

Antenna Test Report

Report No.: TEOT2503000424E4

Applicant Name: Dyson Operations Pte Ltd
Manufacturer Name: Dyson Operations Pte Ltd

Product Name: Bladeless Table Fan
Model Number: SD2

Measurements performed at
SGS Taiwan Ltd.
Hwaya District, Taiwan

Issued Date : April 28, 2025

	Name	Date & Signature
Prepared by:	Nandi Chen Sr. Engineer	<i>Nandi Chen</i> April 28, 2025
Approved by:	Shawn Yen Supervisor	<i>Shawn Yen</i> April 28, 2025

Distribution

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Revision Version

Report Number	Revision	Date	Memo
TEOT2503000424E4	00	2025/04/28	Initial creation of test report.

This test report contains a reference to the previous version test report that it replaces.

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Measurement System Information

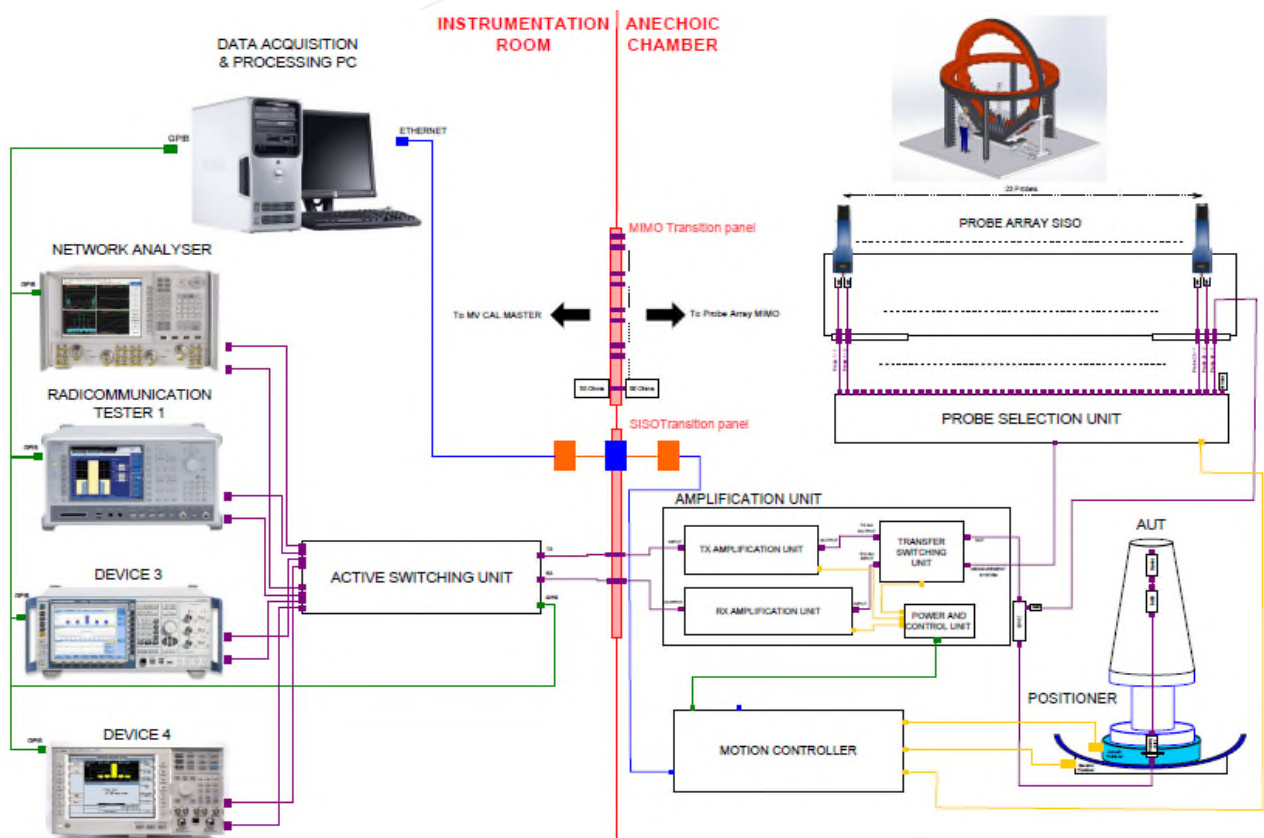
General Information

Testing Condition:

- Temperature: $22 \pm 3^{\circ}\text{C}$
- Humidity: $< 80\%$

Measurement Facility:

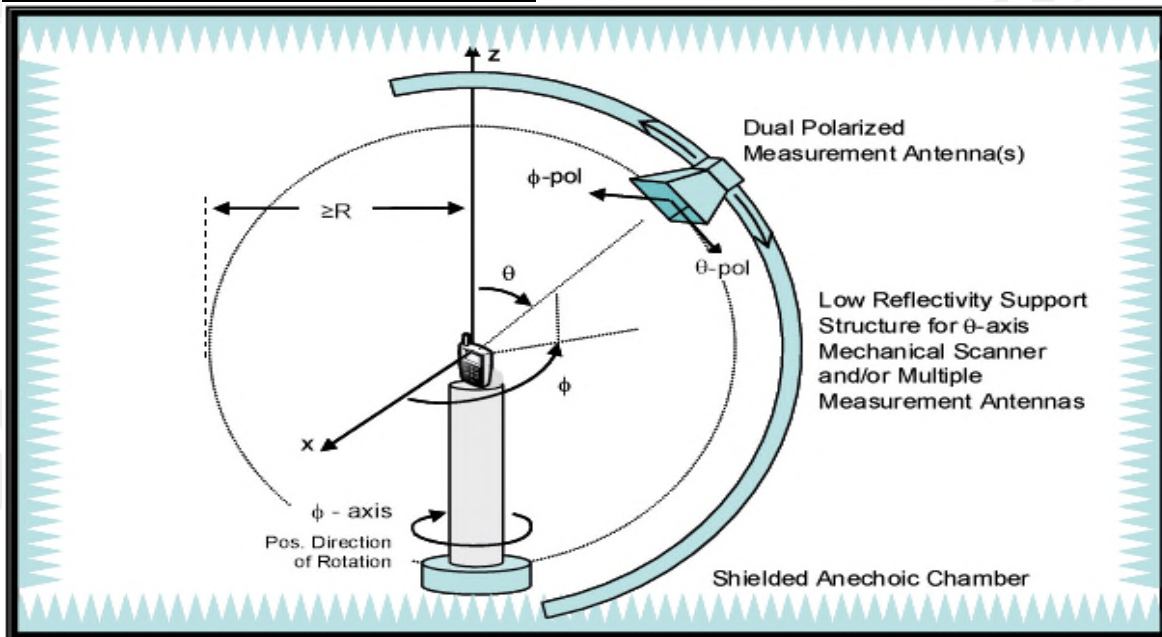
- Measurement Chamber: MVG 3D fully anechoic chamber and its measuring system (Stargate-24-L)
- Network Analyzer: Agilent E5071C



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Measurements are performed in a MVG **Stargate-24-L** with the StarAct interface for a base station simulator. The **Stargate-24-L** has 23 probe antennas mounted with equal spacing on a circular arch. Electronic switching of the probe antennas provides outstanding measurement speed. The geometry of the setup, with only a Styrofoam column within 1.6 meters of the EUT, ensures minimum interference and low ripple on the measured radiation patterns. The DUT is placed on top of the pedestal, in the center of the system.

Typical Setup for MVG Stargate-24-L:



Instruments View



Inside View



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Testing Laboratory: Identification of the Responsible Test Laboratory.● **OTA Laboratory:****SGS Taiwan Ltd. Wireless Laboratory**

No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803.

Telephone: +886 2 2299 3279

Fax: +886 2 2298 0488

Internet: <http://www.tw.sgs.com>

● **Testing Location:**

No. 2, Keji 1st Rd., Hwaya Technology Park, Guishan District, Taoyuan City, Taiwan 33383.

Details of Applicant:

Applicant's name:	Dyson Operations Pte Ltd
Applicant's address:	3 Sentosa Gateway, Singapore 098544
Contact person:	Adam Mokhtar
Telephone:	+6011-28607462
Fax:	N/A
E-mail:	adama.mokhtar@dyson.com

Details of Manufacturer:

Applicant's name:	Flextronics Manufacturing (Zhuhai) Co. Ltd.
Applicant's address:	No.53 Kam Pok Road, San Tin, Yuen Long, N.T.Hong Kong
Contact person:	Jim Lv
Telephone:	+8613554720947
Fax:	N/A
E-mail:	jim.lv@flex.com

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Details of EUT:

Device Description:	Bladeless Table Fan
Device Manufacturer:	Dyson Operations Pte Ltd
Device Model:	SD2
Hardware Version:	02
Software Version:	N/A
Frequency Range:	1000MHz ~ 2000MHz (Step: 100MHz) 2300MHz ~ 2600MHz (Step: 20MHz) 5000MHz ~ 6000MHz (Step: 20MHz) 6000MHz ~ 7000MHz (Step: 50MHz)
Antenna Type:	PCB Antenna

Duration of Tests:

Sample Receive Date:	2025-03-21
Test Starting Date:	2025-03-25
Test Ending Date:	2025-04-10
Report Issued Date:	2025-04-28

Photographs of EUT:**Sample A**
Top View

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Bottom View



**Sample B
Top View**



Bottom View



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List of Equipment

Equipment Summary Sheet

Equipment Description	Manufacturer	Identification no.	Current calibration date	Next calibration date
Network Analyzer	Agilent	E5071C	2024/07/05	2025/07/04
Stargate-24-L probe array	MVG	Stargate-24-L	2024/08/14	2025/08/13
Measurement software	MVG	Wave Studio v23.3.2	N/A	N/A

Reference Measurement Procedure

The reference measurement procedure is described in SGS Working Instruction WI-TESP-EO-002 for OTA service, and MVG Support Document “SG24 active measurements user manual”. Measurements are made by placing the probe in contact with the sample and measuring the admittance or reflection coefficient with respect to the open-circuit end, using a network analyzer or equivalent instrumentation.

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Antenna Gain and Efficiency Sample A

Frequency (MHz)	Efficiency (%)	Average Gain (dBi)	Peak Gain (dBi)	Directivity (dBi)
1000	0.28%	-25.60	-20.37	5.23
1100	0.25%	-26.09	-20.23	5.86
1200	0.40%	-23.93	-18.65	5.28
1300	0.52%	-22.88	-18.15	4.73
1400	0.98%	-20.07	-13.13	6.94
1500	1.43%	-18.45	-11.58	6.87
1600	1.57%	-18.04	-11.63	6.41
1700	4.22%	-13.75	-7.32	6.44
1800	5.52%	-12.58	-6.83	5.75
1900	11.59%	-9.36	-3.40	5.96
2000	15.74%	-8.03	-1.49	6.55
2300	36.39%	-4.39	1.68	6.08
2320	41.78%	-3.79	2.44	6.23
2340	43.55%	-3.61	2.10	5.71
2360	41.30%	-3.84	1.91	5.76
2380	43.45%	-3.62	2.16	5.78
2400	46.77%	-3.30	3.13	6.43
2420	45.92%	-3.38	3.05	6.43
2440	41.69%	-3.80	2.95	6.75
2460	37.33%	-4.28	2.72	7.00
2480	37.84%	-4.22	2.90	7.13
2500	33.27%	-4.78	2.36	7.14
2520	29.85%	-5.25	1.80	7.05
2540	33.34%	-4.77	2.13	6.90
2560	31.99%	-4.95	1.84	6.79
2580	28.51%	-5.45	0.94	6.39
2600	30.83%	-5.11	1.15	6.26
5000	50.12%	-3.00	3.91	6.91
5020	48.75%	-3.12	4.22	7.34
5040	49.77%	-3.03	4.72	7.76
5060	48.98%	-3.10	4.78	7.88
5080	45.60%	-3.41	4.43	7.84
5100	47.64%	-3.22	4.59	7.81
5120	48.87%	-3.11	4.63	7.74
5140	47.97%	-3.19	4.59	7.78
5160	48.75%	-3.12	5.04	8.16
5180	47.75%	-3.21	5.01	8.22
5200	47.97%	-3.19	5.06	8.25
5220	46.77%	-3.30	5.16	8.46
5240	45.81%	-3.39	4.96	8.35
5260	45.71%	-3.40	4.92	8.31
5280	45.19%	-3.45	4.74	8.19
5300	43.55%	-3.61	4.45	8.06
5320	41.21%	-3.85	4.40	8.25
5340	46.24%	-3.35	4.75	8.10
5360	40.93%	-3.88	4.41	8.29
5380	40.83%	-3.89	4.38	8.27
5400	41.98%	-3.77	4.63	8.40

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Frequency (MHz)	Efficiency (%)	Average Gain (dBi)	Peak Gain (dBi)	Directivity (dBi)
5420	40.27%	-3.95	4.45	8.40
5440	39.54%	-4.03	4.41	8.44
5460	40.74%	-3.90	4.40	8.30
5480	37.15%	-4.30	3.90	8.20
5500	35.08%	-4.55	3.61	8.17
5520	35.65%	-4.48	3.68	8.16
5540	34.75%	-4.59	3.41	8.00
5560	33.65%	-4.73	3.13	7.86
5580	33.88%	-4.70	3.20	7.90
5600	32.66%	-4.86	2.90	7.76
5620	32.66%	-4.86	2.64	7.50
5640	31.19%	-5.06	2.30	7.36
5660	35.56%	-4.49	2.84	7.32
5680	34.20%	-4.66	2.79	7.45
5700	35.89%	-4.45	2.87	7.33
5720	35.48%	-4.50	3.14	7.64
5740	34.99%	-4.56	3.00	7.56
5760	36.90%	-4.33	3.14	7.46
5780	34.99%	-4.56	3.12	7.68
5800	35.32%	-4.52	3.04	7.55
5820	35.81%	-4.46	3.12	7.58
5840	33.57%	-4.74	2.98	7.72
5860	35.81%	-4.46	3.41	7.87
5880	32.28%	-4.91	3.03	7.94
5900	32.36%	-4.90	3.36	8.26
5920	31.19%	-5.06	2.98	8.04
5940	32.89%	-4.83	3.14	7.97
5960	31.05%	-5.08	2.72	7.80
5980	31.92%	-4.96	2.83	7.79
6000	38.11%	-4.19	3.66	7.84
6050	39.08%	-4.08	4.32	8.40
6100	38.55%	-4.14	4.66	8.80
6150	35.08%	-4.55	4.97	9.53
6200	36.14%	-4.42	5.26	9.68
6250	34.51%	-4.62	4.79	9.41
6300	35.89%	-4.45	4.33	8.78
6350	29.44%	-5.31	3.16	8.46
6400	26.67%	-5.74	2.51	8.25
6450	24.77%	-6.06	2.27	8.34
6500	26.36%	-5.79	2.52	8.32
6550	24.10%	-6.18	2.26	8.44
6600	26.36%	-5.79	2.85	8.63
6650	25.41%	-5.95	2.88	8.83
6700	27.35%	-5.63	3.14	8.77
6750	27.48%	-5.61	3.14	8.75
6800	25.18%	-5.99	2.16	8.15
6850	24.55%	-6.10	2.14	8.25
6900	25.23%	-5.98	1.82	7.80
6950	28.44%	-5.46	2.85	8.31
7000	26.18%	-5.82	2.61	8.43

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Sample B

Frequency (MHz)	Efficiency (%)	Average Gain (dBi)	Peak Gain (dBi)	Directivity (dBi)
1000	0.18%	-27.49	-22.55	4.94
1100	0.32%	-24.99	-20.13	4.85
1200	0.51%	-22.92	-16.38	6.54
1300	0.58%	-22.34	-16.77	5.57
1400	1.21%	-19.18	-12.51	6.67
1500	1.47%	-18.33	-11.46	6.88
1600	1.40%	-18.53	-10.47	8.06
1700	3.18%	-14.98	-7.49	7.49
1800	9.40%	-10.27	-3.05	7.22
1900	17.34%	-7.61	-0.86	6.75
2000	22.13%	-6.55	-0.62	5.93
2300	49.43%	-3.06	1.75	4.81
2320	57.94%	-2.37	2.83	5.19
2340	59.16%	-2.28	3.06	5.33
2360	53.46%	-2.72	2.33	5.05
2380	53.21%	-2.74	2.65	5.39
2400	53.46%	-2.72	3.02	5.74
2420	53.83%	-2.69	2.95	5.63
2440	54.20%	-2.66	3.00	5.66
2460	50.47%	-2.97	3.01	5.98
2480	51.76%	-2.86	3.03	5.89
2500	48.64%	-3.13	2.55	5.69
2520	42.17%	-3.75	2.35	6.10
2540	44.06%	-3.56	2.80	6.37
2560	40.18%	-3.96	2.57	6.53
2580	32.21%	-4.92	1.44	6.36
2600	32.81%	-4.84	1.07	5.91
5000	48.53%	-3.14	4.76	7.90
5020	46.67%	-3.31	4.62	7.94
5040	47.10%	-3.27	4.99	8.25
5060	46.24%	-3.35	5.00	8.35
5080	42.66%	-3.70	4.31	8.01
5100	44.06%	-3.56	4.29	7.85
5120	44.26%	-3.54	3.87	7.41
5140	44.26%	-3.54	3.46	7.00
5160	43.55%	-3.61	3.48	7.09
5180	42.56%	-3.71	3.49	7.19
5200	42.66%	-3.70	3.70	7.41
5220	41.88%	-3.78	3.94	7.71
5240	42.36%	-3.73	3.89	7.62
5260	41.30%	-3.84	3.89	7.73
5280	40.09%	-3.97	3.84	7.80
5300	41.02%	-3.87	4.05	7.92
5320	38.28%	-4.17	3.58	7.75
5340	41.50%	-3.82	4.00	7.83
5360	36.81%	-4.34	3.57	7.91
5380	37.15%	-4.30	3.83	8.13
5400	37.07%	-4.31	3.74	8.05

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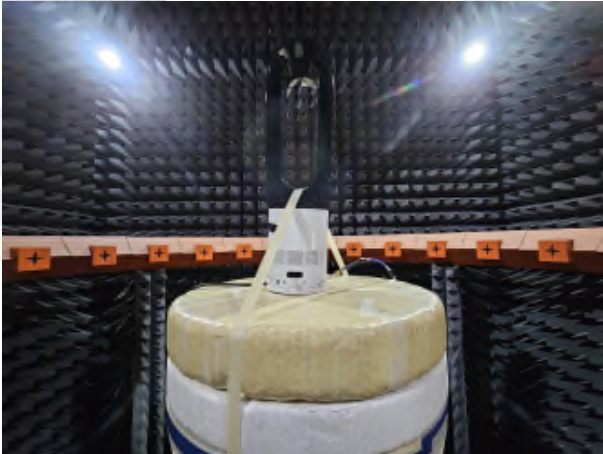
Frequency (MHz)	Efficiency (%)	Average Gain (dBi)	Peak Gain (dBi)	Directivity (dBi)
5420	34.99%	-4.56	3.50	8.06
5440	34.28%	-4.65	3.46	8.12
5460	34.67%	-4.60	3.38	7.98
5480	31.62%	-5.00	2.78	7.78
5500	30.06%	-5.22	2.60	7.82
5520	30.83%	-5.11	2.67	7.77
5540	28.97%	-5.38	2.35	7.73
5560	32.14%	-4.93	2.64	7.57
5580	32.43%	-4.89	2.92	7.80
5600	31.33%	-5.04	3.04	8.08
5620	32.21%	-4.92	3.36	8.28
5640	30.90%	-5.10	3.12	8.22
5660	33.04%	-4.81	3.58	8.39
5680	31.48%	-5.02	3.11	8.13
5700	32.81%	-4.84	3.57	8.41
5720	31.99%	-4.95	3.29	8.24
5740	30.69%	-5.13	3.19	8.32
5760	31.92%	-4.96	3.66	8.63
5780	31.05%	-5.08	3.53	8.61
5800	31.41%	-5.03	3.70	8.73
5820	31.19%	-5.06	3.91	8.97
5840	30.76%	-5.12	3.79	8.91
5860	31.55%	-5.01	3.91	8.91
5880	29.99%	-5.23	3.72	8.96
5900	29.72%	-5.27	3.71	8.98
5920	28.31%	-5.48	3.30	8.78
5940	27.29%	-5.64	3.25	8.89
5960	24.49%	-6.11	3.03	9.14
5980	23.28%	-6.33	2.77	9.09
6000	26.18%	-5.82	3.26	9.08
6050	25.76%	-5.89	3.04	8.93
6100	25.23%	-5.98	2.59	8.57
6150	22.28%	-6.52	1.54	8.06
6200	23.07%	-6.37	1.41	7.78
6250	22.49%	-6.48	1.12	7.59
6300	22.49%	-6.48	1.05	7.53
6350	16.67%	-7.78	-0.14	7.64
6400	15.10%	-8.21	-0.60	7.61
6450	13.30%	-8.76	-0.62	8.14
6500	12.68%	-8.97	-0.86	8.11
6550	10.72%	-9.70	-1.69	8.01
6600	10.14%	-9.94	-2.35	7.59
6650	7.98%	-10.98	-3.15	7.83
6700	7.74%	-11.11	-3.15	7.96
6750	6.98%	-11.56	-3.28	8.28
6800	6.01%	-12.21	-3.62	8.59
6850	5.35%	-12.72	-4.07	8.65
6900	4.70%	-13.28	-4.41	8.87
6950	4.33%	-13.64	-4.90	8.74
7000	3.40%	-14.68	-6.42	8.26

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Test Setup

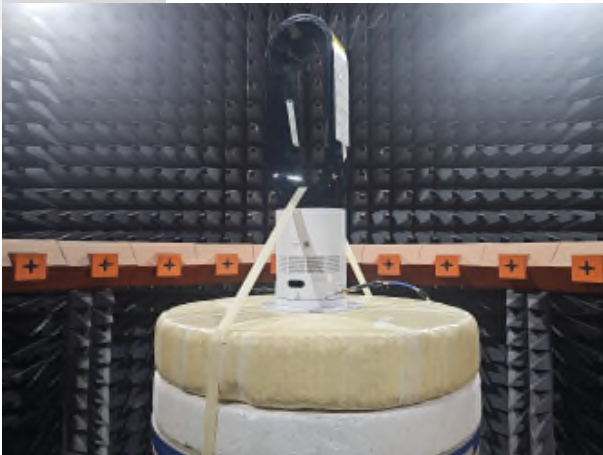
Sample A
Front View



Side View



Sample B
Front View



Side View

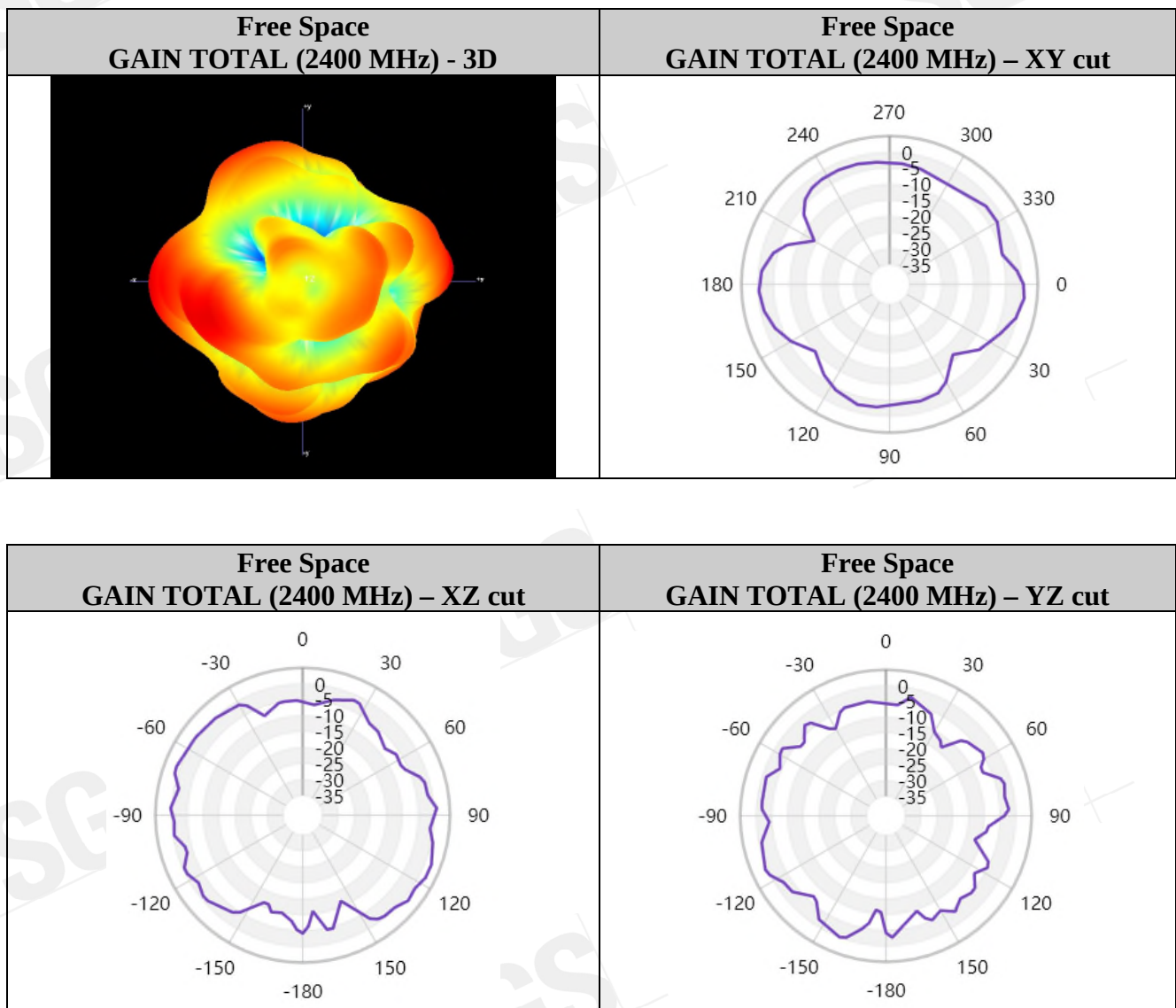


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Antenna 3D Plot Matrix

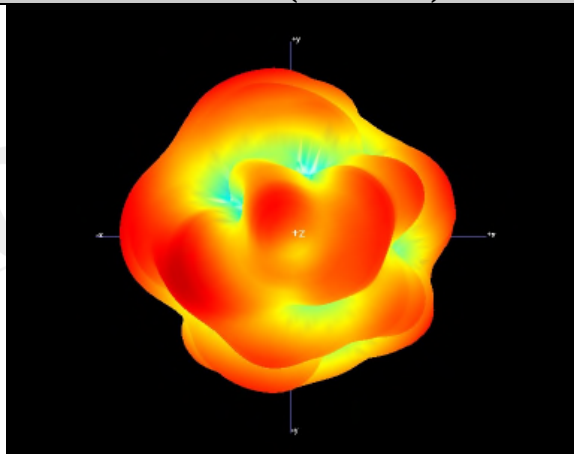
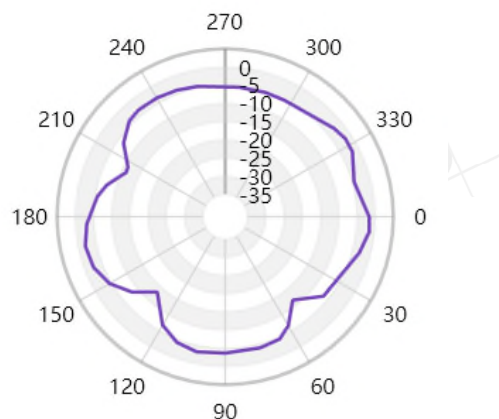
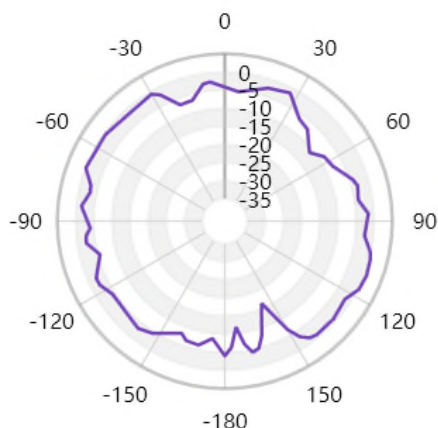
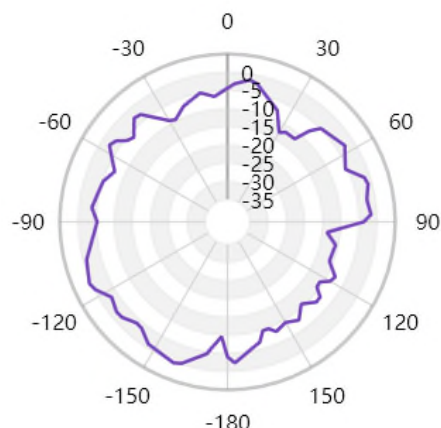
All plots in this section show the total GAIN TOTAL (GAIN TOTAL θ + GAIN TOTAL ϕ) with the +x-axis pointing right, +y-axis pointing up, and +z-axis pointing out of the page.

Sample A



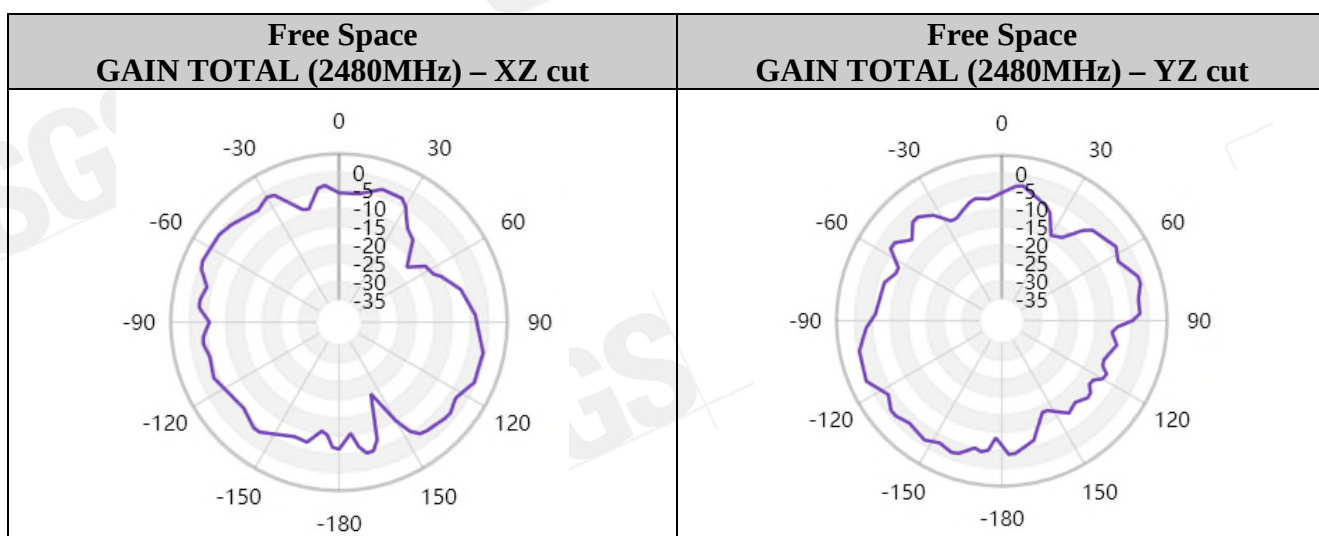
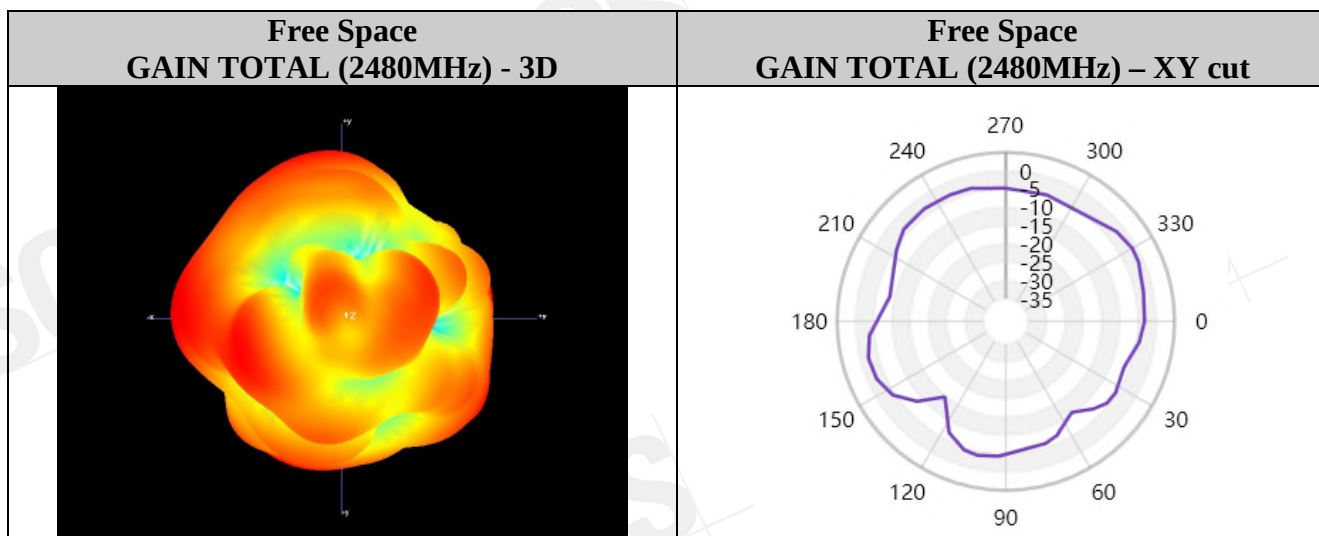
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**Free Space
GAIN TOTAL (2440MHz) - 3D****Free Space
GAIN TOTAL (2440MHz) - XY cut****Free Space
GAIN TOTAL (2440MHz) - XZ cut****Free Space
GAIN TOTAL (2440MHz) - YZ cut**

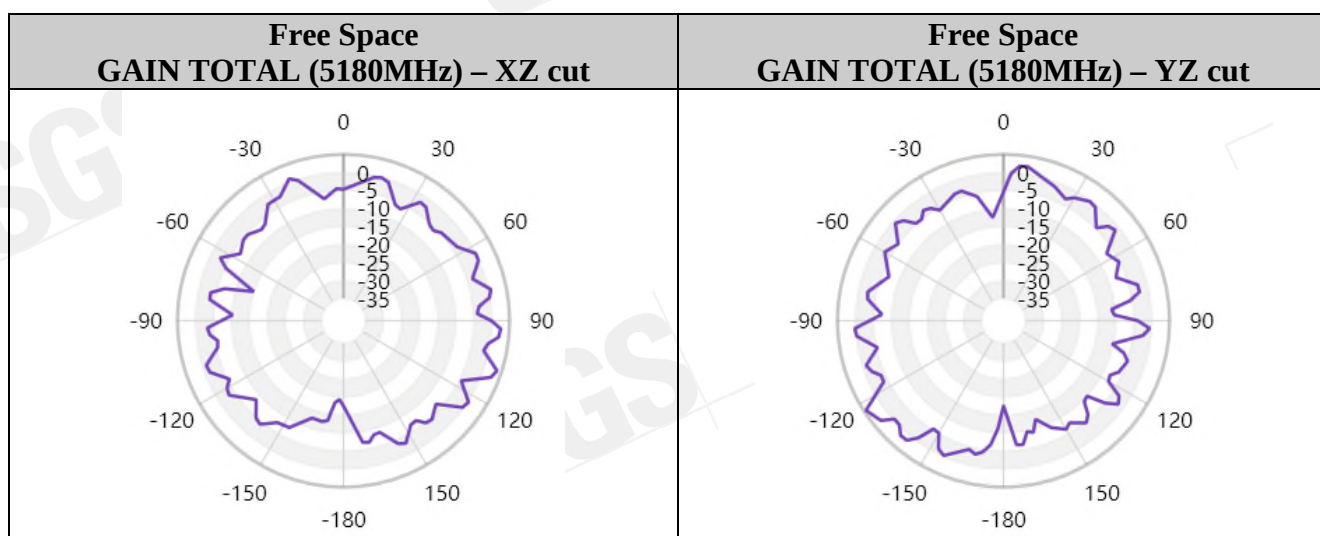
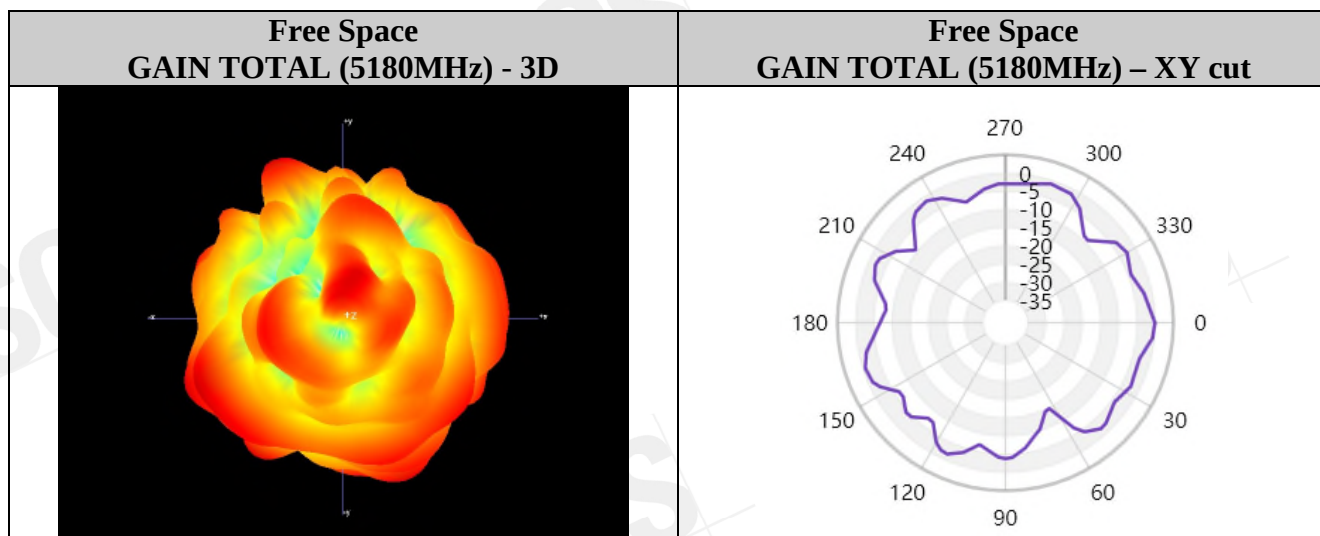
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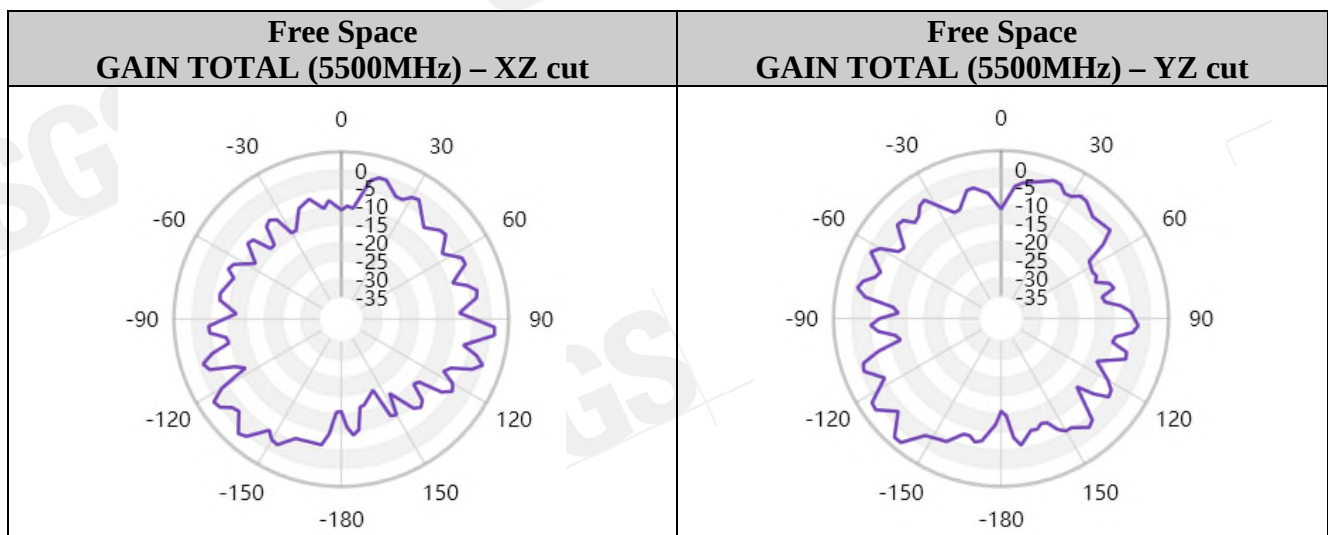
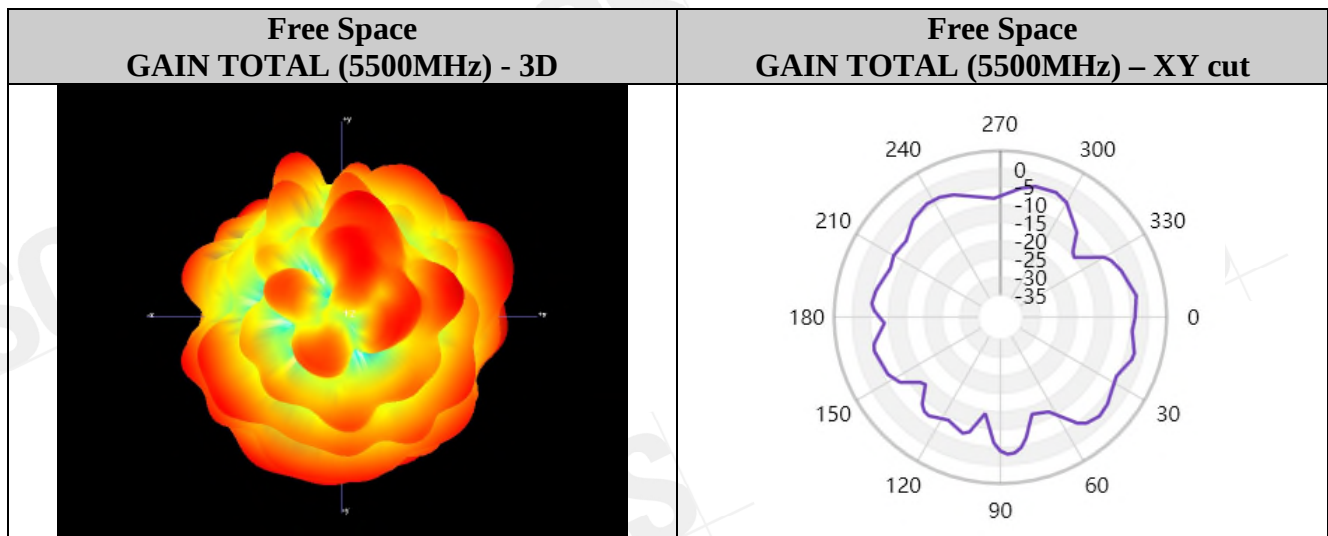
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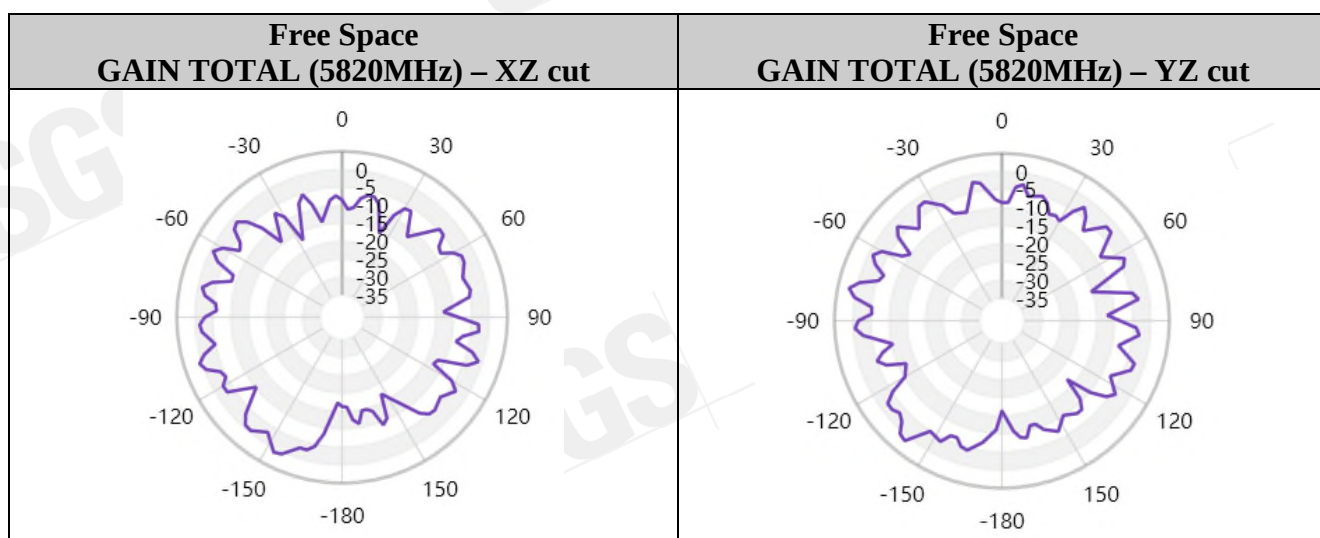
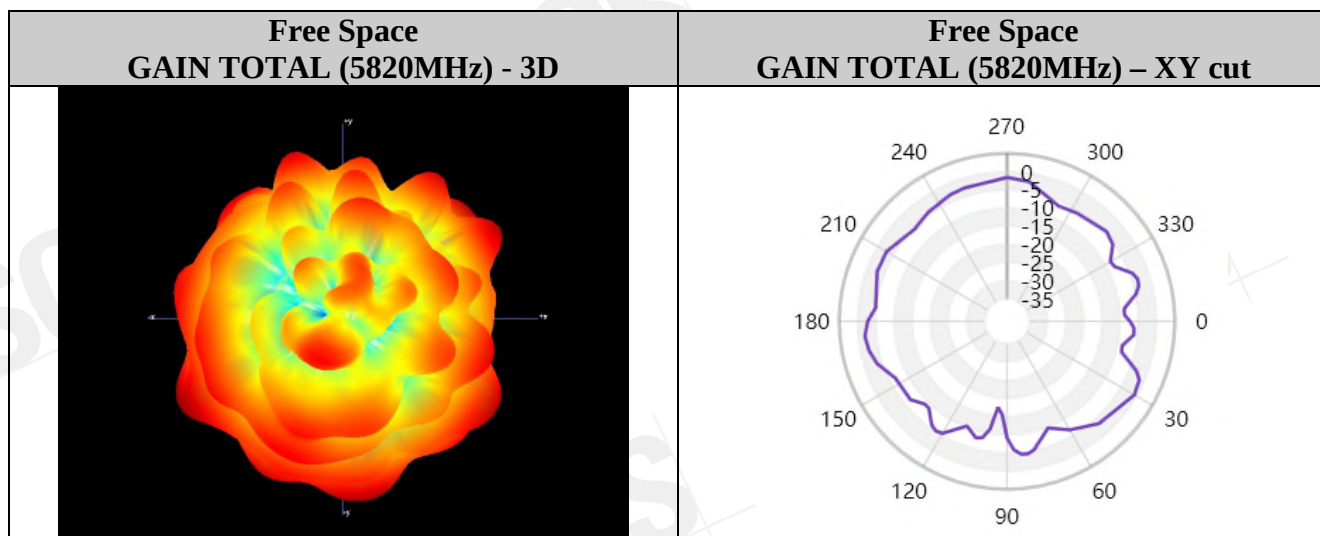
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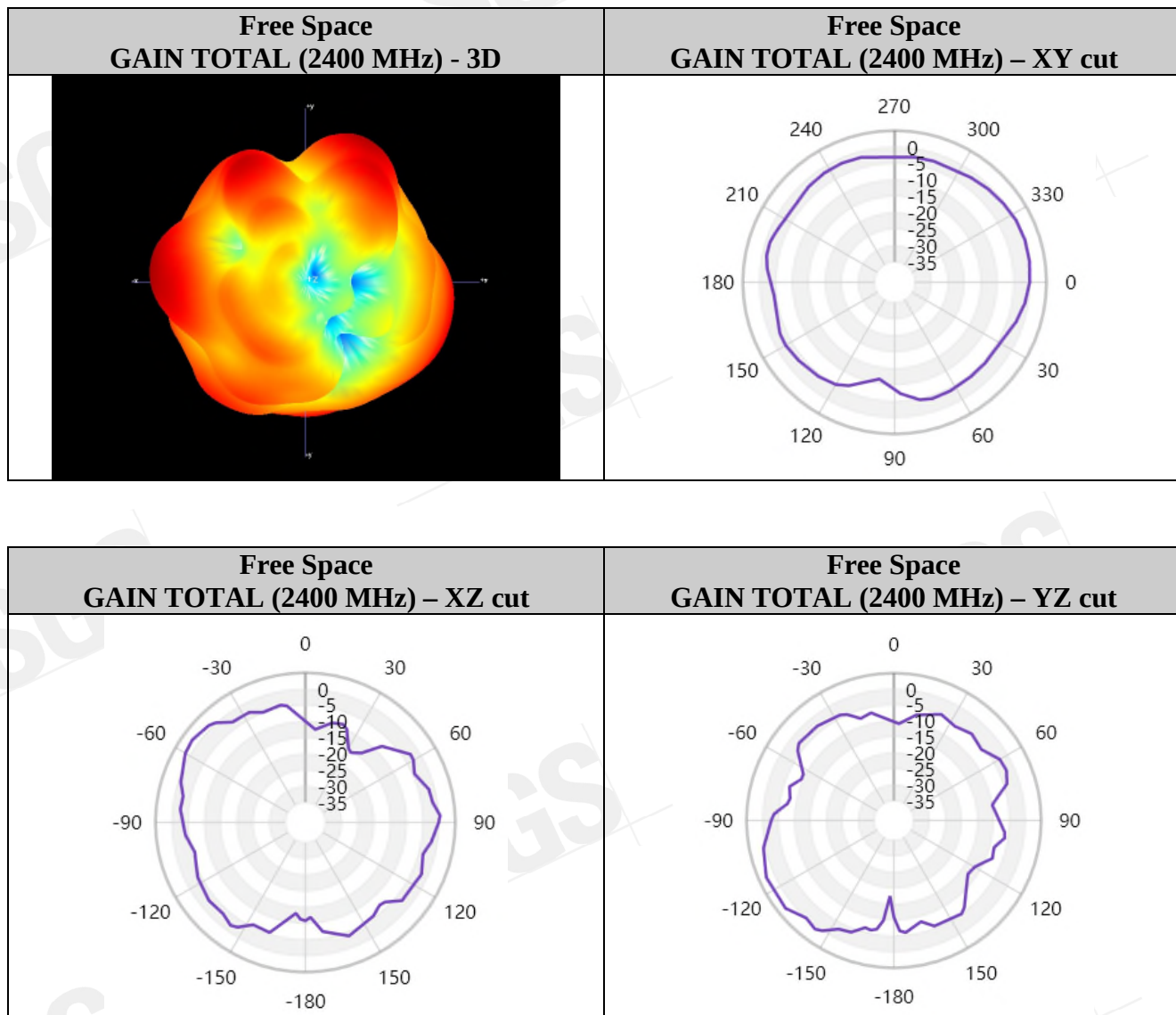
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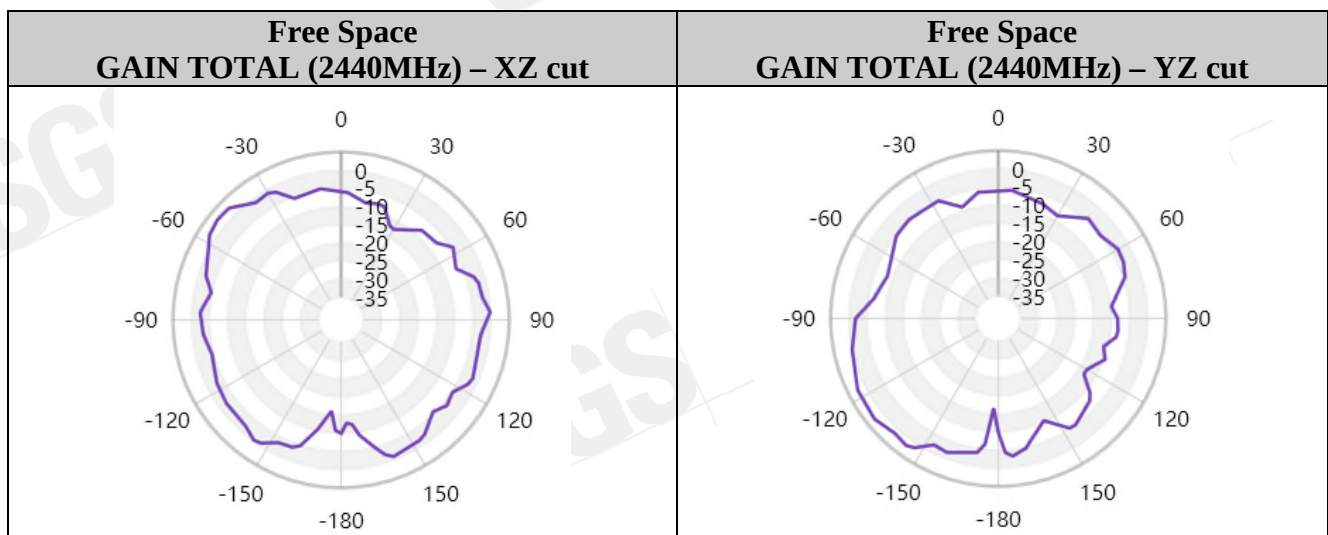
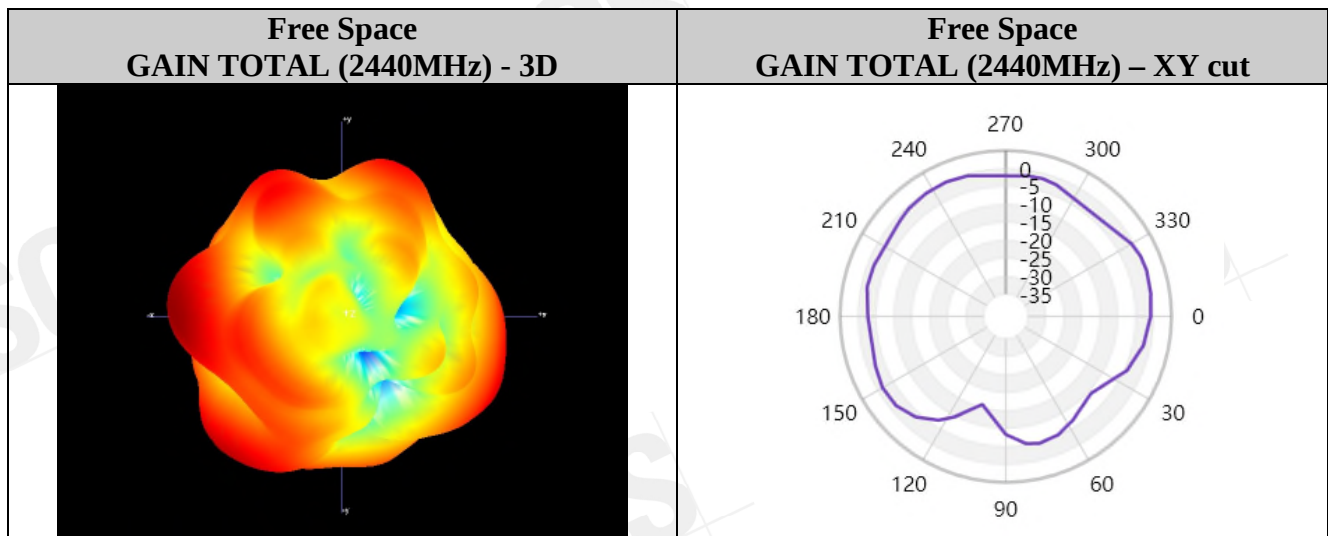
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Sample B



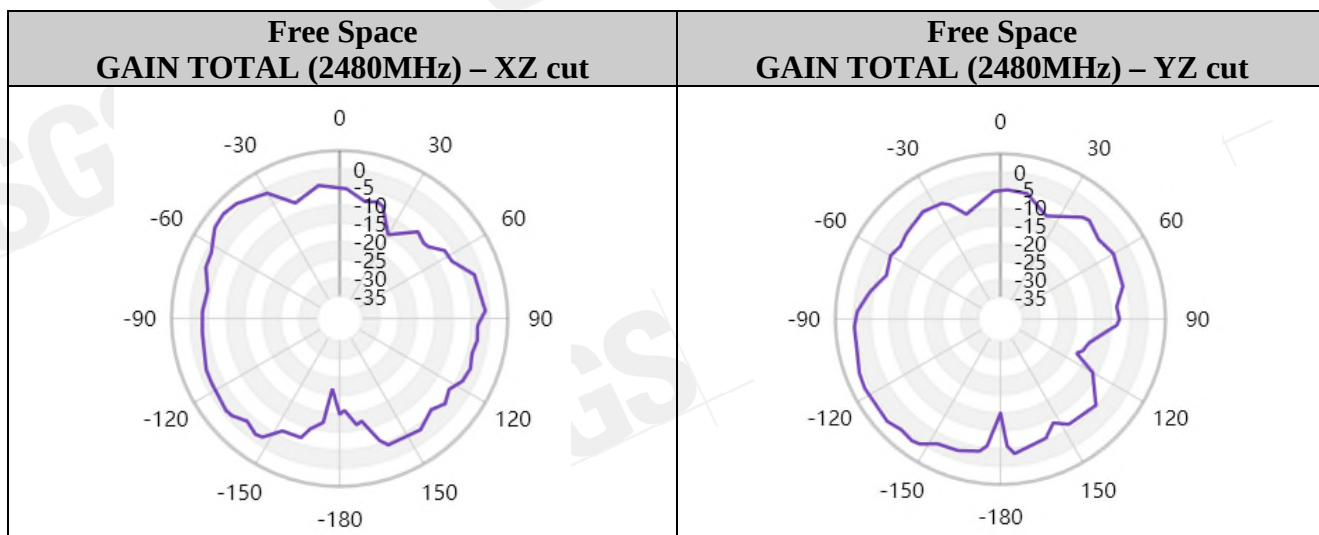
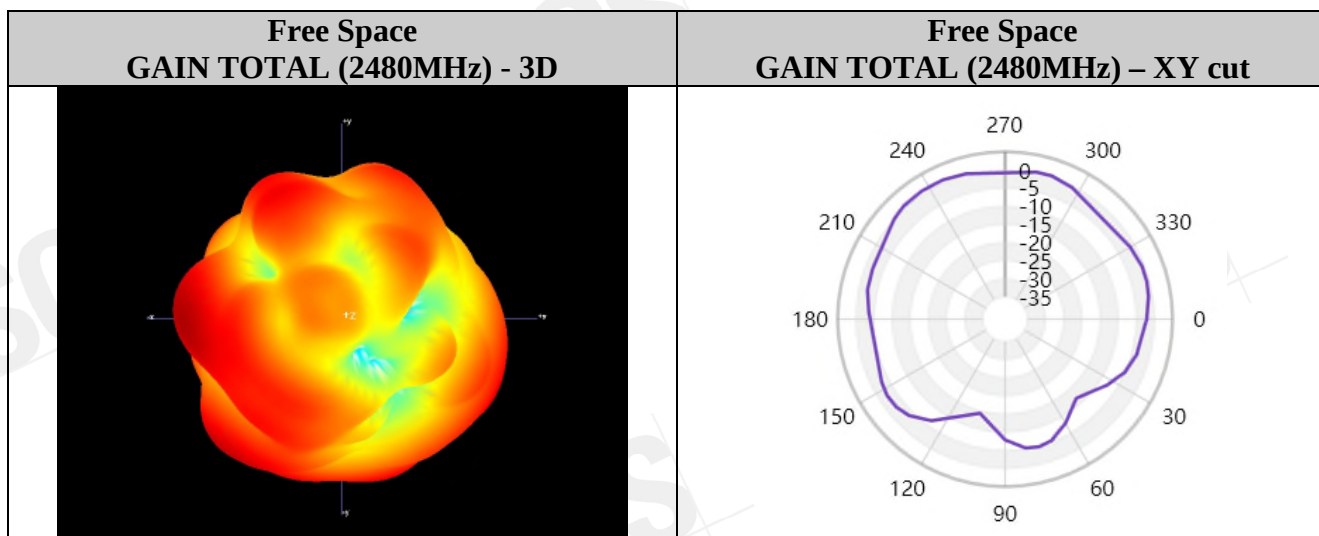
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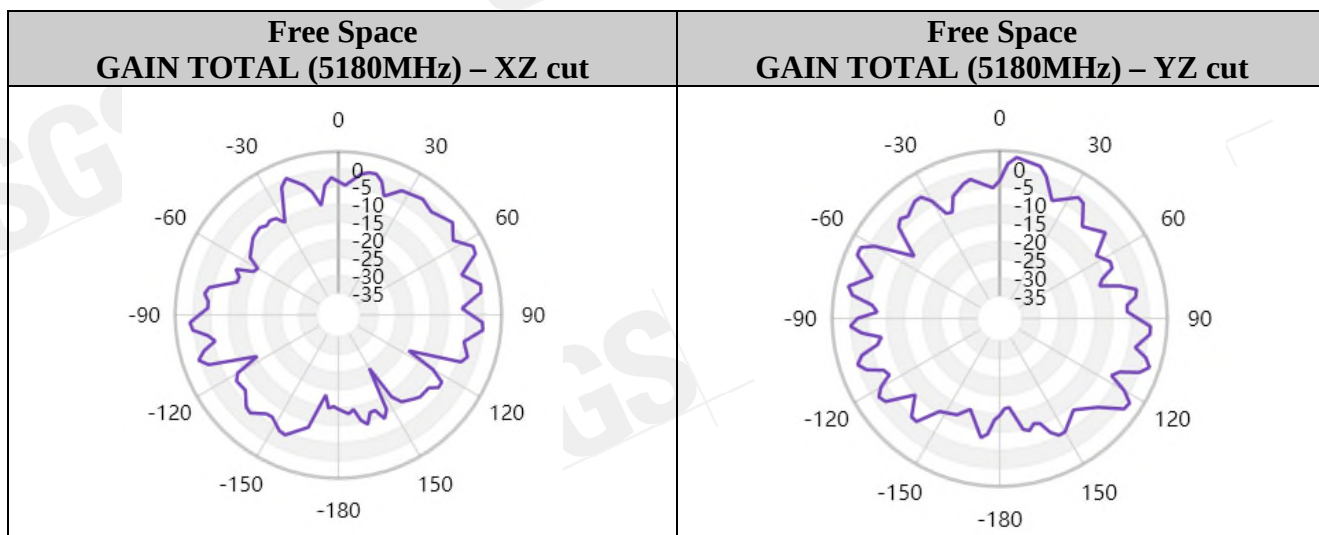
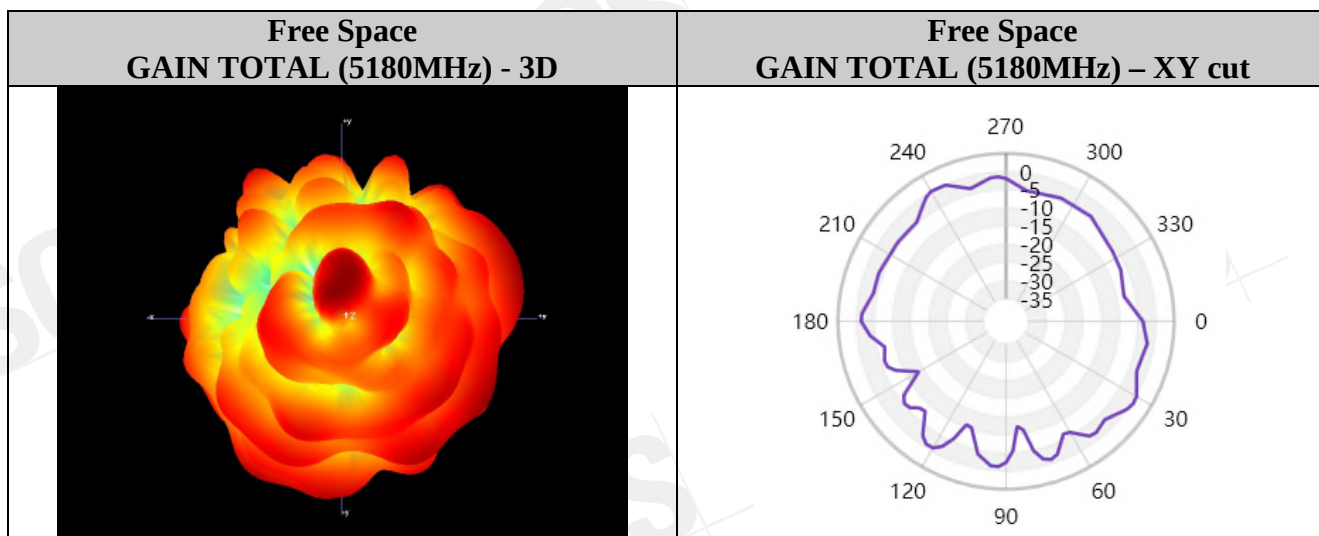
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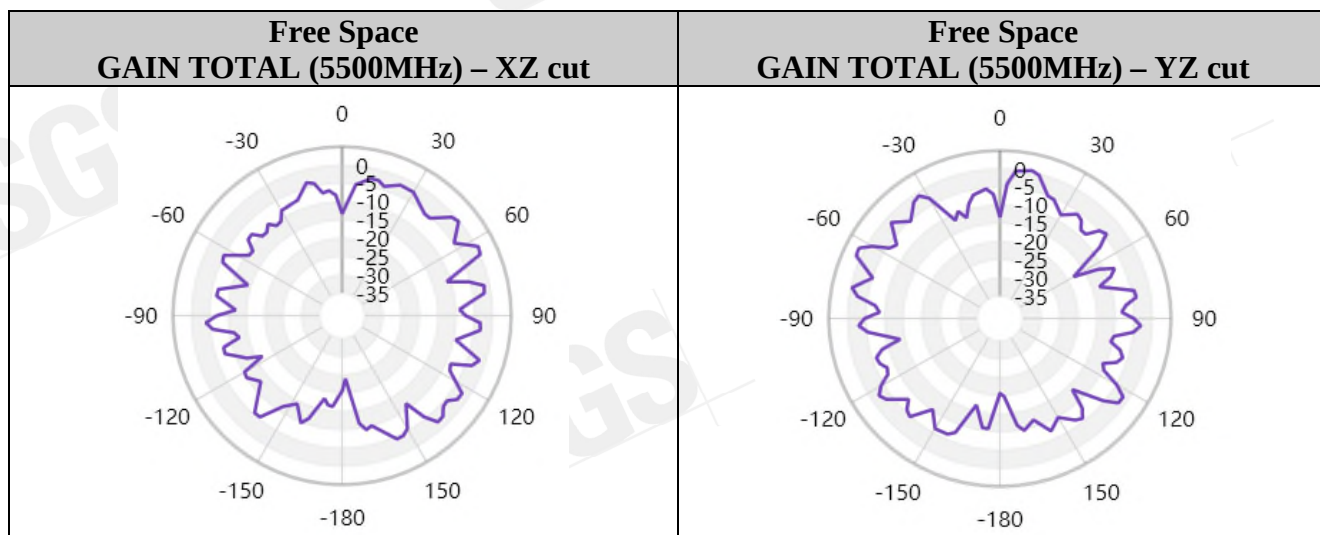
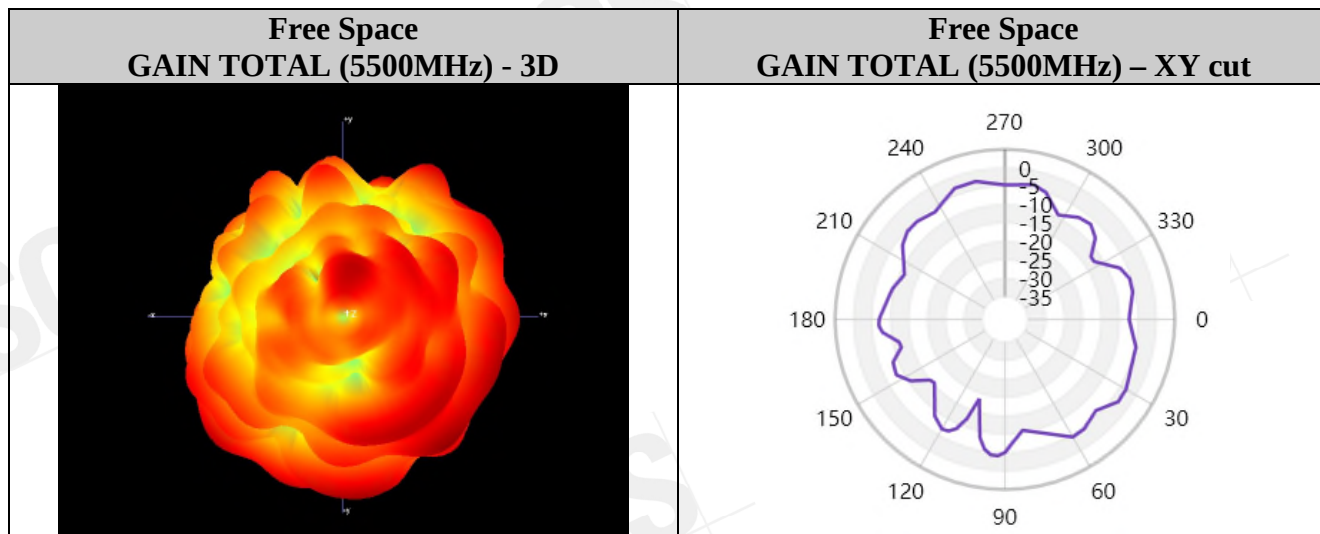
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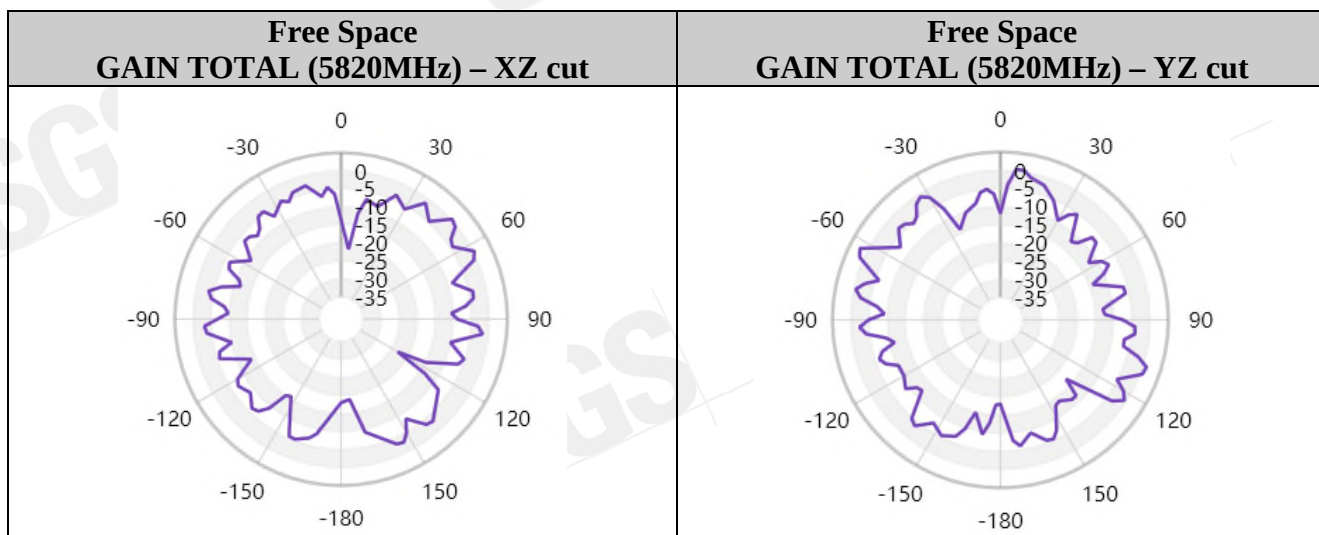
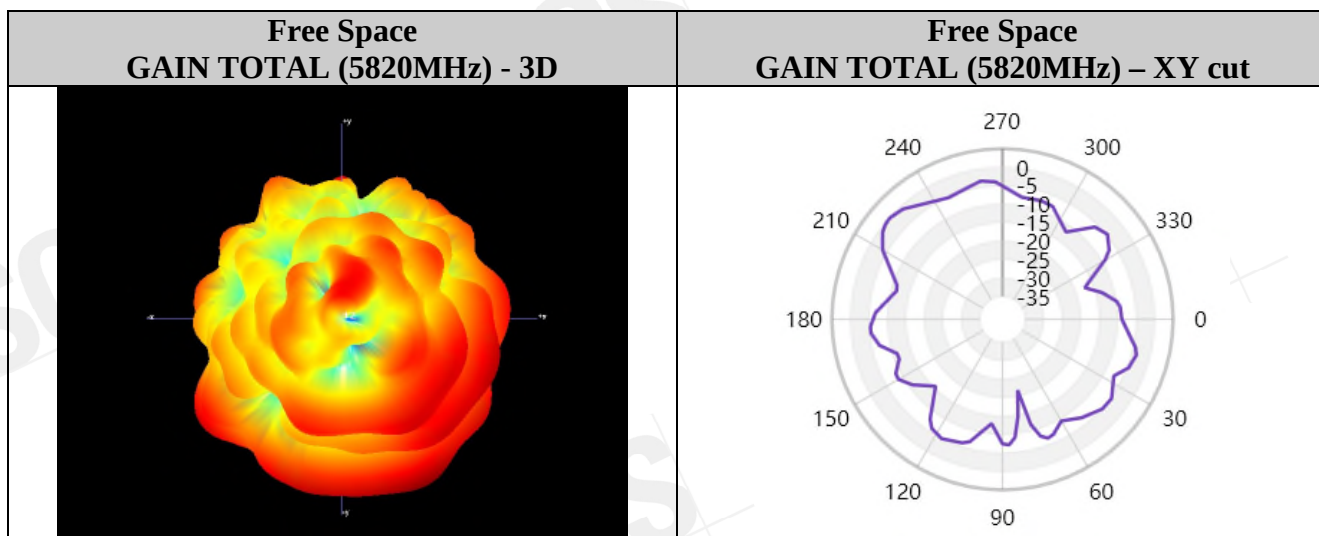
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End of Report

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