89	-14.46/-15.19	-14.54/-13.38	-11.28/-9.49	-8.99/-10.53	-13.46/-14.98	-14.09/-13.69	-11.50/-15.27	-14.57/-15.44
Freq(Hz)	5.6GPol.	TotalAnt. 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gain	Φ(0°)Φ(10°)	Φ(20°)Φ(30°)	Φ(40°)Φ(50°)	Φ(60°)Φ(70°)	Φ(80°)Φ(90°)	Φ(100°)Φ(110°)	Φ(120°)Φ(130°)	Φ(140°)Φ(150°)	Φ(160°)Φ(170°)	Φ(180°)Φ(190°)	Φ(200°)Φ(210°)	Φ(220°)Φ(230°)	Φ(240°)Φ(250°)	Φ(260°)Φ(270°)	Φ(280°)Φ(290°)	Φ(300°)Φ(310°)	Φ(320°)Φ(330°)	Φ(340°)Φ(350°)
θ(0°)	-6.31/-5.43	-4.71/-5.28	-4.00/-4.08	-4.06/-5.47	-5.56/-5.07	-5.27/-5.38	-5.11/-4.38	-4.83/-4.68	-3.84/-5.32	-4.99/-4.14	-4.49/-5.02	-6.11/-6.42	-3.05/-3.21	-3.86/-4.95	-4.69/-3.96	-3.19/-3.10	-3.60/-3.85	-4.38/-4.59
θ(10°)	-5.25/-4.87	-4.67/-4.77	-4.73/-4.50	-4.36/-5.23	-5.46/-4.63	-5.38/-3.33	-8.22/-7.81	-4.71/-4.98	-4.96/-4.83	-5.24/-5.74	-5.81/-5.51	-4.86/-4.01	-4.89/-4.66	-4.01/-3.22	-3.58/-3.85	-3.37/-3.15	-3.69/-4.42	-4.97/-4.52
θ(20°)	-8.41/-6.60	-6.17/-4.23	-3.20/-4.77	-5.70/-6.45	-5.82/-5.31	-9.07/-8.65	-11.13/-10.80	-10.55/-10.51	-9.07/-8.65	-9.10/-9.31	-9.34/-8.83	-9.34/-8.29	-6.06/-6.93	-8.68/-9.71	-10.87/-11.61	-8.27/-5.82	-5.71/-6.66	-6.79/-11.84
θ(30°)	-15.51/-7.48	-6.15/-5.60	-6.72/-6.22	-5.16/-4.00	-4.03/-4.58	-5.55/-5.35	-6.38/-7.82	-9.44/-12.94	-12.58/-14.81	-11.04/-5.43	-3.13/-1.53	-2.11/-3.84	-3.95/-4.04	-3.61/-5.25	-8.01/-9.09	-7.93/-6.30	-4.64/-5.52	-7.30/-10.95
θ(40°)	-5.02/-5.73	-6.24/-6.45	-10.14/-11.76	-11.21/-9.45	-6.15/-3.45	-3.23/-4.39	-5.92/-4.82	-5.15/-6.06	-6.33/-13.92	-6.21/-5.10	0.36/0.43	-0.64/-1.72	-2.05/-1.71	-1.52/-1.76	-4.21/-3.99	-4.98/-3.80	-3.10/-3.95	-5.60/-7.17
θ(50°)	-4.91/-3.84	-4.66/-6.18	-4.66/-6.18	-6.13/-7.80	-8.66/-6.88	-2.14/-4.69	-3.65/-3.25	-2.44/-1.88	-1.44/-0.40	-2.27/-1.42	-2.03/-0.50	-0.52/-1.86	-2.27/-1.24	-0.20/-4.99	-0.20/-4.99	-0.20/-4.99	-0.20/-4.99	-0.20/-4.99
θ(60°)	-4.00/-2.85	-3.90/-3.98	-4.99/-2.47	-1.94/-3.86	-6.26/-7.43	-5.75/-3.02	-4.87/-1.33	-0.15/-3.72	-0.52/-2.99	-0.01/0.45	-0.93/-0.47	-3.65/-2.35	-3.52/-2.18	-1.25/-0.14	-1.10/-2.04	-1.57/-3.36	-2.15/-1.63	-2.83/-2.92
θ(70°)	-6.79/-3.72	-3.67/-4.48	-3.34/-3.44	-4.13/-3.77	-5.76/-8.49	-5.88/-1.63	-0.90/-0.64	0.90/-0.64	-1.50/-3.37	-0.57/-1.07	0.48/0.87	-0.78/1.66	-0.54/0.12	-0.34/1.00	-0.45/1.20	-2.76/-1.08	-2.94/-5.65	-4.15/-2.47
θ(80°)	-5.46/-3.44	-5.29/-3.01	-3.27/-4.46	-5.38/-5.48	-7.34/-11.41	-8.77/-3.27	-0.69/0.46	0.06/-1.63	-1.19/-3.73	-0.23/-4.33	1.39/-0.40	-0.02/1.86	2.24/0.31	0.24/0.07	1.39/-0.40	-0.83/-1.87	-4.66/-4.65	-4.62/-3.05
θ(90°)	-11.22/-6.27	-7.86/-5.87	-5.39/-5.48	-4.14/-6.04	-9.50/-11.37	-5.02/-1.88	0.03/0.80	1.25/-2.32	-2.43/-3.84	-1.40/-1.07	-0.46/-3.59	-2.11/0.16	1.88/1.33	0.91/2.03	2.12/-0.07	1.07/-3.87	-1.99/-2.30	-4.61/-4.82
θ(100°)	-3.72/-11.20	-10.28/-6.11	-7.37/-10.89	-7.18/-6.46	-8.58/-11.69	-14.19/-8.04	-4.42/-1.90	-1.18/-3.91	-5.40/-2.86	-1.26/-0.47	0.65/-0.70	-1.74/-1.56	1.06/0.83	-2.17/-1.41	1.12/-4.33	-1.81/-4.73	-6.56/-4.86	-4.15/-2.47
θ(110°)	-8.37/-6.67	-8.89/-8.36	-7.35/-8.48	-9.42/-9.85	-5.55/-2.10	-2.07/-1.89	-3.03/-1.38	-0.51/-4.05	-1.83/-3.73	-0.23/-4.33	1.39/-0.40	-0.02/1.86	2.24/0.31	0.24/0.07	1.39/-0.40	-0.83/-1.87	-4.66/-4.65	-4.62/-3.05
θ(120°)	-7.70/-8.84	-14.01/-11.30	-14.67/-7.91	-4.65/-6.29	-10.21/-10.29	-9.47/-6.51	-3.90/-1.95	-2.73/-2.79	-8.11/-3.33	-4.82/-3.01	0.08/0.11	-2.13/-3.67	-0.84/-3.80	-3.82/-11.11	-0.62/-4.41	-4.48/-6.48	-11.88/-9.00	-13.79/-3.77
θ(130°)	-6.91/-11.46	-9.92/-14.51	-10.17/-7.85	-11.22/-6.48	-4.44/-5.70	-7.45/-7.99	-12.30/-6.09	-6.13/-8.50	-10.98/-7.10	-5.31/-6.54	-6.50/-3.24	-9.13/-5.53	-1.81/-1.54	-3.14/-3.16	-3.17/-4.19	-8.05/-5.84	-2.15/-10.56	-5.88/-8.89
θ(140°)	-6.37/-5.35	-8.57/-10.67	-10.24/-11.85	-10.83/-7.73	-5.94/-4.86	-3.15/-2.88	-4.89/-6.82	-6.31/-7.72	-12.02/-13.15	-5.64/-4.69	-1.81/-1.04	-1.98/-4.07	-4.85/-10.40	-6.32/-2.37	-2.91/-6.94	-8.91/-15.11	-15.19/-8.10	-15.19/-8.10
θ(150°)	-5.63/-7.38	-11.39/-12.04	-12.19/-11.44	-14.91/-15.23	-10.54/-7.56	-4.88/-3.28	-5.54/-11.15	-15.76/-11.58	-9.92/-7.58	-11.05/-11.14	-12.06/-5.45	-5.10/-6.25	-9.58/-11.99	-12.51/-9.53	-5.73/-5.99	-11.39/-12.46	-11.81/-14.22	-12.50/-9.94
θ(160°)	-15.59/-14.30	-13.34/-11.56	-11.33/-12.01	-14.24/-14.73	-13.54/-10.59	-8.37/-7.65	-8.83/-11.17	-11.43/-11.40	-12.85/-15.00	-15.13/-13.05	-7.22/-10.11	-8.10/-6.27	-8.01/-10.08	-12.60/-8.59	-7.22/-9.55	-15.02/-15.34	-11.19/-7.94	-10.18/-11.99
θ(170°)	-15.89/-15.67	-13.73/-11.27	-10.09/-9.66	-8.46/-8.45	-7.75/-7.18	-6.81/-7.86	-9.07/-10.76	-11.25/-11.04	-11.84/-12.64	-14.54/-13.20	-12.68/-9.60	-8.71/-9.02	-9.75/-9.47	-9.87/-9.47	-8.85/-8.40	-7.78/-6.31	-5.54/-5.97	-9.13/-12.37
θ(180°)	-13.33/-14.93	-14.95/-13.11	-13.95/-14.22	-16.16/-15.43	-13.98/-13.45	-12.69/-12.79	-13.64/-14.25	-15.24/-13.64	-12.00/-12.39	-11.82/-11.66	-11.07/-10.54	-10.02/-9.66	-9.56/-11.07	-10.41/-10.73	-11.32/-12.58	-12.20/-12.39	-14.37/-14.87	-14.63/-12.96
Freq(Hz)	5.785GPol.	TotalAnt. 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gain	Φ(0°)Φ(10°)	Φ(20°)Φ(30°)	Φ(40°)Φ(50°)	Φ(60°)Φ(70°)	Φ(80°)Φ(90°)	Φ(100°)Φ(110°)	Φ(120°)Φ(130°)	Φ(140°)Φ(150°)	Φ(160°)Φ(170°)	Φ(180°)Φ(190°)	Φ(200°)Φ(210°)	Φ(220°)Φ(230°)	Φ(240°)Φ(250°)	Φ(260°)Φ(270°)	Φ(280°)Φ(290°)	Φ(300°)Φ(310°)	Φ(320°)Φ(330°)	Φ(340°)Φ(350°)
θ(0°)	-4.08/-5.00	-5.02/-5.00	-4.92/-4.69	-4.36/-5.26	-6.07/-6.47	-6.28/-5.99	-5.62/-5.05	-5.90/-5.47	-4.31/-6.35	-5.53/-4.36	-5.19/-5.07	-5.71/-5.12	-3.89/-3.60	-3.85/-3.45	-3.53/-3.08	-2.70/-2.70	-2.62/-2.48	-2.55/-2.95
θ(10°)	-3.81/-4.08	-3.86/-4.13	-3.30/-3.07	-3.23/-3.20	-3.66/-3.16	-2.80/-1.83	-2.22/-2.70	-4.23/-4.39	-5.65/-6.66	-7.32/-8.02	-8.35/-7.18	-8.41/-8.35	-8.94/-8.24	-8.03/-6.81	-6.02/-6.49	-5.98/-5.37	-5.04/-5.07	-4.60/-3.88
θ(20°)	-10.62/-8.26	-6.72/-5.10	-3.95/-3.58	-3.47/-4.33	-3.64/-4.04	-5.09/-5.66	-7.28/-9.31	-10.06/-9.71	-11.38/-14.70	-14.30/-10.36	-5.70/-4.24	-3.94/-4.82	-4.88/-5.78	-6.62/-7.51	-8.56/-8.22	-9.03/-11.43	-9.19/-9.90	-9.99/-7.62
θ(30°)	-8.95/-6.60	-5.29/-3.34	-3.15/-4.26	-7.12/-5.16	-3.91/-4.16	-5.85/-7.23	-7.28/-8.70	-12.30/-9.62	-11.12/-6.15	-2.92/-1.38	-1.80/-3.11	-4.85/-4.37	-2.66/-2.35	-3.65/-5.48	-6.01/-7.25	-9.88/-13.53	-15.51/-15.70	-15.17/-8.76
θ(40°)	-6.86/-5.58	-3.93/-5.54	-8.20/-8.97	-9.30/-7.23	-7.12/-6.65	-8.31/-8.66	-6.30/-4.80	-5.30/-4.84	-5.88/-5.81	-2.12/-2.57	-3.21/-4.43	-3.32/-1.31	-1.15/-4.18	-4.95/-3.34	-2.74/-3.64	-4.84/-6.04	-4.92/-6.02	-9.61/-7.32
θ(50°)	-6.15/-4.19	-4.47/-6.57	-6.03/-7.07	-9.08/-10.21	-10.20/-6.03	-3.75/-4.01	-6.61/-5.91	-3.18/-0.43	-3.64/-4.16	-2.33/-4.04	-3.75/-0.36	-0.41/-1.62	-3.56/-5.56	-6.67/-6.68	-4.02/-3.24	-4.14/-4.37	-2.86/-0.42	-2.14/-5.05
θ(60°)	-6.54/-4.18	-4.79/-3.67	-4.66/-3.08	-4.54/-7.71	-9.65/-6.28	-4.10/-2.99	-3.45/-1.79	-3.28/-2.69	-2.54/-2.01	-0.46/-3.81	-1.39/0.84	0.02/-0.21	-3.73/-3.30	-2.71/-2.54	-1.84/-3.04	-2.36/-1.14	-2.65/-4.35	-4.63/-4.80
θ(70°)	-4.76/-4.35	-2.62/-2.37	-2.20/-2.46	-1.39/-2.23	-5.57/-8.39	-2.93/-0.38	-0.41/-0.30	-0.94/-0.06	-2.92/-1.49	-0.80/-2.94	0.09/0.30	-1.33/0.24	0.09/-0.33	-1.11/-1.05	-2.67/-3.19	-1.27/-3.36	-5.74/-3.86	-3.15/-4.10
θ(80°)	-4.79/-6.24	-3.50/-4.89	-3.07/-3.66	-7.31/-8.69	-10.31/-12.74	-8.42/-2.59	-0.67/-1.20	-1.18/-1.56	-2.55/-1.86	-1.50/-1.65	-0.15/-0.06	-0.92/0.56	0.45/-1.92	-0.11/0.74	2.51/-0.64	-0.36/-0.50	-5.88/-3.77	-5.01/-7.10
θ(90°)	-6.49/-8.02	-																

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

