



Antenna Composite Gain Test Report

Equipment	Wireless Access Point
Brand Name	ARISTA
Model Name	C-460
Applicant	Arista Networks, Inc. 5453 Great America Parkway, Santa Clara, CA 95054 USA
Manufacturer	Arista Networks, Inc. 5453 Great America Parkway, Santa Clara, CA 95054 USA
Standard	KDB 662911 D03 v01
Sample Received	Sep. 25, 2023
Start Test Date	Jan. 14, 2024
Final Test Date	Jan. 14, 2024



Approved by: Jackson Tsai

SPORTON INTERNATIONAL INC. Hsinhua Laboratory

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History of this test report

Report No.	Version	Description	Issued Date
AP392143	01	Initial issue of report	May 22, 2024



1. Operation Mode and Antenna Information

Antenna Position	RF Port	Brand Name	Model Name	Ant. Type	Connector	Modes of Operation
6G Ant1	1	WHAYU	C393-510253-A	Dipole	I-Pex	6G
6G Ant2	2	WHAYU	C393-510253-A	Dipole	I-Pex	6G
6G Ant3	3	WHAYU	C393-510253-A	Dipole	I-Pex	6G
6G Ant4	4	WHAYU	C393-510253-A	Dipole	I-Pex	6G
2G 5GAnt1	1	WHAYU	C393-510253-A	PIFA	I-Pex	2.4G+5G
2G 5GAnt2	2	WHAYU	C393-510253-A	PIFA	I-Pex	2.4G+5G
2G 5GAnt3	3	WHAYU	C393-510253-A	PIFA	I-Pex	2.4G+5G
2G 5GAnt4	4	WHAYU	C393-510253-A	PIFA	I-Pex	2.4G+5G

Note:

6GHz Operation Mode (4TX/4RX)

6G Ant1~6G Ant4 can be used as transmitting/receiving antenna.

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

2G 5GAnt1~2G 5GAnt4 can be used as transmitting/receiving antenna.

2. Test Frequency

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

Band [MHz]	Test Frequency [MHz]
2400-2483.5	2450
5150-5250	5200
5250-5350	5300
5470-5725	5600
5725-5850	5785
5850-5895	5885
5925-6425	6175
6425-6525	6475
6525-6875	6695
6875-7125	6995



3. Testing Location

Test Lab. : Sporton International Inc. Hsinhua Laboratory				
<input checked="" type="checkbox"/> Wen 33rd.St.	ADD:	No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)		
	TEL:	886-3-318-0787	FAX:	886-3-318-0287
Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
Radiated	05CH03-HY	ViviJiang	24~24.5°C / 40~55%	14/Jan/2024

Note:

Testing Site Information

Brand Name: TDK

Dimension: 11m*6m*6m

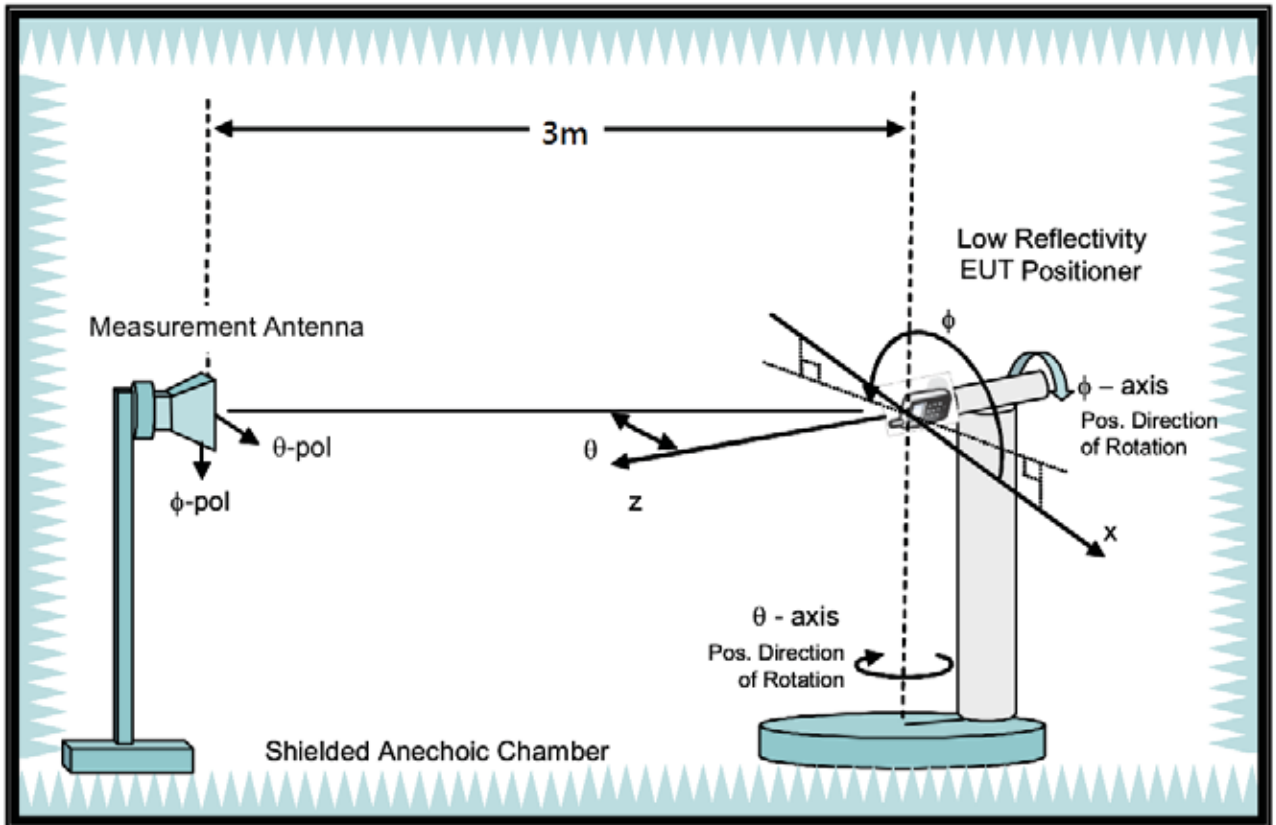
Characteristic: Fully Anechoic Chamber

4. Test Facility and Configuration

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

Measurement antenna: Dual Polarization Horn antenna
 Turntable: Multi-axis positioner (Theta and Phi angle).

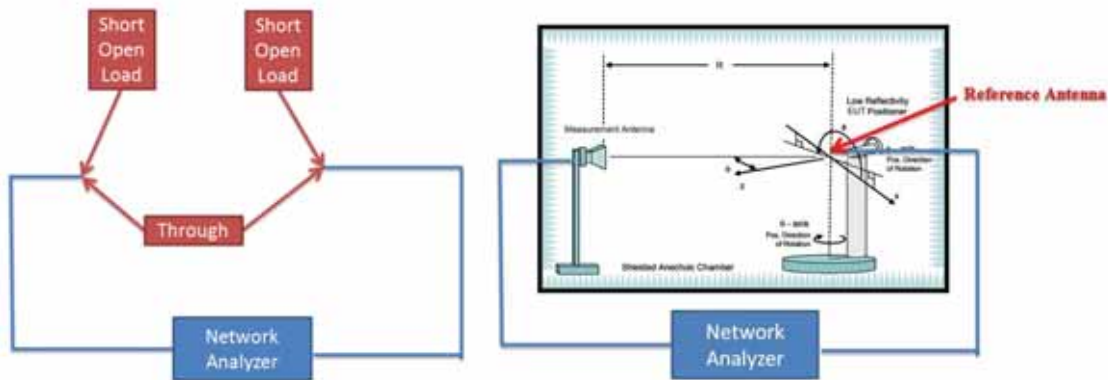
#Reference to CTIA “ctia-test-plan-for-wireless-device-over-the-air-performance-ver-3-7-1”



5. Reference Calibration

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

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



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

Note:

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

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

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

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



6. Test Method

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

DG steps:

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

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



7. Measured Values and Calculation of Maximum Gain Positions

DG_1SS max value position

Frequency (Hz)	2.45G	5.2G	5.3G	5.6G	5.785G
Ant. 1 (dBi)	-0.39	0.94	-2.94	3.83	3.92
Ant. 2 (dBi)	1.93	0.77	-0.74	0.03	-0.41
Ant. 3 (dBi)	0.64	1.94	3.02	1.61	2.08
Ant. 4 (dBi))	-4.57	3.73	4.04	3.62	4.31
DG [1SS] (dBi)	5.74	7.95	7.31	8.43	8.69
Polarization	Theta	Theta	Theta	Theta	Theta
$\Theta(^{\circ})$	67.5	82.5	75	82.5	75
$\Phi(^{\circ})$	180	45	52.5	37.5	37.5

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

Frequency (Hz)	6.175G	6.475G	6.695G	6.995G
Ant. 1 (dBi)	1.71	0.42	2.43	-1.21
Ant. 2 (dBi)	-0.33	2.09	2.45	3.94
Ant. 3 (dBi)	3.71	3.58	0.65	-1.67
Ant. 4 (dBi))	1.59	-0.01	-3.64	0.28
DG [1SS] (dBi)	7.81	7.66	6.82	6.65
Polarization	Phi	Phi	Phi	Phi
$\Theta(^{\circ})$	30	37.5	15	0
$\Phi(^{\circ})$	82.5	262.5	345	0

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



DG_1SS max value position calculation

Frequency (Hz)	2.45G	5.2G	5.3G	5.6G	5.785G
Ant. 1 [10^(G/20)]	10^(-0.39/20)	10^(0.94/20)	10^(-2.94/20)	10^(3.83/20)	10^(3.92/20)
Ant. 2 [10^(G/20)]	10^(1.93/20)	10^(0.77/20)	10^(-0.74/20)	10^(0.03/20)	10^(-0.41/20)
Ant. 3 [10^(G/20)]	10^(0.64/20)	10^(1.94/20)	10^(3.02/20)	10^(1.61/20)	10^(2.08/20)
Ant. 4 [10^(G/20)]	10^(-4.57/20)	10^(3.73/20)	10^(4.04/20)	10^(3.62/20)	10^(4.31/20)
Ant. 1 [10^(G/20)] value	0.956	1.114	0.713	1.554	1.57
Ant. 2 [10^(G/20)] value	1.249	1.093	0.918	1.003	0.954
Ant. 3 [10^(G/20)] value	1.076	1.25	1.416	1.204	1.271
Ant. 4 [10^(G/20)] value	0.591	1.536	1.592	1.517	1.642
Sum All Antenna [Amax]	3.872	4.994	4.639	5.278	5.437
DG [10*log(Amax^2/Nant)]	5.74	7.95	7.31	8.43	8.69

Frequency (Hz)	6.175G	6.475G	6.695G	6.995G
Ant. 1 [10^(G/20)]	10^(1.71/20)	10^(0.42/20)	10^(2.43/20)	10^(-1.21/20)
Ant. 2 [10^(G/20)]	10^(-0.33/20)	10^(2.09/20)	10^(2.45/20)	10^(3.94/20)
Ant. 3 [10^(G/20)]	10^(3.71/20)	10^(3.58/20)	10^(0.65/20)	10^(-1.67/20)
Ant. 4 [10^(G/20)]	10^(1.59/20)	10^(-0.01/20)	10^(-3.64/20)	10^(0.28/20)
Ant. 1 [10^(G/20)] value	1.218	1.05	1.323	0.87
Ant. 2 [10^(G/20)] value	0.963	1.272	1.326	1.574
Ant. 3 [10^(G/20)] value	1.533	1.51	1.078	0.825
Ant. 4 [10^(G/20)] value	1.201	0.999	0.658	1.033
Sum All Antenna [Amax]	4.914	4.831	4.384	4.302
DG [10*log(Amax^2/Nant)]	7.81	7.66	6.82	6.65

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

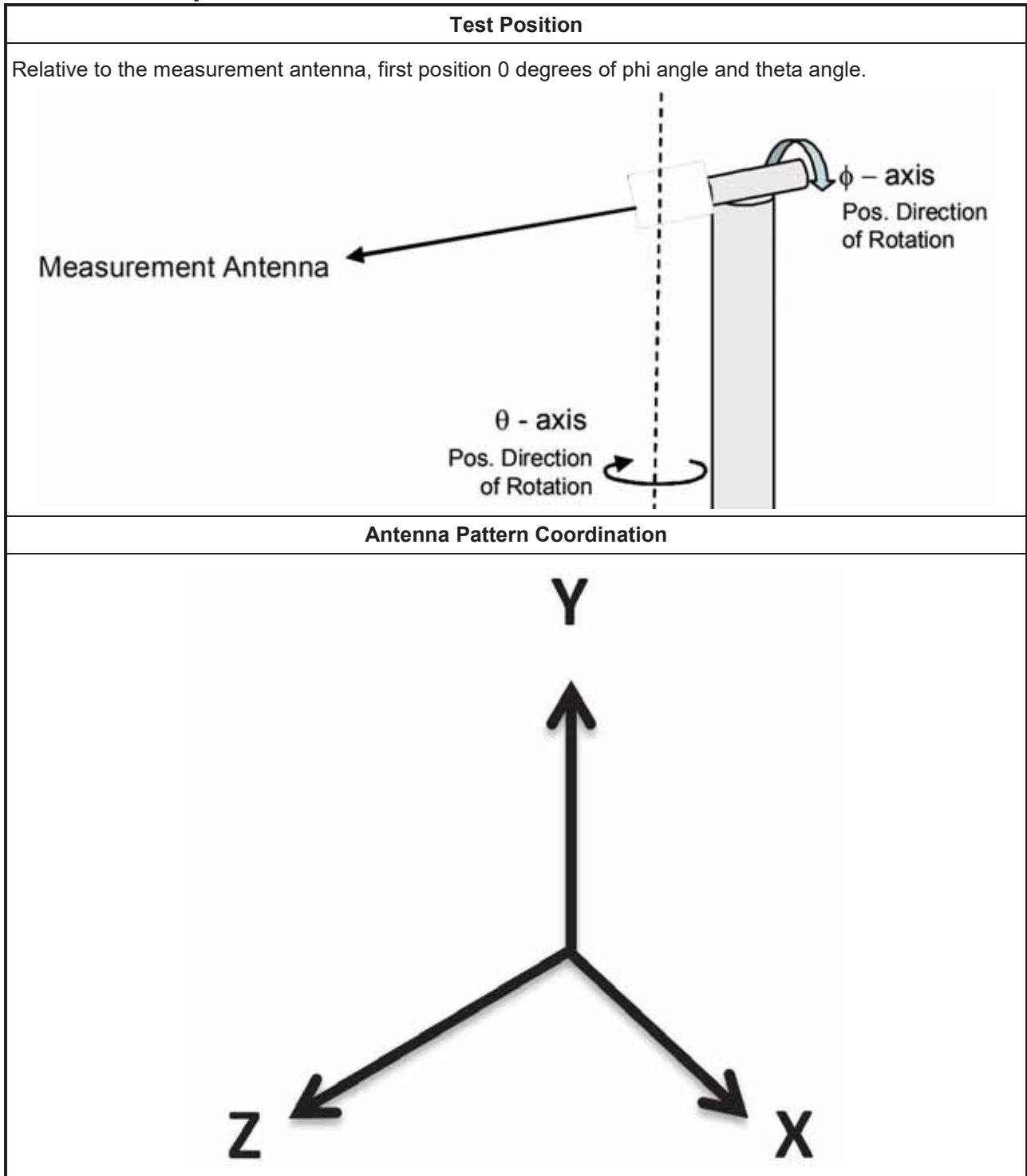
Freq(Hz)	2.45G	5.2G	5.3G	5.6G	5.785G
Ant. 1 Max Gain (dBi)	2.52	5.01	4.18	4.47	4.79
Ant. 2 Max Gain (dBi)	2.26	4.71	4.72	4.48	5.01
Ant. 3 Max Gain (dBi)	2.81	3.56	3.49	5.25	4.23
Ant. 4 Max Gain (dBi)	2.36	5.14	4.59	4.41	4.31
Ant. 1 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/52.5/157.5	Theta/75/0	Theta/75/0	Theta/75/352.5	Theta/75/0
Ant. 2 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/67.5/172.5	Theta/75/217.5	Theta/75/217.5	Theta/45/97.5	Theta/75/225
Ant. 3 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/75/232.5	Theta/67.5/142.5	Theta/60/142.5	Theta/67.5/135	Theta/67.5/135
Ant. 4 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/67.5/255	Theta/75/30	Theta/82.5/30	Theta/75/30	Theta/75/37.5
Max Gain (dBi)	2.81	5.14	4.72	5.25	5.01
DG [1SS] (dBi)	5.74	7.95	7.31	8.43	8.69
DG [2SS] (dBi)	2.81	5.14	4.72	5.43	5.69
DG [4SS] (dBi)	2.81	5.14	4.72	5.25	5.01

Freq(Hz)	6.175G	6.475G	6.695G	6.995G
Ant. 1 Max Gain (dBi)	4.41	4.44	4.06	3.96
Ant. 2 Max Gain (dBi)	5.42	4.8	4.15	4.72
Ant. 3 Max Gain (dBi)	5.35	5.01	5.61	4.45
Ant. 4 Max Gain (dBi)	4.2	3.99	4.51	5.75
Ant. 1 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Theta/22.5/225	Phi/7.5/315	Phi/7.5/307.5	Phi/37.5/120
Ant. 2 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Phi/30/217.5	Phi/30/225	Phi/7.5/30	Phi/15/30
Ant. 3 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Phi/30/315	Phi/30/300	Phi/37.5/285	Theta/45/45
Ant. 4 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$	Phi/22.5/240	Phi/37.5/217.5	Phi/37.5/210	Phi/37.5/202.5
Max Gain (dBi)	5.42	5.01	5.61	5.75
DG [1SS] (dBi)	7.81	7.66	6.82	6.65
DG [2SS] (dBi)	5.42	5.01	5.61	5.75
DG [4SS] (dBi)	5.42	5.01	5.61	5.75

Note:

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

9. Test Setup



Note:

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



10. Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA 9120D-1543	1GHz~18GHz	May 11, 2023	May 10, 2024
Dual Polarization Horn Antenna	Sporton	S0209DP	S0209DP-001	2GHz~9GHz	N.C.R.	N.C.R.
ENA Series Network Analyzer	AGILENT	E5071C	MY46419477	100kHz~8.5GHz	Jul. 28, 2023	Jul. 27, 2024
VNA Calibration Kit	TS RF	TS85033E-F	-	DC~9GHz	N.C.R.	N.C.R.
Multi-axis positioner	Sporton	MAPS01	MAPS01-001	Theta / Phi axis	N.C.R.	N.C.R.
Test Software	SPORTON	SENSE-RDG	V1.0.8	-	N.C.R.	N.C.R.

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

NCR means Non-Calibration required.



11. Test Results

Please refer to the appendix.

Appendix A – Radiated Composite Gain of 2.4GHz/5GHz/6GHz.....Page 15

Appendix B – Radiated Composite Gain of 2.4GHz/5GHz/6GHz.....Page 40

Appendix C – Test Photos.....Page 53

————THE END————



Radiated Composite Gain Data of 2.4GHz/5GHz

Appendix A.1

Freq(Hz)	2.45G	5.2G	5.3G	5.6G	5.785G
Ant. 1 Max Gain (dBi)	2.52	5.01	4.18	4.47	4.79
Ant. 2 Max Gain (dBi)	2.26	4.71	4.72	4.48	5.01
Ant. 3 Max Gain (dBi)	2.81	3.56	3.49	5.25	4.23
Ant. 4 Max Gain (dBi)	2.36	5.14	4.59	4.41	4.31
Ant. 1 Polarization/ $\theta(^{\circ})/\phi(^{\circ})$	Theta/52.5/157.5	Theta/75/0	Theta/75/0	Theta/75/352.5	Theta/75/0
Ant. 2 Polarization/ $\theta(^{\circ})/\phi(^{\circ})$	Theta/67.5/172.5	Theta/75/217.5	Theta/75/217.5	Theta/45/97.5	Theta/75/225
Ant. 3 Polarization/ $\theta(^{\circ})/\phi(^{\circ})$	Theta/75/232.5	Theta/67.5/142.5	Theta/60/142.5	Theta/67.5/135	Theta/67.5/135
Ant. 4 Polarization/ $\theta(^{\circ})/\phi(^{\circ})$	Theta/67.5/255	Theta/75/30	Theta/82.5/30	Theta/75/30	Theta/75/37.5
Max Gain (dBi)	2.81	5.14	4.72	5.25	5.01
DG [1SS] (dBi)	5.74	7.95	7.31	8.43	8.69
DG [2SS] (dBi)	2.81	5.14	4.72	5.43	5.69
DG [4SS] (dBi)	2.81	5.14	4.72	5.25	5.01



Radiated Composite Gain Data of 2.4GHz/5GHz

Appendix A.1

DG 1SS Result

Freq (GHz)	2.4GHz	Phi	+30		+45		+60		+75		+90		-75		-90		-105		-120		
			0°(30°)	15°(75°)	30°(90°)	45°(135°)	60°(180°)	75°(225°)	90°(270°)	105°(315°)	120°(360°)	135°(315°)	150°(270°)	165°(225°)	180°(180°)	195°(135°)	210°(90°)	225°(45°)	240°(0°)	255°(315°)	270°(270°)
(D068)	4.368597	-4.71323	-1.53017	0.02188	2.64323	3.65386	44.04	3.9637	3.16247	1.61162	-0.58021	-3.41468	-5.85152	-4.39269	-1.29005	1.08196	2.74026	3.66682	3.7655	3.19279	2.24751

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Radiated Composite Gain Data of 2.4GHz/5GHz

Appendix A.1

Theta (°)	185.9-12.88	15.36-13.86	-13.71-14.73	-8.91-8.61	-3.98-8.88	-10.05-11.66	-13.57-18.45	-17.79-57	-13.35-12.33	9.79-18.72	-11.33-8.88	-10.25-15.65	-16.20-16.53	-15.91-17	-17.22-7.54	-17.33-4.5	-19.09-9.28	-17.78-17.67	-17.88-18.84	-18.94-15.49	-17.47-15.92	-15.81-16.51	-16.76-14.47	-13.27-17.18
Gain	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)
Theta (°)	185.9-12.88 <td>15.36-13.86 <td>-13.71-14.73 <td>-8.91-8.61 <td>-3.98-8.88 <td>-10.05-11.66 <td>-13.57-18.45 <td>-17.79-57 <td>-13.35-12.33 <td>9.79-18.72 <td>-11.33-8.88 <td>-10.25-15.65 <td>-16.20-16.53 <td>-15.91-17 <td>-17.22-7.54 <td>-17.33-4.5 <td>-19.09-9.28 <td>-17.78-17.67 <td>-17.88-18.84 <td>-18.94-15.49 <td>-17.47-15.92 <td>-15.81-16.51 <td>-16.76-14.47 <td>-13.27-17.18 </td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	15.36-13.86 <td>-13.71-14.73 <td>-8.91-8.61 <td>-3.98-8.88 <td>-10.05-11.66 <td>-13.57-18.45 <td>-17.79-57 <td>-13.35-12.33 <td>9.79-18.72 <td>-11.33-8.88 <td>-10.25-15.65 <td>-16.20-16.53 <td>-15.91-17 <td>-17.22-7.54 <td>-17.33-4.5 <td>-19.09-9.28 <td>-17.78-17.67 <td>-17.88-18.84 <td>-18.94-15.49 <td>-17.47-15.92 <td>-15.81-16.51 <td>-16.76-14.47 <td>-13.27-17.18 </td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	-13.71-14.73 <td>-8.91-8.61 <td>-3.98-8.88 <td>-10.05-11.66 <td>-13.57-18.45 <td>-17.79-57 <td>-13.35-12.33 <td>9.79-18.72 <td>-11.33-8.88 <td>-10.25-15.65 <td>-16.20-16.53 <td>-15.91-17 <td>-17.22-7.54 <td>-17.33-4.5 <td>-19.09-9.28 <td>-17.78-17.67 <td>-17.88-18.84 <td>-18.94-15.49 <td>-17.47-15.92 <td>-15.81-16.51 <td>-16.76-14.47 <td>-13.27-17.18 </td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	-8.91-8.61 <td>-3.98-8.88 <td>-10.05-11.66 <td>-13.57-18.45 <td>-17.79-57 <td>-13.35-12.33 <td>9.79-18.72 <td>-11.33-8.88 <td>-10.25-15.65 <td>-16.20-16.53 <td>-15.91-17 <td>-17.22-7.54 <td>-17.33-4.5 <td>-19.09-9.28 <td>-17.78-17.67 <td>-17.88-18.84 <td>-18.94-15.49 <td>-17.47-15.92 <td>-15.81-16.51 <td>-16.76-14.47 <td>-13.27-17.18 </td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	-3.98-8.88 <td>-10.05-11.66 <td>-13.57-18.45 <td>-17.79-57 <td>-13.35-12.33 <td>9.79-18.72 <td>-11.33-8.88 <td>-10.25-15.65 <td>-16.20-16.53 <td>-15.91-17 <td>-17.22-7.54 <td>-17.33-4.5 <td>-19.09-9.28 <td>-17.78-17.67 <td>-17.88-18.84 <td>-18.94-15.49 <td>-17.47-15.92 <td>-15.81-16.51 <td>-16.76-14.47 <td>-13.27-17.18 </td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	-10.05-11.66 <td>-13.57-18.45 <td>-17.79-57 <td>-13.35-12.33 <td>9.79-18.72 <td>-11.33-8.88 <td>-10.25-15.65 <td>-16.20-16.53 <td>-15.91-17 <td>-17.22-7.54 <td>-17.33-4.5 <td>-19.09-9.28 <td>-17.78-17.67 <td>-17.88-18.84 <td>-18.94-15.49 <td>-17.47-15.92 <td>-15.81-16.51 <td>-16.76-14.47 <td>-13.27-17.18 </td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	-13.57-18.45 <td>-17.79-57 <td>-13.35-12.33 <td>9.79-18.72 <td>-11.33-8.88 <td>-10.25-15.65 <td>-16.20-16.53 <td>-15.91-17 <td>-17.22-7.54 <td>-17.33-4.5 <td>-19.09-9.28 <td>-17.78-17.67 <td>-17.88-18.84 <td>-18.94-15.49 <td>-17.47-15.92 <td>-15.81-16.51 <td>-16.76-14.47 <td>-13.27-17.18 </td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	-17.79-57 <td>-13.35-12.33 <td>9.79-18.72 <td>-11.33-8.88 <td>-10.25-15.65 <td>-16.20-16.53 <td>-15.91-17 <td>-17.22-7.54 <td>-17.33-4.5 <td>-19.09-9.28 <td>-17.78-17.67 <td>-17.88-18.84 <td>-18.94-15.49 <td>-17.47-15.92 <td>-15.81-16.51 <td>-16.76-14.47 <td>-13.27-17.18 </td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	-13.35-12.33 <td>9.79-18.72 <td>-11.33-8.88 <td>-10.25-15.65 <td>-16.20-16.53 <td>-15.91-17 <td>-17.22-7.54 <td>-17.33-4.5 <td>-19.09-9.28 <td>-17.78-17.67 <td>-17.88-18.84 <td>-18.94-15.49 <td>-17.47-15.92 <td>-15.81-16.51 <td>-16.76-14.47 <td>-13.27-17.18 </td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	9.79-18.72 <td>-11.33-8.88 <td>-10.25-15.65 <td>-16.20-16.53 <td>-15.91-17 <td>-17.22-7.54 <td>-17.33-4.5 <td>-19.09-9.28 <td>-17.78-17.67 <td>-17.88-18.84 <td>-18.94-15.49 <td>-17.47-15.92 <td>-15.81-16.51 <td>-16.76-14.47 <td>-13.27-17.18 </td></td></td></td></td></td></td></td></td></td></td></td></td></td>	-11.33-8.88 <td>-10.25-15.65 <td>-16.20-16.53 <td>-15.91-17 <td>-17.22-7.54 <td>-17.33-4.5 <td>-19.09-9.28 <td>-17.78-17.67 <td>-17.88-18.84 <td>-18.94-15.49 <td>-17.47-15.92 <td>-15.81-16.51 <td>-16.76-14.47 <td>-13.27-17.18 </td></td></td></td></td></td></td></td></td></td></td></td></td>	-10.25-15.65 <td>-16.20-16.53 <td>-15.91-17 <td>-17.22-7.54 <td>-17.33-4.5 <td>-19.09-9.28 <td>-17.78-17.67 <td>-17.88-18.84 <td>-18.94-15.49 <td>-17.47-15.92 <td>-15.81-16.51 <td>-16.76-14.47 <td>-13.27-17.18 </td></td></td></td></td></td></td></td></td></td></td></td>	-16.20-16.53 <td>-15.91-17 <td>-17.22-7.54 <td>-17.33-4.5 <td>-19.09-9.28 <td>-17.78-17.67 <td>-17.88-18.84 <td>-18.94-15.49 <td>-17.47-15.92 <td>-15.81-16.51 <td>-16.76-14.47 <td>-13.27-17.18 </td></td></td></td></td></td></td></td></td></td></td>	-15.91-17 <td>-17.22-7.54 <td>-17.33-4.5 <td>-19.09-9.28 <td>-17.78-17.67 <td>-17.88-18.84 <td>-18.94-15.49 <td>-17.47-15.92 <td>-15.81-16.51 <td>-16.76-14.47 <td>-13.27-17.18 </td></td></td></td></td></td></td></td></td></td>	-17.22-7.54 <td>-17.33-4.5 <td>-19.09-9.28 <td>-17.78-17.67 <td>-17.88-18.84 <td>-18.94-15.49 <td>-17.47-15.92 <td>-15.81-16.51 <td>-16.76-14.47 <td>-13.27-17.18 </td></td></td></td></td></td></td></td></td>	-17.33-4.5 <td>-19.09-9.28 <td>-17.78-17.67 <td>-17.88-18.84 <td>-18.94-15.49 <td>-17.47-15.92 <td>-15.81-16.51 <td>-16.76-14.47 <td>-13.27-17.18 </td></td></td></td></td></td></td></td>	-19.09-9.28 <td>-17.78-17.67 <td>-17.88-18.84 <td>-18.94-15.49 <td>-17.47-15.92 <td>-15.81-16.51 <td>-16.76-14.47 <td>-13.27-17.18 </td></td></td></td></td></td></td>	-17.78-17.67 <td>-17.88-18.84 <td>-18.94-15.49 <td>-17.47-15.92 <td>-15.81-16.51 <td>-16.76-14.47 <td>-13.27-17.18 </td></td></td></td></td></td>	-17.88-18.84 <td>-18.94-15.49 <td>-17.47-15.92 <td>-15.81-16.51 <td>-16.76-14.47 <td>-13.27-17.18 </td></td></td></td></td>	-18.94-15.49 <td>-17.47-15.92 <td>-15.81-16.51 <td>-16.76-14.47 <td>-13.27-17.18 </td></td></td></td>	-17.47-15.92 <td>-15.81-16.51 <td>-16.76-14.47 <td>-13.27-17.18 </td></td></td>	-15.81-16.51 <td>-16.76-14.47 <td>-13.27-17.18 </td></td>	-16.76-14.47 <td>-13.27-17.18 </td>	-13.27-17.18
Gain	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)	0.0719(0.57)



Radiated Composite Gain Data of 2.4GHz/5GHz

Appendix A.1

Frequency	Theta 22.5	Theta 45	Theta 67.5	Theta 90	Theta 112.5	Theta 135	Theta 157.5	Theta 180	Theta 202.5	Theta 225	Theta 247.5	Theta 270	Theta 292.5	Theta 315	Theta 337.5	Theta 360
Gain	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Theta 22.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Theta 45	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Theta 67.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Theta 90	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Theta 112.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Theta 135	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Theta 157.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Theta 180	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Theta 202.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Theta 225	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Theta 247.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Theta 270	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Theta 292.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Theta 315	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Theta 337.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Theta 360	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000



Radiated Composite Gain Data of 2.4GHz/5GHz

Appendix A.1

Main data table with columns for frequency ranges (e.g., (f1)(f2)), gain values, and various identifiers. The table is organized into multiple sections (e.g., Section 1, Section 2, Section 3) and includes sub-headers like 'Gain', 'Section 1', 'Section 2', 'Section 3', 'Section 4', and 'Section 5'.



Radiated Composite Gain Data of 6GHz

Appendix A.2

Freq(Hz)	6.175G	6.475G	6.695G	6.995G
Ant. 1 Max Gain (dBi)	4.41	4.44	4.06	3.96
Ant. 2 Max Gain (dBi)	5.42	4.8	4.15	4.72
Ant. 3 Max Gain (dBi)	5.35	5.01	5.61	4.45
Ant. 4 Max Gain (dBi)	4.2	3.99	4.51	5.75
Ant. 1 Polarization/ θ (°)/ ϕ (°)	Theta/22.5/225	Phi/7.5/315	Phi/7.5/307.5	Phi/37.5/120
Ant. 2 Polarization/ θ (°)/ ϕ (°)	Phi/30/217.5	Phi/30/225	Phi/7.5/30	Phi/15/30
Ant. 3 Polarization/ θ (°)/ ϕ (°)	Phi/30/315	Phi/30/300	Phi/37.5/285	Theta/45/45
Ant. 4 Polarization/ θ (°)/ ϕ (°)	Phi/22.5/240	Phi/37.5/217.5	Phi/37.5/210	Phi/37.5/202.5
Max Gain (dBi)	5.42	5.01	5.61	5.75
DG [1SS] (dBi)	7.81	7.66	6.82	6.65
DG [2SS] (dBi)	5.42	5.01	5.61	5.75
DG [4SS] (dBi)	5.42	5.01	5.61	5.75

Radiated Composite Gain Data of 6GHz

Appendix A.2

Theta (deg)	0.00	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	10.50	11.00	11.50	12.00	12.50	13.00	13.50	14.00	14.50	15.00	15.50	16.00	16.50	17.00	17.50	18.00	18.50	19.00	19.50	20.00	20.50	21.00	21.50	22.00	22.50	23.00	23.50	24.00	24.50	25.00	25.50	26.00	26.50	27.00	27.50	28.00	28.50	29.00	29.50	30.00	30.50	31.00	31.50	32.00	32.50	33.00	33.50	34.00	34.50	35.00	35.50	36.00	36.50	37.00	37.50	38.00	38.50	39.00	39.50	40.00	40.50	41.00	41.50	42.00	42.50	43.00	43.50	44.00	44.50	45.00	45.50	46.00	46.50	47.00	47.50	48.00	48.50	49.00	49.50	50.00	50.50	51.00	51.50	52.00	52.50	53.00	53.50	54.00	54.50	55.00	55.50	56.00	56.50	57.00	57.50	58.00	58.50	59.00	59.50	60.00	60.50	61.00	61.50	62.00	62.50	63.00	63.50	64.00	64.50	65.00	65.50	66.00	66.50	67.00	67.50	68.00	68.50	69.00	69.50	70.00	70.50	71.00	71.50	72.00	72.50	73.00	73.50	74.00	74.50	75.00	75.50	76.00	76.50	77.00	77.50	78.00	78.50	79.00	79.50	80.00	80.50	81.00	81.50	82.00	82.50	83.00	83.50	84.00	84.50	85.00	85.50	86.00	86.50	87.00	87.50	88.00	88.50	89.00	89.50	90.00	90.50	91.00	91.50	92.00	92.50	93.00	93.50	94.00	94.50	95.00	95.50	96.00	96.50	97.00	97.50	98.00	98.50	99.00	99.50	100.00
Phi (deg)	0.00	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	10.50	11.00	11.50	12.00	12.50	13.00	13.50	14.00	14.50	15.00	15.50	16.00	16.50	17.00	17.50	18.00	18.50	19.00	19.50	20.00	20.50	21.00	21.50	22.00	22.50	23.00	23.50	24.00	24.50	25.00	25.50	26.00	26.50	27.00	27.50	28.00	28.50	29.00	29.50	30.00	30.50	31.00	31.50	32.00	32.50	33.00	33.50	34.00	34.50	35.00	35.50	36.00	36.50	37.00	37.50	38.00	38.50	39.00	39.50	40.00	40.50	41.00	41.50	42.00	42.50	43.00	43.50	44.00	44.50	45.00	45.50	46.00	46.50	47.00	47.50	48.00	48.50	49.00	49.50	50.00	50.50	51.00	51.50	52.00	52.50	53.00	53.50	54.00	54.50	55.00	55.50	56.00	56.50	57.00	57.50	58.00	58.50	59.00	59.50	60.00	60.50	61.00	61.50	62.00	62.50	63.00	63.50	64.00	64.50	65.00	65.50	66.00	66.50	67.00	67.50	68.00	68.50	69.00	69.50	70.00	70.50	71.00	71.50	72.00	72.50	73.00	73.50	74.00	74.50	75.00	75.50	76.00	76.50	77.00	77.50	78.00	78.50	79.00	79.50	80.00	80.50	81.00	81.50	82.00	82.50	83.00	83.50	84.00	84.50	85.00	85.50	86.00	86.50	87.00	87.50	88.00	88.50	89.00	89.50	90.00	90.50	91.00	91.50	92.00	92.50	93.00	93.50	94.00	94.50	95.00	95.50	96.00	96.50	97.00	97.50	98.00	98.50	99.00	99.50	100.00

Radiated Composite Gain Data of 6GHz

Appendix A.2

(p1)	(p2)	(p3)	(p4)	(p5)	(p6)	(p7)	(p8)	(p9)	(p10)	(p11)	(p12)	(p13)	(p14)	(p15)	(p16)	(p17)	(p18)	(p19)	(p20)	(p21)	(p22)	(p23)	(p24)	(p25)	(p26)	(p27)	(p28)	(p29)	(p30)	(p31)	(p32)	(p33)	(p34)	(p35)	(p36)	(p37)	(p38)	(p39)	(p40)	(p41)	(p42)	(p43)	(p44)	(p45)	(p46)	(p47)	(p48)	(p49)	(p50)	(p51)	(p52)	(p53)	(p54)	(p55)	(p56)	(p57)	(p58)	(p59)	(p60)	(p61)	(p62)	(p63)	(p64)	(p65)	(p66)	(p67)	(p68)	(p69)	(p70)	(p71)	(p72)	(p73)	(p74)	(p75)	(p76)	(p77)	(p78)	(p79)	(p80)	(p81)	(p82)	(p83)	(p84)	(p85)	(p86)	(p87)	(p88)	(p89)	(p90)	(p91)	(p92)	(p93)	(p94)	(p95)	(p96)	(p97)	(p98)	(p99)	(p100)
(p101)	(p102)	(p103)	(p104)	(p105)	(p106)	(p107)	(p108)	(p109)	(p110)	(p111)	(p112)	(p113)	(p114)	(p115)	(p116)	(p117)	(p118)	(p119)	(p120)	(p121)	(p122)	(p123)	(p124)	(p125)	(p126)	(p127)	(p128)	(p129)	(p130)	(p131)	(p132)	(p133)	(p134)	(p135)	(p136)	(p137)	(p138)	(p139)	(p140)	(p141)	(p142)	(p143)	(p144)	(p145)	(p146)	(p147)	(p148)	(p149)	(p150)	(p151)	(p152)	(p153)	(p154)	(p155)	(p156)	(p157)	(p158)	(p159)	(p160)	(p161)	(p162)	(p163)	(p164)	(p165)	(p166)	(p167)	(p168)	(p169)	(p170)	(p171)	(p172)	(p173)	(p174)	(p175)	(p176)	(p177)	(p178)	(p179)	(p180)	(p181)	(p182)	(p183)	(p184)	(p185)	(p186)	(p187)	(p188)	(p189)	(p190)	(p191)	(p192)	(p193)	(p194)	(p195)	(p196)	(p197)	(p198)	(p199)	(p200)



Radiated Composite Gain Data of 6GHz

Appendix A.2

Theta (172.5)	-16.64+16.1	-15.27+14.27	-14.94+16.32	-18.21+17.47	-18.09+18.44	-18.77+18.89	-18.85+19.36	-17.75+16.33	-13.82+13.37	-16.4+18.75	-17.97+16.62	-15.77+15.65	-14.57+14.1	-15.39+18.5	-18.1+18.99	-18.81+18.87	-17.59+15.47	-14.79+15.32	-17.07+16.08	-17.31+17.48	-18.73+18.38	-19.09+18.17	-19.33+18.65	-17.83+18.87
Phi (180)	-18.71+18.86	-18.1+18.18	-18.26+18.33	-19.22+19.29	-17.42+18.83	-19.62+13.78	-13.41+12.77	-12.65+14.56	-18.39+18.54	-18.97+13.13	-17.99+19.13	-17.79+18.23	-18.51+18.66	-18.79+17.1	-18.63+18.36	-17.41+18.47	-13.58+13.2	-12.19+11.56	-10.84+10.89	-11.88+13.81	-15.07+15.21	-15.96+18.36	-18.52+18.55	-18.69+18.33
Frequency	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504
Gain	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194
Theta (172.5)	-16.64+16.1	-15.27+14.27	-14.94+16.32	-18.21+17.47	-18.09+18.44	-18.77+18.89	-18.85+19.36	-17.75+16.33	-13.82+13.37	-16.4+18.75	-17.97+16.62	-15.77+15.65	-14.57+14.1	-15.39+18.5	-18.1+18.99	-18.81+18.87	-17.59+15.47	-14.79+15.32	-17.07+16.08	-17.31+17.48	-18.73+18.38	-19.09+18.17	-19.33+18.65	-17.83+18.87
Phi (180)	-18.71+18.86	-18.1+18.18	-18.26+18.33	-19.22+19.29	-17.42+18.83	-19.62+13.78	-13.41+12.77	-12.65+14.56	-18.39+18.54	-18.97+13.13	-17.99+19.13	-17.79+18.23	-18.51+18.66	-18.79+17.1	-18.63+18.36	-17.41+18.47	-13.58+13.2	-12.19+11.56	-10.84+10.89	-11.88+13.81	-15.07+15.21	-15.96+18.36	-18.52+18.55	-18.69+18.33
Frequency	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504
Gain	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194
Theta (172.5)	-16.64+16.1	-15.27+14.27	-14.94+16.32	-18.21+17.47	-18.09+18.44	-18.77+18.89	-18.85+19.36	-17.75+16.33	-13.82+13.37	-16.4+18.75	-17.97+16.62	-15.77+15.65	-14.57+14.1	-15.39+18.5	-18.1+18.99	-18.81+18.87	-17.59+15.47	-14.79+15.32	-17.07+16.08	-17.31+17.48	-18.73+18.38	-19.09+18.17	-19.33+18.65	-17.83+18.87
Phi (180)	-18.71+18.86	-18.1+18.18	-18.26+18.33	-19.22+19.29	-17.42+18.83	-19.62+13.78	-13.41+12.77	-12.65+14.56	-18.39+18.54	-18.97+13.13	-17.99+19.13	-17.79+18.23	-18.51+18.66	-18.79+17.1	-18.63+18.36	-17.41+18.47	-13.58+13.2	-12.19+11.56	-10.84+10.89	-11.88+13.81	-15.07+15.21	-15.96+18.36	-18.52+18.55	-18.69+18.33
Frequency	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504	6.175504
Gain	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194	0.077194



Radiated Composite Gain Data of 6GHz

Appendix A.2

Table with columns for frequency (e.g., e(120)), gain values, and various identifiers (e.g., Gain, 0(15), 0(16), etc.). The table is organized into two main sections, one above and one below a horizontal line, with identical column headers and varying data entries.



Antenna Pattern of 2.4GHz/5GHz

Appendix B.1

Total Gain Data

Freq(Hz)	2.4GHz	Total 1	0°		30°		60°		90°		120°		150°		180°		210°		240°		270°		300°		330°		360°		
Gain	0°(180°)	0°(180°)	0°(180°)	30°(210°)	30°(210°)	60°(150°)	60°(150°)	90°(90°)	90°(90°)	120°(60°)	120°(60°)	150°(30°)	150°(30°)	180°(0°)	180°(0°)	210°(30°)	210°(30°)	240°(60°)	240°(60°)	270°(90°)	270°(90°)	300°(120°)	300°(120°)	330°(150°)	330°(150°)	360°(180°)	360°(180°)		
0°	1.6811	1.6317	1.5114	1.5617	1.5114	1.4611	1.4114	1.3611	1.3114	1.2611	1.2114	1.1611	1.1114	1.0611	1.0114	1.0611	1.1114	1.1611	1.2114	1.2611	1.3114	1.3611	1.4114	1.4611	1.5114	1.5617	1.6317	1.6811	
30°	1.2011	1.1349	1.0684	1.0921	1.0145	0.9370	0.8605	0.7840	0.7075	0.6310	0.5545	0.4780	0.4015	0.3250	0.2485	0.3250	0.4015	0.4780	0.5545	0.6310	0.7075	0.7840	0.8605	0.9370	1.0145	1.0921	1.1349	1.2011	1.2684
60°	1.1910	1.0564	0.9218	0.9811	0.8465	0.7119	0.5773	0.4427	0.3081	0.1735	0.0389	-0.0957	-0.2303	-0.3649	-0.4995	-0.3649	-0.2303	-0.0957	0.0389	0.1735	0.3081	0.4427	0.5773	0.7119	0.8465	0.9811	1.0564	1.1910	1.2684
90°	1.1671	1.0172	0.8673	0.9176	0.7677	0.6178	0.4679	0.3180	0.1681	0.0182	-0.1317	-0.2818	-0.4319	-0.5820	-0.7321	-0.5820	-0.4319	-0.2818	-0.1317	0.0182	0.1681	0.3180	0.4679	0.6178	0.7677	0.9176	1.0172	1.1671	1.2684
120°	1.1512	1.0013	0.8514	0.9017	0.7518	0.6019	0.4520	0.3021	0.1522	0.0023	-0.1476	-0.2977	-0.4478	-0.5979	-0.7480	-0.5979	-0.4478	-0.2977	-0.1476	0.0023	0.1522	0.3021	0.4520	0.6019	0.7518	0.9017	1.0013	1.1512	1.2684
150°	1.1353	0.9854	0.8355	0.8858	0.7359	0.5860	0.4361	0.2862	0.1363	-0.0136	-0.1637	-0.3138	-0.4639	-0.6140	-0.7641	-0.6140	-0.4639	-0.3138	-0.1637	-0.0136	0.1363	0.2862	0.4361	0.5860	0.7359	0.8858	0.9854	1.1353	1.2684
180°	1.1194	0.9695	0.8196	0.8699	0.7199	0.5700	0.4201	0.2702	0.1203	0.0704	0.0205	0.0706	0.1207	0.1708	0.2209	0.1708	0.1207	0.0706	0.0205	0.0704	0.1203	0.2702	0.4201	0.5700	0.7199	0.8699	0.9695	1.1194	1.2684
210°	1.1035	0.9536	0.8037	0.8540	0.7041	0.5542	0.4043	0.2544	0.1045	0.0546	0.0047	0.0548	0.1049	0.1550	0.2051	0.1550	0.1049	0.0548	0.0047	0.0546	0.1045	0.2544	0.4043	0.5542	0.7041	0.8540	0.9536	1.1035	1.2684
240°	1.0876	0.9377	0.7878	0.8381	0.6882	0.5383	0.3884	0.2385	0.0886	0.0387	0.0888	0.1389	0.1890	0.2391	0.2892	0.2391	0.1890	0.1389	0.0888	0.0387	0.0886	0.2385	0.3884	0.5383	0.6882	0.8381	0.9377	1.0876	1.2684
270°	1.0717	0.9218	0.7719	0.8222	0.6723	0.5224	0.3725	0.2226	0.0727	0.0228	0.0729	0.1230	0.1731	0.2232	0.2733	0.2232	0.1731	0.1230	0.0729	0.0228	0.0727	0.2226	0.3725	0.5224	0.6723	0.8222	0.9218	1.0717	1.2684
300°	1.0558	0.9059	0.7560	0.8063	0.6564	0.5065	0.3566	0.2067	0.0568	0.0069	0.0570	0.1071	0.1572	0.2073	0.2574	0.2073	0.1572	0.1071	0.0570	0.0069	0.0568	0.2067	0.3566	0.5065	0.6564	0.8063	0.9059	1.0558	1.2684
330°	1.0399	0.8900	0.7401	0.7904	0.6405	0.4906	0.3407	0.1908	0.0409	0.0910	0.1411	0.1912	0.2413	0.2914	0.2413	0.1912	0.1411	0.0910	0.0409	0.0908	0.1908	0.3407	0.4906	0.6405	0.7904	0.8900	1.0399	1.2684	1.3685
360°	1.0240	0.8741	0.7242	0.7745	0.6246	0.4747	0.3248	0.1749	0.0250	0.0751	0.1252	0.1753	0.2254	0.2755	0.2254	0.1753	0.1252	0.0751	0.0250	0.0749	0.1749	0.3248	0.4747	0.6246	0.7745	0.8741	1.0240	1.2684	1.3685

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Antenna Pattern of 2.4GHz/5GHz

Appendix B.1

Large data table with columns for Azimuth (Az) and Elevation (El) angles, followed by a grid of gain values. Includes a legend for Gain values and a reference table for Azimuth and Elevation angles.

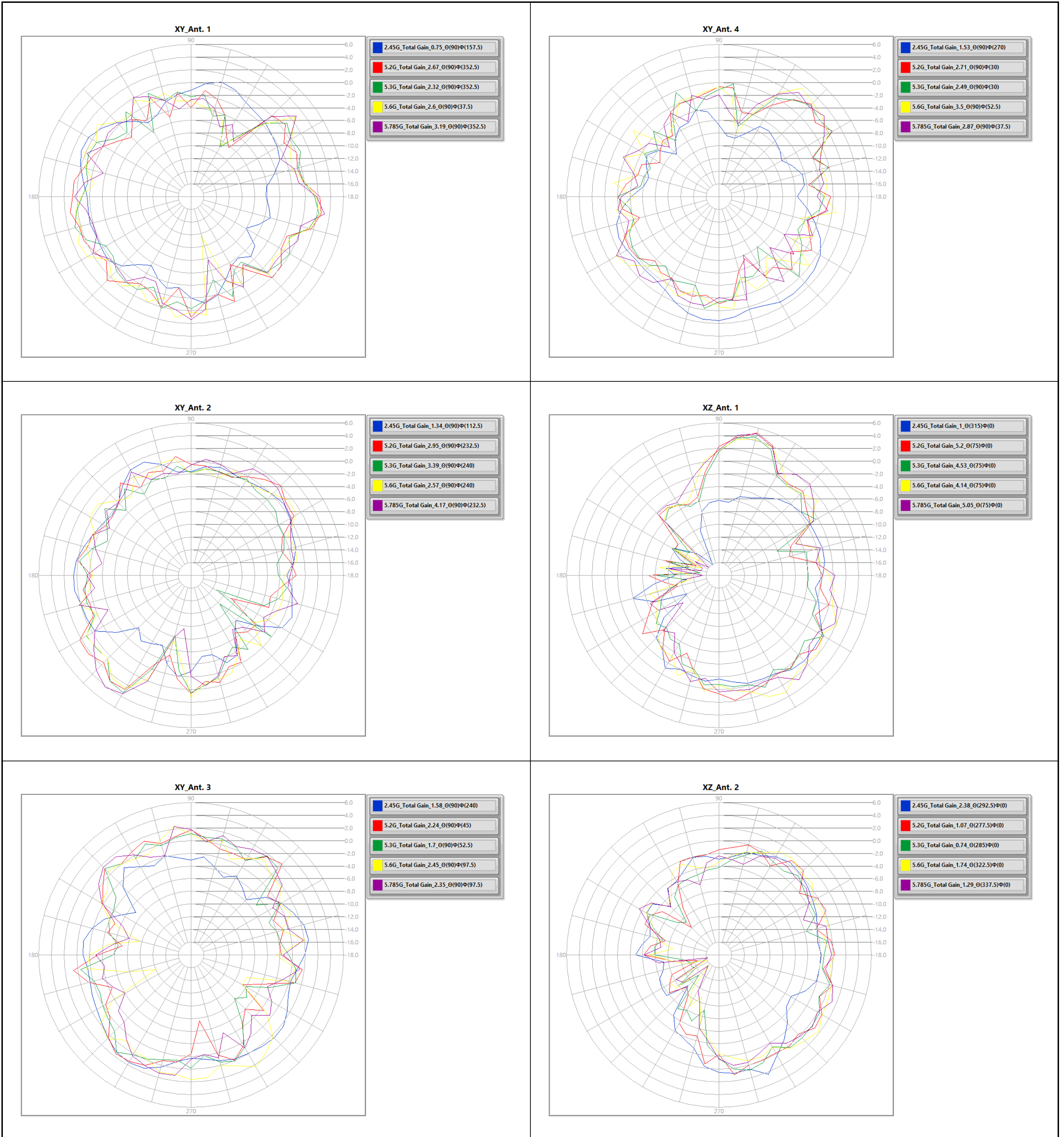


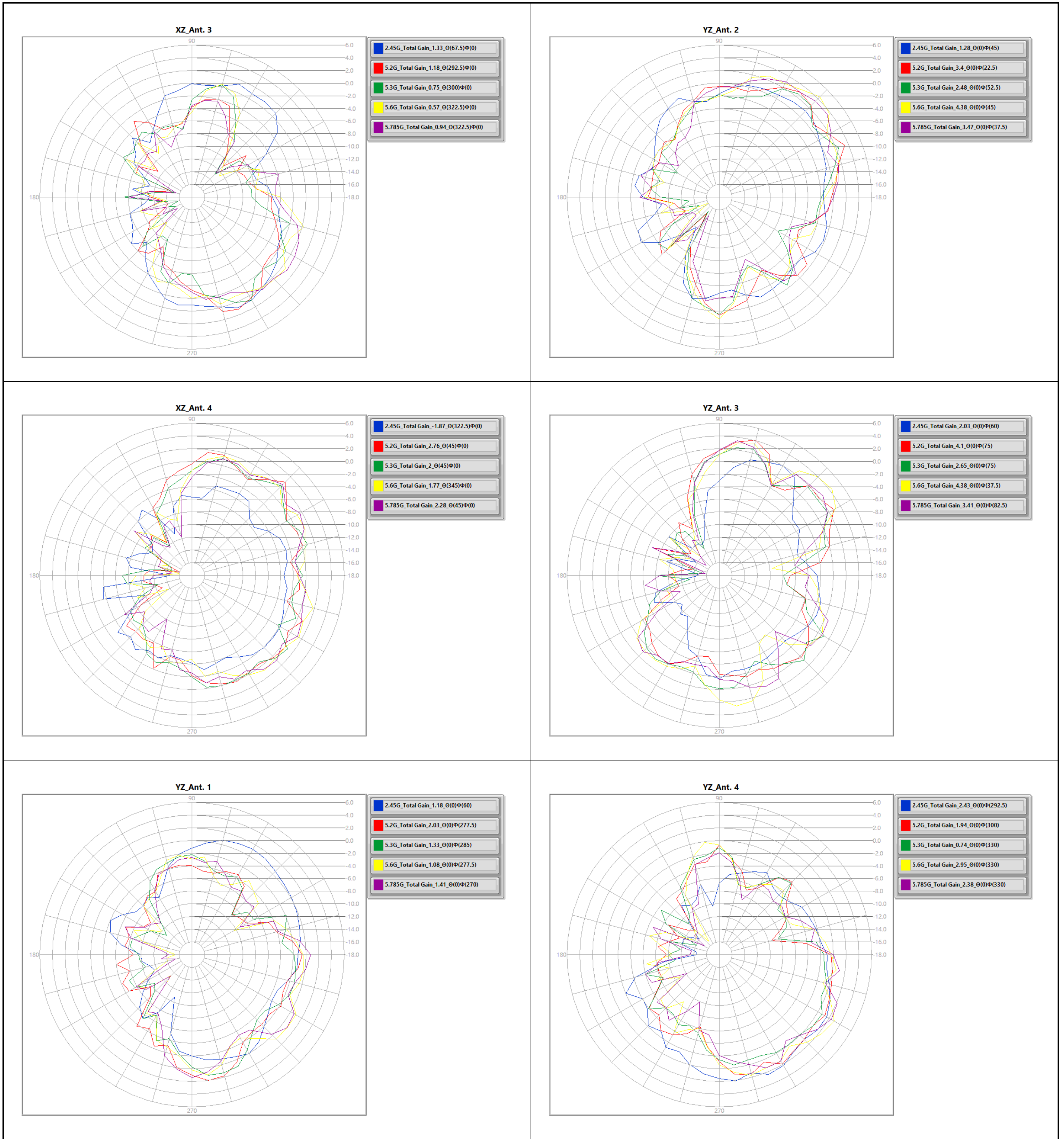
Antenna Pattern of 2.4GHz/5GHz

Appendix B.1

Table with multiple columns and rows representing antenna pattern data for 2.4GHz/5GHz. The table includes headers for Gain, Elevation, Azimuth, and multiple data points for various frequencies and directions. The data is organized into sections labeled with gain values such as 18dBi, 15dBi, 12dBi, and 9dBi.

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







Antenna Pattern of 6GHz

Appendix B.2

Table containing antenna pattern data for 6GHz, with columns for frequency (MHz), elevation angle (Theta), and azimuth angle (Phi). The data is organized into multiple sections, each starting with a 'Gain' header and followed by a grid of numerical values representing signal strength in dB.

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

