OAW-AP1511
Antenna Test Report

Version:V1
2024-6-14

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1. Test Information

Equipment	EMT Chamber
Applicant	Han-Networks
Manufacturer	AOT

2. Testing Location

Testing Location	
AOT	ADD: 289 Jinghua Road,Shipai, BachengTown, Kunshan City, Jiangsu Province

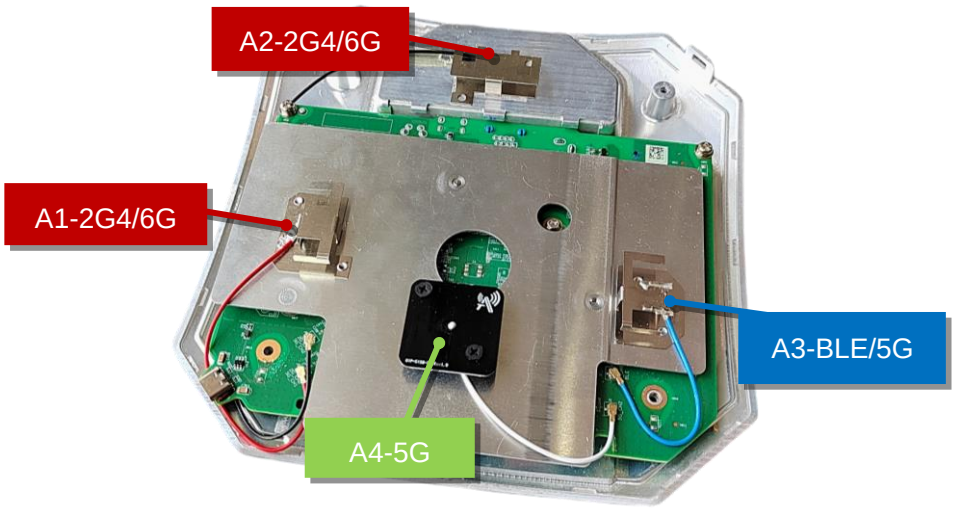
Test Condition	Test Engineer	Test Environment (°C / %)	Test Date
Radiated	Changgan Lai	20-24 / 45-60	5.27.2024~5.27.2024

3. Test Frequency

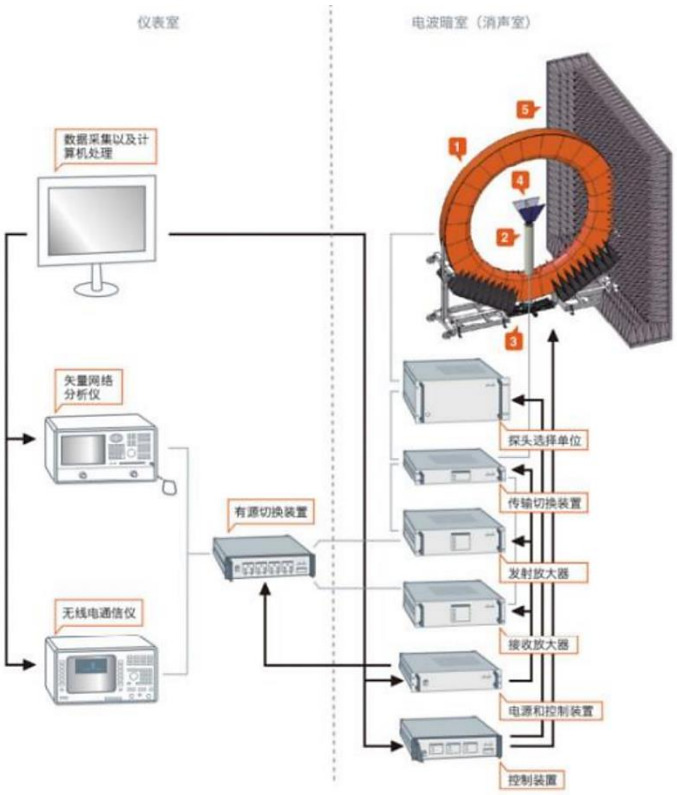
Band (MHz)	Test Frequency (MHz)
2400-2500	2450
5150-5850	5150/5500/5850
5925-7125	5925/6500/7125

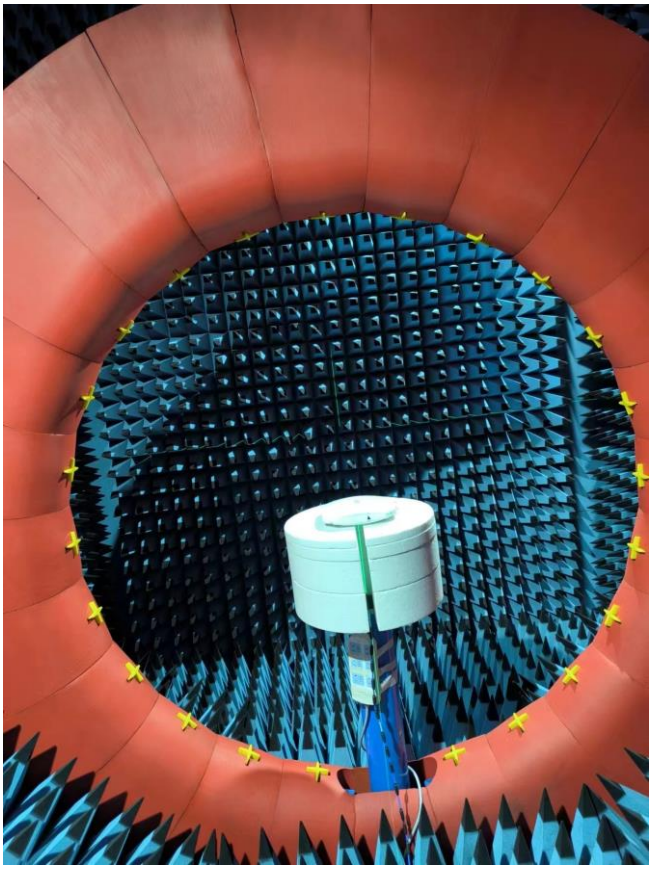
4. Antenna Information

Ant. Position	Polarization Type	Ant. Type	Connector
Antenna 1 (2.4G/6G)	Vertical	Dipole	I-PEX
Antenna 2 (2.4G/6G)	Vertical	Dipole	I-PEX
Antenna 3 (BLE/Zigbee/5G)	Vertical	Dipole	I-PEX
Antenna 4 (5G)	Horizontal	Dipole	I-PEX

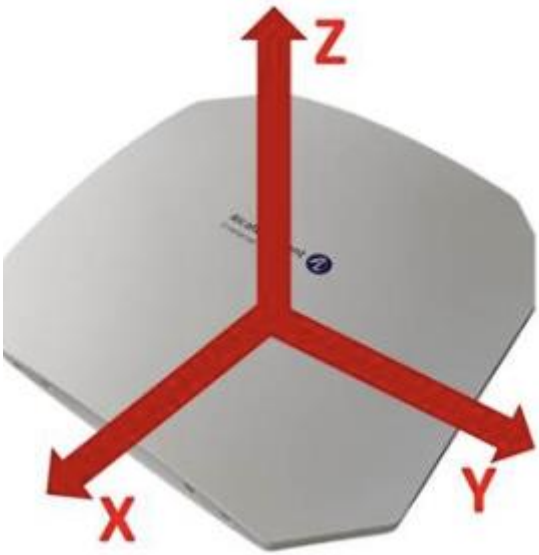


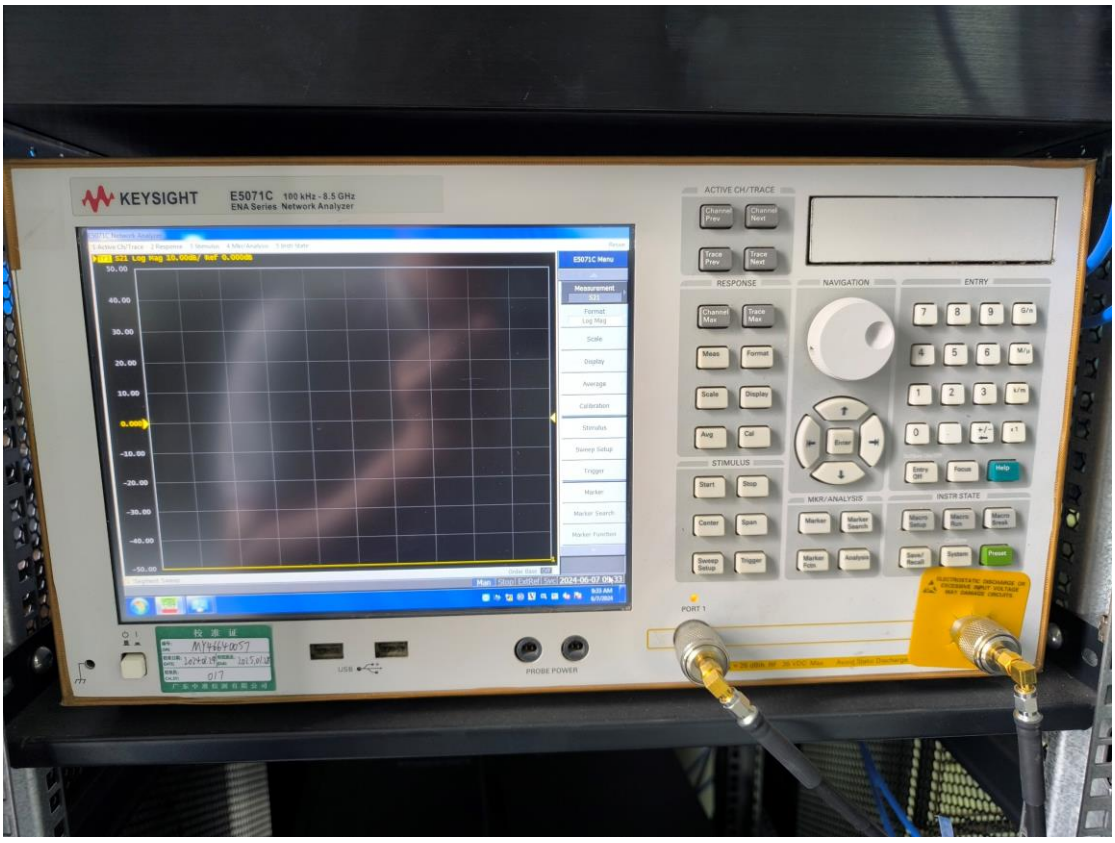
5. Test Configuration





6. Reference Calibration





CALIBRATION PASS
CAL.DATA: 2024.1.29
NEXT CAL.DATA: 2025.1.29

7. Test Method

The “great circle” cut method, whereby the Measurement Antenna remains fixed and the EUT is rotated about two axes in sequential order. The radiated RF performance of the Equipment Under Test (EUT) is measured by sampling the radiated transmit power of the mobile at various locations surrounding the device. A three-dimensional characterization of the 'transmit' performance of the EUT is pieced together by analyzing the data from the spatially distributed measurements.

Data points taken every 2 degrees in the theta and in the phi axes are deemed sufficient to fully characterize the EUT's Far-Field radiation pattern and total radiated power All of the measured power values will be integrated.

8. Measured Values and Calculation of Correlated / Uncorrelated Gains

Summary of Antenna Peak Gain

Antenna Peak Gain Table (Ant. Position：2.4G Ant.1~2)

Band (MHz)	2400-2500
Ant.1 Max Gain (dBi)	5.6
Ant.2 Max Gain (dBi)	3.5

Antenna Peak Gain Table (Ant. Position：5G Ant.3~4)

Band (MHz)	5150 ~ 5350	5470 ~ 5725	5725 ~ 5850
Ant.3 Max Gain (dBi)	5.3	5.9	5.7
Ant.4 Max Gain (dBi)	4.6	4.3	3.7

Antenna Peak Gain Table (Ant. Position：6G Ant.1~2)

Band (MHz)	5925 ~ 6425	6425 ~ 6875	6875 ~ 7125
Ant.1 Max Gain (dBi)	6.4	6.4	5.9
Ant.1 Min Gain (dBi)	4.7		
Ant.2 Max Gain (dBi)	5.1	5.7	5.9
Ant.2 Min Gain (dBi)	4.0		

Antenna Peak Gain Table (Ant. Position：BLE/Zigbee Ant.3)

Band (MHz)	2400-2500
Ant.3 Max Gain (dBi)	4.3

Result for Uncorrelated Gain and Correlated Gain

Maximum Correlated Gain Calculation

Because the antennas are fixed in location within the device the directional antenna gain for MIMO is calculated over a sphere using the raw spatial data taken at 10 degree steps of theta and 10 degree of theta phi for each antenna using the equations from KDB 662911 D01. The raw antenna data is located in the appendix of this report.

The correlated antenna gain was calculated using KDB 662911 D01 F(2)(d)(i).

$$\text{Directional gain} = 10\log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/N_{ANT}]\ \text{dBi}$$

The uncorrelated antenna gain was calculated using KDB 662911 D01 F(2)(d)(ii)

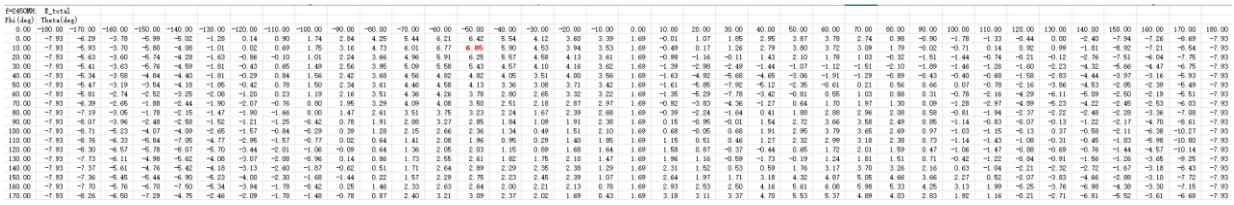
$$\text{Directional gain} = 10\log[(10^{G1/10} + 10^{G2/10} + \ldots + 10^{GN/10})/N_{ANT}]\ \text{dBi}$$

The correlated gains were calculated for each point in the spatial data and the highest values reported.

Correlated Directional Gain for 2.4GHz (Ant. Position：2.4G Ant.1~2)

Frequency (MHz)	2450
Directional Gain	6.85

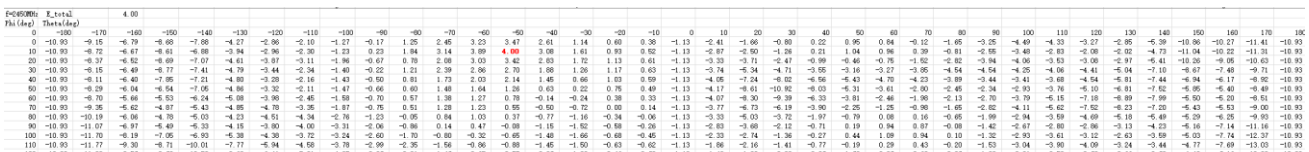
Ant.1~2 @2.45GHz



Uncorrelated Directional Gain for 2.4GHz (Ant. Position：2.4G Ant.1~2)

Frequency (MHz)	2450
Directional Gain	4.00

Ant.1~2 @2.45GHz

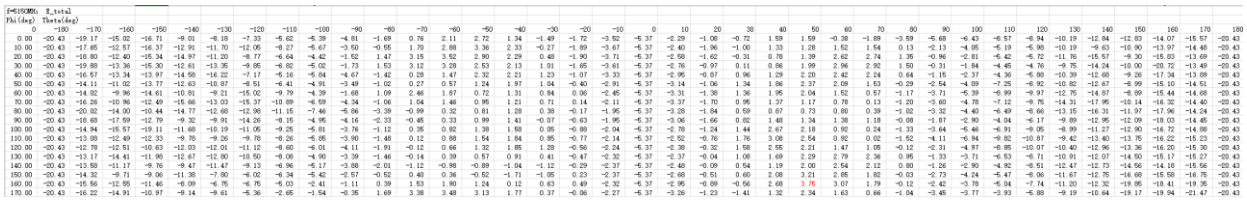


Correlated / Uncorrelated Directional Gain for 5GHz (Ant. Position：5G Ant.3~4)

Frequency (MHz)	5150	5500	5850
Directional Gain	3.75	4.21	3.9

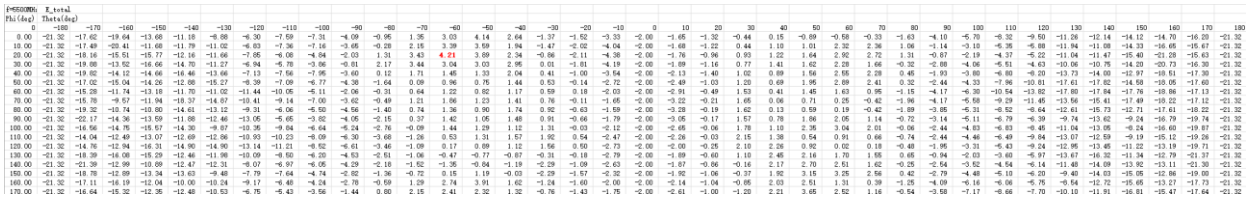
Note: Two 5GHz outputs drive a cross-polarized pair of linearly polarized antennas. Therefore, the results are the same for correlated and uncorrelated gains.

Ant.3~4 @5.15GHz



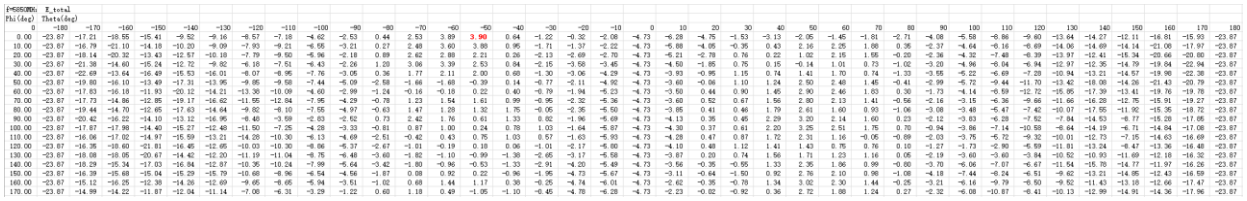
f=5150MHz E_total Phi (deg) \ Theta (deg)	-180	-170	-160	-150	-140	-130	-120	-110	-100	-90	-80	-70	-60	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0.00	-20.43	-19.17	-15.02	-16.71	-9.01	-8.18	-7.33	-5.62	-5.39	-4.81	-1.69	0.76	2.11	2.72	1.34	-1.49	-1.72	-3.52	-5.37	-2.29	-1.06	-0.72	1.59	1.59	-0.38	-1.89	-3.59	-5.68	-6.43	-8.57	-6.94	-10.19	-12.84	-12.83	-14.07	-15.57	-20.43
10.00	-20.43	-17.65	-12.57	-16.37	-12.91	-11.70	-12.05	-9.27	-5.67	-3.50	-0.55	1.70	2.88	3.36	2.33	-0.27	-1.69	-3.67	-5.37	-2.40	-1.96	-1.00	1.33	1.28	1.52	1.54	0.13	-2.13	-4.05	-5.19	-5.90	-10.19	-9.63	-10.90	-13.97	-14.48	-20.43
20.00	-20.43	-18.80	-12.40	-15.34	-14.97	-11.20	-8.77	-6.64	-4.42	-1.52	1.47	3.15	3.52	2.90	2.29	0.48	-1.90	-3.71	-5.37	-2.58	-1.62	-0.31	0.78	1.39	2.62	2.74	1.35	-0.96	-2.81	-5.42	-5.72	-11.76	-15.57	-9.30	-15.03	-13.69	-20.43
30.00	-20.43	-19.88	-13.36	-15.30	-12.61	-13.35	-9.85	-6.82	-5.02	-1.73	1.53	3.12	3.28	2.53	2.13	1.01	-1.65	-3.61	-5.37	-2.76	-0.97	0.11	0.86	1.99	2.96	2.92	1.50	-0.31	-1.84	-4.45	-4.76	-9.75	-14.24	-10.00	-20.72	-13.49	-20.43
40.00	-20.43	-16.57	-13.34	-13.97	-14.58	-16.22	-7.17	-5.16	-5.04	-4.67	-1.42	0.28	1.47	2.32	2.21	1.23	-1.07	-3.33	-5.37	-2.95	-0.67	0.96	1.29	2.20	2.42	2.24	0.64	-1.15	-2.37	-4.36	-5.80	-10.39	-12.60	-8.26	-17.34	-13.09	-20.43
50.00	-20.43	-14.11	-11.02	-13.77	-12.63	-10.87	-8.51	-6.41	-4.91	-3.49	-1.02	0.27	0.57	1.24	1.97	1.04	-0.40	-2.91	-5.37	-3.14	-1.06	1.34	1.86	2.37	2.09	1.53	-0.29	-2.54	-4.09	-7.25	-6.92	-10.82	-12.67	-8.99	-15.10	-14.51	-20.43
60.00	-20.43	-14.02	-9.96	-14.61	-10.81	-9.21	-15.02	-9.79	-4.39	-1.68	1.09	2.46	1.87	0.72	1.31	0.84	0.06	-2.45	-5.37	-3.31	-1.38	1.36	1.95	2.04	1.52	0.57	-1.17	-3.71	-5.39	-6.99	-9.97	-12.75	-14.87	-8.89	-15.44	-14.68	-20.43
70.00	-20.43	-16.26	-10.96	-12.49	-15.66	-13.03	-15.37	-10.89	-6.59	-4.34	-1.06	1.04	1.46	0.95	1.21	0.71	0.14	-2.11	-5.37	-3.37	-1.70	0.95	1.37	1.17	0.78	0.13	-1.20	-3.60	-4.78	-7.12	-9.75	-14.31	-17.95	-10.14	-16.32	-14.40	-20.43
80.00	-20.43	-20.02	-14.00	-10.44	-14.77	-12.68	-12.96	-11.15	-7.46	-5.66	-3.39	-0.99	0.32	0.81	1.28	0.38	-0.17	-1.95	-5.37	-3.28	-1.84	0.59	0.87	0.73	0.60	0.39	-1.02	-3.32	-4.40	-6.49	-8.66	-13.15	-16.31	-11.97	-17.96	-14.24	-20.43
90.00	-20.43	-18.68	-17.59	-12.79	-9.32	-9.91	-14.26	-8.15	-4.95	-4.16	-2.33	-0.45	0.33	0.99	1.41	-0.07	-0.63	-1.95	-5.37	-3.06	-1.66	0.82	1.48	1.34	1.38	1.18	-0.09	-1.87	-2.90	-4.04	-6.17	-9.89	-12.95	-12.09	-18.03	-14.45	-20.43
100.00	-20.43	-14.94	-15.57	-19.11	-11.68	-10.19	-11.05	-9.25	-6.81	-3.76	-1.12	0.35	0.82	1.38	1.59	0.85	-0.89	-2.04	-5.37	-2.78	-1.24	1.44	2.67	2.18	0.92	0.24	-1.33	-3.64	-5.46	-6.91	-9.05	-8.99	-11.27	-12.90	-16.72	-14.88	-20.43
110.00	-20.43	-13.99	-12.49	-12.33	-9.78	-9.26	-9.76	-9.26	-5.95	-3.90	-1.48	0.12	0.89	1.54	1.94	0.95	-0.77	-2.14	-5.37	-2.52	-0.76	1.76	3.08	2.54	0.92	0.02	-1.52	-4.11	-6.94	-9.82	-10.97	-9.42	-13.40	-13.75	-16.22	-15.23	-20.43
120.00	-20.43	-12.78	-12.51	-10.63	-12.03	-12.01	-11.12	-9.60	-6.01	-4.11	-1.91	-0.12	0.66	1.32	1.85	1.28	-0.56	-2.24	-5.37	-2.38	-0.32	1.58	2.55	2.21	1.47	1.05	-0.12	-2.31	-4.97	-8.85	-10.07	-10.40	-12.96	-13.36	-16.20	-15.30	-20.43
130.00	-20.43	-13.17	-14.41	-11.90	-12.67	-12.90	-10.50	-9.08	-4.90	-3.39	-1.46	-0.14	0.39	0.57	0.91	0.41	-0.47	-2.32	-5.37	-2.37	-0.04	1.08	1.69	2.29	2.79	2.36	0.95	-1.33	-3.71	-6.53	-8.71	-10.91	-12.07	-14.50	-15.17	-15.27	-20.43
140.00	-20.43	-13.58	-11.17	-9.76	-9.47	-11.47	-9.13	-6.96	-5.17	-3.08	-2.01	-1.12	-0.99	-0.69	-1.04	-1.12	-0.29	-2.37	-5.37	-2.48	-0.09	0.54	1.19	2.00	2.54	2.12	0.80	-1.26	-2.80	-4.92	-6.51	-12.47	-12.73	-14.56	-14.18	-15.56	-20.43
150.00	-20.43	-14.32	-9.71	-9.06	-11.38	-7.80	-8.02	-6.34	-5.42	-2.57	-0.52	0.40	0.36	-0.52	-1.71	-1.05	0.23	-2.37	-5.37	-2.68	-0.51	0.60	2.08	3.21	2.65	1.82	-0.03	-2.73	-4.24	-5.47	-8.06	-11.67	-12.75	-16.68	-15.58	-16.75	-20.43
160.00	-20.43	-15.58	-12.95	-11.46	-6.99	-6.75	-6.75	-5.03	-2.41	-1.11	0.39	1.53	1.90	1.24	0.12	0.63	0.49	-2.32	-5.37	-2.95	-0.99	-0.56	2.68	3.75	3.07	1.79	-0.12	-2.42	-3.78	-5.04	-7.74	-11.20	-12.32	-19.66	-18.41	-19.35	-20.43
170.00	-20.43	-16.22	-14.91	-10.97	-9.14	-9.61	-5.36	-2.65	-1.54	-0.35	1.69	3.38	3.49	3.13	1.77	0.37	-0.06	-2.27	-5.37	-3.26	-1.23	-1.41	1.32	2.34	1.63	0.66	-1.04	-3.45	-3.77	-3.93	-5.89	-9.19	-10.64	-19.17	-19.94	-21.47	-20.43

Ant.3~4 @5.5GHz



f=5500MHz E_total Phi (deg) \ Theta (deg)	-180	-170	-160	-150	-140	-130	-120	-110	-100	-90	-80	-70	-60	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0.00	-21.32	-17.62	-19.64	-13.68	-11.18	-8.88	-6.30	-7.59	-7.31	-4.09	-0.95	1.35	3.03	4.14	2.64	-1.37	-1.52	-3.33	-2.00	-1.65	-1.32	-0.44	0.15	-0.89	-0.58	-0.33	-1.63	-4.10	-5.70	-8.32	-9.50	-11.26	-12.14	-14.12	-14.70	-16.20	-21.32
10.00	-21.32	-17.49	-20.41	-11.68	-11.79	-11.02	-6.83	-7.36	-7.16	-3.65	-0.28	2.15	3.39	3.59	1.94	-1.47	-2.02	-4.04	-2.00	-1.68	-1.22	0.44	1.10	1.01	2.32	2.36	1.06	-1.14	-3.10	-5.35	-5.88	-11.94	-11.08	-14.33	-16.65	-15.67	-21.32
20.00	-21.32	-19.16	-15.51	-15.77	-12.16	-11.66	-7.65	-6.08	-4.84	-2.03	1.31	3.43	4.21	3.69	2.34	-0.96	-2.11	-4.38	-2.00	-1.76	-0.96	0.93	1.22	1.64	2.92	2.72	1.31	-0.67	-2.19	-4.37	-5.22	-11.04	-11.47	-15.40	-21.28	-15.63	-21.32
30.00	-21.32	-19.88	-13.52	-16.66	-14.70	-11.27	-6.94	-5.78	-3.06	-0.81	2.17	3.44	3.04	3.03	2.95	0.01	-1.81	-4.19	-2.00	-1.89	-1.16	0.77	1.41	1.62	2.28	1.66	-0.32	-2.88	-4.06	-6.51	-4.63	-10.06	-10.75	-14.20	-20.73	-16.30	-21.32
40.00	-21.32	-19.02	-14.12	-14.66	-16.46	-13.66	-7.13	-7.56	-7.95	-3.60	0.12	1.71	1.45	1.33	2.04	0.41	-1.00	-3.54	-2.00	-2.13	-1.40	1.02	0.89	1.56	2.55	2.28	0.45	-1.93	-3.80	-6.80	-8.20	-13.73	-14.00	-12.97	-19.51	-17.30	-21.32
50.00	-21.32	-17.02	-15.04	-14.26	-12.88	-15.27	-8.39	-7.09	-6.77	-4.36	-1.64	0.09	0.96	0.75	1.44	0.53	-0.14	-2.72	-2.00	-2.49	-1.03	1.23	0.69	1.95	2.69	2.41	0.32	-2.44	-4.33	-7.96	-10.81	-17.61	-17.82	-14.59	-18.05	-17.60	-21.32
60.00	-21.32	-15.28	-11.74	-13.18	-11.70	-11.02	-11.44	-10.05	-5.11	-2.06	-0.31	0.64	1.22	0.82	1.17	0.59	0.18	-2.03	-2.00	-2.91	-0.49	1.53	0.41	1.45	1.63	0.95	-1.15	-4.17	-6.30	-10.54	-13.82	-17.80	-17.84	-17.76	-19.86	-17.13	-21.32
70.00	-21.32	-15.78	-9.57	-11.94	-10.57	-14.67	-10.41	-9.14	-7.00	-3.62	-0.49	1.21	1.66	1.23	1.41	0.76	-0.11	-1.65	-2.00	-3.22	-0.21	1.65	0.06	0.71	0.25	-0.42	-1.96	-4.17	-6.58	-9.29	-11.45	-13.56	-15.41	-17.49	-18.22	-17.12	-21.32
80.00	-21.32	-19.32	-10.74	-10.80	-14.61	-13.12	-9.31	-6.06	-5.50	-4.56	-1.40	0.74	1.36	0.90	1.74	0.92	-0.63	-1.59	-2.00	-3.28	-0.19	1.62	0.13	0.59	0.19	-0.42	-1.89	-3.85	-5.31	-8.52	-8.64	-12.61	-15.73	-12.71	-17.61	-18.22	-21.32
90.00	-21.32	-22.17	-14.36	-13.59	-11.88	-12.46	-13.05	-5.65	-3.92	-4.05	-2.15	0.37	1.42	1.05	1.48	0.91	-0.66	-1.79	-2.00	-3.05	-0.17	1.67	0.78	1.86	2.05	1.14	-0.72	-3.14	-5.11	-6.79	-6.39	-9.74	-13.62	-9.24	-16.79	-19.74	-21.32
100.00	-21.32	-16.56	-14.75	-15.57	-14.30	-9.67	-10.35	-9.84	-6.64	-6.24	-2.76	-0.09	1.44	1.29	1.12	1.31	-0.03	-2.12	-2.00	-2.68	-0.06	1.78	1.10	2.35	3.04	2.01	-0.06	-2.44	-4.83	-6.63	-8.45	-11.04	-13.05	-8.24	-16.60	-19.87	-21.32
110.00	-21.32	-14.04	-12.49	-13.07	-12.69	-12.86	-10.93	-10.23	-6.09	-6.30	-3.68	-1.26	0.53	1.31	1.57	1.92	0.54	-2.47	-2.00	-2.26	-0.03	2.15	1.38	0.54	0.91	0.66	-0.74	-2.44	-4.46	-6.49	-9.84	-13.07	-12.59	-9.19	-15.12	-19.26	-21.32
120.00	-21.32	-14.76	-12.94	-16.31	-14.90	-14.90	-13.14	-11.21	-8.52	-6.61	-3.46	-1.09	0.17	0.89	1.12	1.56	0.50	-2.73	-2.00	-2.00	-0.25	2.10	2.26	0.92	0.02	0.18	-0.48	-1.95	-3.31	-5.43	-9.24	-12.96	-13.45	-11.22	-13.19	-19.71	-21.32
130.00	-21.32	-18.39	-16.08	-15.29	-12.46	-11.96	-10.09	-8.50	-6.20	-4.53	-2.51	-1.06	-0.47	-0.77	-0.87	-0.31	-0.18	-2.79	-2.00	-1.89	-0.60	1.10	2.46	2.16	1.70	1.55	0.65	-0.94	-2.03	-3.60	-6.97	-13.67	-16.32	-11.34	-12.79	-21.37	-21.32
140.00	-21.32	-21.39	-12.99	-10.89	-12.47	-12.31	-9.07	-6.97	-6.05	-4.29	-2.18	-1.52	-1.35	-0.64	-1.19	-2.29	-1.09	-2.63	-2.00	-1.87	-0.66	-0.16	2.17	2.70	2.51	1.62	-0.25	-2.54	-3.52	-4.54	-5.14	-11.48	-14.09	-13.92	-13.11	-21.30	-21.32
150.00	-21.32	-18.78	-12.89	-13.34	-13.63	-9.48	-7.79	-7.64	-4.74	-2.82	-1.36	-0.72	0.15	1.19	-0.03	-2.29	-1.57	-2.32	-2.00	-1.92	-1.06	-0.37	1.92	3.15	3.25	2.56	0.42	-2.79	-4.48	-5.10	-6.20	-9.40	-14.03	-15.05	-12.86	-19.00	-21.32
160.00	-21.32	-17.11	-16.19	-12.04	-10.00	-10.24	-9.17	-6.48	-4.24	-2.78	-0.59	1.29	2.74	3.91	1.62	-1.24	-1.60	-2.00	-2.00	-2.14	-1.04	-0.65	2.03	2.51	1.31	0.39	-1.25	-4.09	-6.16	-6.06	-5.75	-8.54	-12.72	-15.65	-13.27	-17.73	-21.32
170.00	-21.32	-16.64	-15.32	-12.35	-12.48	-10.53	-6.75	-5.43	-3.56	-1.44	0.80	2.15	2.41	2.32	1.32	-0.76	-1.43	-1.75	-2.00	-2.61	-1.00	-1.28	2.21	3.65	2.52	1.16	-0.54	-3.58	-7.17	-8.66	-7.70	-10.10	-11.91	-16.81	-15.47	-17.64	-21.32

Ant.3~4 @5.85GHz

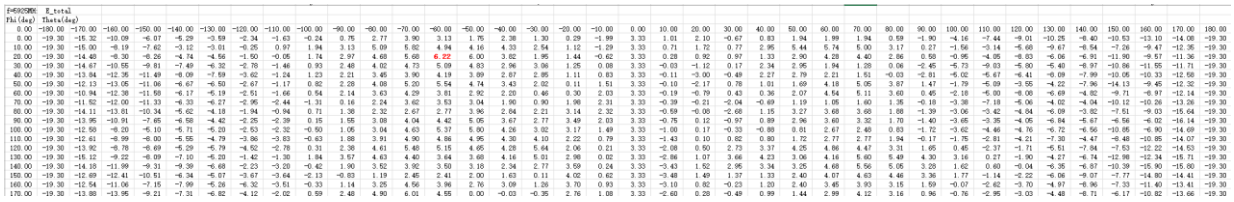


f=5850MHz E_total Phi (deg) \ Theta (deg)	-180	-170	-160	-150	-140	-130	-120	-110	-100	-90	-80	-70	-60	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0.00	-23.67	-17.21	-18.55	-15.41	-9.52	-9.16	-9.57	-7.18	-4.62	-2.53	0.44	2.53	3.89	3.90	0.64	-1.22	-0.32	-2.08	-4.73	-6.28	-4.75	-1.53	-3.13	-2.05	-1.45	-1.81	-2.71	-4.08	-5.58	-8.86	-9.60	-13.64	-14.27	-12.11	-16.81	-15.93	-23.67
10.00	-23.67	-16.79	-21.10	-14.18	-10.20	-9.09	-7.93	-9.21	-6.56	-3.21	0.27	2.43	3.60	3.89	0.95	-1.71	-1.37	-2.22	-4.73	-5.68	-4.05	-0.35	0.43	2.16	2.25	1.68	0.35	-2.37	-4.64	-6.16	-6.69	-14.06	-14.69	-14.18	-21.06	-17.97	-23.67
20.00	-23.67	-18.14	-20.32	-13.43	-12.57	-10.18	-7.79	-9.50	-6.96	-2.18	0.89	2.62	2.88	2.21	0.26	-2.13	-2.69	-2.70	-4.73	-5.21	-2.78	0.76	0.22	1.02	2.15	1.55	-0.20	-2.36	-4.32	-7.48	-6.39	-13.97	-12.41	-15.34	-20.66	-20.80	-23.67
30.00	-23.67	-21.38	-14.60	-15.24	-12.72	-9.82	-6.16	-7.51	-6.43	-2.26	1.20	3.06	3.39	2.53	0.84	-2.15	-3.58	-3.45	-4.73	-4.50	-1.85	0.75	0.15	-0.14	1.01	0.73	-1.02	-3.20	-4.96	-6.84	-6.94	-12.97	-12.35	-14.79	-19.84	-22.94	-23.67
40.00	-23.67	-22.69	-13.64	-16.49	-15.53	-16.01	-8.07	-8.95	-7.76	-3.05	0.36	1.77	2.11	2.80	0.68	-1.30	-3.06	-4.29	-4.73	-3.93	-0.95	1.15	0.74	1.41	1.70	0.74	-1.33	-3.55	-5.22	-6.69	-7.23	-10.94	-13.21	-14.57	-19.96	-22.36	-23.67
50.00	-23.67	-19.80	-16.10	-13.49	-17.31	-13.95	-9.85	-9.58	-7.44	-5.09	-2.58	-1.66	-1.68	-0.39	0.14	-0.77	-2.11	-4.92	-4.73	-3.68	-0.06	1.10	1.24	2.50	2.48	1.45	-0.41	-2.99	-5.72	-9.44	-11.70	-13.42	-18.08	-14.26	-21.43	-20.79	-23.67
60.00	-23.67	-17.63	-16.18	-11.93	-20.12	-14.21	-13.36	-10.09	-4.60	-2.99	-1.24	-0.16	-0.18	0.22	0.40	-0.79	-1.94	-5.23	-4.73	-3.50	0.44	0.90	1.45	2.90	2.46	1.63	0.30	-1.73	-4.14	-6.59	-12.72	-15.95	-17.39	-13.41	-19.76	-19.78	-23.67
70.00	-23.67	-17.73	-14.86	-12.85	-19.17	-16.62	-11.55	-12.84	-7.95	-4.29	-0.78	1.23	1.54	1.61	0.99	-0.95	-2.32	-5.36	-4.73	-3.68	0.52	0.67	1.56	2.80	2.13	1.41	-0.56	-2.16	-3.15	-6.36	-9.66	-11.66	-16.28	-12.75	-15.91	-19.27	-23.67
80.00	-23.67	-19.44	-14.70	-12.65	-17.63	-14.64	-9.82	-8.10	-7.55	-4.97	-0.63	1.47	1.28	1.32	1.75	-0.05	-2.35	-5.50	-4.73	-3.85	0.41	0.46	1.79	2.61	1.60	0.93	-1.06	-3.08	-3.48	-5.47	-7.42	-10.07	-17.55	-11.92	-15.35	-19.72	-23.67
90.00	-23.67	-20.42	-16.22	-14.10	-13.12	-16.95	-8.48	-3.59	-2.83	-2.52	0.73	2.42	1.76	0.61	1.33	0.82	-1.96	-5.69	-4.73	-4.13	0.35	0.45	2.29	3.20	2.14	1.60	0.23	-2.12	-3.83	-6.28	-7.52	-7.84	-14.53	-8.77	-15.28	-17.05	-23.67
100.00	-23.67	-17.87	-17.98	-14.40	-15.27	-12.48	-11.50	-7.25	-4.28	-3.33	-0.81	0.87	1.00	0.24	0.78	1.03	-1.64	-5.87	-4.73	-4.30	0.37	0.61	2.20	3.25	2.51	1.75	0.70	-0.94	-3.86	-7.14	-10.58	-8.64	-14.19	-6.71	-14.84	-17.08	-23.67
110.00	-23.67	-16.06	-17.02	-14.97	-15.59	-13.21	-14.28	-10.30	-6.13	-4.69	-2.51	-0.42	0.43	0.75	1.03	0.57	-1.63	-5.93	-4.73	-4.28	0.47	0.87	1.72	2.31	1.16	-0.05	-0.69	-2.03	-3.75	-5.72	-9.32	-10.01	-12.73	-7.15	-14.63	-16.69	-23.67
120.00	-23.67	-16.35	-19.60	-21.81	-16.45	-12.65	-10.03	-10.30	-8.06	-5.37	-2.67	-1.01	-0.19	0.18	0.06	-1.01	-2.17	-5.60	-4.73	-4.10	0.48	1.12	1.41	1.43	0.75	0.76	0.10	-1.27	-1.73	-2.90	-6.59	-11.81	-13.24	-6.47	-13.36	-16.48	-23.67
130.00	-23.67	-18.08	-19.05	-20.67	-14.42	-12.20	-11.19	-11.04	-8.75	-6.48	-3.60	-1.82	-1.10	-0.99	-1.36	-2.65	-3.17	-5.58	-4.73	-3.67	0.20	0.74	1.56	1.71	1.23	1.16	0.05	-2.19	-3.60	-3.60	-3.94	-10.52	-10.93	-11.69	-12.16	-16.32	-23.67
140.00	-23.67	-18.29	-15.34	-17.03	-16.94	-12.97	-10.35	-10.24	-7.99	-5.64	-3.42	-1.80	-0.96	-0.53	-1.33	-2.91	-4.20	-5.49	-4.73	-3.56	-0.35	-0.55	1.33	2.35	1.96	0.99	-0.60	-3.70	-6.06	-7.07	-6.67	-11.54	-15.78	-14.77	-11.97	-16.26	-23.67
150.00	-23.67	-16.39	-15.68	-15.04	-15.29	-15.79	-10.68	-8.96	-6.54	-4.56	-1.87	0.08	0.92	0.22	-0.96	-1.95	-4.73	-5.67	-4.73	-3.11	-0.64	-1.50	0.92	2.76	2.10	0.92	-1.08	-4.18	-7.44	-6.24	-6.51	-9.62	-13.21	-14.85	-12.43	-16.59	-23.67
160.00	-23.67	-15.12	-16.25	-12.39	-14.26	-12.69	-9.66	-8.65	-6.94	-3.51	-1.02	0.68	1.44	1.17	0.36	-0.25	-4.74	-6.01	-4.73	-2.62	-0.35	-0.70	1.34	3.02	2.30	1.44	-0.25	-3.21	-6.16	-9.79	-6.50	-9.52	-11.43	-13.18	-12.66	-17.47	-23.67
170.00	-23.67	-14.99	-14.22	-11.87	-12.04	-11.14	-7.08	-6.31	-3.29	-1.22	0.60	1.18	0.49	-1.05	-1.10	-0.45	-4.78	-6.28	-4.73	-2.23	-0.62	-0.92	0.36	2.72	1.88	1.24	0.27	-2.32	-6.08	-10.87	-6.41	-10.13	-12.99	-14.91	-14.36	-17.96	-23.67

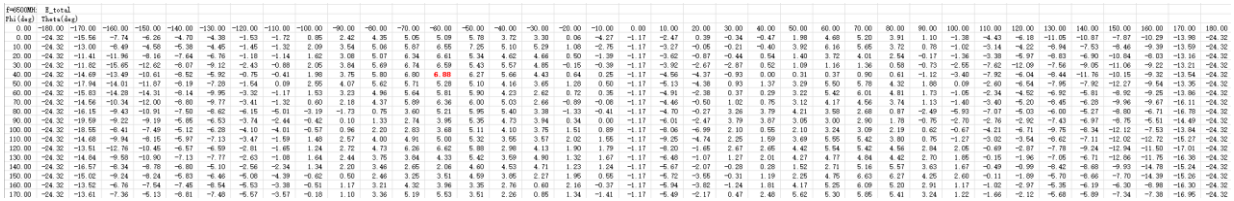
Correlated Directional Gain for 6GHz (Ant. Position：6G Ant.1~2)

Frequency (MHz)	5925	6500	7125
Directional Gain	6.22	6.88	6.87

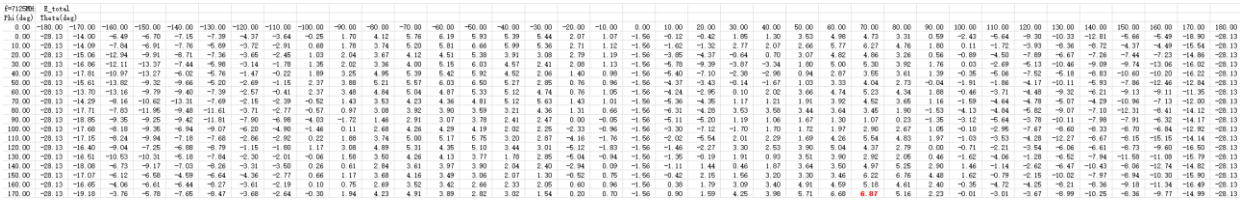
Ant.1~2 @5.925GHz



Ant.1~2 @6.5GHz



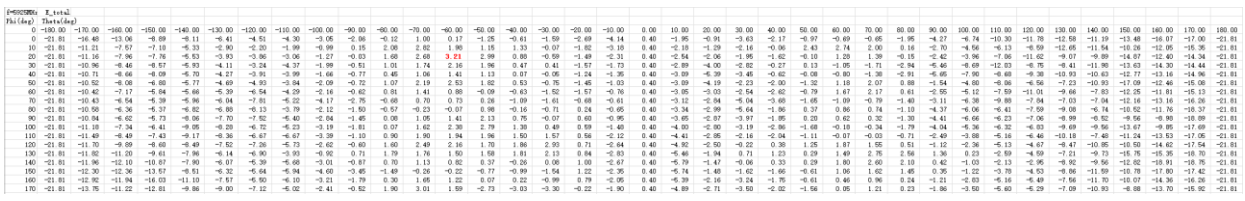
Ant.1~2 @7.125GHz



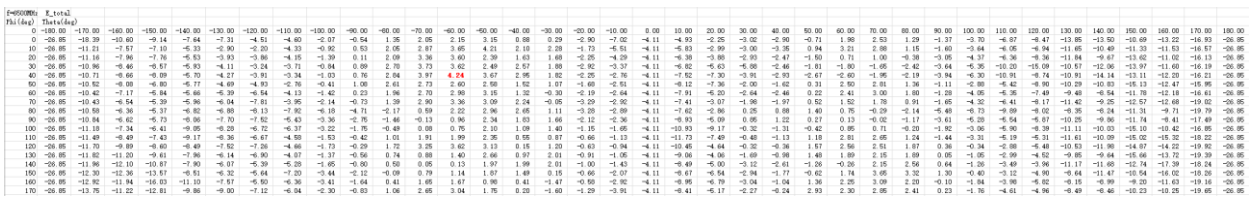
Uncorrelated Directional Gain for 6GHz (Ant. Position：6G Ant.1~2)

Frequency (MHz)	5925	6500	7125
Directional Gain	3.21	4.24	3.95

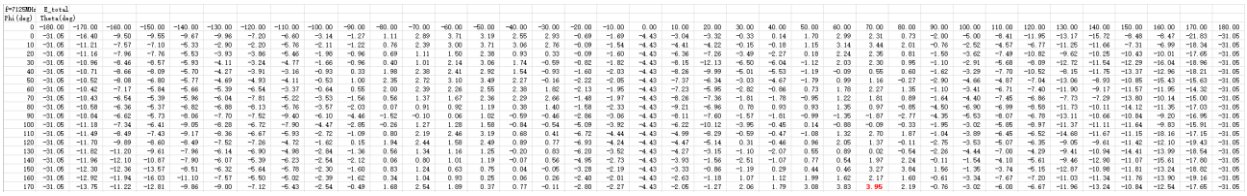
Ant.1~2 @5.925GHz



Ant.1~2 @6.5GHz



Ant.1~2 @7.125GHz

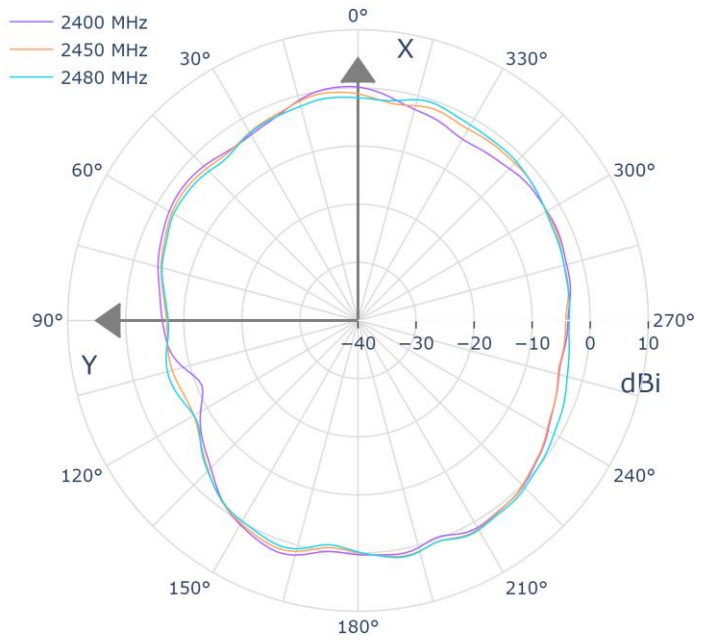


f=7125MHz	E_total																																
Phi (deg)	Theta (deg)																																
0	-180.00	-170.00	-160.00	-150.00	-140.00	-130.00	-120.00	-110.00	-100.00	-90.00	-80.00	-70.00	-60.00	-50.00	-40.00	-30.00	-20.00	-10.00	0.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	100.00	110.00	120.00	130.00	140.00	150.00	160.00	170.00	180.00
0	-31.05	-16.40	-9.50	-9.55	-9.67	-9.96	-7.20	-6.60	-3.14	-1.27	1.11	2.89	3.71	3.19	2.55	2.93	-0.69	-1.69	-4.43	-3.04	-3.32	-0.33	0.14	1.70	2.99	2.31	0.73	-2.00	-5.00	-6.41	-11.95	-13.17	-15.72	-6.48	-6.47	-21.83	-31.05
10	-31.05	-11.21	-7.57	-7.10	-5.33	-2.90	-2.20	-5.76	-2.11	-1.22	0.76	2.39	3.00	3.71	3.06	2.76	-0.09	-1.54	-4.43	-4.41	-4.22	-0.15	-0.18	1.15	3.14	3.44	2.01	-0.76	-2.52	-4.57	-6.77	-11.25	-11.66	-7.31	-6.99	-18.34	-31.05
20	-31.05	-11.16	-7.96	-7.76	-5.53	-3.93	-3.86	-5.46	-1.98	-0.96	0.69	1.11	1.59	2.38	0.93	0.33	-0.09	-1.60	-4.43	-6.36	-7.08	-3.49	-2.27	0.18	2.24	2.36	0.81	-1.59	-3.62	-7.49	-10.82	-9.62	-10.25	-10.43	-10.01	-17.45	-31.05
30	-31.05	-10.96	-8.46	-8.57	-5.93	-4.11	-3.24	-4.77	-1.66	-0.96	0.40	1.01	2.14	3.06	1.74	-0.59	-0.82	-1.82	-4.43	-6.15	-12.13	-6.50	-6.04	-1.12	2.03	2.30	0.95	-1.10	-2.91	-5.68	-8.09	-12.72	-11.54	-12.29	-16.04	-18.96	-31.05
40	-31.05	-10.71	-8.66	-8.09	-5.70	-4.27	-3.91	-3.16	-0.93	0.33	1.98	2.38	2.41	2.92	1.54	-0.93	-1.60	-2.03	-4.43	-8.26	-9.99	-5.01	-5.53	-1.19	-0.09	0.55	0.60	-1.62	-3.29	-7.70	-10.52	-8.15	-11.75	-13.37	-12.96	-18.21	-31.05
50	-31.05	-10.52	-8.08	-8.80	-5.77	-4.69	-4.93	-4.11	-0.53	1.06	2.35	2.72	3.10	3.49	2.27	-0.16	-2.22	-2.05	-4.43	-7.37	-6.34	-3.03	-4.67	-1.79	0.99	1.16	-0.27	-2.90	-4.66	-4.67	-7.04	-13.06	-8.93	-10.85	-18.43	-16.63	-31.05
60	-31.05	-10.42	-7.17	-6.84	-5.66	-5.39	-6.54	-3.37	-0.64	0.55	2.00	2.39	2.26	2.55	2.38	1.62	-2.13	-1.95	-4.43	-7.23	-5.95	-2.82	-0.86	0.73	1.78	2.27	1.35	-1.10	-3.41	-6.71	-7.40	-11.90	-9.17	-11.57	-11.95	-14.32	-31.05
70	-31.05	-10.43	-6.54	-5.39	-5.96	-6.04	-7.81	-5.22	-3.53	-1.56	0.56	1.37	1.67	2.36	2.29	2.66	-1.48	-1.97	-4.43	-8.26	-7.36	-1.81	-1.78	-0.95	1.22	1.81	0.89	-1.64	-4.40	-7.45	-6.86	-7.73	-7.29	-13.80	-10.14	-15.00	-31.05
80	-31.05	-10.59	-6.36	-6.37	-6.82	-6.89	-6.13	-6.76	-3.57	-2.03	0.07	0.91	0.92	1.19	0.39	1.40	-1.58	-2.33	-4.43	-9.21	-6.96	0.76	0.93	0.83	1.35	0.97	-0.95	-4.50	-6.90	-6.99	-6.59	-11.73	-10.11	-14.12	-11.35	-17.03	-31.05
90	-31.05	-10.84	-6.62	-6.73	-6.86	-7.70	-7.52	-9.40	-6.10	-4.46	-1.52	-0.10	0.06	1.02	-0.59	-0.46	-2.86	-3.06	-4.43	-8.11	-7.60	-1.57	-1.61	-0.99	-1.35	-1.87	-2.77	-4.35	-6.53	-8.07	-6.70	-13.11	-10.66	-10.84	-9.20	-16.95	-31.05
100	-31.05	-11.18	-7.34	-6.41	-9.05	-8.28	-6.72	-7.90	-4.47	-2.85	-0.26	1.27	1.28	1.58	-0.84	-0.54	-5.09	-3.92	-4.43	-6.22	-10.12	-3.95	-0.45	0.14	-0.88	-0.09	-0.33	-1.95	-3.02	-5.85	-6.97	-11.37	-11.11	-11.64	-9.83	-15.91	-31.05
110	-31.05	-11.49	-8.49	-7.43	-9.17	-8.36	-6.67	-5.93	-2.72	-1.09	0.80	2.19	2.46	3.19	0.68	0.41	-6.72	-4.44	-4.43	-4.99	-8.29	-0.59	-0.47	-1.08	1.32	2.70	1.87	-1.04	-3.89	-6.45	-6.52	-14.68	-11.67	-11.15	-18.16	-17.15	-31.05
120	-31.05	-11.70	-9.89	-8.69	-8.49	-7.52	-7.26	-4.72	-1.62	0.15	1.94	2.44	1.58	2.49	0.89	0.77	-6.93	-4.24	-4.43	-4.47	-5.14	0.31	-0.46	0.96	2.05	1.37	-0.11	-2.75	-3.53	-5.07	-6.35	-9.05	-9.61	-11.42	-12.10	-19.43	-31.05
130	-31.05	-11.82	-11.20	-9.61	-7.96	-6.14	-5.90	-4.98	-2.84	-1.36	0.56	1.34	1.16	1.25	-0.20	0.83	-6.20	-3.52	-4.43	-4.27	-3.15	-1.10	-2.07	0.55	0.89	0.02	-0.54	-2.26	-4.44	-7.08	-4.29	-9.41	-10.94	-14.41	-13.99	-18.54	-31.05
140	-31.05	-11.96	-12.10	-10.67	-7.90	-6.07	-5.39	-6.23	-2.54	-2.12	0.06	0.80	1.01	1.19	-0.07	0.56	-4.95	-2.73	-4.43	-3.93	-1.56	-2.51	-1.07	0.77	0.54	1.97	2.24	-0.11	-1.54	-4.10	-5.61	-9.46	-12.96	-11.07	-25.61	-17.80	-31.05
150	-31.05	-12.30	-12.36	-13.57	-9.51	-6.32	-5.64	-5.76	-2.30	-1.68	0.83	1.24	0.63	0.75	0.04	-0.05	-3.28	-2.19	-4.43	-3.33	-0.86	-1.19	0.29	0.44	0.46	3.27	3.84	1.56	-1.35	-3.74	-5.15	-12.67	-10.98	-11.81	-13.24	-18.82	-31.05
160	-31.05	-12.92	-11.94	-16.03	-11.10	-7.57	-5.93	-5.92	-2.39	-1.62	0.34	1.04	0.93	0.25	0.06	0.26	-2.40	-2.01	-4.43	-2.63	-1.18	1.07	1.12	1.99	1.62	2.17	1.60	-0.61	-3.34	-7.67	-7.20	-11.03	-11.34	-11.76	-13.90	-19.16	-31.05
170	-31.05	-13.75	-11.22	-12.81	-9.86	-9.00	-7.12	-5.43	-2.54	-0.49	1.68	2.54	1.89	0.37	0.77	-0.11	-2.88	-2.27	-4.43	-2.05	-1.27	2.06	1.79	3.08	3.83	**3.95**	2.19	-0.76	-3.02	-6.08	-6.67	-11.96	-13.24	-10.84	-12.54	-17.65	-31.05

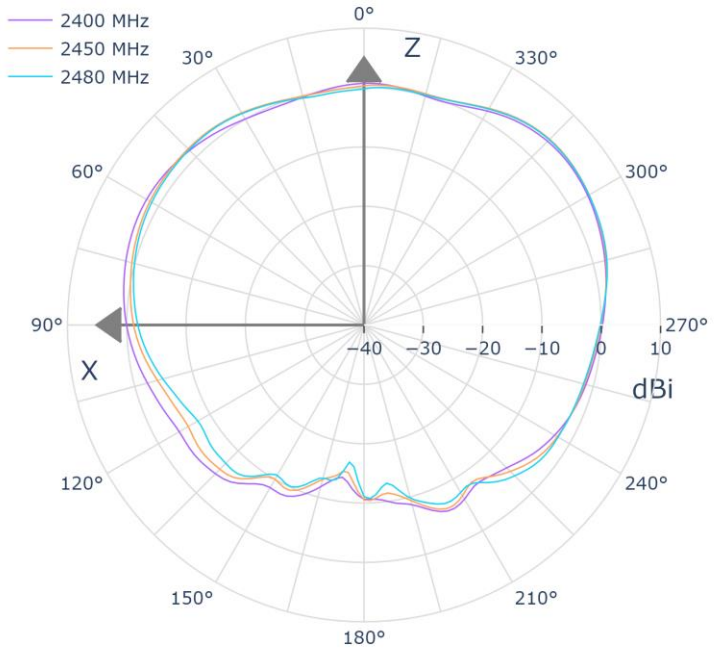
9. Radiation Pattern

Ant. Position：2.4G Ant.1

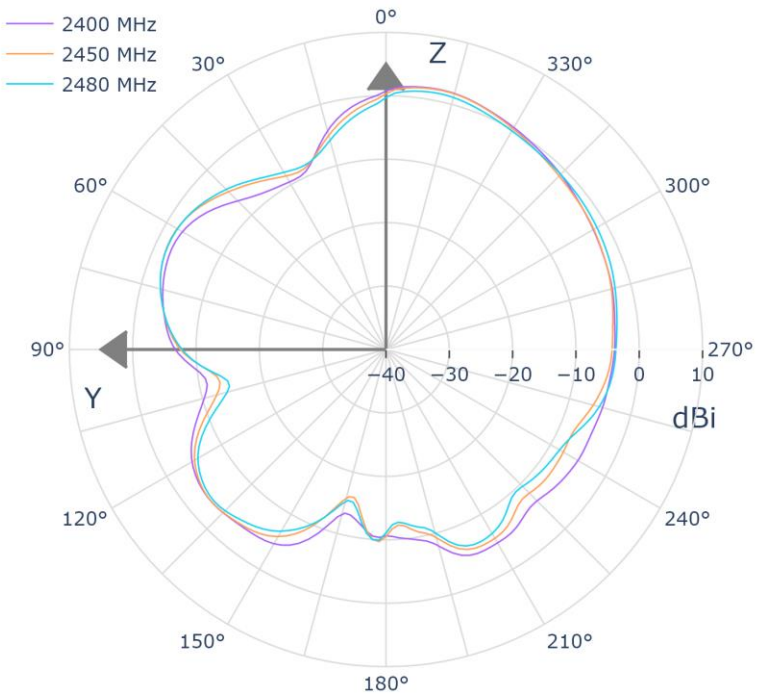
XY_Ant.1@2.4G



XZ_Ant.1@2.4G

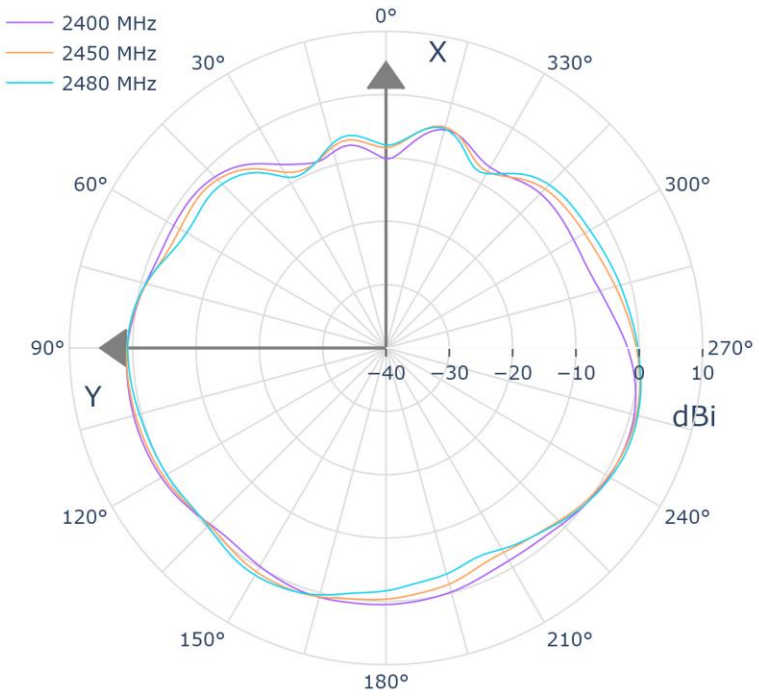


YZ_Ant.1@2.4G

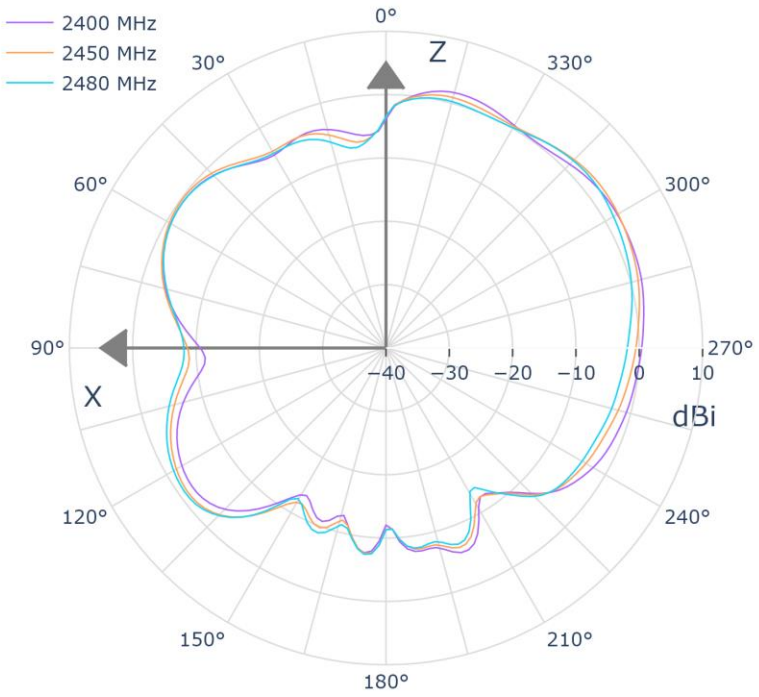


Ant. Position：2.4G Ant.2

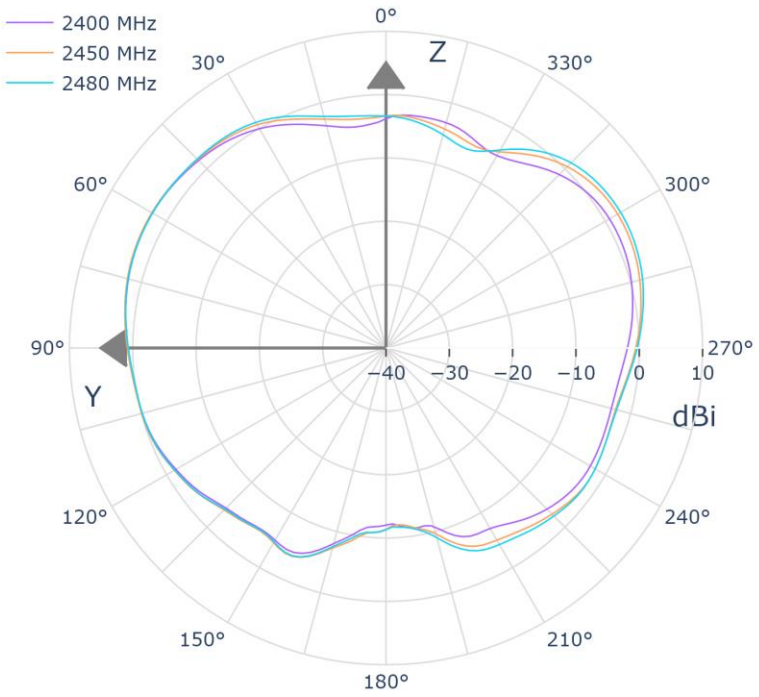
XY_Ant.2@2.4G



XZ_Ant.2@2.4G

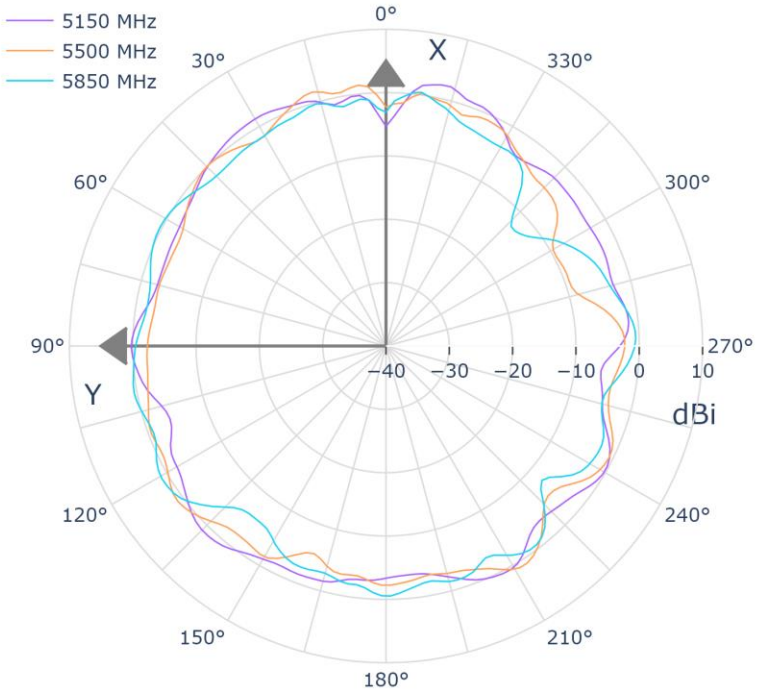


YZ_Ant.2@2.4G

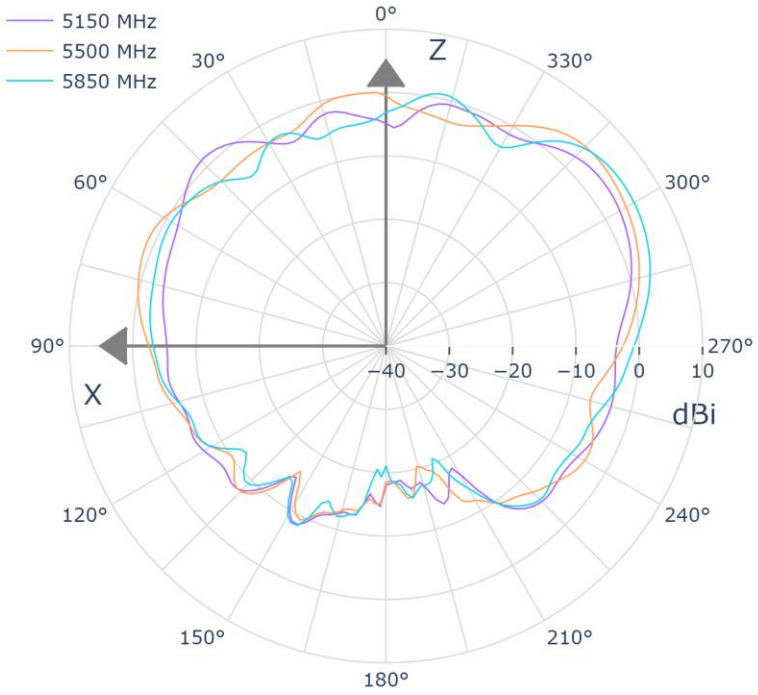


Ant. Position：5G Ant.3

XY_Ant.3@5G



XZ_Ant.3@5G



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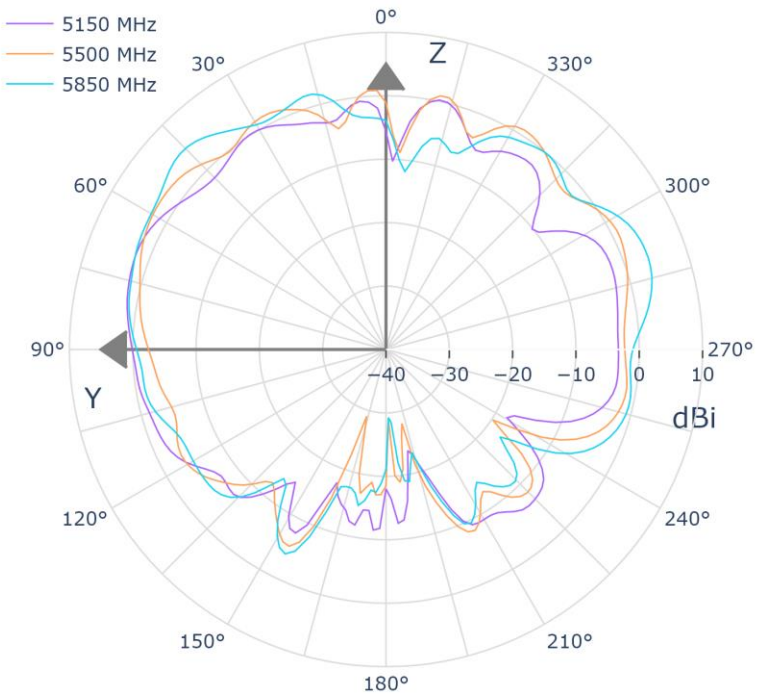
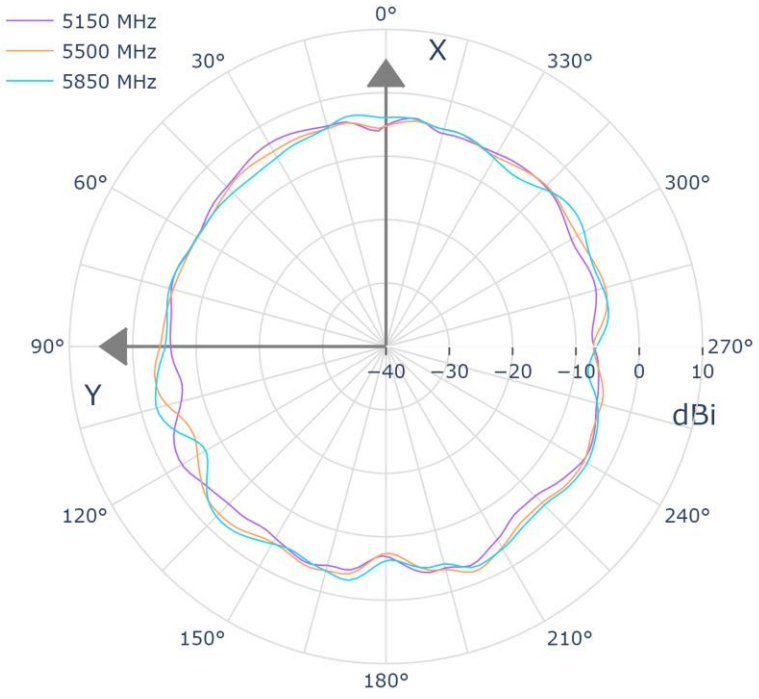
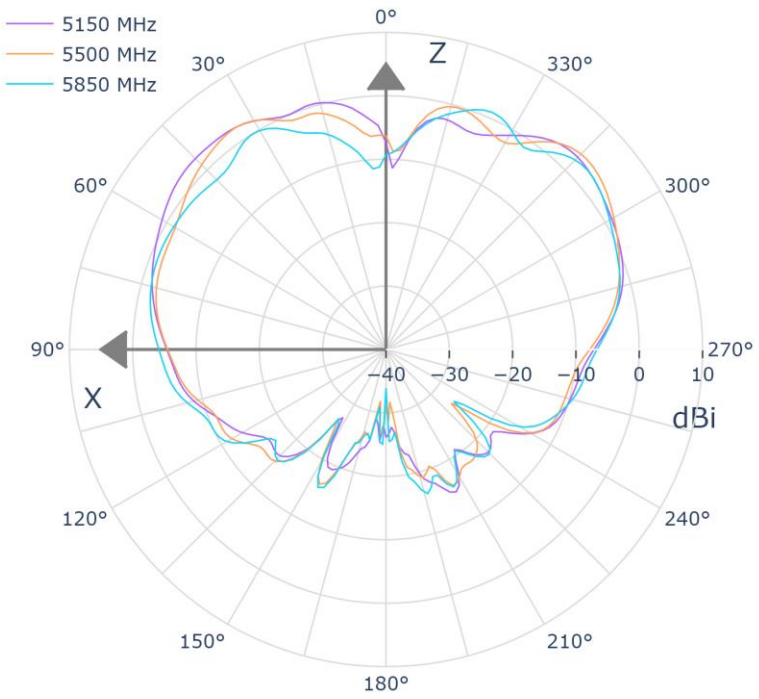


Ant. Position：5G Ant.4

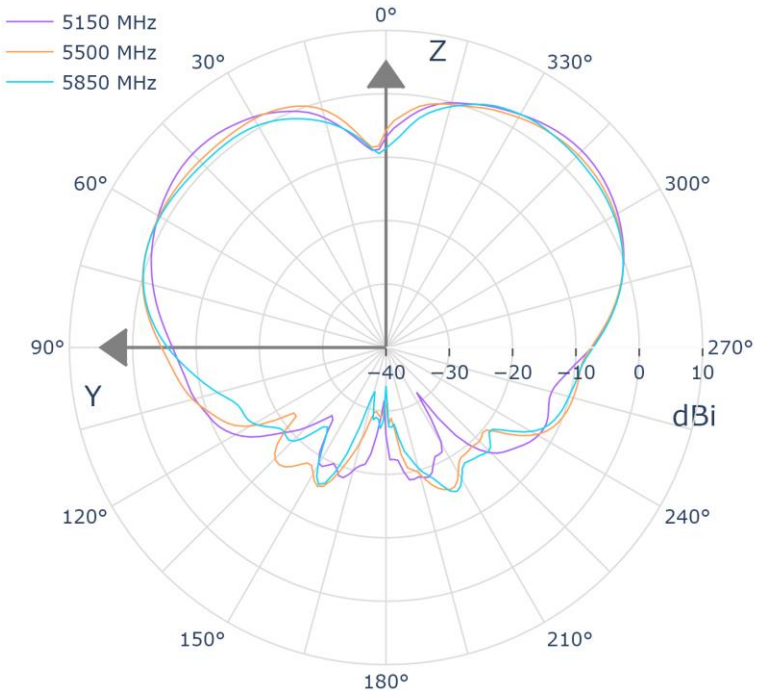
XY_Ant.4@5G



XZ_Ant.4@5G

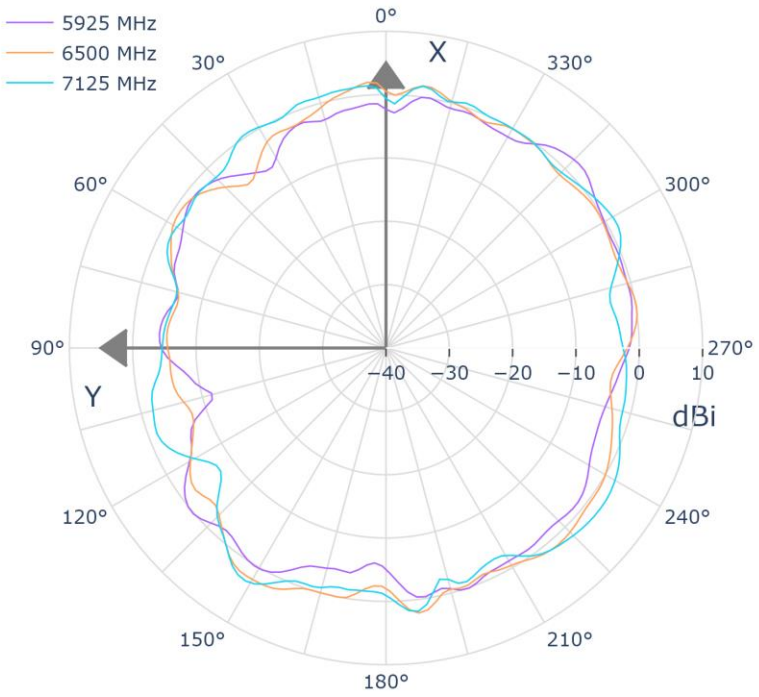


YZ_Ant.4@5G

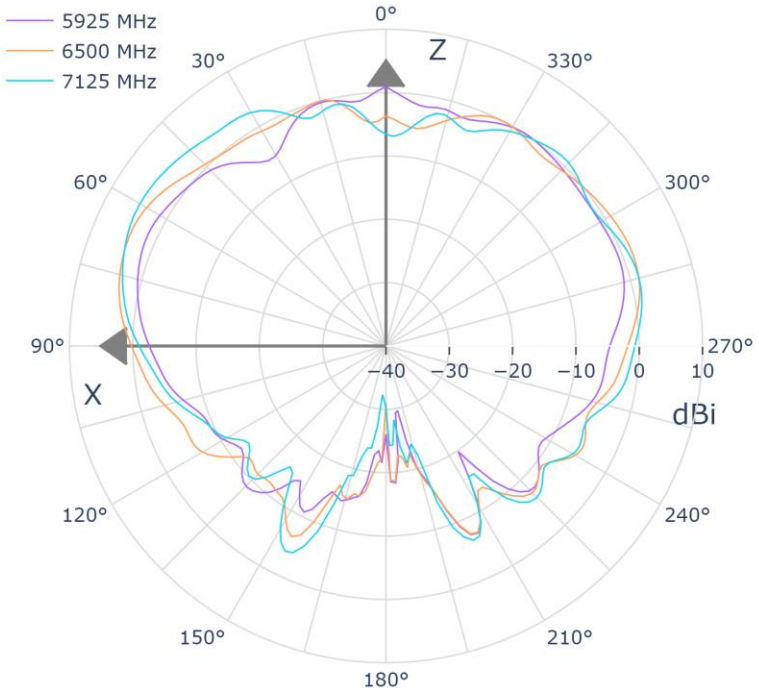


Ant. Position：6G Ant.1

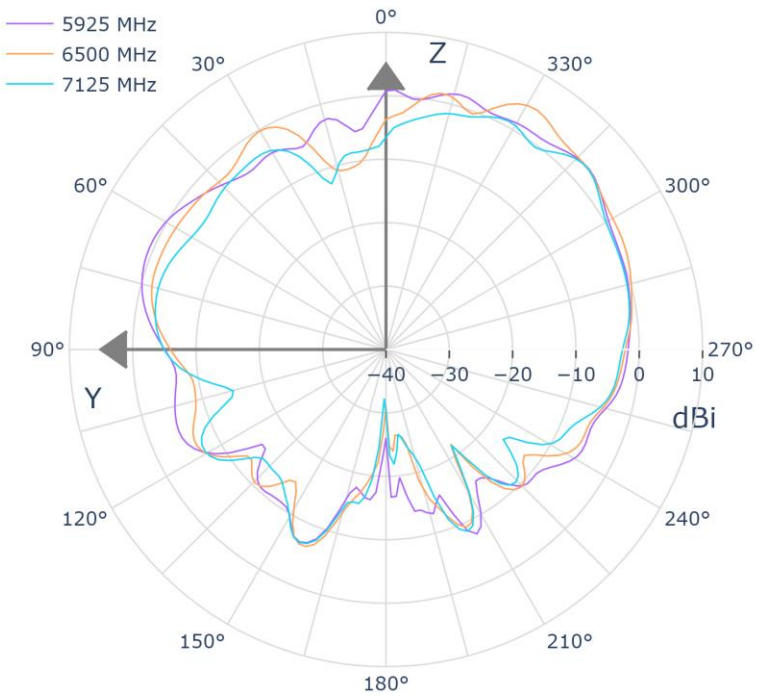
XY_Ant.1@6G



XZ_Ant.1@6G

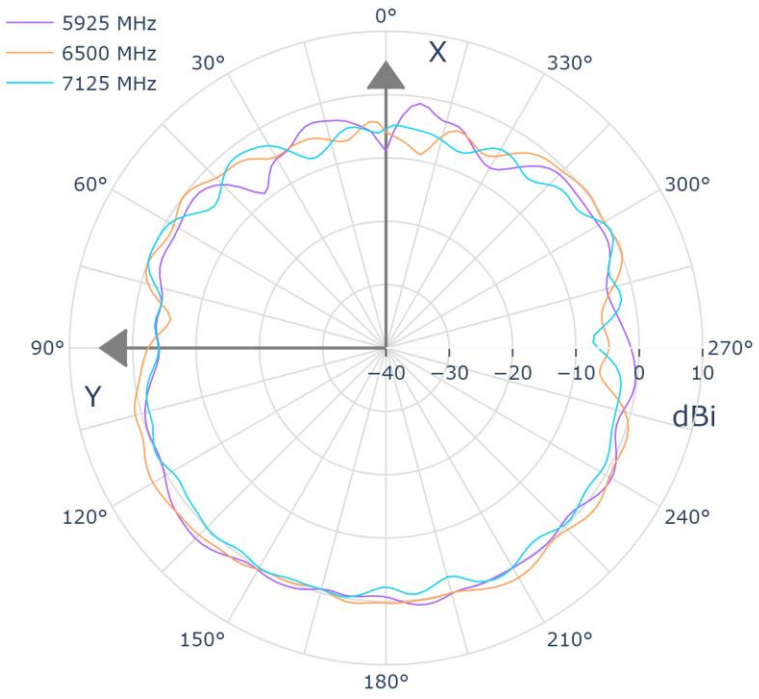


YZ_Ant.1@6G

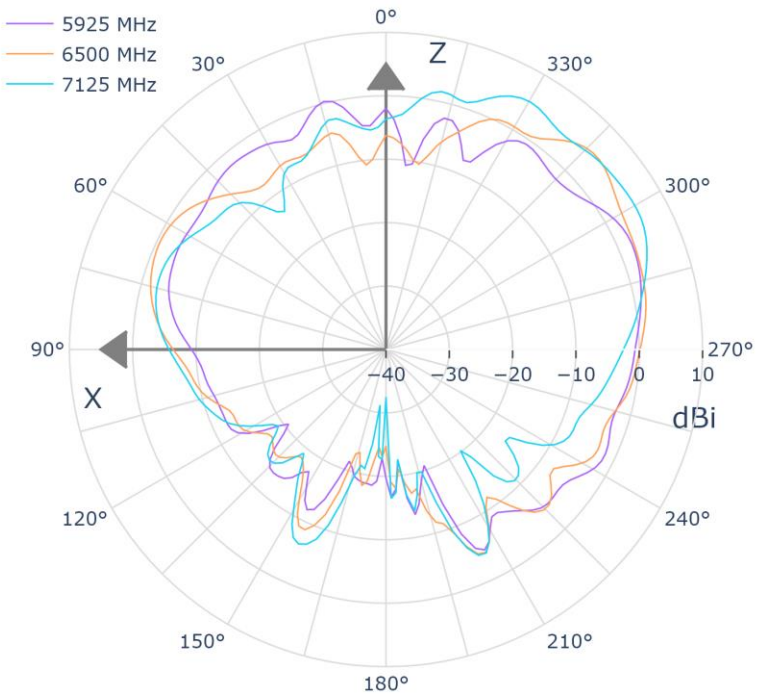


Ant. Position：6G Ant.2

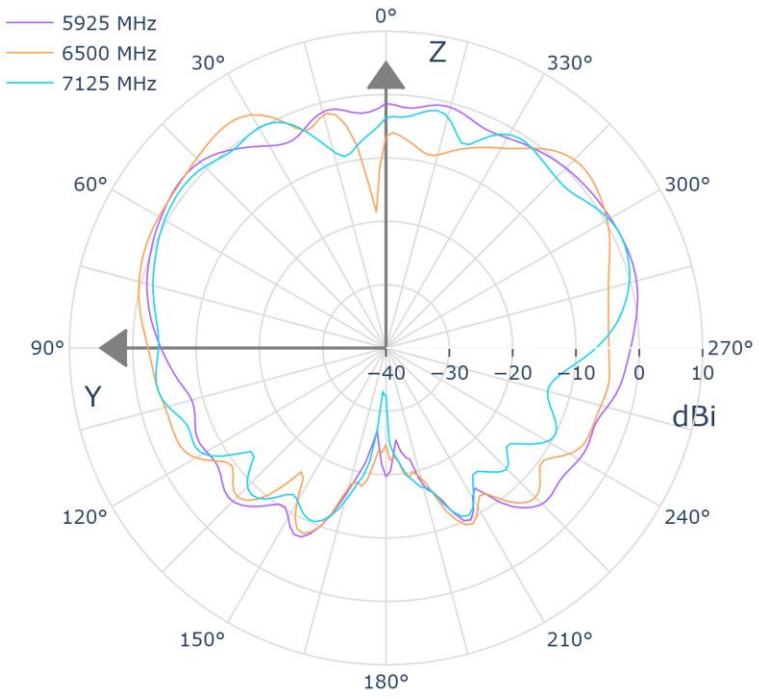
XY_Ant.2@6G



XZ_Ant.2@6G

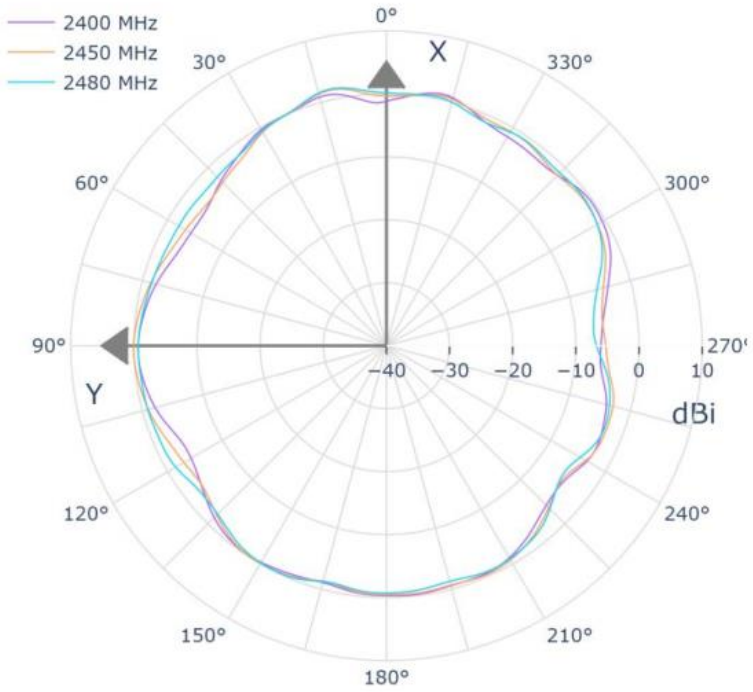


YZ_Ant.2@6G

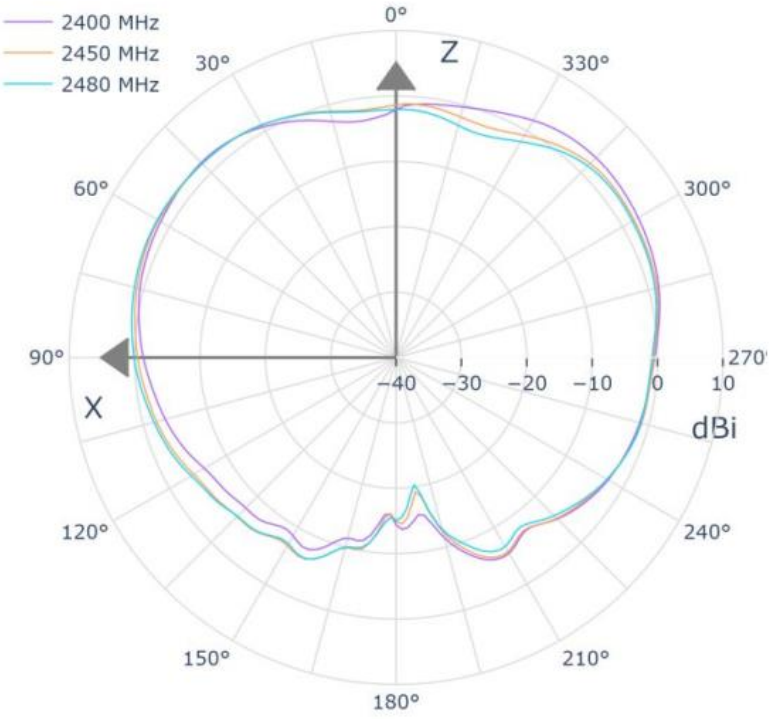


Ant. Position：BLE Ant.3

XY_Ant.3@2.4G



XZ_Ant.2@6G



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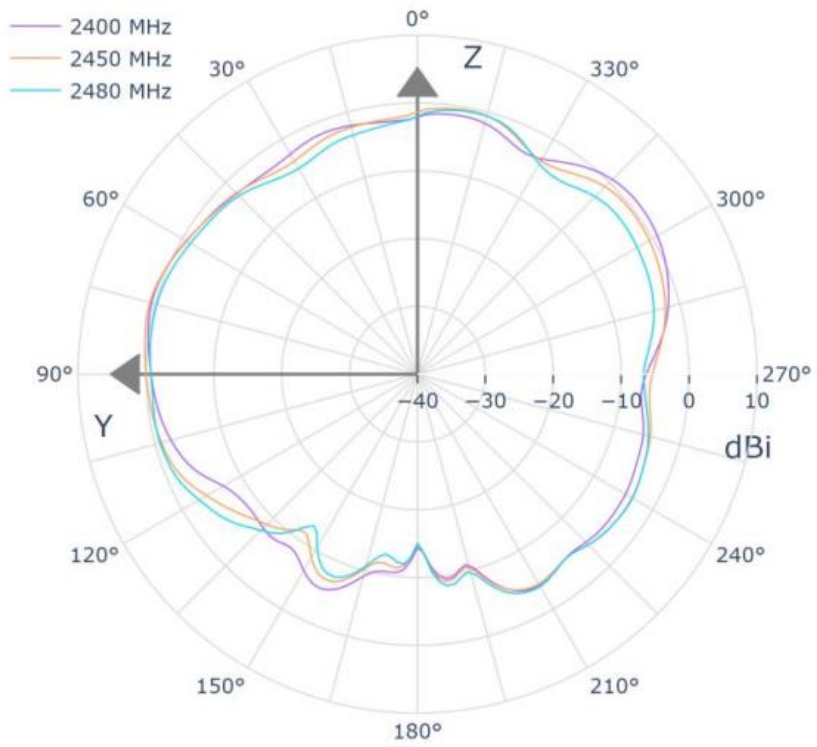
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2450 MHz
2480 MHz
0°
30°
330°
60°
300°
90°
270°
120°
240°
150°
210°
180°
Z
Y
−40
−30
−20
−10
0
10
dBi