



Antenna Composite Gain Test Report

Equipment	XE5-8
Brand Name	Cambium Networks
Model Name	XE5-8
Applicant	Cambium Networks Inc. 3800 Golf Road, Suite 360 Rolling Meadows, IL 60008, USA
Manufacturer	Cambium Networks, Ltd. Ashburton, TQ13 7UP, UK
Sample Received	Dec. 07, 2021
Start Test Date	Dec. 23, 2021
Final Test Date	Dec. 24, 2021



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1. Operation Mode and Antenna Information

Antenna Position	2.4GHz port	5GHz port	5GHz port	6E port	Brand Name	Model Name	Ant. Type	Connector	Modes of Operation
Radio 1 Ant1 2G 5G	4	4 (High band)	4 (Full band)	-	ACCTON	EAP9819A-6E-1120-CAM	PCB	I-PEX	2.4GHz, 5GHz UNII 1~3
Radio 1 Ant2 2G 5G	3	3 (High band)	3 (Full band)	-	ACCTON	EAP9819A-6E-1120-CAM	PCB	I-PEX	2.4GHz, 5GHz UNII 1~3
Radio 1 Ant3 2G 5G	2	2 (High band)	2 (Full band)	-	ACCTON	EAP9819A-6E-1120-CAM	PCB	I-PEX	2.4GHz, 5GHz UNII 1~3
Radio 1 Ant4 2G 5G	1	1 (High band)	1 (Full band)	-	ACCTON	EAP9819A-6E-1120-CAM	PCB	I-PEX	2.4GHz, 5GHz UNII 1~3
Radio 1 Ant5 5G	-	4 (Low band)	8 (Full band)	-	ACCTON	EAP9819A-6E-1120-CAM	PCB	I-PEX	5GHz UNII 1~3
Radio 1 Ant6 5G	-	3 (Low band)	7 (Full band)	-	ACCTON	EAP9819A-6E-1120-CAM	PCB	I-PEX	5GHz UNII 1~3
Radio 1 Ant7 5G	-	2 (Low band)	6 (Full band)	-	ACCTON	EAP9819A-6E-1120-CAM	PCB	I-PEX	5GHz UNII 1~3
Radio 1 Ant8 5G	-	1 (Low band)	5 (Full band)	-	ACCTON	EAP9819A-6E-1120-CAM	PCB	I-PEX	5GHz UNII 1~3
Radio 2 Ant1 6G	-	4		4	ACCTON	EAP9819A-6E-1120-CAM	Metal	I-PEX	5GHz UNII 1~3 & 6GHz UNII5~8
Radio 2 Ant2 6G	-	2		2	ACCTON	EAP9819A-6E-1120-CAM	Metal	I-PEX	5GHz UNII 1~3 & 6GHz UNII5~8
Radio 2 Ant3 6G	-	3		3	ACCTON	EAP9819A-6E-1120-CAM	Metal	I-PEX	5GHz UNII 1~3 & 6GHz UNII5~8
Radio 2 Ant4 6G	-	1		1	ACCTON	EAP9819A-6E-1120-CAM	Metal	I-PEX	5GHz UNII 1~3 & 6GHz UNII5~8
Radio 3 Ant1 6G	-	4		4	ACCTON	EAP9819A-6E-1120-CAM	Metal	I-PEX	5GHz UNII 1~3 & 6GHz UNII5~8
Radio 3 Ant2 6G	-	2		2	ACCTON	EAP9819A-6E-1120-CAM	Metal	I-PEX	5GHz UNII 1~3 & 6GHz UNII5~8
Radio 3 Ant3 6G	-	3		3	ACCTON	EAP9819A-6E-1120-CAM	Metal	I-PEX	5GHz UNII 1~3 & 6GHz UNII5~8
Radio 3 Ant4 6G	-	1		1	ACCTON	EAP9819A-6E-1120-CAM	Metal	I-PEX	5GHz UNII 1~3 & 6GHz UNII5~8

Note:

DBS Mode: Radio 1 (2.4GHz/5GHz Full Band)+Radio 2 (5GHz/6GHz)+Radio 3 (5GHz/6GHz)

Radio 1:

2.4GHz Operation Mode (4TX/4RX)

Radio 1 Ant1 2G 5G~Radio 1 Ant4 2G 5G can be used as transmitting/receiving antenna.

Radio 1 Ant1 2G 5G~Radio 1 Ant4 2G 5G could transmit/receive simultaneously.

5GHz Operation Mode (8TX/8RX): UNII 1~3

Radio 1 Ant1 2G 5G~Radio 1 Ant4 2G 5G and Radio 1 Ant5 5G~ Radio 1 Ant8 5G can be used as transmitting/receiving antenna.

Radio 1 Ant1 2G 5G~Radio 1 Ant4 2G 5G and Radio 1 Ant5 5G~ Radio 1 Ant8 5G could transmit/receive simultaneously.

Radio 2:

6GHz Operation Mode (4TX/4RX)

Radio 2 Ant1 6G~Radio 2 Ant4 6G can be used as transmitting/receiving antenna.

Radio 2 Ant1 6G~Radio 2 Ant4 6G could transmit/receive simultaneously.



Radio 3:

6GHz Operation Mode (4TX/4RX)

Radio 2 Ant1 6G~Radio 2 Ant4 6G can be used as transmitting/receiving antenna.

Radio 2 Ant1 6G~Radio 2 Ant4 6G could transmit/receive simultaneously.

SBS Mode: Radio 1 (2.4GHz/5GHz Low Band/High Band)+Radio 2 (5GHz/6GHz)+ Radio 3 (5GHz/6GHz)

Radio 1:

2.4GHz Operation Mode (4TX/4RX)

Radio 1 Ant1 2G 5G~Radio 1 Ant4 2G 5G can be used as transmitting/receiving antenna.

Radio 1 Ant1 2G 5G~Radio 1 Ant4 2G 5G could transmit/receive simultaneously.

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

Radio 1 Ant1 2G 5G~Radio 1 Ant4 2G 5G can be used as transmitting/receiving antenna.

Radio 1 Ant1 2G 5G~Radio 1 Ant4 2G 5G could transmit/receive simultaneously.

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

Radio 1 Ant5 5G~ Radio 1 Ant8 5G can be used as transmitting/receiving antenna.

Radio 1 Ant5 5G~ Radio 1 Ant8 5G could transmit/receive simultaneously.

Radio 2:

6GHz Operation Mode (4TX/4RX)

Radio 2 Ant1 6G~Radio 2 Ant4 6G can be used as transmitting/receiving antenna.

Radio 2 Ant1 6G~Radio 2 Ant4 6G could transmit/receive simultaneously.

Radio 3:

6GHz Operation Mode (4TX/4RX)

Radio 2 Ant1 6G~Radio 2 Ant4 6G can be used as transmitting/receiving antenna.

Radio 2 Ant1 6G~Radio 2 Ant4 6G 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
5925-6425	6175
6425-6525	6475
6525-6875	6695
6875-7125	6995

3. Testing Location

Testing Location		
<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	22-23 / 45-55	Dec. 23, 2021~Dec. 24, 2021

Note:

Testing Site Information

Brand Name: TDK

Dimension: 11m*6m*6m

Characteristic: Fully Anechoic Chamber

4. Test Facility and Configuration

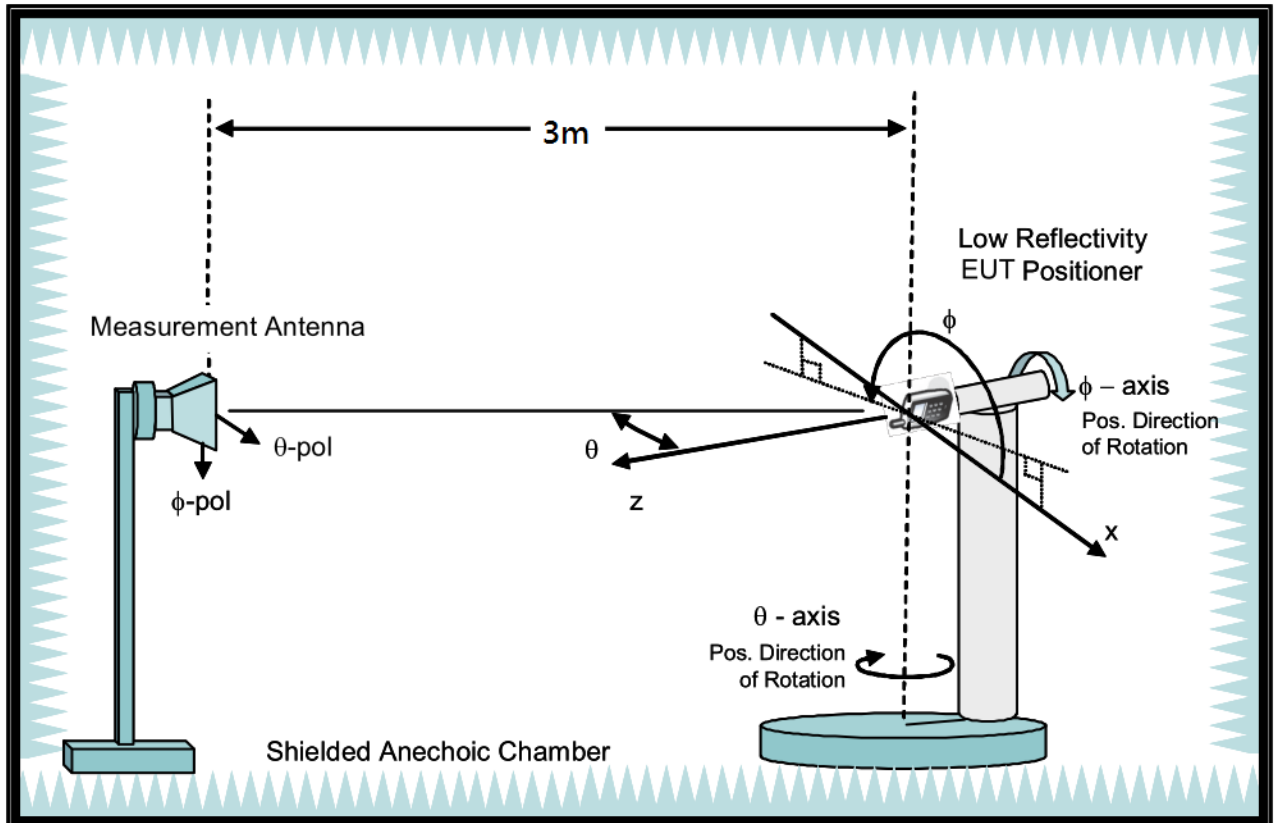
Test configuration: Reference to CITA OTA distributed-axes system configuration.

Chamber: Fully Anechoic Chamber.

Measurement antenna: Single Polarization Horn antenna calibrated according to ANSI C63.5.

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

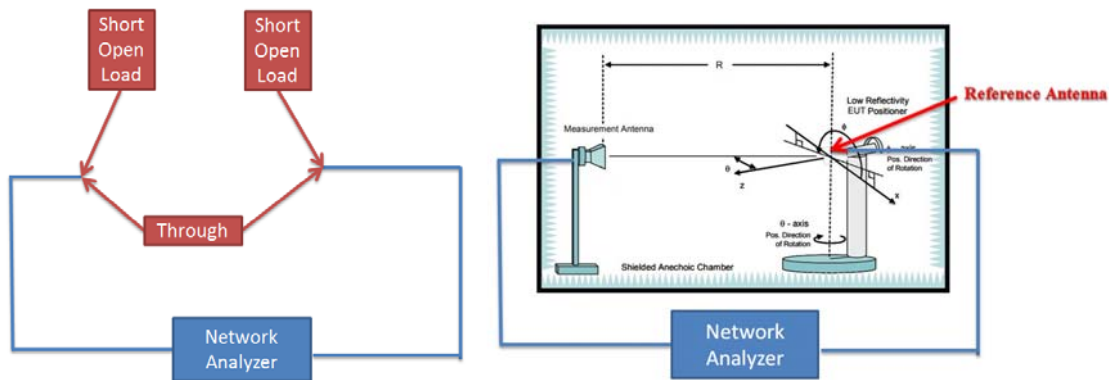
#Reference to CTIA "ctia-test-plan-for-wireless-device-over-the-air-performance-ver-3-7-1"



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 S21 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 S21 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
S21 values (dBi)	-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)	41.63	41.81	41.89	43.72	43.78	44.12	43.5	43.78	43.76	43.88	44.45	45.14	46.08	46.51



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 S21 value every 15 degree from 0 to 345 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 (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.



7. Measured Values and Calculation of Maximum Gain Positions

Mode 1: Radio 1 2.4GHz 4TX and 5GHz full band 8TX

DG_1SS max value position

Frequency (Hz)	2.45G	5.2G	5.3G	5.6G	5.785G
Ant. 1 (dBi)	4.51	0.1	2.05	1.72	-1.09
Ant. 2 (dBi)	4.97	1.93	3.87	3.22	2.83
Ant. 3 (dBi)	2.11	1.28	4.41	4.38	2.74
Ant. 4 (dBi)	3.72	4.61	1.28	0.84	3.36
Ant. 5 (dBi)		-1.86	-3.79	-10.88	-5.67
Ant. 6 (dBi)		-5.81	-5.44	-11.75	-15.3
Ant. 7 (dBi)		-5.45	-10.18	-28.18	-17.2
Ant. 8 (dBi)		-6.83	-5.72	-4.42	-6.31
DG [1SS] (dBi)	9.91	8.39	8.65	7.37	7.13
Polarization	Phi	Theta	Theta	Theta	Theta
Θ (°)	45	30	30	30	30
Φ (°)	0	210	15	45	45

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^(4.51/20)	10^(0.1/20)	10^(2.05/20)	10^(1.72/20)	10^(-1.09/20)
Ant. 2 [10^(G/20)]	10^(4.97/20)	10^(1.93/20)	10^(3.87/20)	10^(3.22/20)	10^(2.83/20)
Ant. 3 [10^(G/20)]	10^(2.11/20)	10^(1.28/20)	10^(4.41/20)	10^(4.38/20)	10^(2.74/20)
Ant. 4 [10^(G/20)]	10^(3.72/20)	10^(4.61/20)	10^(1.28/20)	10^(0.84/20)	10^(3.36/20)
Ant. 5 [10^(G/20)]		10^(-1.86/20)	10^(-3.79/20)	10^(-10.88/20)	10^(-5.67/20)
Ant. 6 [10^(G/20)]		10^(-5.81/20)	10^(-5.44/20)	10^(-11.75/20)	10^(-15.3/20)
Ant. 7 [10^(G/20)]		10^(-5.45/20)	10^(-10.18/20)	10^(-28.18/20)	10^(-17.2/20)
Ant. 8 [10^(G/20)]		10^(-6.83/20)	10^(-5.72/20)	10^(-4.42/20)	10^(-6.31/20)
Ant. 1 [10^(G/20)] value	1.681	1.012	1.266	1.219	0.882
Ant. 2 [10^(G/20)] value	1.772	1.249	1.561	1.449	1.385
Ant. 3 [10^(G/20)] value	1.275	1.159	1.661	1.656	1.371
Ant. 4 [10^(G/20)] value	1.535	1.7	1.159	1.102	1.472
Ant. 5 [10^(G/20)] value		0.807	0.646	0.286	0.521
Ant. 6 [10^(G/20)] value		0.512	0.535	0.259	0.172
Ant. 7 [10^(G/20)] value		0.534	0.31	0.039	0.138
Ant. 8 [10^(G/20)] value		0.456	0.518	0.601	0.484
Sum All Antenna [Amax]	6.262	7.428	7.656	6.61	6.424
DG [10*log(Amax^2/Nant)]	9.91	8.39	8.65	7.37	7.13

Note:

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

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



DG [4SS(2G)/8SS(5G)] max value position

Frequency (Hz)	2.45G	5.2G	5.3G	5.6G	5.785G
Ant. 1 (dBi)	4.51	3.14	-0.92	1.72	-1.09
Ant. 2 (dBi)	4.97	3.18	5.7	3.22	2.83
Ant. 3 (dBi)	2.11	5.17	4.29	4.38	2.74
Ant. 4 (dBi)	3.72	-0.02	0.91	0.84	3.36
Ant. 5 (dBi)		-7.72	-2.71	-10.88	-5.67
Ant. 6 (dBi)		-13.24	-4.69	-11.75	-15.3
Ant. 7 (dBi)		-9.29	-11.43	-28.18	-17.2
Ant. 8 (dBi)		-4.5	-8.85	-4.42	-6.31
DG [4SS(2G)/8SS(5G)] (dBi)	3.96	0.57	0.76	0.03	-0.4
Polarization	Phi	Theta	Theta	Theta	Theta
Θ (°)	45	30	30	30	30
Φ (°)	0	45	0	45	45

Note: The DG 4SS max value position is the maximum DG 4SS value calculated from section 11 table Gain Result.

DG [4SS(2G)/8SS(5G)] max value position calculation

Frequency (Hz)	2.45G	5.2G	5.3G	5.6G	5.785G
Ant. 1 ((10^(G/20))^2)	2.8249	2.0606	0.8091	1.4859	0.778
Ant. 2 ((10^(G/20))^2)	3.1405	2.0797	3.7154	2.0989	1.9187
Ant. 3 ((10^(G/20))^2)	1.6255	3.2885	2.6853	2.7416	1.8793
Ant. 4 ((10^(G/20))^2)	2.355	0.9954	1.2331	1.2134	2.1677
Ant. 5 ((10^(G/20))^2)		0.169	0.5358	0.0817	0.271
Ant. 6 ((10^(G/20))^2)		0.0474	0.3396	0.0668	0.0295
Ant. 7 ((10^(G/20))^2)		0.1178	0.0719	0.0015	0.0191
Ant. 8 ((10^(G/20))^2)		0.3548	0.1303	0.3614	0.2339
Sum All Antenna	9.946	9.1133	9.5206	8.0513	7.2972
DG [10*log(sum all/Nant)]	3.96	0.57	0.76	0.03	-0.4

Note: Directional Gain (4SS) is the max value of all position. Each position value is calculated by KDB662911 D01 (e) (ii).

$$g_{j,k} = 10^{(G/20)}$$

$$\text{Directional Gain (4SS)} = 10 \cdot \log\left(\frac{10^{(G_{ant1}/20)} + 10^{(G_{ant2}/20)} + 10^{(G_{ant3}/20)} + 10^{(G_{ant4}/20)} + \dots}{N_{ant}}\right)$$



Mode 2: Radio 1 2.4GHz and 5GHz high band 4TX

DG_1SS max value position

Frequency (Hz)	2.45G	5.6G	5.785G
Ant. 1 (dBi)	4.51	1.72	-1.09
Ant. 2 (dBi)	4.97	3.22	2.83
Ant. 3 (dBi)	2.11	4.38	2.74
Ant. 4 (dBi)	3.72	0.84	3.36
DG [1SS] (dBi)	9.91	8.67	8.15
Polarization	Phi	Theta	Theta
Θ (°)	45	30	30
Φ (°)	0	45	45

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	5.6G	5.785G
Ant. 1 [10^(G/20)]	10^(4.51/20)	10^(1.72/20)	10^(-1.09/20)
Ant. 2 [10^(G/20)]	10^(4.97/20)	10^(3.22/20)	10^(2.83/20)
Ant. 3 [10^(G/20)]	10^(2.11/20)	10^(4.38/20)	10^(2.74/20)
Ant. 4 [10^(G/20)]	10^(3.72/20)	10^(0.84/20)	10^(3.36/20)
Ant. 1 [10^(G/20)] value	1.681	1.219	0.882
Ant. 2 [10^(G/20)] value	1.772	1.449	1.385
Ant. 3 [10^(G/20)] value	1.275	1.656	1.371
Ant. 4 [10^(G/20)] value	1.535	1.102	1.472
Sum All Antenna [Amax]	6.262	5.425	5.11
DG [10*log(Amax^2/Nant)]	9.91	8.67	8.15

Note:

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

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



DG_4SS max value position

Frequency (Hz)	2.45G	5.6G	5.785G
Ant. 1 (dBi)	4.51	1.72	-1.09
Ant. 2 (dBi)	4.97	3.22	2.83
Ant. 3 (dBi)	2.11	4.38	2.74
Ant. 4 (dBi)	3.72	0.84	3.36
DG [4SS] (dBi)	3.96	2.75	2.27
Polarization	Phi	Theta	Theta
Θ (°)	45	30	30
Φ (°)	0	45	45

Note: The DG 4SS max value position is the maximum DG 4SS value calculated from section 11 table Gain Result.

DG_4SS max value position calculation

Frequency (Hz)	2.45G	5.6G	5.785G
Ant. 1 ((10^(G/20))^2)	2.8249	1.4859	0.778
Ant. 2 ((10^(G/20))^2)	3.1405	2.0989	1.9187
Ant. 3 ((10^(G/20))^2)	1.6255	2.7416	1.8793
Ant. 4 ((10^(G/20))^2)	2.355	1.2134	2.1677
Sum All Antenna	9.946	7.5398	6.7437
DG [10*log(sum all/Nant)]	3.96	2.75	2.27

Note: Directional Gain (4SS) is the max value of all position. Each position value is calculated by KDB662911 D01 (e) (ii).

$$g_{j,k} = 10^{(G/20)}$$

$$\text{Directional Gain (4SS)} = 10 * \log((10^{(G_{ant1}/20)})^2 + (10^{(G_{ant2}/20)})^2 + (10^{(G_{ant3}/20)})^2 + (10^{(G_{ant4}/20)})^2 + \dots) / N_{ant})$$



Mode 3: Radio 1 5GHz low band 4TX

DG_1SS max value position

Frequency (Hz)	5.2G	5.3G
Ant. 5 (dBi)	1.7	0.3
Ant. 6 (dBi)	1.03	1.7
Ant. 7 (dBi)	2.49	3.13
Ant. 8 (dBi)	-0.11	-0.06
DG [1SS] (dBi)	7.35	7.38
Polarization	Phi	Phi
Θ (°)	45	45
Φ (°)	225	225

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
Ant. 5 [10 ^{^(G/20)}]	10 ^{^(1.7/20)}	10 ^{^(0.3/20)}
Ant. 6 [10 ^{^(G/20)}]	10 ^{^(1.03/20)}	10 ^{^(1.7/20)}
Ant. 7 [10 ^{^(G/20)}]	10 ^{^(2.49/20)}	10 ^{^(3.13/20)}
Ant. 8 [10 ^{^(G/20)}]	10 ^{^(-0.11/20)}	10 ^{^(-0.06/20)}
Ant. 5 [10 ^{^(G/20)}] value	1.216	1.035
Ant. 6 [10 ^{^(G/20)}] value	1.126	1.216
Ant. 7 [10 ^{^(G/20)}] value	1.332	1.434
Ant. 8 [10 ^{^(G/20)}] value	0.987	0.993
Sum All Antenna [Amax]	4.661	4.678
DG [10*log(Amax ² /Nant)]	7.35	7.38

Note:

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

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



DG_4SS max value position

Frequency (Hz)	5.2G	5.3G
Ant. 5 (dBi)	1.7	-0.59
Ant. 6 (dBi)	1.03	1.89
Ant. 7 (dBi)	2.49	3.68
Ant. 8 (dBi)	-0.11	-0.68
DG [4SS] (dBi)	1.38	1.47
Polarization	Phi	Phi
Θ (°)	45	45
Φ (°)	225	135

Note: The DG 4SS max value position is the maximum DG 4SS value calculated from section 11 table Gain Result.

DG_4SS max value position calculation

Frequency (Hz)	5.2G	5.3G
Ant. 5 ((10^(G/20))^2)	1.4791	0.873
Ant. 6 ((10^(G/20))^2)	1.2677	1.5453
Ant. 7 ((10^(G/20))^2)	1.7742	2.3335
Ant. 8 ((10^(G/20))^2)	0.975	0.8551
Sum All Antenna	5.4959	5.6068
DG [10*log(sum all/Nant)]	1.38	1.47

Note: Directional Gain (4SS) is the max value of all position. Each position value is calculated by KDB662911 D01 (e) (ii).

gj,k = 10^(G/20)



Radio 2 5GHz and 6GHz 4TX

DG_1SS max value position

Frequency (Hz)	5.2G	5.3G	5.6G	5.785G	6.175G	6.475G	6.695G	6.995G
Ant. 1 (dBi)	2.63	-3.4	-1.05	-4.5	-0.02	1.47	-3.15	4.44
Ant. 2 (dBi)	1.08	3.18	-2.79	1.53	0.07	1.16	2.45	-5.01
Ant. 3 (dBi)	-1.66	1.68	1.87	0.83	0.21	-2.78	1.85	1.71
Ant. 4 (dBi)	0.68	2.59	-2.43	-0.3	3.54	0.55	-2.43	0.51
DG [1SS] (dBi)	6.84	7.38	5.12	5.7	7.11	6.27	6.05	7.06
Polarization	Theta	Theta	Theta	Theta	Theta	Theta	Theta	Theta
Θ (°)	45	75	75	75	30	60	30	45
Φ (°)	225	180	135	150	120	255	105	240

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	6.175G	6.475G	6.695G	6.995G
Ant. 1 [10^(G/20)]	10^(2.63/20)	10^(-3.4/20)	10^(-1.05/20)	10^(-4.5/20)	10^(-0.02/20)	10^(1.47/20)	10^(-3.15/20)	10^(4.44/20)
Ant. 2 [10^(G/20)]	10^(1.08/20)	10^(3.18/20)	10^(-2.79/20)	10^(1.53/20)	10^(0.07/20)	10^(1.16/20)	10^(2.45/20)	10^(-5.01/20)
Ant. 3 [10^(G/20)]	10^(-1.66/20)	10^(1.68/20)	10^(1.87/20)	10^(0.83/20)	10^(0.21/20)	10^(-2.78/20)	10^(1.85/20)	10^(1.71/20)
Ant. 4 [10^(G/20)]	10^(0.68/20)	10^(2.59/20)	10^(-2.43/20)	10^(-0.3/20)	10^(3.54/20)	10^(0.55/20)	10^(-2.43/20)	10^(0.51/20)
Ant. 1 [10^(G/20)] value	1.354	0.676	0.886	0.596	0.998	1.184	0.696	1.667
Ant. 2 [10^(G/20)] value	1.132	1.442	0.725	1.193	1.008	1.143	1.326	0.562
Ant. 3 [10^(G/20)] value	0.826	1.213	1.24	1.1	1.024	0.726	1.237	1.218
Ant. 4 [10^(G/20)] value	1.081	1.347	0.756	0.966	1.503	1.065	0.756	1.06
Sum All Antenna [Amax]	4.394	4.679	3.608	3.855	4.533	4.119	4.015	4.507
DG [10*log(Amax^2/Nant)]	6.84	7.38	5.12	5.7	7.11	6.27	6.05	7.06

Note:

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

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



DG_4SS max value position

Frequency (Hz)	5.2G	5.3G	5.6G	5.785G	6.175G	6.475G	6.695G	6.995G
Ant. 1 (dBi)	2.63	-3.4	-0.37	4.7	1.06	1.47	-3.15	4.44
Ant. 2 (dBi)	1.08	3.18	3.45	-0.64	-0.06	1.16	2.45	-5.01
Ant. 3 (dBi)	-1.66	1.68	-8.77	-6.18	-13.96	-2.78	1.85	1.71
Ant. 4 (dBi)	0.68	2.59	-7.81	-18.23	4.85	0.55	-2.43	0.51
DG [4SS] (dBi)	0.94	1.63	-0.67	0.08	1.27	0.39	0.36	1.54
Polarization	Theta	Theta	Theta	Theta	Phi	Theta	Theta	Theta
Θ (°)	45	75	60	45	15	60	30	45
Φ (°)	225	180	270	240	165	255	105	240

Note: The DG 4SS max value position is the maximum DG 4SS value calculated from section 11 table Gain Result.

DG_4SS max value position calculation

Frequency (Hz)	5.2G	5.3G	5.6G	5.785G	6.175G	6.475G	6.695G	6.995G
Ant. 1 ((10^(G/20))^2)	1.8323	0.4571	0.9183	2.9512	1.2764	1.4028	0.4842	2.7797
Ant. 2 ((10^(G/20))^2)	1.2823	2.0797	2.2131	0.863	0.9863	1.3062	1.7579	0.3155
Ant. 3 ((10^(G/20))^2)	0.6823	1.4723	0.1327	0.241	0.0402	0.5272	1.5311	1.4825
Ant. 4 ((10^(G/20))^2)	1.1695	1.8155	0.1656	0.015	3.0549	1.135	0.5715	1.1246
Sum All Antenna	4.9665	5.8246	3.4297	4.0702	5.3578	4.3712	4.3447	5.7023
DG [10*log(sum all/Nant)]	0.94	1.63	-0.67	0.08	1.27	0.39	0.36	1.54

Note: Directional Gain (4SS) is the max value of all position. Each position value is calculated by KDB662911 D01 (e) (ii).

$$g_{j,k} = 10^{(G/20)}$$

$$\text{Directional Gain (4SS)} = 10 \cdot \log\left(\frac{10^{(G_{ant1}/20)} + 10^{(G_{ant2}/20)} + 10^{(G_{ant3}/20)} + 10^{(G_{ant4}/20)} + \dots}{N_{ant}}\right)$$



Radio 3 5GHz and 6GHz 4TX

DG_1SS max value position

Frequency (Hz)	5.2G	5.3G	5.6G	5.785G	6.175G	6.475G	6.695G	6.995G
Ant. 1 (dBi)	-1.95	-2.11	-3.23	-6.75	0.87	1.15	-6.99	-0.32
Ant. 2 (dBi)	1.09	1.22	-1.32	3.96	2.22	1.09	1.91	-2.17
Ant. 3 (dBi)	1.03	-3.55	-1.51	-1.37	-1.7	-2.49	-0.33	-0.71
Ant. 4 (dBi)	2.36	3.33	-0.25	-0.71	2.2	0.69	-1.48	1.07
DG [1SS] (dBi)	6.79	6.16	4.51	5.6	7.06	6.25	4.86	5.56
Polarization	Theta	Theta	Theta	Theta	Theta	Theta	Theta	Theta
Θ (°)	45	45	75	60	60	60	30	15
Φ (°)	255	240	270	240	165	165	135	15

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	6.175G	6.475G	6.695G	6.995G
Ant. 1 [10^(G/20)]	10 ^{^(-1.95/20)}	10 ^{^(-2.11/20)}	10 ^{^(-3.23/20)}	10 ^{^(-6.75/20)}	10 ^{^(0.87/20)}	10 ^{^(1.15/20)}	10 ^{^(-6.99/20)}	10 ^{^(-0.32/20)}
Ant. 2 [10^(G/20)]	10 ^{^(1.09/20)}	10 ^{^(1.22/20)}	10 ^{^(-1.32/20)}	10 ^{^(3.96/20)}	10 ^{^(2.22/20)}	10 ^{^(1.09/20)}	10 ^{^(1.91/20)}	10 ^{^(-2.17/20)}
Ant. 3 [10^(G/20)]	10 ^{^(1.03/20)}	10 ^{^(-3.55/20)}	10 ^{^(-1.51/20)}	10 ^{^(-1.37/20)}	10 ^{^(-1.7/20)}	10 ^{^(-2.49/20)}	10 ^{^(-0.33/20)}	10 ^{^(-0.71/20)}
Ant. 4 [10^(G/20)]	10 ^{^(2.36/20)}	10 ^{^(3.33/20)}	10 ^{^(-0.25/20)}	10 ^{^(-0.71/20)}	10 ^{^(2.2/20)}	10 ^{^(0.69/20)}	10 ^{^(-1.48/20)}	10 ^{^(1.07/20)}
Ant. 1 [10^(G/20)] value	0.799	0.784	0.689	0.46	1.105	1.142	0.447	0.964
Ant. 2 [10^(G/20)] value	1.134	1.151	0.859	1.578	1.291	1.134	1.246	0.779
Ant. 3 [10^(G/20)] value	1.126	0.665	0.84	0.854	0.822	0.751	0.963	0.922
Ant. 4 [10^(G/20)] value	1.312	1.467	0.972	0.922	1.288	1.083	0.843	1.131
Sum All Antenna [Amax]	4.371	4.067	3.361	3.813	4.507	4.109	3.499	3.795
DG [10*log(Amax^2/Nant)]	6.79	6.16	4.51	5.6	7.06	6.25	4.86	5.56

Note:

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

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



DG_4SS max value position

Frequency (Hz)	5.2G	5.3G	5.6G	5.785G	6.175G	6.475G	6.695G	6.995G
Ant. 1 (dBi)	-1.26	-12.43	-16.6	-6.75	-3.69	1.15	-6.99	-0.32
Ant. 2 (dBi)	1.5	1.56	1.58	3.96	4.72	1.09	1.91	-2.17
Ant. 3 (dBi)	-0.75	0.79	-0.5	-1.37	-3.54	-2.49	-0.33	-0.71
Ant. 4 (dBi)	2.87	3.18	-0.06	-0.71	2.25	0.69	-1.48	1.07
DG [4SS] (dBi)	0.92	0.76	-0.79	0.29	1.39	0.34	-0.72	-0.38
Polarization	Theta	Theta	Theta	Theta	Theta	Theta	Theta	Theta
Θ (°)	30	60	45	60	60	60	30	15
Φ (°)	225	225	225	240	240	165	135	15

Note: The DG 4SS max value position is the maximum DG 4SS value calculated from section 11 table Gain Result.

DG_4SS max value position calculation

Frequency (Hz)	5.2G	5.3G	5.6G	5.785G	6.175G	6.475G	6.695G	6.995G
Ant. 1 ((10^(G/20))^2)	0.7482	0.0571	0.0219	0.2113	0.4276	1.3032	0.2	0.929
Ant. 2 ((10^(G/20))^2)	1.4125	1.4322	1.4388	2.4889	2.9648	1.2853	1.5524	0.6067
Ant. 3 ((10^(G/20))^2)	0.8414	1.1995	0.8913	0.7295	0.4426	0.5636	0.9268	0.8492
Ant. 4 ((10^(G/20))^2)	1.9364	2.0797	0.9863	0.8492	1.6788	1.1722	0.7112	1.2794
Sum All Antenna	4.9385	4.7685	3.3382	4.2788	5.5138	4.3243	3.3904	3.6643
DG [10*log(sum all/Nant)]	0.92	0.76	-0.79	0.29	1.39	0.34	-0.72	-0.38

Note: Directional Gain (4SS) is the max value of all position. Each position value is calculated by KDB662911 D01 (e) (ii).

$$g_{j,k} = 10^{(G/20)}$$

$$\text{Directional Gain (4SS)} = 10 \cdot \log\left(\frac{10^{(G_{ant1}/20)} + 10^{(G_{ant2}/20)} + 10^{(G_{ant3}/20)} + 10^{(G_{ant4}/20)} + \dots}{N_{ant}}\right)$$



8. Summary of Test Result

Mode 1: Radio 1 2.4GHz 4TX and 5GHz UNII 1~UNII 3 8TX

Frequency (Hz)	2.45G
Radio 1 Ant1 2G 5G	4.51
Radio 1 Ant2 2G 5G	4.97
Radio 1 Ant3 2G 5G	4.66
Radio 1 Ant4 2G 5G	5.95
Max Gain (dBi)	5.95
DG [1SS] (dBi)	9.91
DG [2SS] (dBi)	6.91
DG [4SS(2G)/8SS(5G)] (dBi)	3.96

Note:

1. Directional Gain (2SS) = Directional Gain (1SS) – 3dB. If directional gain is less than max gain, use max gain as directional gain.
2. Each antenna max gain is the max value of measurement S21 of theta and phi through all measurement angles.
3. The max gain is the max value of all antennas.



Frequency (Hz)	5.2G	5.3G	5.6G	5.785G
Radio 1 Ant1 2G 5G	4.09	3.06	3.82	3.6
Radio 1 Ant2 2G 5G	4.4	5.7	3.79	2.99
Radio 1 Ant3 2G 5G	5.17	5.99	4.38	3.52
Radio 1 Ant4 2G 5G	4.64	4.09	4.19	3.36
Radio 1 Ant5 5G	3.39	3.58	3.34	2.01
Radio 1 Ant6 5G	3.7	3.39	2.52	3.03
Radio 1 Ant7 5G	3.1	3.68	2.83	2.84
Radio 1 Ant8 5G	2.82	3.13	2.19	2.61
Max Gain (dBi)	5.17	5.99	4.38	3.6
DG [1SS] (dBi)	8.39	8.65	7.37	7.13
DG [2SS] (dBi)	5.39	5.99	4.38	4.13
DG [4SS(2G)/8SS(5G)] (dBi)	0.57	0.76	0.03	-0.4

Note:

1. Directional Gain (2SS) = Directional Gain (1SS) – 3dB. If directional gain is less than max gain, use max gain as directional gain.
2. Each antenna max gain is the max value of measurement S21 of theta and phi through all measurement angles.
3. The max gain is the max value of all antennas.



Mode 2: Radio 1 2.4GHz and 5GHz UNII 2C~UNII 3 4TX

Frequency (Hz)	2.45G
Radio 1 Ant1 2G 5G	4.51
Radio 1 Ant2 2G 5G	4.97
Radio 1 Ant3 2G 5G	4.66
Radio 1 Ant4 2G 5G	5.95
Max Gain (dBi)	5.95
DG [1SS] (dBi)	9.91
DG [2SS] (dBi)	6.91
DG [4SS] (dBi)	3.96

Note:

1. Directional Gain (2SS) = Directional Gain (1SS) – 3dB. If directional gain is less than max gain, use max gain as directional gain.
2. Each antenna max gain is the max value of measurement S21 of theta and phi through all measurement angles.
3. The max gain is the max value of all antennas.



Frequency (Hz)	5.6G	5.785G
Radio 1 Ant1 2G 5G	3.82	3.6
Radio 1 Ant2 2G 5G	3.79	2.99
Radio 1 Ant3 2G 5G	4.38	3.52
Radio 1 Ant4 2G 5G	4.19	3.36
Max Gain (dBi)	4.38	3.6
DG [1SS] (dBi)	8.67	8.15
DG [2SS] (dBi)	5.67	5.15
DG [4SS] (dBi)	2.75	2.27

Note:

1. Directional Gain (2SS) = Directional Gain (1SS) – 3dB. If directional gain is less than max gain, use max gain as directional gain.
2. Each antenna max gain is the max value of measurement S21 of theta and phi through all measurement angles.
3. The max gain is the max value of all antennas.



Mode 3: Radio 1 5GHz UNII 1~UNII 2A 4TX

Frequency (Hz)	5.2G	5.3G
Radio 1 Ant5 5G	3.39	3.58
Radio 1 Ant6 5G	3.7	3.39
Radio 1 Ant7 5G	3.1	3.68
Radio 1 Ant8 5G	2.82	3.13
Max Gain (dBi)	3.7	3.68
DG [1SS] (dBi)	7.35	7.38
DG [2SS] (dBi)	4.35	4.38
DG [4SS] (dBi)	1.38	1.47

Note:

1. Directional Gain (2SS) = Directional Gain (1SS) – 3dB. If directional gain is less than max gain, use max gain as directional gain.
2. Each antenna max gain is the max value of measurement S21 of theta and phi through all measurement angles.
3. The max gain is the max value of all antennas.



Radio 2 5GHz UNII 1~UNII 3 and 6GHz UNII 5~8 4TX

Frequency (Hz)	5.2G	5.3G	5.6G	5.785G
Radio 2 Ant1 6G	3.56	4.37	3.82	4.7
Radio 2 Ant2 6G	1.25	3.18	3.45	1.86
Radio 2 Ant3 6G	4.27	4.24	2.25	3.64
Radio 2 Ant4 6G	1.94	2.59	2.08	3.11
Max Gain (dBi)	4.27	4.37	3.82	4.7
DG [1SS] (dBi)	6.84	7.38	5.12	5.7
DG [2SS] (dBi)	4.27	4.38	3.82	4.7
DG [4SS] (dBi)	0.94	1.63	-0.67	0.08

Note:

1. Directional Gain (2SS) = Directional Gain (1SS) – 3dB. If directional gain is less than max gain, use max gain as directional gain.
2. Each antenna max gain is the max value of measurement S21 of theta and phi through all measurement angles.
3. The max gain is the max value of all antennas.



Frequency (Hz)	6.175G	6.475G	6.695G	6.995G
Radio 2 Ant1 6G	4.96	3.57	3.72	4.44
Radio 2 Ant2 6G	4.4	3.52	3.12	3.31
Radio 2 Ant3 6G	4.14	2.03	3.08	4.86
Radio 2 Ant4 6G	4.85	2.6	3.43	3.41
Max Gain (dBi)	4.96	3.57	3.72	4.86
DG [1SS] (dBi)	7.11	6.27	6.05	7.06
DG [2SS] (dBi)	4.96	3.57	3.72	4.86
DG [4SS] (dBi)	1.27	0.39	0.36	1.54

Note:

1. Directional Gain (2SS) = Directional Gain (1SS) – 3dB. If directional gain is less than max gain, use max gain as directional gain.
2. Each antenna max gain is the max value of measurement S21 of theta and phi through all measurement angles.
3. The max gain is the max value of all antennas.



Radio 3 5GHz UNII 1~UNII 3 and 6GHz UNII 5~8 4TX

Frequency (Hz)	5.2G	5.3G	5.6G	5.785G
Radio 3 Ant1 6G	3.25	3.68	3.74	2.9
Radio 3 Ant2 6G	2.35	4.2	2.48	3.96
Radio 3 Ant3 6G	3.07	3.84	2.89	2.61
Radio 3 Ant4 6G	3.41	3.65	1.81	3.31
Max Gain (dBi)	3.41	4.2	3.74	3.96
DG [1SS] (dBi)	6.79	6.16	4.51	5.6
DG [2SS] (dBi)	3.79	4.2	3.74	3.96
DG [4SS] (dBi)	0.92	0.76	-0.79	0.29

Note:

1. Directional Gain (2SS) = Directional Gain (1SS) – 3dB. If directional gain is less than max gain, use max gain as directional gain.
2. Each antenna max gain is the max value of measurement S21 of theta and phi through all measurement angles.
3. The max gain is the max value of all antennas.

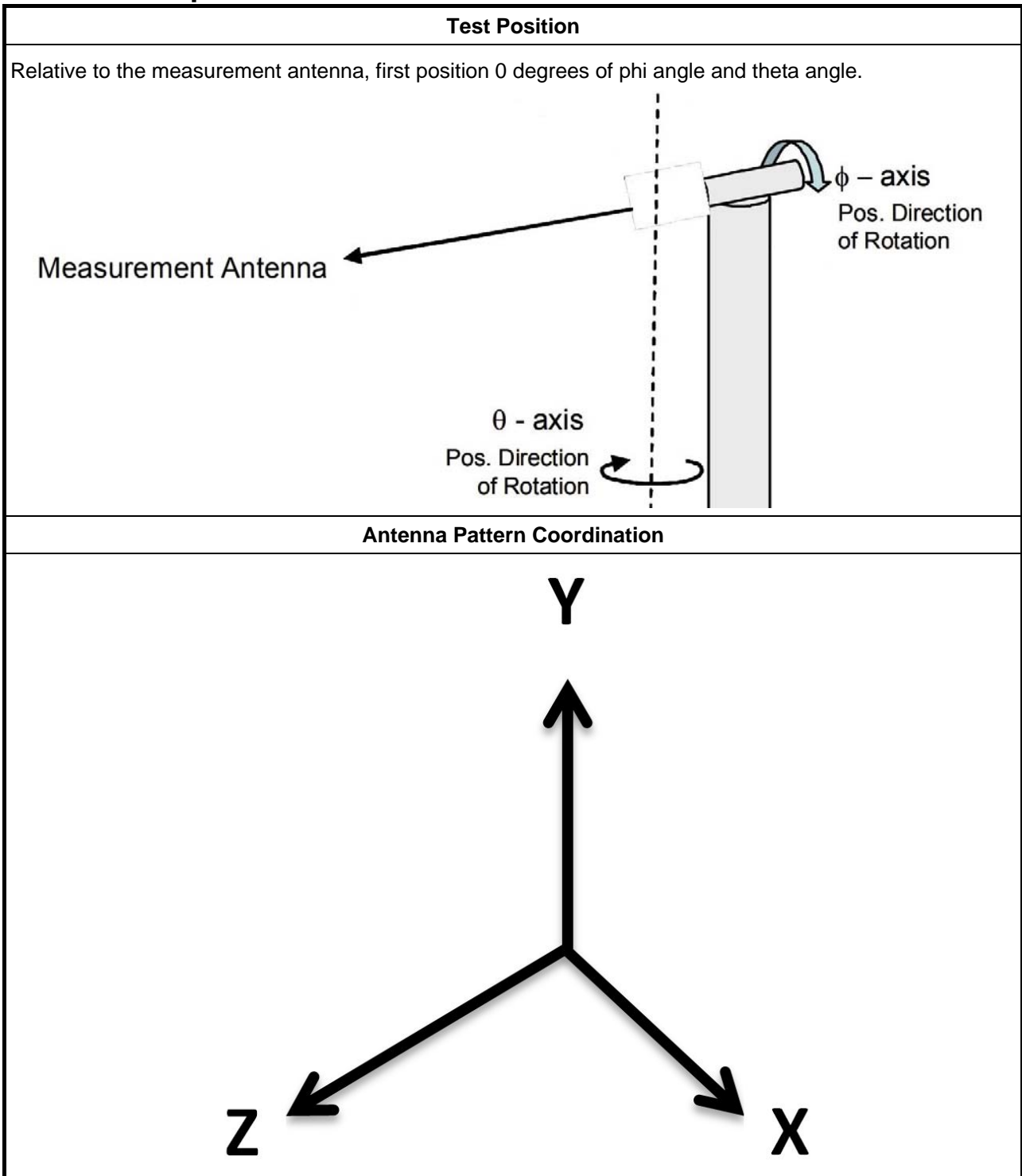


Frequency (Hz)	6.175G	6.475G	6.695G	6.995G
Radio 3 Ant1 6G	4.16	2.52	0.71	2.03
Radio 3 Ant2 6G	4.72	2.06	1.91	2.03
Radio 3 Ant3 6G	2.24	1.61	2.74	2.45
Radio 3 Ant4 6G	3.43	3.56	2.35	1.93
Max Gain (dBi)	4.72	3.56	2.74	2.45
DG [1SS] (dBi)	7.06	6.25	4.86	5.56
DG [2SS] (dBi)	4.72	3.56	2.74	2.56
DG [4SS] (dBi)	1.39	0.34	-0.72	-0.38

Note:

1. Directional Gain (2SS) = Directional Gain (1SS) – 3dB. If directional gain is less than max gain, use max gain as directional gain.
2. Each antenna max gain is the max value of measurement S21 of theta and phi through all measurement angles.
3. The max gain is the max value of all antennas.

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
Test Software	SPORTON	SENSE-RDG	V1.0.6	-	N.C.R.	N.C.R.

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

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



11. Test Results

Please refer to the appendix.

Appendix A – Radiated Composite Gain of Radio 1 2.4GHz and 5GHz U-NII 1~U-NII 3.....Page 32

Appendix B – Radiated Composite Gain of Radio 1 2.4GHz and 5GHz U-NII 2C~U-NII 3.....Page 47

Appendix C – Radiated Composite Gain of Radio 1 5GHz U-NII 1 and U-NII 2A.....Page 54

Appendix D – Radiated Composite Gain of Radio 2 5GHz U-NII1~U-NII 3 and 6GHz U-NII 5~U-NII 8..Page 59

Appendix E – Radiated Composite Gain of Radio 3 5GHz U-NII1~U-NII 3 and 6GHz U-NII 5~U-NII 8..Page 73

Appendix F – Antenna Pattern of Radio 1 2.4GHz and 5GHz U-NII 1~U-NII 3.....Page 87

Appendix G – Antenna Pattern of Radio 2 5GHz U-NII1~U-NII 3 and 6GHz U-NII 5~U-NII 8..... Page 101

Appendix H – Antenna Pattern of Radio 3 5GHz U-NII1~U-NII 3 and 6GHz U-NII 5~U-NII 8..... Page 110

Appendix I – Test Photos..... Page 119



Freq(Hz)	2.45G	5.2G	5.3G	5.6G	5.785G
Ant. 1 Max Gain (dBi)	4.51	4.09	3.06	3.82	3.6
Ant. 2 Max Gain (dBi)	4.97	4.4	5.7	3.79	2.99
Ant. 3 Max Gain (dBi)	4.66	5.17	5.99	4.38	3.52
Ant. 4 Max Gain (dBi)	5.95	4.64	4.09	4.19	3.36
Ant. 5 Max Gain (dBi)		3.39	3.58	3.34	2.01
Ant. 6 Max Gain (dBi)		3.7	3.39	2.52	3.03
Ant. 7 Max Gain (dBi)		3.1	3.68	2.83	2.84
Ant. 8 Max Gain (dBi)		2.82	3.13	2.19	2.61
Ant. 1 Polarization/θ(°)/φ(°)	Phi/45/0	Theta/30/300	Theta/30/45	Theta/45/330	Theta/45/330
Ant. 2 Polarization/θ(°)/φ(°)	Phi/45/0	Theta/30/0	Theta/30/0	Theta/30/15	Theta/30/120
Ant. 3 Polarization/θ(°)/φ(°)	Phi/45/180	Theta/30/45	Theta/30/45	Theta/30/45	Theta/30/75
Ant. 4 Polarization/θ(°)/φ(°)	Phi/45/180	Theta/30/225	Theta/30/225	Theta/30/270	Theta/30/45
Ant. 5 Polarization/θ(°)/φ(°)		Phi/90/300	Phi/90/300	Phi/90/300	Phi/90/300
Ant. 6 Polarization/θ(°)/φ(°)		Phi/60/15	Phi/60/15	Phi/75/0	Phi/75/0
Ant. 7 Polarization/θ(°)/φ(°)		Phi/60/225	Phi/45/135	Phi/45/225	Phi/45/225
Ant. 8 Polarization/θ(°)/φ(°)		Phi/75/90	Phi/75/90	Phi/75/90	Phi/75/90
Max Gain (dBi)	5.95	5.17	5.99	4.38	3.6
DG [1SS] (dBi)	9.91	8.39	8.65	7.37	7.13
DG [2SS] (dBi)	6.91	5.39	5.99	4.38	4.13
DG [4SS] (dBi)		5.17	5.99	4.38	3.6
DG [4SS(2G)/8SS(5G)] (dBi)	3.96	0.57	0.76	0.01	-0.4



DG 1SS Result

Table with columns for Freq(Hz), DG(dB), and various Phi angles (0 to 345 degrees) for frequencies 2.45G, 5.2G, and 5.3G. The table contains multiple rows of data for each frequency, showing gain values in dB.



Radiated Composite Gain_Radio 1 2.4GHz and 5GHz U-NII 1~U-NII 3

Appendix A

Table with columns for frequency (5.6G, 5.785G), polarization (Pol.), phase (Phi), and directivity gain (DG(dBi)) for various elevation angles (Theta) from 0 to 180 degrees. The table contains multiple rows of data for each frequency and angle, with some cells highlighted in red (e.g., 6.38, 7.37, 7.13).



Radiated Composite Gain_Radio 1 2.4GHz and 5GHz U-NII 1~U-NII 3

Appendix A

Gain Result

Table with columns for Freq(Hz), Gain, and various Phi and Theta angles (0 to 345 degrees) for frequencies 2.45G, 5.2G, and 5.3G. The table contains multiple rows of numerical data for each frequency and angle combination.



Radiated Composite Gain_Radio 1 2.4GHz and 5GHz U-NII 1~U-NII 3

Appendix A

Table with columns for Frequency (5.6G, 5.785G, 2.45G, 5.2G), Gain, and various Phi angles (0 to 345 degrees). It contains multiple rows of numerical data representing gain values.



Radiated Composite Gain_Radio 1 2.4GHz and 5GHz U-NII 1~U-NII 3

Appendix A

Table with columns for frequency (5.3G, 5.6G, 5.785G, 2.45G), polarization (Pol.), phase (Phi), antenna (Ant. 2, 3), and gain for various angles (Theta) and azimuths (Phi) from 0 to 345 degrees.



Radiated Composite Gain_Radio 1 2.4GHz and 5GHz U-NII 1~U-NII 3

Appendix A

Table with columns for Frequency (2.45G, 5.2G, 5.3G, 5.6G), Gain, and various angles (Theta, Phi) from 0 to 180 degrees. The table contains numerical data for each combination of frequency and angle.



Radiated Composite Gain_Radio 1 2.4GHz and 5GHz U-NII 1~U-NII 3

Appendix A

Table with columns for Frequency (5.785G, 2.45G, 5.2G), Gain, and various Phi angles (0 to 165 degrees). Contains numerical data for gain measurements.



Radiated Composite Gain_Radio 1 2.4GHz and 5GHz U-NII 1~U-NII 3

Appendix A

Table with columns for Frequency (5.3G, 5.6G, 5.785G, 2.45G), Polarization (Pol.), and various Azimuth angles (Theta) from 0 to 120 degrees. Each cell contains a numerical value representing the gain in dBi.



Radiated Composite Gain_Radio 1 2.4GHz and 5GHz U-NII 1~U-NII 3

Appendix A

Table with columns for Frequency (2.45G, 5.2G, 5.3G, 5.6G), Gain, and various Phi angles (0 to 345 degrees). The table contains numerical data for gain in different directions.



Radiated Composite Gain_Radio 1 2.4GHz and 5GHz U-NII 1~U-NII 3

Appendix A

Table with columns for frequency (5.785G, 2.45G, 5.2G, 5.3G), polarization (Pol.), antenna (Ant. 5, 6), and gain values for various angles (Theta) and azimuths (Phi) from 0 to 345 degrees.



Radiated Composite Gain_Radio 1 2.4GHz and 5GHz U-NII 1~U-NII 3

Appendix A

Table with columns for Gain, Theta, and various Phi angles (0 to 345 degrees) for frequencies 5.3G, 5.6G, 5.785G, and 2.45G. The table contains numerical values for gain in different directions.



Radiated Composite Gain_Radio 1 2.4GHz and 5GHz U-NII 1~U-NII 3

Appendix A

Table with columns for Azimuth (Theta), Elevation (Phi), Frequency, and Gain. It contains multiple data blocks for frequencies 5.2G, 5.3G, 5.6G, and 5.8G, each with a grid of gain values for various angles.



Radiated Composite Gain_Radio 1 2.4GHz and 5GHz U-NII 1~U-NII 3

Appendix A

Table with columns for Frequency (5.785G, 2.45G, 5.2G, 5.3G), Polarization (Pol.), Phi angle, Antenna (Ant. 7, 8), Gain, and various Phi angles (0 to 345 degrees) for each frequency band.



Radiated Composite Gain_Radio 1 2.4GHz and 5GHz U-NII 1~U-NII 3

Appendix A

Table with columns for Frequency (5.3G, 5.6G, 5.785G), Gain, and various Phi angles (0 to 345 degrees). It contains numerical data for gain measurements across different frequencies and angles.



Freq(Hz)	2.45G	5.6G	5.785G
Ant. 1 Max Gain (dBi)	4.51	3.82	3.6
Ant. 2 Max Gain (dBi)	4.97	3.79	2.99
Ant. 3 Max Gain (dBi)	4.66	4.38	3.52
Ant. 4 Max Gain (dBi)	5.95	4.19	3.36
Ant. 1 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Phi/45/0	Theta/45/330	Theta/45/330
Ant. 2 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Phi/45/0	Theta/30/15	Theta/30/120
Ant. 3 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Phi/45/180	Theta/30/45	Theta/30/75
Ant. 4 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Phi/45/180	Theta/30/270	Theta/30/45
Max Gain (dBi)	5.95	4.38	3.6
DG [1SS] (dBi)	9.91	8.67	8.15
DG [2SS] (dBi)	6.91	5.67	5.15
DG [4SS] (dBi)	3.96	2.75	2.27



DG 1SS Result

Table with columns for Freq(Hz), DG(dBi), and various Phi angles (0 to 345 degrees) for frequencies 2.45G, 5.6G, and 5.785G. The table contains multiple rows of data for each frequency, showing gain values in dBi for different azimuthal angles.



Θ(180°)	-10.18	-10.16	-8.94	-10.63	-12.3	-11.92	-12.38	-13.18	-13.62	-12.65	-11.94	-11.59	-10.12	-9.65	-10.89	-12.57	-12.33	-11.55	-11.78	-10.88	-9.01	-7.96	-8.14	-10.95
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Radiated Composite Gain_Radio 1 2.4GHz and 5GHz U-NII 2C~U-NII 3

Appendix B

Gain Result

Table with columns for Freq(Hz), Pol., Phi, Ant. 1, and Gain for various angles (0 to 180 degrees) across multiple frequency bands (2.45G, 5.6G, 5.785G).



Radiated Composite Gain_Radio 1 2.4GHz and 5GHz U-NII 2C~U-NII 3

Appendix B

Table with columns for Frequency (2.45G, 5.6G, 5.785G), Gain, and various Phi angles (0 to 345 degrees). It contains multiple rows of numerical data representing gain values across different frequencies and angles.



Radiated Composite Gain_Radio 1 2.4GHz and 5GHz U-NII 2C~U-NII 3

Appendix B

Table with columns for frequency (5.6G, 5.785G, 2.45G), polarization (Pol.), phase (Phi), antenna (Ant. 3, 4), and gain values for various angles (Theta) and frequencies (Phi).



Radiated Composite Gain_Radio 1 2.4GHz and 5GHz U-NII 2C~U-NII 3

Appendix B

Table with columns for frequency (5.6G, 5.785G), polarization (Pol.), theta angle, antenna number (Ant. 4), gain, and phi angles (0 to 345 degrees) for various theta angles (0 to 180 degrees).



Freq(Hz)	5.2G	5.3G
Ant. 5 Max Gain (dBi)	3.39	3.58
Ant. 6 Max Gain (dBi)	3.7	3.39
Ant. 7 Max Gain (dBi)	3.1	3.68
Ant. 8 Max Gain (dBi)	2.82	3.13
Ant. 5 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Phi/90/300	Phi/90/300
Ant. 6 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Phi/60/15	Phi/60/15
Ant. 7 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Phi/60/225	Phi/45/135
Ant. 8 Polarization/ $\theta(^{\circ})/\Phi(^{\circ})$	Phi/75/90	Phi/75/90
Max Gain (dBi)	3.7	3.68
DG [1SS] (dBi)	7.35	7.38
DG [2SS] (dBi)	4.35	4.38
DG [4SS] (dBi)	1.38	1.47



Radiated Composite Gain_Radio 1 5GHz U-NII 1 and U-NII 2A

Appendix C

Gain Result

Table with columns for Freq(Hz), Pol., Phi, Ant. 5, and Gain. It contains multiple data blocks for frequencies 5.2G, 5.3G, and 5.3G, each with a grid of gain values for various angles and polarizations.



Radiated Composite Gain_Radio 1 5GHz U-NII 1 and U-NII 2A

Appendix C

Table with columns for frequency (5.3G, 5.2G, 5.3G, 5.2G), polarization (Pol), antenna (Ant. 6, 7, 7, 8), and gain values for various angles (Theta) and phases (Phi) from 0 to 345 degrees.



Table with multiple rows and columns containing gain values in dB. Headers include theta and phi angles. A value of 3.13 is highlighted in red in the table.



Freq(Hz)	5.2G	5.3G	5.6G	5.785G	6.175G	6.475G	6.695G	6.995G
Ant. 1 Max Gain (dBi)	3.56	4.37	3.82	4.7	4.96	3.57	3.72	4.44
Ant. 2 Max Gain (dBi)	1.25	3.18	3.45	1.86	4.4	3.52	3.12	3.31
Ant. 3 Max Gain (dBi)	4.27	4.24	2.25	3.64	4.14	2.03	3.08	4.86
Ant. 4 Max Gain (dBi)	1.94	2.59	2.08	3.11	4.85	2.6	3.43	3.41
Ant. 1 Polarization/ Θ (°)/ Φ (°)	Theta/60/270	Theta/30/270	Theta/30/240	Theta/45/240	Theta/30/255	Theta/30/240	Theta/45/225	Theta/45/240
Ant. 2 Polarization/ Θ (°)/ Φ (°)	Theta/75/240	Theta/75/180	Theta/60/270	Theta/30/135	Theta/30/345	Theta/45/120	Phi/15/30	Theta/30/330
Ant. 3 Polarization/ Θ (°)/ Φ (°)	Theta/75/75	Theta/75/75	Theta/45/120	Theta/45/105	Theta/60/135	Phi/45/45	Theta/60/105	Phi/60/45
Ant. 4 Polarization/ Θ (°)/ Φ (°)	Theta/45/75	Theta/75/180	Theta/60/345	Phi/30/150	Phi/15/165	Theta/60/75	Theta/45/330	Phi/30/60
Max Gain (dBi)	4.27	4.37	3.82	4.7	4.96	3.57	3.72	4.86
DG [1SS] (dBi)	6.84	7.38	5.12	5.7	7.11	6.27	6.05	7.06
DG [2SS] (dBi)	4.27	4.38	3.82	4.7	4.96	3.57	3.72	4.86
DG [4SS] (dBi)	0.94	1.63	-0.67	0.08	1.27	0.39	0.36	1.54



DG 1SS Result

Table with columns for Freq(Hz), DG(dBi), and various Phi angles (0 to 345 degrees) for frequencies 5.2G, 5.3G, and 5.6G. The table contains numerical data for each combination of frequency and angle.



Radiated Composite Gain_Radio 2 5GHz U-NII1~U-NII 3 and 6GHz U-NII 5~U-NII 8

Appendix D

Table with columns for frequency (5.785G, 6.175G, 6.475G), polarization (Phi, Theta), and gain (DG(dBi)) for various angles (0 to 180 degrees) across multiple frequency bands.



Radiated Composite Gain_Radio 2 5GHz U-NII1~U-NII 3 and 6GHz U-NII 5~U-NII 8

Appendix D

Table with columns: Freq(Hz), DG(dBi), and various Phi angles (0 to 345 degrees) for frequencies 6.695G, 6.995G, and 6.995G. The table contains numerical data for each combination of frequency and angle.



Gain Result

Table with columns for Freq(Hz), Pol, Phi, Ant. 1, and Gain for various angles (0 to 120 degrees) across multiple frequency bands (5.2G, 5.3G, 5.6G, 5.785G).



Radiated Composite Gain_Radio 2 5GHz U-NII1~U-NII 3 and 6GHz U-NII 5~U-NII 8

Appendix D

Table with columns for frequency (5.785G, 6.175G, 6.475G, 6.695G), polarization (Pol.), and various gain angles (Theta and Phi) from 0 to 180 degrees. Each cell contains a numerical gain value.



Radiated Composite Gain_Radio 2 5GHz U-NII1~U-NII 3 and 6GHz U-NII 5~U-NII 8

Appendix D

Table with columns for frequency (6.995G, 5.2G, 5.3G, 5.6G), polarization (Pol.), phase (Phi), antenna (Ant. 1, 2), and gain values for various angles (Theta) and azimuths (Phi) from 0 to 345 degrees.



Radiated Composite Gain_Radio 2 5GHz U-NII1~U-NII 3 and 6GHz U-NII 5~U-NII 8

Appendix D

Table with columns for Gain, Theta, and various Phi angles (0 to 345 degrees) across multiple frequency bands (5.66G, 5.785G, 6.175G, 6.475G).



Radiated Composite Gain_Radio 2 5GHz U-NII1~U-NII 3 and 6GHz U-NII 5~U-NII 8

Appendix D

Table with columns for Azimuth (Theta) and Elevation (Phi) angles, and Gain values for various antenna configurations. Includes sub-tables for 6.995G and 5.2G frequencies with different antenna types (Ant. 2, Ant. 3).



Radiated Composite Gain_Radio 2 5GHz U-NII1~U-NII 3 and 6GHz U-NII 5~U-NII 8

Appendix D

Table with columns for frequency, polarization, and gain in various directions (Theta and Phi). Rows include data for 5.3G, 5.6G, and 5.785G frequencies.



Radiated Composite Gain_Radio 2 5GHz U-NII1~U-NII 3 and 6GHz U-NII 5~U-NII 8

Appendix D

Table with columns for frequency (6.175G, 6.475G, 6.695G, 6.995G), polarization (Pol.), and various gain angles (Theta, Phi) from 0 to 180 degrees. The table contains numerical gain values for each combination of frequency and angle.



Radiated Composite Gain_Radio 2 5GHz U-NII1~U-NII 3 and 6GHz U-NII 5~U-NII 8

Appendix D

Table with columns for frequency (5.2G, 5.3G, 5.6G, 5.785G), polarization (Pol.), phase (Phi), antenna (Ant. 4), and gain for various angles (Theta) and frequencies (Phi). Values range from -19.92 to 3.11.



Radiated Composite Gain_Radio 2 5GHz U-NII1~U-NII 3 and 6GHz U-NII 5~U-NII 8

Appendix D

Table with columns for frequency (5.785G, 6.175G, 6.475G, 6.695G), polarization (Pol.), theta angle, antenna number (Ant. 4), gain, and azimuth angle (Theta) from 0 to 180 degrees. Each azimuth angle has a corresponding row of gain values for 15-degree increments of Phi (0, 15, 30, 45, 60, 75, 90, 105, 120, 135, 150, 165, 180 degrees).



Table with columns for Azimuth (Theta) and Elevation (Phi) angles, and Gain values. Includes sub-headers for Freq(Hz), Pol., and Ant. 4. Values range from -19.65 to -17.55 dBm.



Freq(Hz)	5.2G	5.3G	5.6G	5.785G	6.175G	6.475G	6.695G	6.995G
Ant. 1 Max Gain (dBi)	3.25	3.68	3.74	2.9	4.16	2.52	0.71	2.03
Ant. 2 Max Gain (dBi)	2.35	4.2	2.48	3.96	4.72	2.06	1.91	2.03
Ant. 3 Max Gain (dBi)	3.07	3.84	2.89	2.61	2.24	1.61	2.74	2.45
Ant. 4 Max Gain (dBi)	3.41	3.65	1.81	3.31	3.43	3.56	2.35	1.93
Ant. 1 Polarization/ Θ (°)/ Φ (°)	Theta/60/345	Theta/45/345	Theta/60/345	Theta/60/345	Theta/45/315	Theta/60/345	Theta/30/345	Theta/30/60
Ant. 2 Polarization/ Θ (°)/ Φ (°)	Theta/75/0	Theta/45/210	Theta/75/0	Theta/60/240	Theta/60/240	Theta/75/75	Theta/30/135	Theta/45/270
Ant. 3 Polarization/ Θ (°)/ Φ (°)	Theta/75/105	Theta/75/120	Theta/60/120	Theta/75/90	Theta/45/90	Theta/60/60	Theta/45/90	Theta/75/285
Ant. 4 Polarization/ Θ (°)/ Φ (°)	Theta/30/240	Theta/30/255	Theta/30/120	Theta/45/240	Theta/45/240	Theta/15/0	Theta/15/30	Phi/30/120
Max Gain (dBi)	3.41	4.2	3.74	3.96	4.72	3.56	2.74	2.45
DG [1SS] (dBi)	6.79	6.16	4.51	5.6	7.06	6.25	4.86	5.56
DG [2SS] (dBi)	3.79	4.2	3.74	3.96	4.72	3.56	2.74	2.56
DG [4SS] (dBi)	0.92	0.76	-0.79	0.29	1.39	0.34	-0.72	-0.38



DG 1SS Result

Table with columns for Freq(Hz), Pol., Phi, and DG(dBi) for various angles (0 to 165 degrees) across frequencies 5.2G, 5.3G, and 5.6G. Includes values for Phi(0) to Phi(345) and Theta.



Radiated Composite Gain_Radio 3 5GHz U-NII1~U-NII 3 and 6GHz U-NII 5~U-NII 8

Appendix E

Table with columns for Frequency (Hz), Polarization (Pol.), and various Azimuth (Theta) and Elevation (Phi) angles. It contains multiple data blocks for different frequencies (5.785G, 6.175G, 6.475G) and polarizations (Phi, Theta). Values represent DG(dBi) for various angles from 0 to 180 degrees.



Radiated Composite Gain_Radio 3 5GHz U-NII1~U-NII 3 and 6GHz U-NII 5~U-NII 8

Appendix E

Freq(Hz)	6.695G	Pol.	Phi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DG(dBi)	Φ(0°)	Φ(15°)	Φ(30°)	Φ(45°)	Φ(60°)	Φ(75°)	Φ(90°)	Φ(105°)	Φ(120°)	Φ(135°)	Φ(150°)	Φ(165°)	Φ(180°)	Φ(195°)	Φ(210°)	Φ(225°)	Φ(240°)	Φ(255°)	Φ(270°)	Φ(285°)	Φ(300°)	Φ(315°)	Φ(330°)	Φ(345°)																									
Θ(0°)	-0.18	-1.68	-2.62	-3.85	-4.98	-3.32	-2.09	-1.04	-0.78	-0.65	-1.57	-1.61	-2.16	-3.74	-4.45	-3.17	-3.13	-1.86	-1.32	-0.5	0.28	0.62	0.85	0.22																									
Θ(15°)	0.36	0.64	2.42	2.3	-1.88	-2.49	-3.27	-0.46	-1.23	-0.28	0.18	-0.55	-4.51	-2.54	-0.94	1.59	2.47	2.37	1.73	-1.29	-1.65	-1.49	-0.9	-0.09																									
Θ(30°)	-1.5	-2.8	-3.6	-1.67	3.07	-0.43	-0.71	-1.26	2.58	0.07	-2.42	1.26	-0.91	-3.92	-2.38	-3.85	-0.18	2.49	1.9	2.49	0.72	-1.75	-1	-3.42																									
Θ(45°)	-5.59	-2.38	-2.25	-0.79	0.75	0.55	-1.55	-0.46	1.85	0.16	-0.45	-3.88	-3.56	-1.96	-3.68	-3.29	-0.79	-2.26	-2.93	-3.05	-0.59	-3.22	0.09	-4.71																									
Θ(60°)	-8.22	-7.74	-2.99	-3.09	-2.43	-1.35	-0.23	-1.39	-0.97	-2.32	-4.15	-3.33	-5.63	-2.46	-5.01	-8.29	-3.36	-3.57	-3.01	-1.66	-4.9	-4.91	-9.45	-6.97																									
Θ(75°)	-5.24	-8.7	-7.18	-4.03	-2.63	-1.86	0.5	-2.96	-4.82	-4.81	-6.98	-6.12	-10.17	-5.24	-6.85	-5.97	-7.49	-10.15	-5.02	-3.29	-4.72	-7.14	-7.18	-6.88																									
Θ(90°)	-3.93	-5.68	-6.17	-4.57	-4.18	-1.67	-0.71	-7.1	-7.38	-8	-7.3	-10.8	-9.5	-9.7	-9.04	-2.82	-8.05	-8.18	-5.9	-5.13	-3.28	-6.52	-13.02	-8.5																									
Θ(105°)	-10.11	-10.66	-11.78	-4.05	-6.89	-3.82	-5.94	-7.07	-9.2	-8.8	-7.55	-11.48	-10.34	-8.77	-8.99	-5.91	-6.04	-11.09	-8.06	-10.12	-5.72	-7.74	-8.58	-9.67																									
Θ(120°)	-7.51	-9.21	-8.93	-7.2	-11.08	-6.57	-5.15	-4.48	-9.2	-8.51	-9.21	-12.92	-10.01	-11.37	-9.41	-7.92	-8.49	-8.57	-10.31	-8.35	-9.86	-7.14	-10.96	-10.53																									
Θ(135°)	-8.77	-12.52	-12.29	-12.27	-13.82	-7.61	-6.74	-2.81	-5.32	-11.68	-11.21	-12.11	-11.51	-12.14	-13.61	-8.69	-8.25	-9.41	-10.66	-9.43	-12.59	-11.25	-12.08	-10.64																									
Θ(150°)	-13.14	-12.97	-11.63	-12.43	-11.09	-9.72	-12.68	-7.56	-8.9	-11.19	-11.86	-13.14	-10.7	-12.07	-11.31	-10.7	-8.35	-10.15	-8.22	-10.42	-13.27	-14.06	-11.99	-11																									
Θ(165°)	-10.1	-12.5	-12.22	-12.23	-12.86	-11.83	-12.71	-11.54	-11.5	-11.99	-11.72	-11.8	-13.15	-13.38	-12.12	-10.87	-11.55	-11.72	-12.37	-11.98	-13.13	-12.04	-9.98	-9.44																									
Θ(180°)	-12.67	-11.88	-11.69	-11.96	-11.15	-10.96	-9.9	-9.42	-11.22	-11.19	-12.21	-12.88	-13.4	-12.55	-13.01	-12.65	-13.16	-11.5	-11.94	-12.06	-11.79	-9.86	-10.71	-10.92																									

Freq(Hz)	6.695G	Pol.	Theta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DG(dBi)	Φ(0°)	Φ(15°)	Φ(30°)	Φ(45°)	Φ(60°)	Φ(75°)	Φ(90°)	Φ(105°)	Φ(120°)	Φ(135°)	Φ(150°)	Φ(165°)	Φ(180°)	Φ(195°)	Φ(210°)	Φ(225°)	Φ(240°)	Φ(255°)	Φ(270°)	Φ(285°)	Φ(300°)	Φ(315°)	Φ(330°)	Φ(345°)																									
Θ(0°)	-1.64	-0.22	0.46	0.42	-1.23	-2.04	-3.36	-4.76	-6.32	-5.33	-3.59	-1.63	-0.05	0.78	1.3	1.02	0.86	0.33	-0.9	-2.22	-2.62	-2.8	-2.7	-2.66																									
Θ(15°)	4.32	3.74	4.16	3.58	1.46	0.8	-0.04	0.93	1.79	1.64	1.61	2.43	2.53	2.5	1.14	-3.06	-7.61	-6.2	-0.81	0.95	1.28	1.91	2.66	4.12																									
Θ(30°)	2.53	3.65	4.04	2.5	1.26	0.13	-3.08	-0.59	2.38	4.86	2.94	2.03	0	-1.13	-0.24	-0.5	-0.18	1.02	1.28	0.38	1.44	0.63	2.95	3.26																									
Θ(45°)	-0.2	1.45	1.05	4.23	3.1	3.91	2.84	2.43	3.15	3.67	4.73	3.65	2.56	0.42	-1.2	1.37	2.18	3	2.79	2.37	1.81	1.94	-1.34	-0.96																									
Θ(60°)	-0.23	0.72	2.59	1.57	4.33	3.29	0.96	1.8	3.5	3.22	3.7	3.97	3.71	1.26	-0.54	0.77	1.7	2.31	2.85	1.28	0.22	0.4	0.13	2.54																									
Θ(75°)	-0.03	1.54	2.79	3.15	3.3	3.95	0.24	-1.67	2.34	1.07	4.67	3.09	1.56	0.19	0.77	1.55	1.44	3.09	4.26	3.36	2.82	1.69	0.85	2.77																									
Θ(90°)	-2.13	-0.18	-0.31	0.77	0.29	1.09	2.34	0.03	0.24	-0.13	0.83	-0.44	-1.06	-1.65	-0.15	-0.21	0.99	-0.92	2.96	0.25	2.79	0.69	-1.59	-1.3																									
Θ(105°)	-7.47	-6.18	-7.35	-2.55	-3.18	-2.8	-0.02	-1.92	-1.58	-3.65	-2.87	-3.69	-2.74	-2.82	-2.39	-3.53	-1.24	-3.19	-4.36	-8.38	-3.45	-5.97	-6.29	-7.12																									
Θ(120°)	-9.68	-8.56	-8.34	-9.53	-5.25	-6.87	-5.71	-10.13	-7.08	-6.03	-8.07	-8.28	-6.61	-5.82	-6.51	-5.92	-5.89	-8.08	-7.24	-8.19	-8.67	-6.83	-8.17	-12.07																									
Θ(135°)	-11.08	-11.04	-11.11	-10.21	-9.51	-9.31	-7.72	-9.11	-10.24	-7.74	-9.11	-7.59	-5.53	-6.75	-4.81	-4.99	-6.01	-8.81	-11.94	-13.08	-8.58	-7.57	-12.2	-12.36																									
Θ(150°)	-9.1	-11.23	-10.02	-9.29	-11.19	-10.66	-11.58	-8.5	-9.31	-12.22	-13.7	-9.29	-6.71	-7.02	-9.36	-11.63	-10.57	-10.28	-11.54	-11.33	-10.71	-11.3	-12.17	-9.52																									
Θ(165°)	-12.19	-12.27	-12.97	-13.37	-12.72	-13.18	-11.21	-11.41	-11.84	-11.85	-10.51	-9.69	-9.1	-7.03	-6.68	-7.89	-11.55	-11.56	-12.23	-11.82	-12.39	-12.86	-11.9	-12.16																									
Θ(180°)	-9.26	-9.13	-9.6	-10.79	-10.22	-12.72	-13.58	-11.74	-11.85	-11.79	-10.3	-9.2	-9.96	-10.11	-10.57	-11.67	-11.61	-12.12	-12.26	-12.18	-11.56	-11.22	-10.26	-9.78																									

Freq(Hz)	6.995G	Pol.	Phi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DG(dBi)	Φ(0°)	Φ(15°)	Φ(30°)	Φ(45°)	Φ(60°)	Φ(75°)	Φ(90°)	Φ(105°)	Φ(120°)	Φ(135°)	Φ(150°)	Φ(165°)	Φ(180°)	Φ(195°)	Φ(210°)	Φ(225°)	Φ(240°)	Φ(255°)	Φ(270°)	Φ(285°)	Φ(300°)	Φ(315°)	Φ(330°)	Φ(345°)																								
Θ(0°)	-2.24	-2.4	-0.79	0.71	1.23	2.06	2.15	0.41	0	-1.67	-3.21	-4.95	-5.27	-2.61	-1.37	0.64	2.43	2.81	2.97	2.95	2.45	1.23	0.12	-0.89																								
Θ(15°)	-1.2	0.04	0.96	0.44	1.43	0.45	-0.53	1.39	3.15	2.8	1.79	1.14	-0.97	-1.14	0.63	1.36	1.23	1.88	3.37	2.6	-0.53	-0.45	-0.62	-1.09																								
Θ(30°)	-3.88	0.52	-2.66	1.19	0.91	0.48	0.51	2.9	2.96	2.36	0.93	-1.55	0.01	2.02	-0.2	1.58	-1.77	1.76	1.56	0.88	0.89	-1.94	-2.47	-1.88																								
Θ(45°)	-5.96	-3.54	-0.47	-1.31	-1.47	-0.5	1.1	2.1	2.57	2.36	-1.42	-2.66	-0.75	2.19	-4.18	-2.6	-0.36	0.52	-2.03	-2.54	-2.06	-0.63	-1.24	-7.34																								
Θ(60°)	-6	-6.6	-2.31	-2.25	-2.77	-0.28	2.4	0.87	-1.98	-0.86	-6.3	-3.23	-5.16	-1.71	-4.19	-6.9	-4.15	-1.59	-6.83	-5.44	-4.27	-2.69	-7.68	-5.07																								
Θ(75°)	-5.42	-8.54	-7.58	-2.45	-4.54	-2.41	1.1	-0.83	-7.01	-5.58	-6.63	-7.03	-4.48	-4.28	-4.69	-2.3	-5.71	-4.57	-2.67	-1.82	-2.21	-5.24	-7.94	-7.6																								
Θ(90°)	-3.21	-5.16	-6.83	-4.01	-4.66	-2.36	-4.01	-5	-9.15	-7.83	-6.86	-7.61	-6.72	-5.2	-8.19	-2.27	-4.57	-8.91	-6.94	-4	-3.18	-2.97	-10.99	-8																								
Θ(105°)	-11.23	-8.62	-6.49	-2.84	-4.25	-6.33	-3.34	-7.67	-7.03	-8.15	-11.07	-9.73	-10.69	-6.29	-5.84	-5.08	-3.98	-10.59	-4.45	-11.15	-8.32	-7.89	-8.81	-9.19																								
Θ(120°)	-7.67	-5.43	-10.93	-10.78	-6.6	-4.61	-4.8	-5.94	-6.44	-10.69	-9.82	-10.35	-10.87	-9.63	-8.46	-8.84	-6.03	-9.25	-10.98	-7.94	-8.1	-12.59	-12.45	-8.2																								
Θ(135°)	-8.9	-9.9	-9.91	-10.69	-11.51	-6.46	-7.58	-6.62	-10.2	-11.02	-10.36	-10.2	-12.5	-11.17	-8.55	-12.25	-6.53	-12.29	-9.25	-9.67	-8.56	-11.56	-12	-10.86																								
Θ(150°)	-12.17	-10.46	-10.64	-8.8	-11.13	-8.37	-11.11	-5.02	-8.35	-10.11	-10.37	-9.44	-12.36	-10.94	-9.71	-12.15	-11.17	-10.01	-11.06	-12.91	-14.03	-13.33	-11.26	-12.58																								
Θ(165°)	-13.16	-12.59	-13.61	-13.36	-9.59	-11.23	-12.07	-11.96	-10.12	-9.93	-11.51	-12.87	-13.55	-12.39	-11.8	-11.7	-11.86	-11.4	-12.76	-12.17	-13.32	-13.54	-13.42	-12.91																								
Θ(180°)	-13.92	-12.97	-13.38	-12.54	-10.67	-11.41	-12.43	-11.36	-12.46	-11.85	-13.06	-13.1	-13.2	-13.73	-12.53	-13.29	-12.99	-12.23	-13.32	-11.13	-11.36	-13.27	-13.24	-13.4																								

Freq(Hz)	6.995G	Pol.	Theta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DG(dBi)	Φ(0°)	Φ(15°)	Φ(30°)	Φ(45°)	Φ(60°)	Φ(75°)	Φ(90°)	Φ(105°)	Φ(120°)	Φ(135°)	Φ(150°)	Φ(165°)	Φ(180°)	Φ(195°)	Φ(210°)	Φ(225°)	Φ(240°)	Φ(255°)	Φ(270°)	Φ(285°)	Φ(300°)	Φ(315°)	Φ(330°)	Φ(345°)																								
Θ(0°)	3.61	3.07	2.57	1.36	-1.23	-2.96	-5.08	-4.95	-2.95	-1.31	-0.24	0.85	2.39	2.55	1.64	0.58	-0.84	-2.56	-3.81	-2.02	0.01	1.47	2.39	3.6																								
Θ(15°)	4.86	5.56	4.93	4.25	1.96	0.45	0.79	0.57	0.65	1.69	3.58	4.64	3.09</																																			



Radiated Composite Gain_Radio 3 5GHz U-NII1~U-NII 3 and 6GHz U-NII 5~U-NII 8

Appendix E

Gain Result

Table with columns for Freq(Hz), Pol., Phi, Ant. 1, and Gain. Rows are grouped by frequency (5.2G, 5.3G, 5.6G, 5.785G) and include gain values for various angles (Theta) and polarizations (Phi).



Radiated Composite Gain_Radio 3 5GHz U-NII1~U-NII 3 and 6GHz U-NII 5~U-NII 8

Appendix E

Table with columns for Frequency (5.785G, 6.175G, 6.475G, 6.695G), Gain, and various Phi angles (0 to 345 degrees). The table contains numerical data for each combination of frequency and angle.



Radiated Composite Gain_Radio 3 5GHz U-NII1~U-NII 3 and 6GHz U-NII 5~U-NII 8

Appendix E

Table with columns for frequency (6.995G, 5.2G, 5.3G, 5.6G), gain, and various angles (Theta and Phi) from 0 to 180 degrees. The table contains numerical data for each combination of frequency and angle.



Radiated Composite Gain_Radio 3 5GHz U-NII1~U-NII 3 and 6GHz U-NII 5~U-NII 8

Appendix E

Table with columns for Frequency (5.6G, 5.785G, 6.175G, 6.475G), Polarization (Pol.), Theta, Antenna (Ant. 2), Gain, and Azimuthal angle (Theta) from 0 to 180 degrees. Each cell contains a numerical value representing the radiated composite gain.



Radiated Composite Gain_Radio 3 5GHz U-NII1~U-NII 3 and 6GHz U-NII 5~U-NII 8

Appendix E

Table with columns for frequency (6.695G, 6.995G, 5.2G), gain, and various angles (Theta and Phi) from 0 to 165 degrees. The table contains numerical data for each combination of frequency and angle.