



Antenna Composite Gain Test Report

FCC ID	NKR-ATTC61W1
Equipment	Wireless Genie Mini
Brand Name	DirecTV
Model Name	C61W-400, C61WBP-400, C61WNC-400
Applicant	Wistron NeWeb Corporation 20 Park Avenue II Hsinchu Science Park Hsinchu, 308 Taiwan
Manufacturer	Wistron NeWeb Corporation 20 Park Avenue II Hsinchu Science Park Hsinchu, 308 Taiwan
Sample Received	Mar. 31, 2023
Start Test Date	May 31, 2023
Final Test Date	May 31, 2023

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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History of this test report

Report No.	Version	Description	Issued Date
AP730747-01	01	Initial issue of report	Jul. 03, 2023
AP730747-01	02	Adding Master (AP) function.	Jul. 25, 2023

1. Operation Mode and Antenna Information

Antenna Position	RF Port	Brand Name	Model Name	Ant. Type	Connector	Modes of Operation
2G Ant1	1	WNC	ANT1	PCB	N/A	2.4GHz
2G Ant2	2	WNC	ANT2	PCB	N/A	2.4GHz
5G Ant1	1	Airgain	N5X35BCMY	PIFA	I-PEX	5GHz UNII 1~3
5G Ant2	2	Airgain	N5X35BCHY	PIFA	I-PEX	5GHz UNII 1~3
5G Ant3	3	Airgain	N5X35BC2MY	PIFA	I-PEX	5GHz UNII 1~3
5G Ant4	4	Airgain	N5X35BC2MY	PIFA	I-PEX	5GHz UNII 1~3

Note:

2.4GHz Operation Mode (1TX/1RX)

The EUT supports the antenna with TX and RX diversity functions.

Both Port 1 and Port 2 support transmit and receive functions, but only one of them will be used at one time.

5GHz Operation Mode (4TX/4RX)

Port 1~Port 4 can be used as transmitting/receiving antenna.

Port 1~Port 4 could transmit/receive simultaneously.

2. Test Frequency

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

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



3. Testing Location

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

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
Radiated	05CH03-HY	Rex Liao	23.5-24.5 / 50-55	May 31, 2023

Note:

Testing Site Information

Brand Name: TDK

Dimension: 11m*6m*6m

Characteristic: Fully Anechoic Chamber

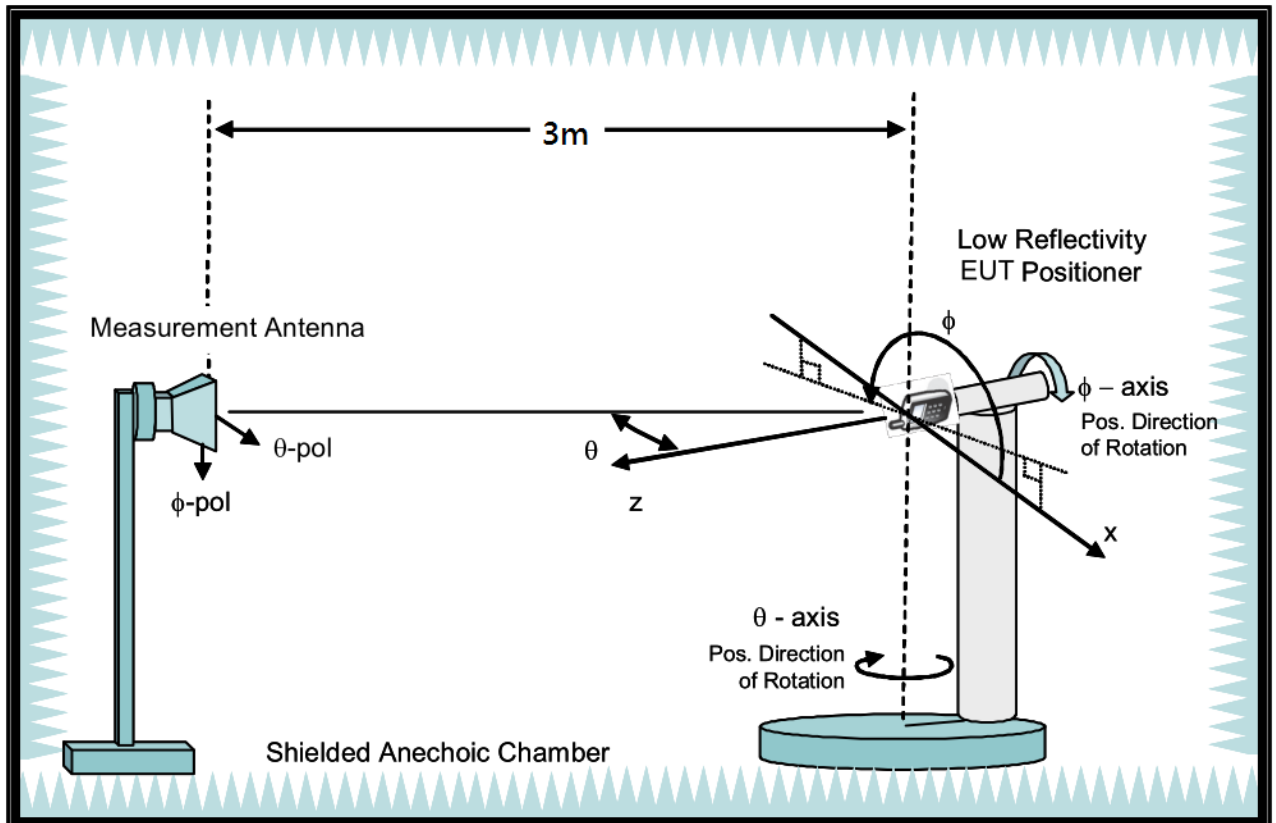
4. EUT Support Function

Function	Supports Type	Supports band
AP	Master	5GHz UNII 1/3, RF4CE
Slave	Slave without Radar	5GHz UNII 1~3, RF4CE

5. 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).

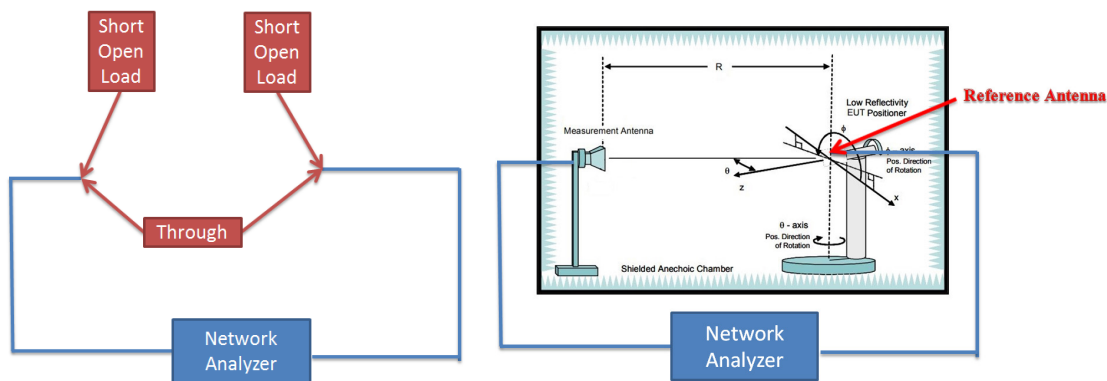
#Reference to CTIA "ctia-test-plan-for-wireless-device-over-the-air-performance-ver-3-7-1"



6. Reference Calibration

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

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



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

Note:

$$G \text{ reading (dB)} = 20 \cdot \log(V_2/V_1) = 10 \cdot \log(P_2/P_1)$$

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

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

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



7. Test Method

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

DG steps:

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

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



8. Measured Values and Calculation of Maximum Gain Positions

DG_1SS Max Value Position

Frequency (Hz)	5.2G	5.3G	5.6G	5.785G
Ant. 1 (dBi)	1.38	1.27	0.17	1.71
Ant. 2 (dBi)	-1.17	-1.42	-9.61	-3.87
Ant. 3 (dBi)	-0.74	-0.79	-2.86	-0.34
Ant. 4 (dBi)	-7.83	-6.23	1.98	1.37
DG [1SS] (dBi)	4.53	4.63	4.42	6
Polarization	Theta	Theta	Theta	Theta
$\Theta(^{\circ})$	37.5	37.5	90	90
$\Phi(^{\circ})$	105	97.5	202.5	247.5

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

DG_1SS Max Value Position Calculation

Frequency (Hz)	5.2G	5.3G	5.6G	5.785G
Ant. 1 [$10^{(G/20)}$]	$10^{(1.38/20)}$	$10^{(1.27/20)}$	$10^{(0.17/20)}$	$10^{(1.71/20)}$
Ant. 2 [$10^{(G/20)}$]	$10^{(-1.17/20)}$	$10^{(-1.42/20)}$	$10^{(-9.61/20)}$	$10^{(-3.87/20)}$
Ant. 3 [$10^{(G/20)}$]	$10^{(-0.74/20)}$	$10^{(-0.79/20)}$	$10^{(-2.86/20)}$	$10^{(-0.34/20)}$
Ant. 4 [$10^{(G/20)}$]	$10^{(-7.83/20)}$	$10^{(-6.23/20)}$	$10^{(1.98/20)}$	$10^{(1.37/20)}$
Ant. 1 [$10^{(G/20)}$] value	1.172	1.157	1.02	1.218
Ant. 2 [$10^{(G/20)}$] value	0.874	0.849	0.331	0.64
Ant. 3 [$10^{(G/20)}$] value	0.918	0.913	0.719	0.962
Ant. 4 [$10^{(G/20)}$] value	0.406	0.488	1.256	1.171
Sum All Antenna [Amax]	3.37	3.408	3.326	3.991
DG [$10*\log(Amax^2/Nant)$]	4.53	4.63	4.42	6

Note:

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

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

9. Summary of Test Result

Freq(Hz)	2.4G	2.45G	2.4835G
Ant. 1 Max Gain (dBi)	1.66	2.79	2.77
Ant. 2 Max Gain (dBi)	3.72	3.49	2.32
Ant. 1 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Phi/82.5/352.5	Phi/82.5/352.5	Phi/82.5/345
Ant. 2 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Phi/90/307.5	Phi/90/315	Phi/90/315
Max Gain (dBi)	3.72	3.49	2.77

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.

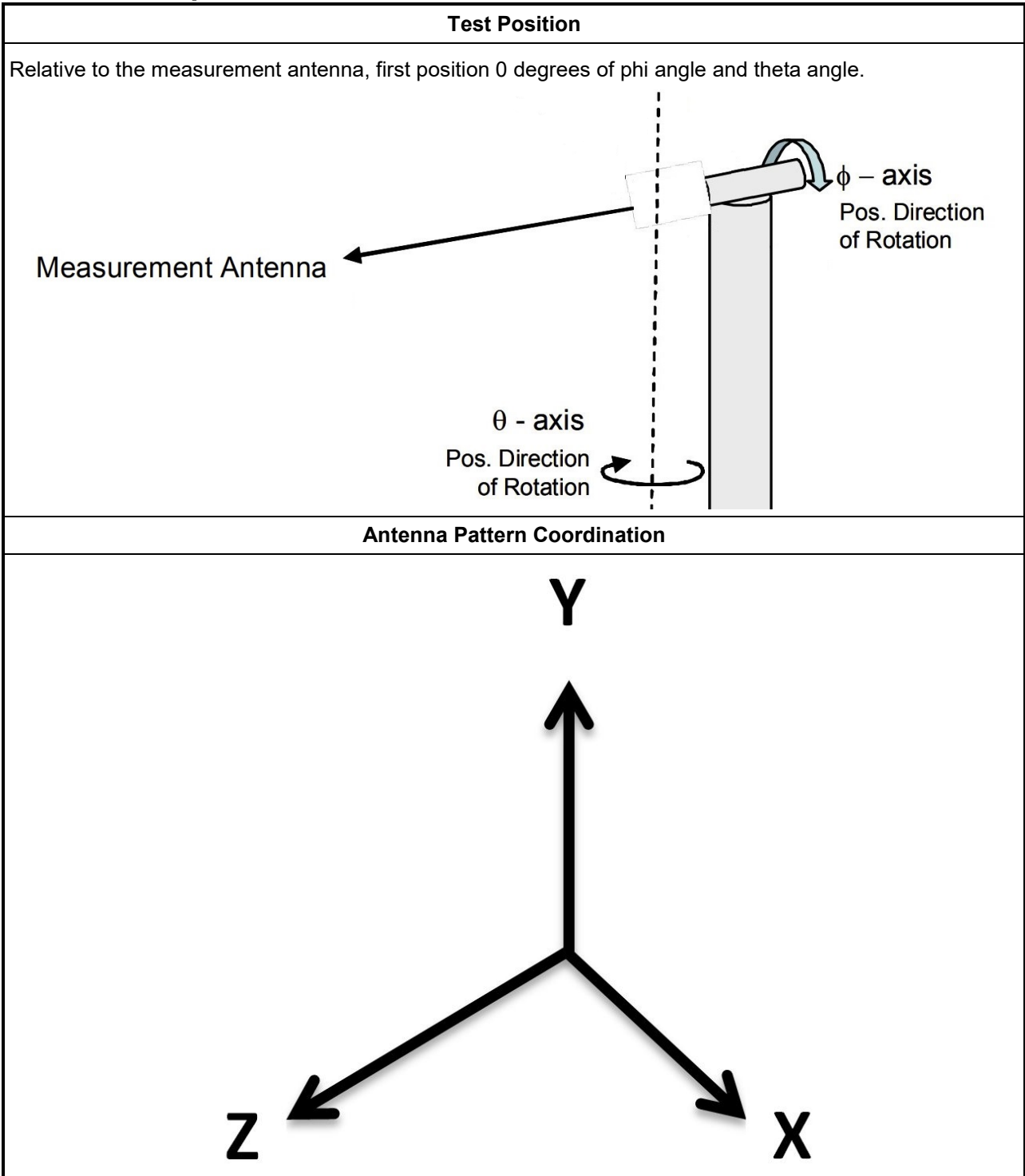


Frequency (Hz)	5.2G	5.3G	5.6G	5.785G
Ant. 1 Max Gain (dBi)	1.89	1.77	1.83	2.06
Ant. 2 Max Gain (dBi)	1.73	2.2	1.35	1.77
Ant. 3 Max Gain (dBi)	2.07	1.91	1.25	2.61
Ant. 4 Max Gain (dBi)	2.94	2.67	3.22	3.11
Ant. 1 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Theta/90/217.5	Theta/45/97.5	Theta/82.5/240	Theta/82.5/247.5
Ant. 2 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Phi/45/22.5	Phi/22.5/37.5	Theta/15/67.5	Phi/30/7.5
Ant. 3 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Theta/90/127.5	Theta/97.5/127.5	Theta/82.5/352.5	Theta/90/225
Ant. 4 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Theta/82.5/300	Theta/90/322.5	Theta/82.5/210	Theta/127.5/292.5
Max Gain (dBi)	2.94	2.67	3.22	3.11
DG [1SS] (dBi)	4.53	4.63	4.42	6
DG [2SS] (dBi)	2.94	2.67	3.22	3.11
DG [4SS] (dBi)	2.94	2.67	3.22	3.11

Note:

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

10. Test Setup



Note:

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



11. Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA 9120D-1543	1GHz~18GHz	May 11, 2023	May 10, 2024
Dual Polarization Horn Antenna	Sporton	S0209DP	S0209DP-001	2GHz~9GHz	N.C.R.	N.C.R.
ENA Series Network Analyzer	AGILENT	E5071C	MY46419477	100kHz~8.5GHz	Jul. 20, 2022	Jul. 19, 2023
VNA Calibration Kit	TS RF	TS85033E-F	-	DC~9GHz	N.C.R.	N.C.R.
Multi-axis positioner	Sporton	MAPS01	MAPS01-001	Theta / Phi axis	N.C.R.	N.C.R.
Test Software	SPORTON	SENSE-RDG	V1.0.8	-	N.C.R.	N.C.R.

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

N.C.R. means Non-Calibration required.



12. Test Results

Please refer to the appendix.

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Freq(Hz)	2.4G	2.45G	2.4835G
Ant. 1 Max Gain (dBi)	1.66	2.79	2.77
Ant. 2 Max Gain (dBi)	3.72	3.49	2.32
Ant. 1 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Phi/82.5/352.5	Phi/82.5/352.5	Phi/82.5/345
Ant. 2 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Phi/90/307.5	Phi/90/315	Phi/90/315
Max Gain (dBi)	3.72	3.49	2.77



Radiated Composite Gain Data_2.4GHz

Appendix A

Gain Result

Table with columns for Frequency (Freq(Hz)), Gain, and various Phi(Ant) values (Phi(0), Phi(15), 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)). Rows represent different frequency points and gain measurements.



Radiated Composite Gain Data_2.4GHz

Appendix A

Theta (°)	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180												
Gain dBSm	-6.94/5.53	-3.67/2.9	-3.34/4.38	-4.21/2.56	-1.46/1.72	-3.37/5.62	-6.28/5.4	-5.07/6.22	-9.45/14.47	-15.17/12.06	-10.61/9.82	-9.32/9.11	-9.08/8.87	-7.9/3.64	-4.74/3.56	-2.96/3	-3.82/5.08	-5.85/4.87	-2.79/0.85	0.61/6.4	2.43/2.97	3.11/2.79	1.86/0.19	2.33/5.32																							
Freq (Hz)	2.450 GHz	2.455 GHz	2.460 GHz	2.465 GHz	2.470 GHz	2.475 GHz	2.480 GHz	2.485 GHz	2.490 GHz	2.495 GHz	2.500 GHz	2.505 GHz	2.510 GHz	2.515 GHz	2.520 GHz	2.525 GHz	2.530 GHz	2.535 GHz	2.540 GHz	2.545 GHz	2.550 GHz	2.555 GHz	2.560 GHz	2.565 GHz	2.570 GHz	2.575 GHz	2.580 GHz	2.585 GHz	2.590 GHz	2.595 GHz	2.600 GHz	2.605 GHz	2.610 GHz	2.615 GHz	2.620 GHz												
Gain dBS	(7.5°)	(15°)	(22.5°)	(30°)	(37.5°)	(45°)	(52.5°)	(60°)	(67.5°)	(75°)	(82.5°)	(90°)	(97.5°)	(105°)	(112.5°)	(120°)	(127.5°)	(135°)	(142.5°)	(150°)	(157.5°)	(165°)	(172.5°)	(180°)	(187.5°)	(195°)	(202.5°)	(210°)	(217.5°)	(225°)	(232.5°)	(240°)	(247.5°)	(255°)	(262.5°)	(270°)	(277.5°)	(285°)	(292.5°)	(300°)	(307.5°)	(315°)	(322.5°)	(330°)	(337.5°)	(345°)	(352.5°)

Freq(Hz)	5.2G	5.3G	5.6G	5.785G
Ant. 1 Max Gain (dBi)	1.89	1.77	1.83	2.06
Ant. 2 Max Gain (dBi)	1.73	2.2	1.35	1.77
Ant. 3 Max Gain (dBi)	2.07	1.91	1.25	2.61
Ant. 4 Max Gain (dBi)	2.94	2.67	3.22	3.11
Ant. 1 Polarization/ $\theta(^{\circ})/\phi(^{\circ})$	Theta/90/217.5	Theta/45/97.5	Theta/82.5/240	Theta/82.5/247.5
Ant. 2 Polarization/ $\theta(^{\circ})/\phi(^{\circ})$	Phi/45/22.5	Phi/22.5/37.5	Theta/15/67.5	Phi/30/7.5
Ant. 3 Polarization/ $\theta(^{\circ})/\phi(^{\circ})$	Theta/90/127.5	Theta/97.5/127.5	Theta/82.5/352.5	Theta/90/225
Ant. 4 Polarization/ $\theta(^{\circ})/\phi(^{\circ})$	Theta/82.5/300	Theta/90/322.5	Theta/82.5/210	Theta/127.5/292.5
Max Gain (dBi)	2.94	2.67	3.22	3.11
DG [1SS] (dBi)	4.53	4.63	4.42	6
DG [2SS] (dBi)	2.94	2.67	3.22	3.11
DG [4SS] (dBi)	2.94	2.67	3.22	3.11



Radiated Composite Gain Data_5GHz UNII 1~UNII 3

Appendix B

Theta	Phi	Phi(7.5)	Phi(15)	Phi(22.5)	Phi(30)	Phi(37.5)	Phi(45)	Phi(52.5)	Phi(60)	Phi(67.5)	Phi(75)	Phi(82.5)	Phi(90)	Phi(105)	Phi(120)	Phi(135)	Phi(150)	Phi(165)	Phi(180)	Phi(195)	Phi(210)	Phi(225)	Phi(240)	Phi(255)	Phi(270)	Phi(285)	Phi(300)	Phi(315)	Phi(330)	Phi(345)		
Theta(7.5)	Phi(0)	-0.42/-1.53	-1.66/-3.12	-4.06/-5.23	-6.16/-5.2	-7.22/-12.31	-11.08/-11.06	-18.58/-18.15	-13.62/-16.29	-11.81/-8.64	-13.65/-11.72	-12.65/-7.49	-8.24/-6.63	-6.9/4.7	-10.96/-13.04	-14.4/-10.08	-7.08/-7.45	-14.75/-18.53	-13.31/-14.81	-18.47/-6.36	-7.98/-4.27	-3.97/-1.45	-1.57/-1.4	-2.76/-2.54	-1.57/-1.4	-2.76/-2.54	-1.57/-1.4	-2.76/-2.54	-1.57/-1.4	-2.76/-2.54	-1.57/-1.4	-2.76/-2.54
Theta(105)	Phi(0)	-1.34/-1.47	-1.73/-2.47	-4.1/-6.6	-6.5/-5.7	-5.44/-9.31	-10.76/-12.06	-12.55/-18.01	-14/-16.69	-11.72/-8.51	-12.31/-10.02	-9.68/-8.06	-8.91/-10.43	-8.95/-10.62	-8.4/-18.73	-11.51/-19.2	-8.3/-9.1	-14.99/-18.23	-19.3/-16.19	-17.7/-7.39	-7.77/-3.59	-3.65/-3.9	-1.39/-2.79	-3.36/-1.81	-1.56/-2.07	-3.36/-1.81	-1.56/-2.07	-3.36/-1.81	-1.56/-2.07	-3.36/-1.81	-1.56/-2.07	-3.36/-1.81
Theta(112.5)	Phi(0)	-0.97/-0.89	-1.29/-3.42	-5.69/-8.01	-7.14/-5.8	-5.28/-6.23	-11.01/-18.22	-16.59/-17.79	-13.64/-16.69	-15.95/-10.23	-11.09/-14.08	-15.73/-8.46	-10.43/-13.92	-10.78/-12.21	-18.18/-11.47	-12.72/-14.74	-9.74/-8.74	-14.37/-16.26	-14.01/-16.19	-17.76/-6.99	-7.86/-4.53	-3.24/-2.97	-1.94/-3.69	-2.58/-0.51	-0.95/-1.62	-2.58/-0.51	-0.95/-1.62	-2.58/-0.51	-0.95/-1.62	-2.58/-0.51	-0.95/-1.62	-2.58/-0.51
Theta(120)	Phi(0)	-2.15/-1.07	-2.96/-3.28	-6.11/-6.91	-7.08/-6.56	-5.83/-6.08	-7.04/-11.63	-12.43/-19.07	-15.31/-11.82	-14.76/-11.99	-9.14/-7.41	-10.22/-18.27	-11.91/-18.32	-15.43/-18.49	-17.61/-16.31	-14.95/-15.19	-6.14/-11.81	-16.55/-11.07	-15.59/-17.13	-16.51/-9.53	-8.06/-5.96	-5.69/-3.72	-0.49/-2.26	-7.18/-4.18	-3.09/-0.97	-7.18/-4.18	-3.09/-0.97	-7.18/-4.18	-3.09/-0.97	-7.18/-4.18	-3.09/-0.97	-7.18/-4.18
Theta(127.5)	Phi(0)	-2.75/-2.96	-2.37/-3.66	-3.56/-5.07	-4.45/-4.53	-5.81/-6.65	-10.3/-13.91	-12.23/-19.49	-13.85/-11.1	-14.38/-15.9	-10.56/-6.82	-8.22/-3.71	-7.38/-11.26	-15.44/-18.02	-16.47/-9.71	-12.21/-13.45	-6.67/-6.3	-11.95/-10.6	-14.19/-8.64	-14.19/-8.64	-8.3/-8.6	-8.78/-5.09	-0.86/-3.0	-2.34/-2.09	-2.54/-2.88	-2.34/-2.09	-2.54/-2.88	-2.34/-2.09	-2.54/-2.88	-2.34/-2.09	-2.54/-2.88	-2.34/-2.09
Theta(135)	Phi(0)	-1.81/-1.33	-0.03/-0.2	-0.22/-1.53	-4.43/-5.85	-7.76/-13.09	-18.57/-14.1	-11.91/-18.56	-18.89/-12.21	-13.82/-12.85	-9.87/-6.64	-6.25/-10.36	-15.82/-10.52	-10.72/-8.88	-7.05/-4.59	-5.59/-6.56	-6.91/-8.91	-5.58/-10.04	-14.72/-12.55	-19.69/-14.73	-10.28/-18.08	-10.08/-5.4	-1.74/-0.55	-1.25/-1.7	-2.69/-2.82	-1.25/-1.7	-2.69/-2.82	-1.25/-1.7	-2.69/-2.82	-1.25/-1.7	-2.69/-2.82	-1.25/-1.7
Theta(142.5)	Phi(0)	-3.6/-2.84	-1.45/-0.63	-1.18/-1.31	-2.01/-3.68	-5.29/-8.59	-14.94/-18.73	-18.86/-18.07	-12.84/-10.02	-12.07/-17.97	-17.93/-8.69	-5.77/-5.47	-6.73/-11.38	-10.45/-7.75	-5.17/-6.17	-12.12/-19.12	-14.44/-10.39	-14.31/-12.18	-10.21/-2.89	-17.32/-18.62	-12.39/-8.27	-10.61/-10.76	-7.06/-4.83	-4.79/-4.81	-6.34/-5.61	-4.79/-4.81	-6.34/-5.61	-4.79/-4.81	-6.34/-5.61	-4.79/-4.81	-6.34/-5.61	-4.79/-4.81
Theta(150)	Phi(0)	-4.85/-3.59	-3.18/-3.77	-3.85/-3.54	-3.44/-0.2	-5.37/-7.06	-8.94/-11.18	-14.35/-18.19	-15.52/-10.4	-8.17/-7.17	-7.23/-6.99	-6.51/-7.35	-9.09/-11.1	-13.02/-17.28	-15.23/-9.61	-5.91/-5.37	-3.36/-5.83	-10.91/-10.67	-10.97/-16.21	-18.34/-18.23	-12.41/-17.8	-5.92/-6.3	-7.46/-6.46	-5.22/-5.15	-5.89/-6.2	-5.22/-5.15	-5.89/-6.2	-5.22/-5.15	-5.89/-6.2	-5.22/-5.15	-5.89/-6.2	-5.22/-5.15
Theta(157.5)	Phi(0)	-4.55/-3.85	-3.11/-2.33	-1.97/-2.26	-3.15/-3.87	-4.67/-6.7	-10.47/-12.19	-11.92/-12.49	-12.96/-11.22	-8.05/-6.88	-6.64/-7.56	-8.33/-9.08	-10.53/-13.16	-18.08/-19.14	-13.31/-10.18	-9.1/-9.13	-10.08/-10.36	-10.28/-12.03	-17.24/-18.08	-17.49/-16.53	-14.47/-7.65	-4.98/-3.49	-2.67/-2.86	-3.4/-4.1	-4.6/-4.81	-3.4/-4.1	-4.6/-4.81	-3.4/-4.1	-4.6/-4.81	-3.4/-4.1	-4.6/-4.81	-3.4/-4.1
Theta(165)	Phi(0)	-4.16/-4.58	-4.51/-4.22	-3.57/-3.49	-4.14/-5.97	-8.41/-12.72	-17.93/-15.92	-12.23/-11.91	-13.86/-16.21	-13.58/-11.25	-10.45/-11.1	-11.67/-12.15	-13.56/-16.89	-17.63/-18.04	-18.83/-19.08	-18.11/-17.64	-19.11/-17.18	-18.99/-17.2	-18.79/-17.83	-18.69/-17.91	-15.83/-10.64	-7.21/-5.47	-4.6/-4.41	-4.43/-4.27	-3.99/-3.92	-4.43/-4.27	-3.99/-3.92	-4.43/-4.27	-3.99/-3.92	-4.43/-4.27	-3.99/-3.92	-4.43/-4.27
Theta(172.5)	Phi(0)	-7.23/-7.48	-7.87/-7.83	-8.72/-10.76	-11.06/-9.38	-8.42/-8.1	-8.13/-6.64	-9.35/-10.67	-13.71/-18.36	-17.41/-18.44	-19.17/-16.14	-14.28/-14.26	-16.63/-18.24	-17.67/-19.04	-18.18/-19.39	-17.86/-19.18	-15.13/-14.27	-15.25/-16.73	-17.66/-18.2	-19.25/-18.36	-17.96/-16.88	-13.06/-10.24	-8.39/-6.87	-6.51/-6.64	-7.01/-7.04	-8.39/-6.87	-6.51/-6.64	-7.01/-7.04	-8.39/-6.87	-6.51/-6.64	-7.01/-7.04	-8.39/-6.87
Theta(180)	Phi(0)	-7.14/-7.41	-8.87/-8.41	-8.18/-8.72	-9.88/-10.7	-10.85/-11.88	-13.91/-16.37	-19.33/-18.78	-13.57/-15.7	-19.48/-18.63	-16.51/-15.73	-16.55/-15.73	-18.42/-19.18	-15.95/-15.58	-15.26/-13.32	-12.48/-13.88	-16.41/-18.48	-18.18/-18.96	-18.98/-17.87	-18.67/-19.35	-18.03/-16.64	-16.16/-14.24	-12.89/-11.67	-9.95/-9.16	-8.41/-7.33	-12.89/-11.67	-9.95/-9.16	-8.41/-7.33	-12.89/-11.67	-9.95/-9.16	-8.41/-7.33	-12.89/-11.67
Gain	Phi(0)	5.6GPol	ThetaAnt 2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+



Radiated Composite Gain Data_5GHz UNII 1~UNII 3

Appendix B

Table with columns for Frequency (MHz), Azimuth (Ant. 4), and Gain (dBi) for various antenna configurations (Theta and Phi) from 0 to 90 degrees. The table contains numerical gain values for each combination of frequency and direction.



Radiated Composite Gain Data_5GHz UNII 1~UNII 3

Appendix B

Table with 22 columns representing frequency and gain data for various antenna configurations. The columns are labeled with frequency ranges and gain values. The table contains multiple rows of data for different frequencies and antenna types.