

Antenna Composite Gain Test Report

1. Test Information

Equipment	Campus Access Points
Brand Name	Aruba
Model Name	AP615
Applicant	Aruba
Manufacturer	Aruba

2. Testing Location

Testing Location	
WNC	ADD : 20 Park Ave. II, Hsinchu Science Park, Hsinchu 308 Taiwan

Test Condition	Test Engineer	Test Environment (°C / %)	Test Date
Radiated	Lucien Hsieh	20-24 / 45-60	08.23.2021~09.06.2021

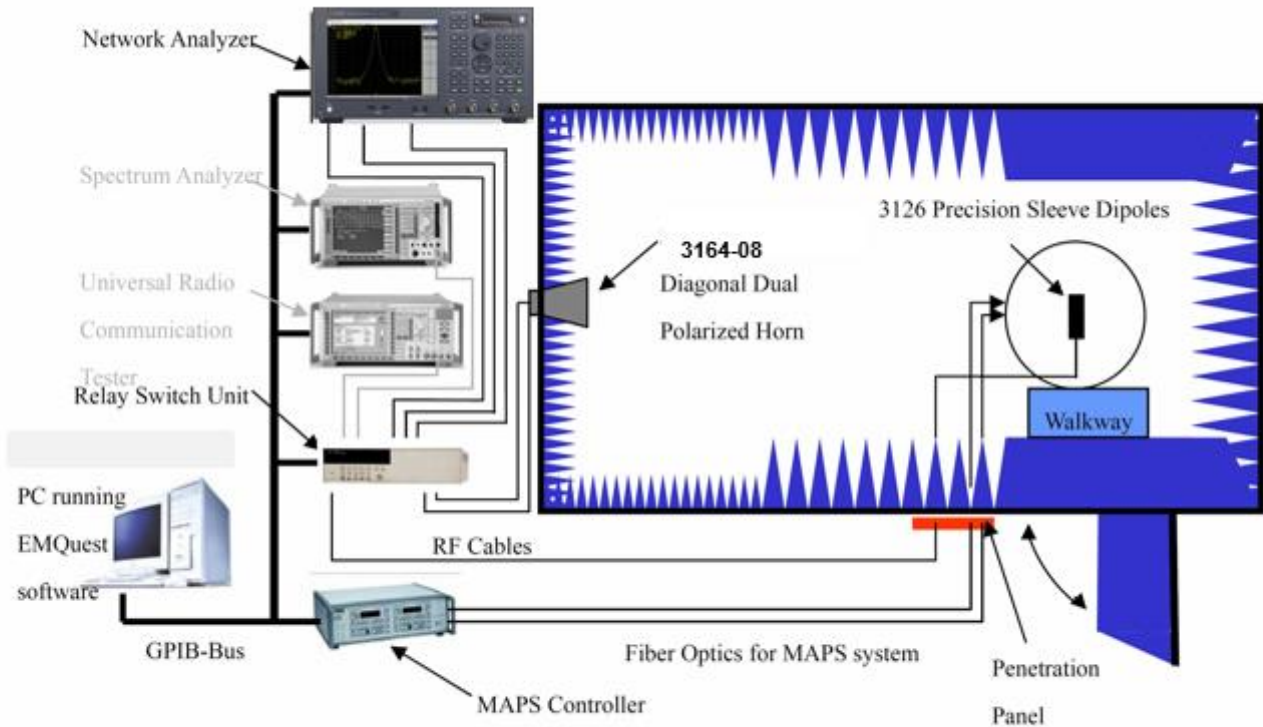
3. Test Frequency

Band (MHz)	Test Frequency (MHz)
1560-1590	1575
2400-2480	2450
5150-5250	5150
5470-5725	5550
5725-5850	5850
5925-6425	5925
6425-6525	6500
6875-7125	7000

4. Antenna Information

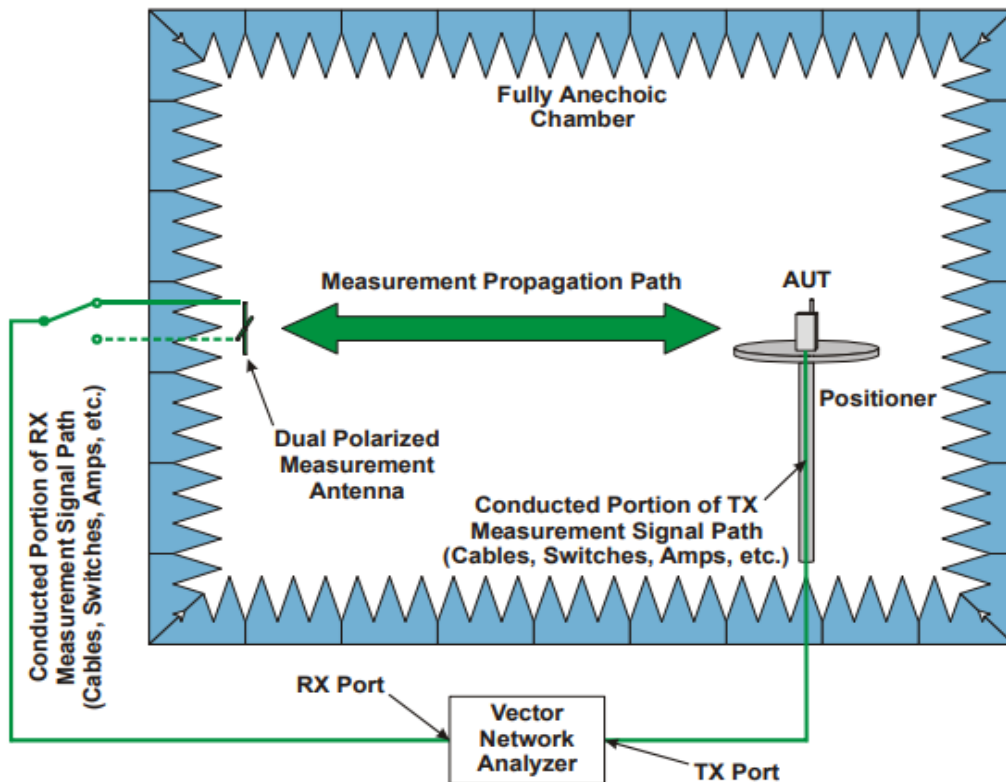
Ant. Position	Brand Name	Model Name	Ant. Type	Connector
Antenna 1 (2G/5G)	Aruba	95XKAN15.G92	PIFA	I-PEX
Antenna 2 (2G/5G)	Aruba	95XKAN15.G93	PIFA	I-PEX
Antenna 3 (2G/6G)	Aruba	95XKAN15.G94	PIFA	I-PEX
Antenna 4 (2G/6G)	Aruba	95XKAN15.G95	PIFA	I-PEX
Antenna 5 (BLE)	Aruba	95XKAN15.G96	PIFA	I-PEX
Antenna 6 (GPS)	Aruba	95XKAN15.G97	PIFA	I-PEX

5. Test Configuration



6. Reference Calibration

Range Calibration Configuration (Passive)



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 15 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

Antenna Peak Gain Table (Ant. Position : 2G/5G Ant.1~2)

Band (MHz)	2400-2480
Frequency (MHz)	2450
Ant.1 Max Gain (dBi)	1.7
Ant.2 Max Gain (dBi)	1.0
Max Gain (dBi)	1.7

Band (MHz)	5150-5470	5470-5725	5725-5850
Frequency (MHz)	5150	5550	5850
Ant.1 Max Gain (dBi)	4.4	3.9	4.5
Ant.2 Max Gain (dBi)	4.0	4.3	3.8
Max Gain (dBi)	4.4	4.3	4.5

Antenna Peak Gain Table (Ant. Position : 2G/6G Ant.3~4)

Band (MHz)	2400-2480
Frequency (MHz)	2450
Ant.3 Max Gain (dBi)	1.6
Ant.4 Max Gain (dBi)	2.8
Max Gain (dBi)	2.8

Band (MHz)	5925-6425	6425-6525	6525-7125
Frequency (MHz)	5925	6500	7000
Ant.3 Max Gain (dBi)	3.9	3.6	4.3
Ant.4 Max Gain (dBi)	3.4	3.6	4.0
Max Gain (dBi)	3.9	3.6	4.3

Antenna Peak Gain Table (Ant. Position : BLE Ant.5)

Band (MHz)	2400-2480
Frequency (MHz)	2450
Ant.5 Max Gain (dBi)	2.6

Antenna Peak Gain Table (Ant. Position : GPS Ant.6)

Band (MHz)	1560-1590
Frequency (MHz)	1575
Ant.6 Max Gain (dBi)	2.3

Antenna Correlated / Uncorrelated Gain Table (Ant. Position : 2G/5G Ant.1~2)

Frequency (MHz)	Correlated Gain (dBi)	Uncorrelated Gain (dBi)
2450	3.5	0.6
5150	5.7	2.9
5550	6.7	3.7
5850	6.8	3.8

Antenna Correlated / Uncorrelated Gain Table (Ant. Position : 2G/6G Ant.3~4)

Frequency (MHz)	Correlated Gain (dBi)	Uncorrelated Gain (dBi)
2450	5.0	2.0
5925	5.9	2.9
6500	6.0	3.0
7000	6.4	3.5

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 5 degree steps of theta and 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 662611 D01, F(2)(d)(i). The uncorrelated antenna gain was calculated using KDB 662911 D01, F(2)(d)(ii).

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

Note :

KDB 662611 D01, F(2)(d)(i)

$$\text{Correlated Gain} = 10 \log \left[\left(10^{\frac{G_1}{20}} + 10^{\frac{G_2}{20}} + \dots + 10^{\frac{G_n}{20}} \right)^2 / N_{Ant.} \right] \text{ dBi}$$

KDB 662611 D01, F(2)(d)(ii)

$$\text{Uncorrelated Gain} = 10 \log \left[\left(10^{\frac{G_1}{10}} + 10^{\frac{G_2}{10}} + \dots + 10^{\frac{G_n}{10}} \right) / N_{Ant.} \right] \text{ dBi}$$

 $N_{Ant.}$: Number of antenna G_n : Gain of antenna**Maximum Correlated / Uncorrelated Gain Calculation****(Ant. Position : 2G/5G Ant.1~2)**

Frequency (MHz)	2450	5850
Ant.1 Gain (dBi)	1.49	4.15
Ant.2 Gain (dBi)	-0.66	3.40
Phi (°)	205	35
Theta(°)	50	50
Corr. Ant. Gain (dBi) [10^(G1/20)+10^(G2/20)] ² /N _{ANT.}	2.23	4.78
Uncor. Ant. Gain (dBi) [10^(G1/10)+10^(G2/10)]/N _{ANT.}	1.13	2.40
Corr. Gain (dBi) 10*log(Corr. Ant. Gain)	3.5	6.8
Uncor. Gain (dBi) 10*log(Uncor. Ant. Gain)	0.6	3.8

(Ant. Position : 2G/6G Ant.3~4)

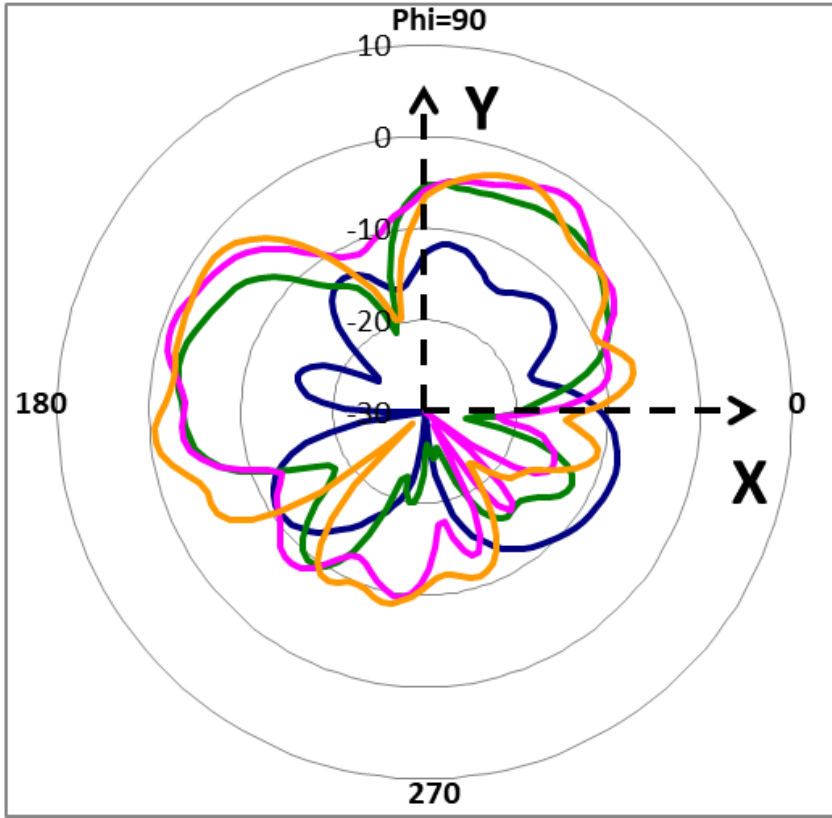
Frequency (MHz)	2450	7000
Ant.3 Gain (dBi)	1.24	4.12
Ant.4 Gain (dBi)	2.66	2.67
Phi (°)	110	145
Theta(°)	55	60
Corr. Ant. Gain (dBi) [10^(G1/20)+10^(G2/20)] ² /N _{ANT.}	3.16	4.40
Uncor. Ant. Gain (dBi) [10^(G1/10)+10^(G2/10)]/N _{ANT.}	1.59	2.22
Corr. Gain (dBi) 10*log(Corr. Ant. Gain)	5.0	6.4
Uncor. Gain (dBi) 10*log(Uncor. Ant. Gain)	2.0	3.5

Note : Antenna gain is the correlated / uncorrelated gain position in the appendix gain table.

10. Radiation Pattern

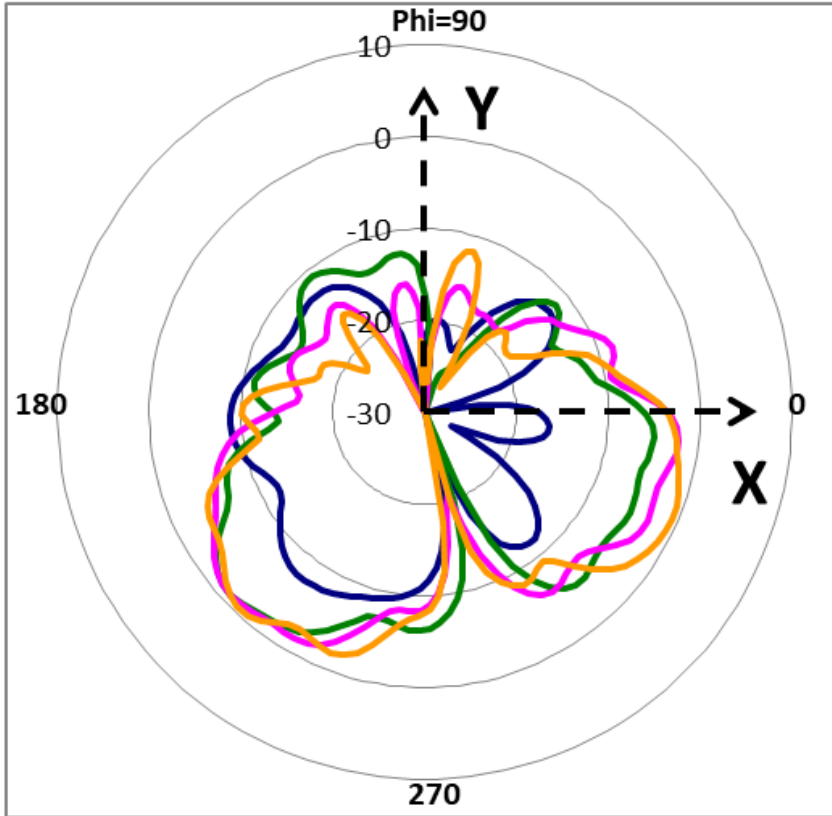
Ant. Position : 2G/5G Ant.1~2

XY_Pol._Phi_Ant.1



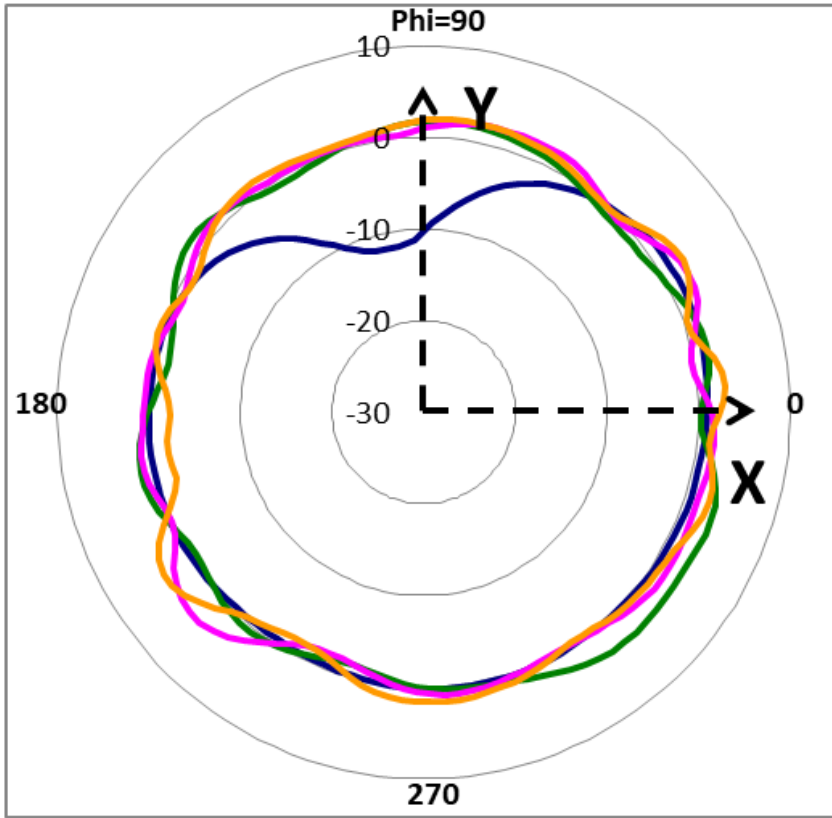
- 2450 MHz_Gain_-8.23
- 5150 MHz_Gain_-2.79
- 5550 MHz_Gain_-0.94
- 5850 MHz_Gain_-0.48

XY_Pol._Phi_Ant.2



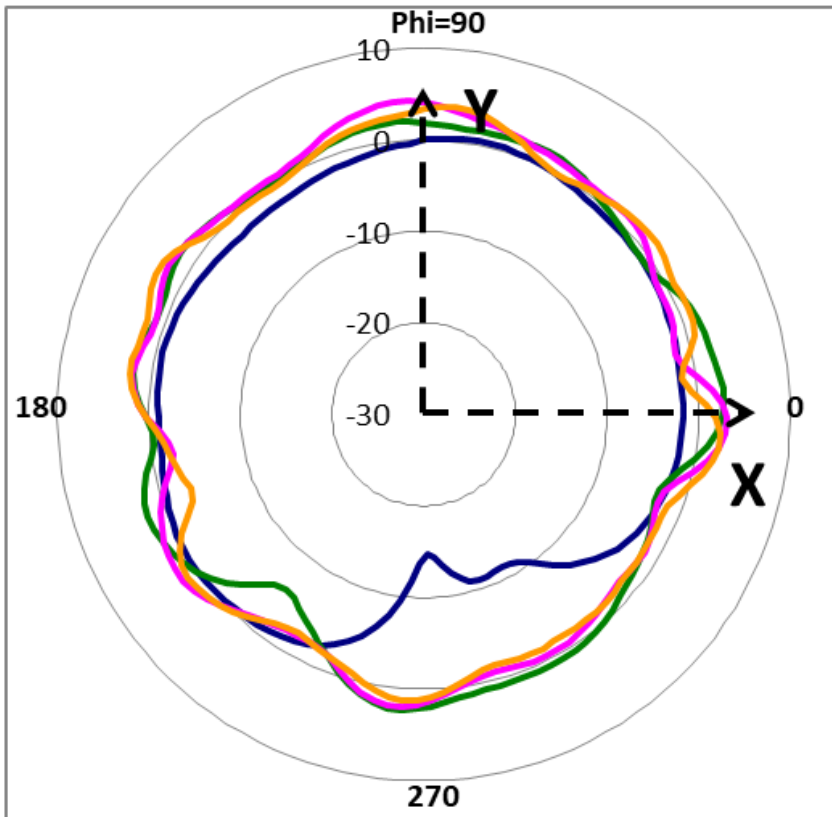
- 2450 MHz_Gain_-7.47
- 5150 MHz_Gain_-1.04
- 5550 MHz_Gain_-0.95
- 5850 MHz_Gain_-0.59

XY_Pol._Theta_Ant.1



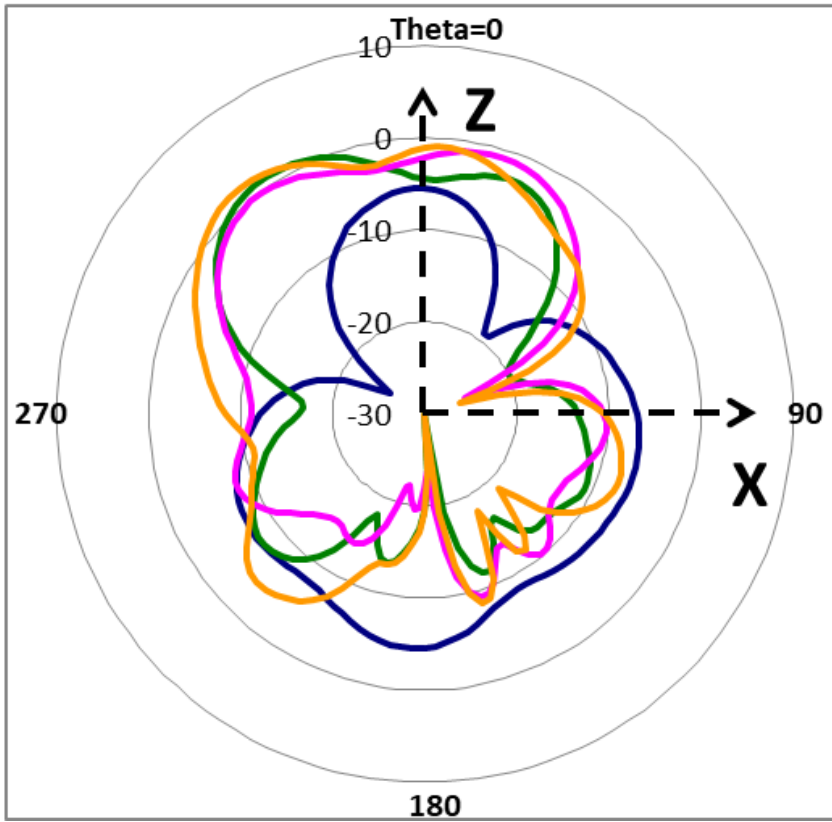
- 2450 MHz_Gain_1.37
- 5150 MHz_Gain_3.53
- 5550 MHz_Gain_3.62
- 5850 MHz_Gain_3.47

XY_Pol._Theta_Ant.2



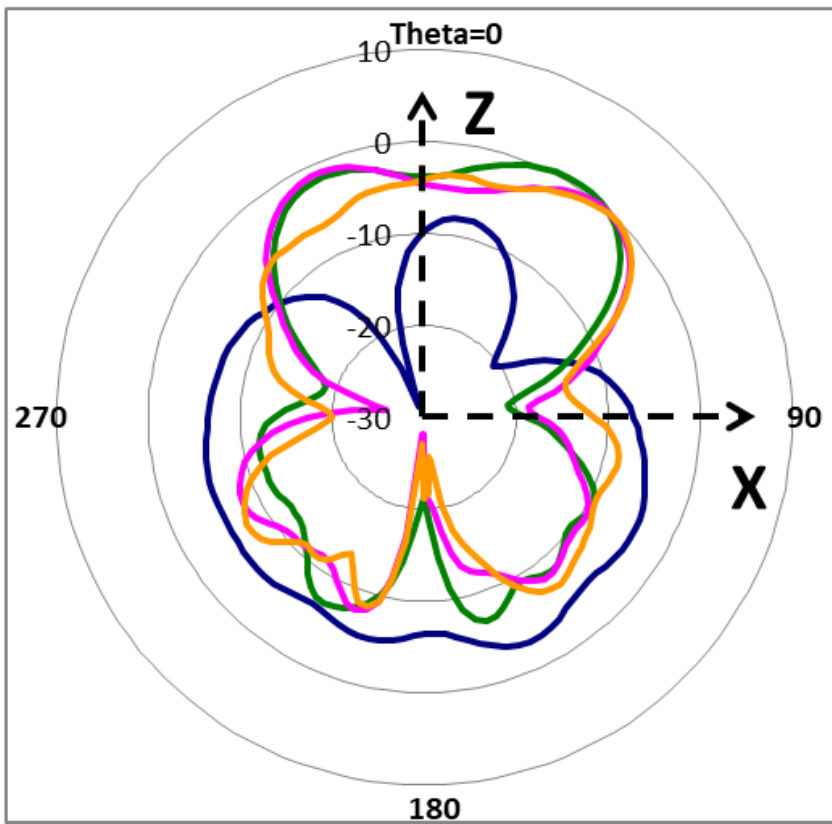
- 2450 MHz_Gain_0.44
- 5150 MHz_Gain_2.80
- 5550 MHz_Gain_4.24
- 5850 MHz_Gain_3.69

XZ_Pol._Phi_Ant.1



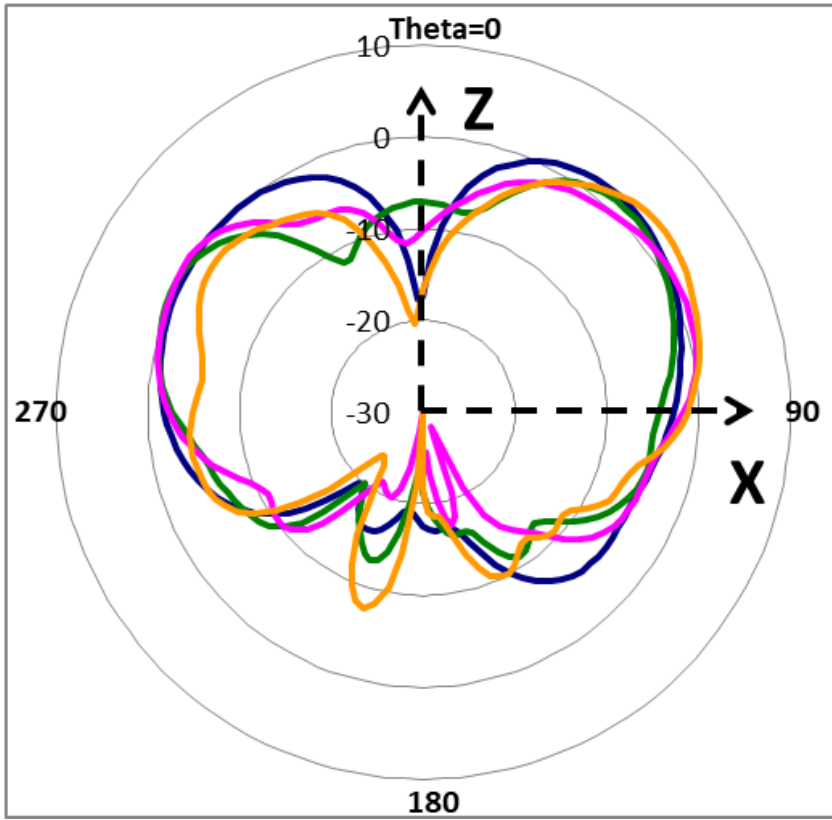
- 2450 MHz_Gain_-4.51
- 5150 MHz_Gain_0.99
- 5550 MHz_Gain_-0.17
- 5850 MHz_Gain_1.67

XZ_Pol._Phi_Ant.2



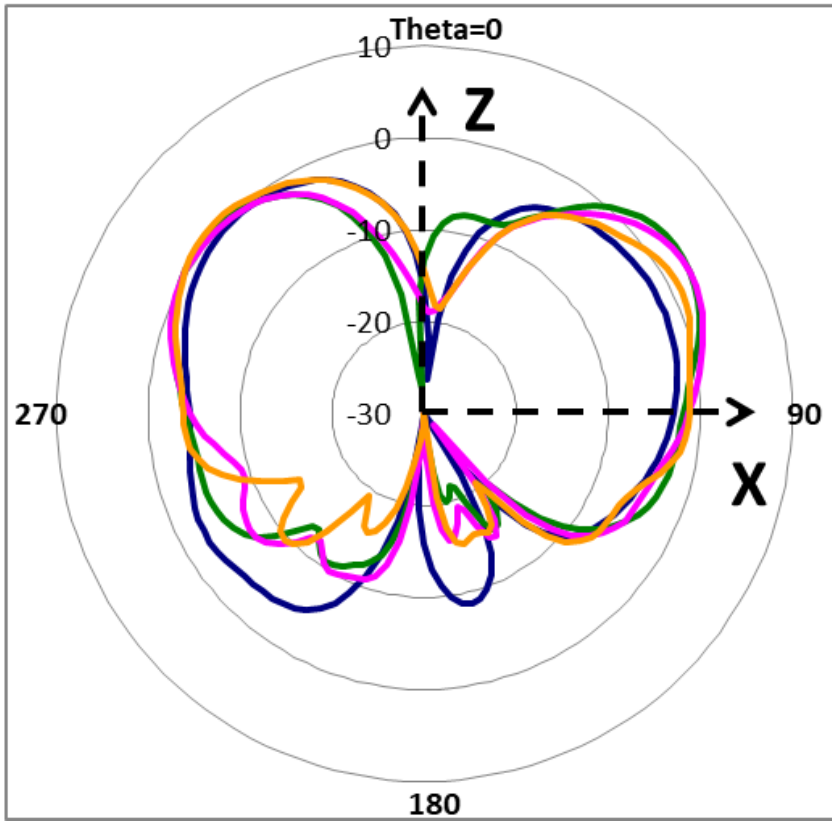
- 2450 MHz_Gain_-3.03
- 5150 MHz_Gain_0.53
- 5550 MHz_Gain_-0.01
- 5850 MHz_Gain_-0.13

XZ_Pol._Theta_Ant.1



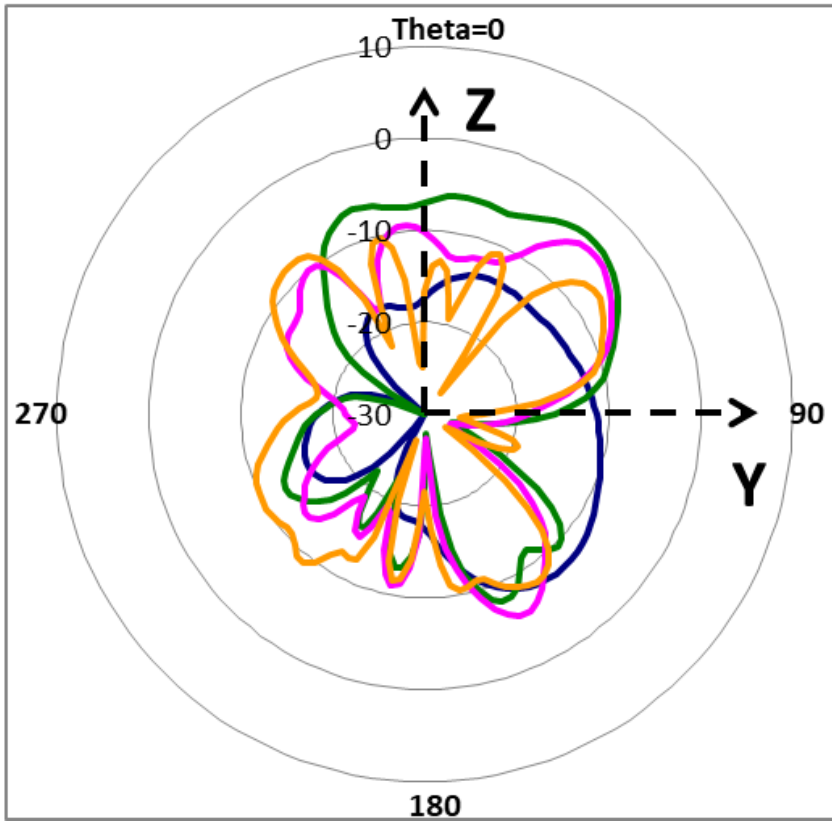
- 2450 MHz_Gain_1.83
- 5150 MHz_Gain_1.28
- 5550 MHz_Gain_1.05
- 5850 MHz_Gain_2.98

XZ_Pol._Theta_Ant.2



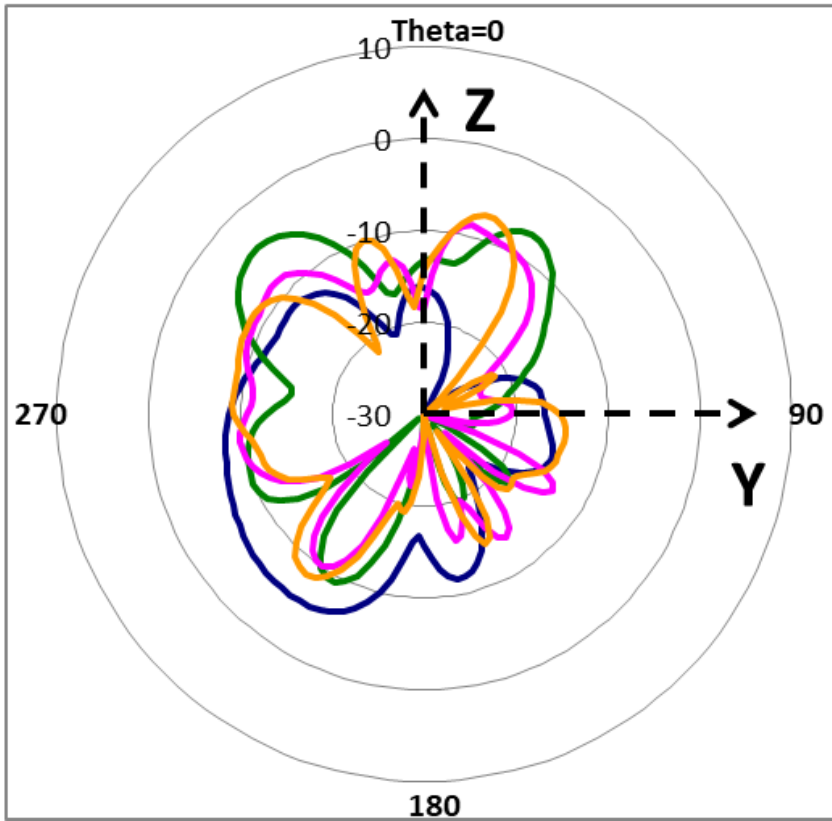
- 2450 MHz_Gain_-0.45
- 5150 MHz_Gain_2.80
- 5550 MHz_Gain_2.70
- 5850 MHz_Gain_1.03

YZ_Pol._Phi_Ant.1



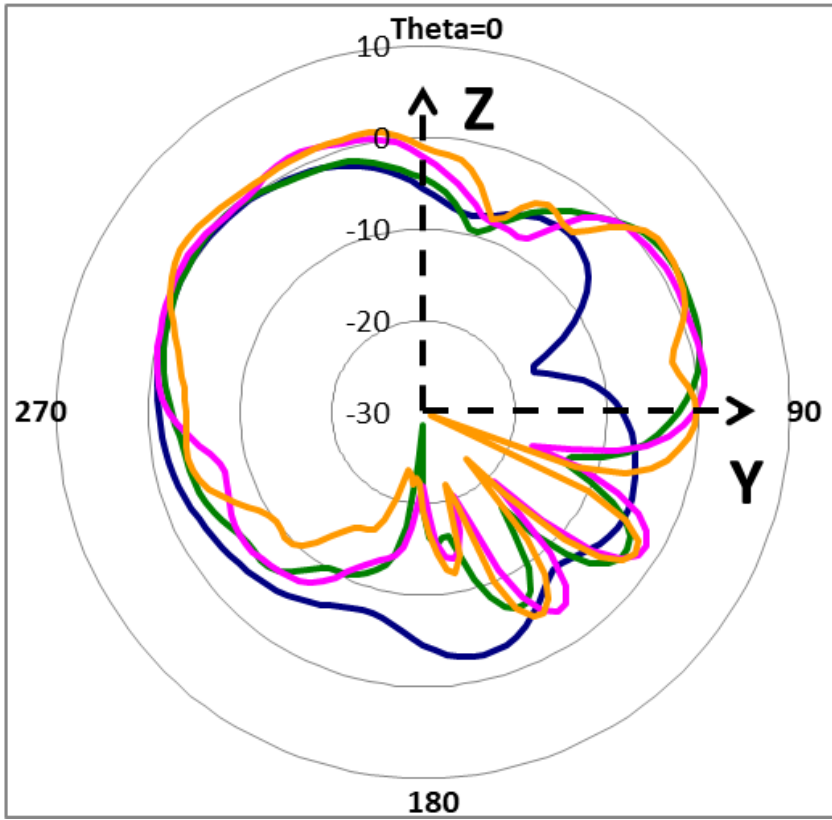
- 2450 MHz_Gain_-7.51
- 5150 MHz_Gain_-3.71
- 5550 MHz_Gain_-4.66
- 5850 MHz_Gain_-7.17

YZ_Pol._Phi_Ant.2



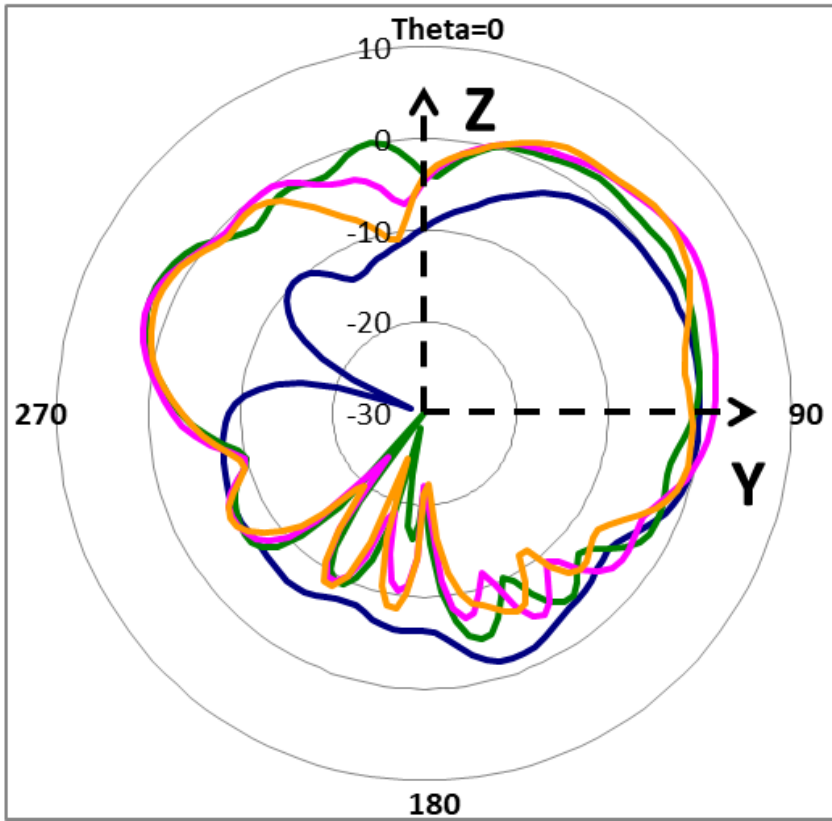
- 2450 MHz_Gain_-5.50
- 5150 MHz_Gain_-4.33
- 5550 MHz_Gain_-8.38
- 5850 MHz_Gain_-7.38

YZ_Pol._Theta_Ant.1



- 2450 MHz_Gain_0.25
- 5150 MHz_Gain_1.73
- 5550 MHz_Gain_1.41
- 5850 MHz_Gain_1.96

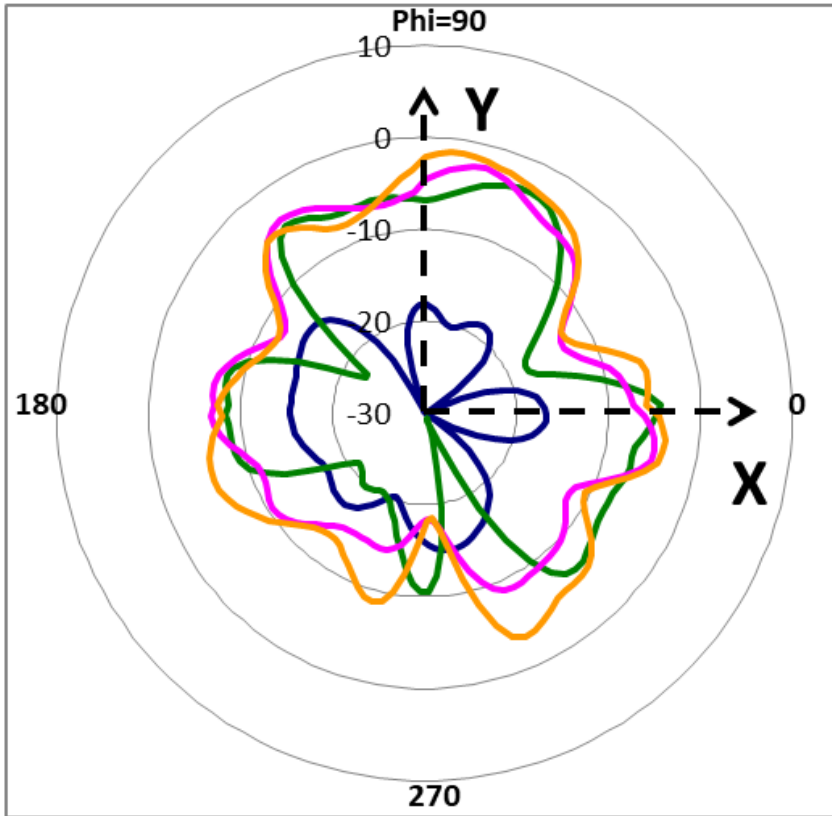
YZ_Pol._Theta_Ant.2



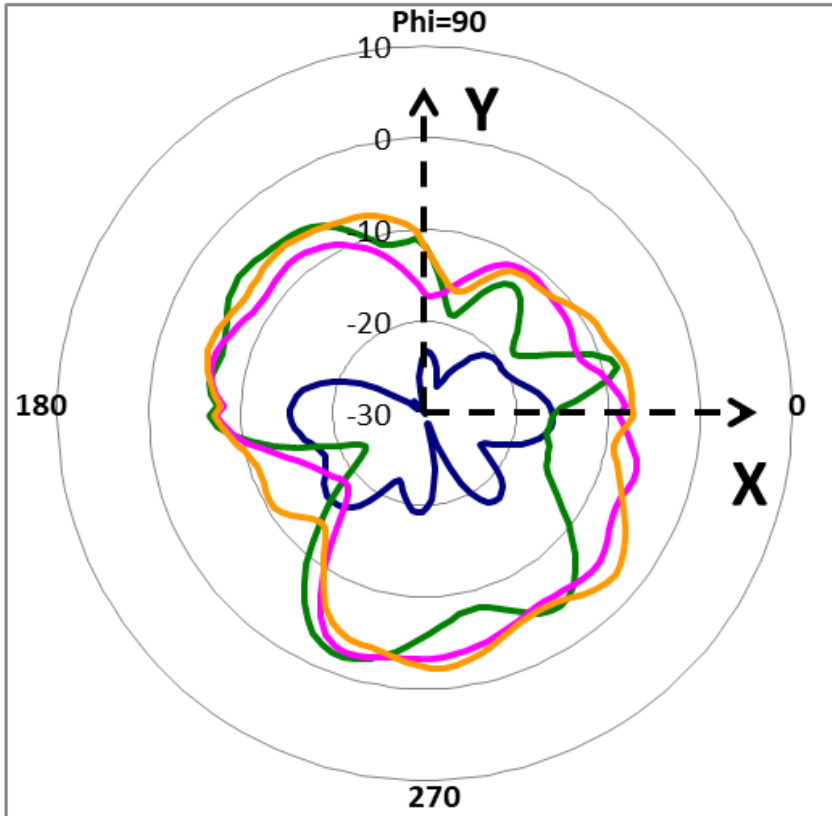
- 2450 MHz_Gain_0.14
- 5150 MHz_Gain_2.34
- 5550 MHz_Gain_4.19
- 5850 MHz_Gain_3.76

Ant. Position : 2G/6G Ant.3~4

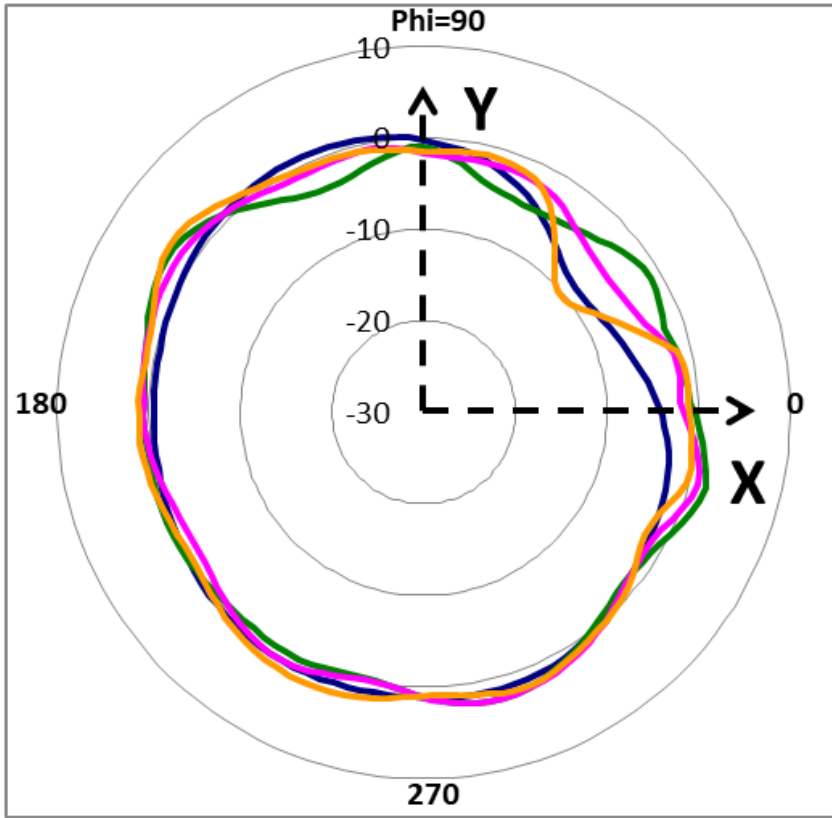
XY_Pol._Phi_Ant.3



XY_Pol._Phi_Ant.4

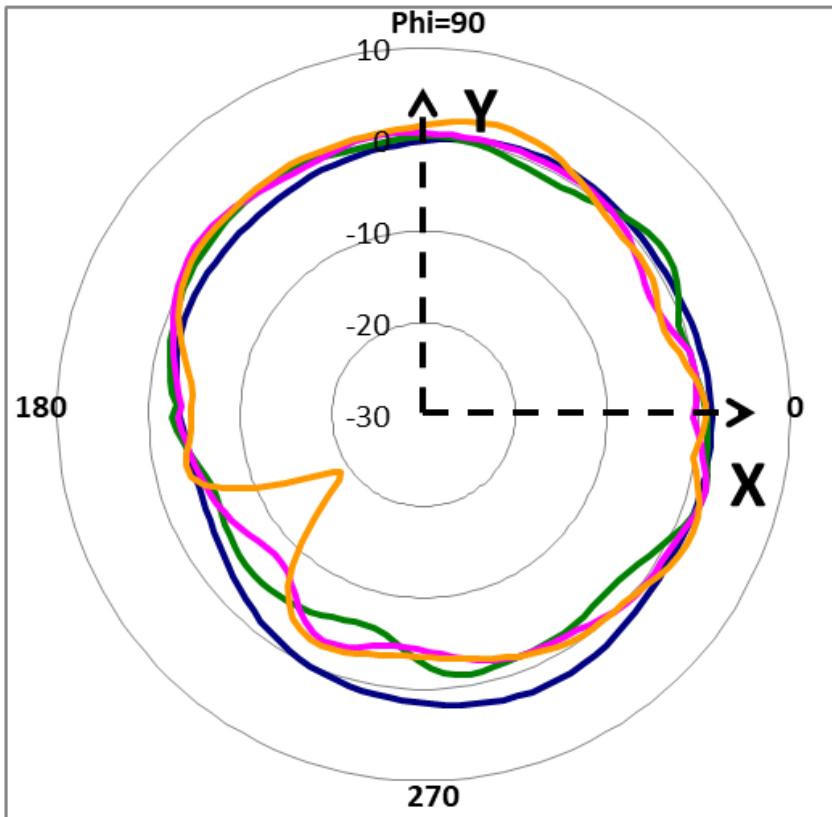


XY_Pol._Theta_Ant.3



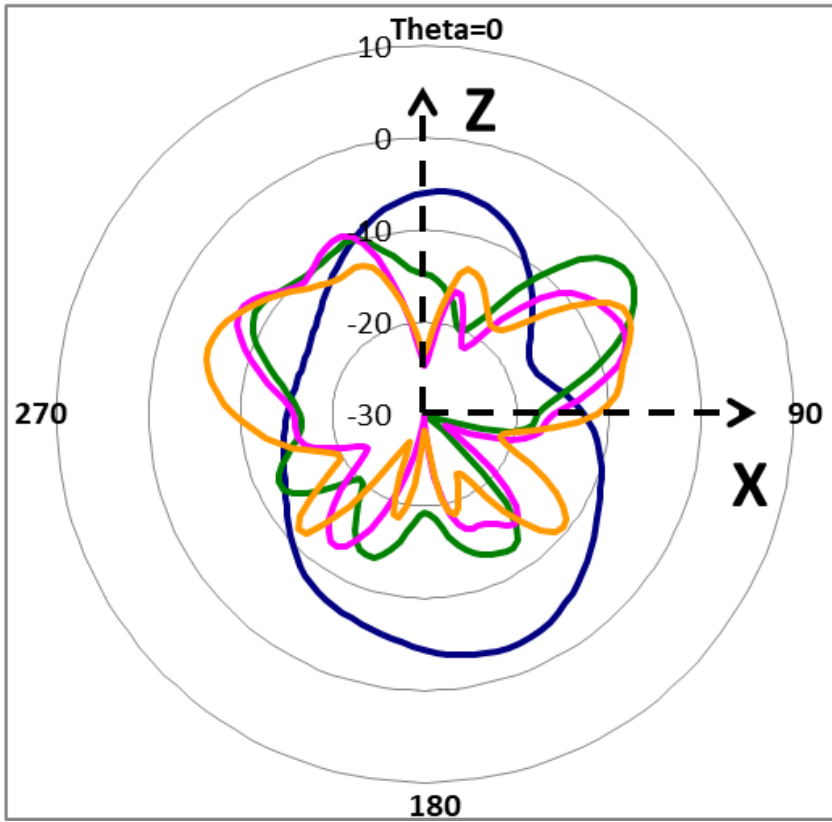
- 2450 MHz_Gain_1.35
- 5925 MHz_Gain_2.72
- 6500 MHz_Gain_2.40
- 7000 MHz_Gain_3.19

XY_Pol._Theta_Ant.4



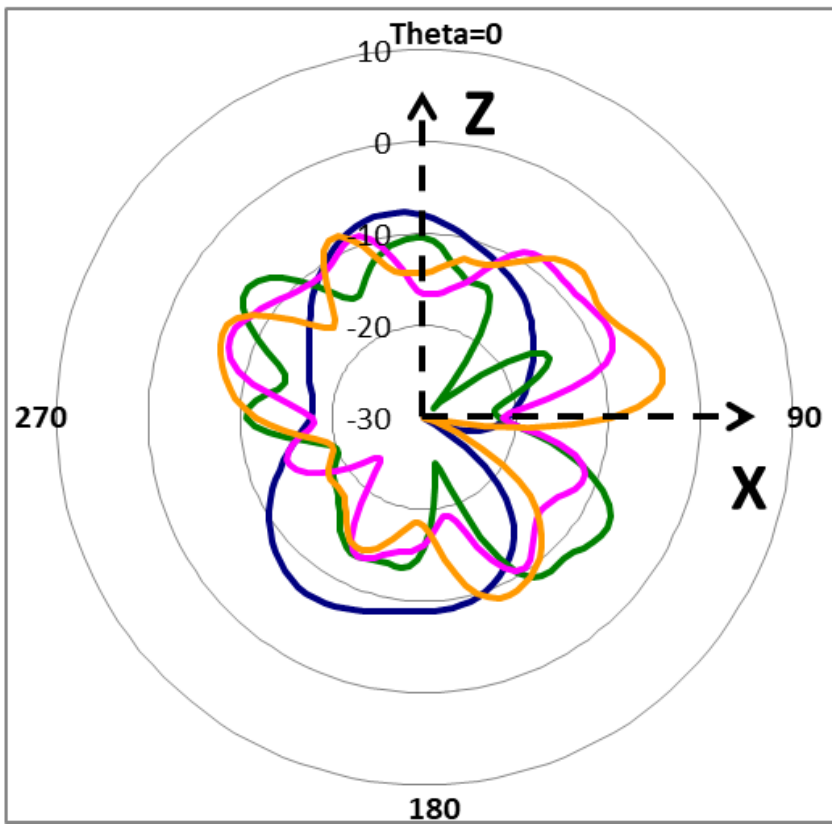
- 2450 MHz_Gain_2.50
- 5925 MHz_Gain_1.92
- 6500 MHz_Gain_1.85
- 7000 MHz_Gain_2.55

XZ_Pol._Phi_Ant.3



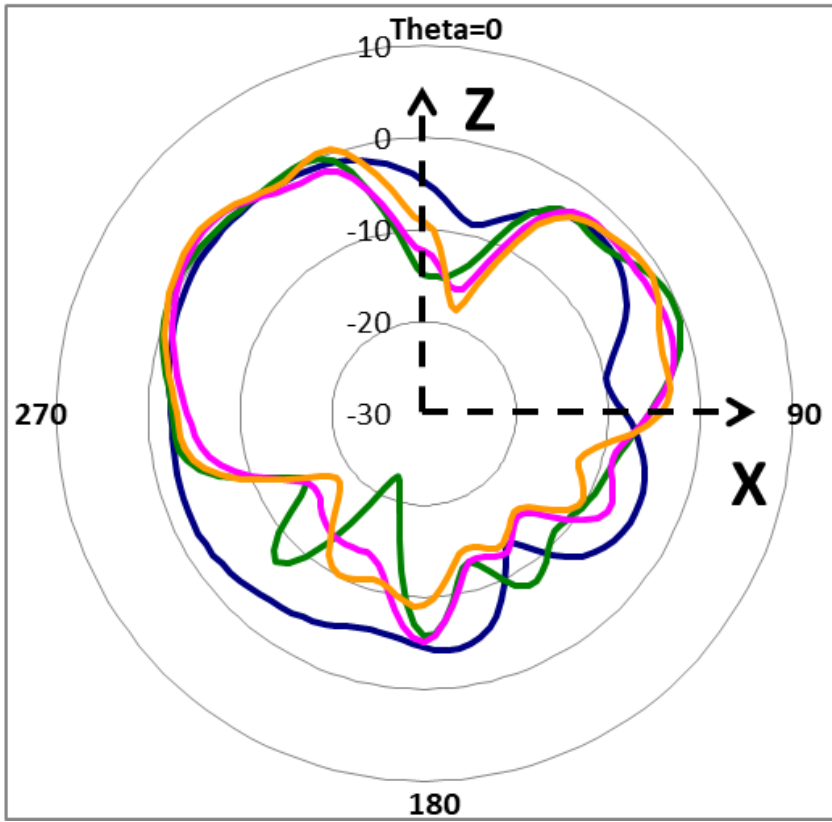
- 2450 MHz_Gain_-3.05
- 5925 MHz_Gain_-3.15
- 6500 MHz_Gain_-6.57
- 7000 MHz_Gain_-5.39

XZ_Pol._Phi_Ant.4



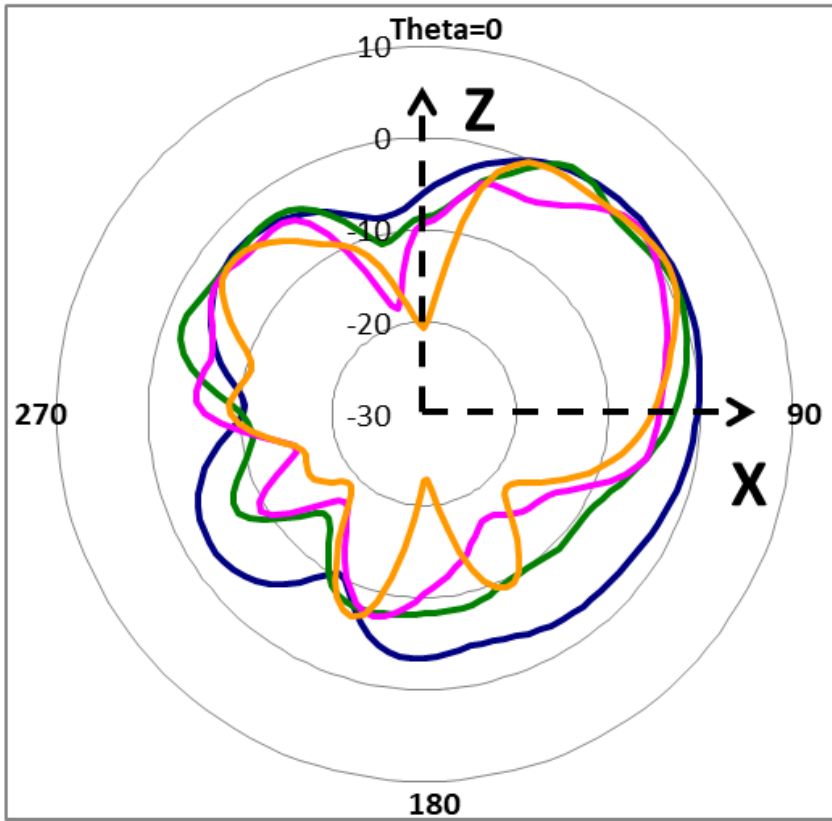
- 2450 MHz_Gain_6.97
- 5925 MHz_Gain_-6.18
- 6500 MHz_Gain_-7.17
- 7000 MHz_Gain_-3.53

XZ_Pol._Theta_Ant.3



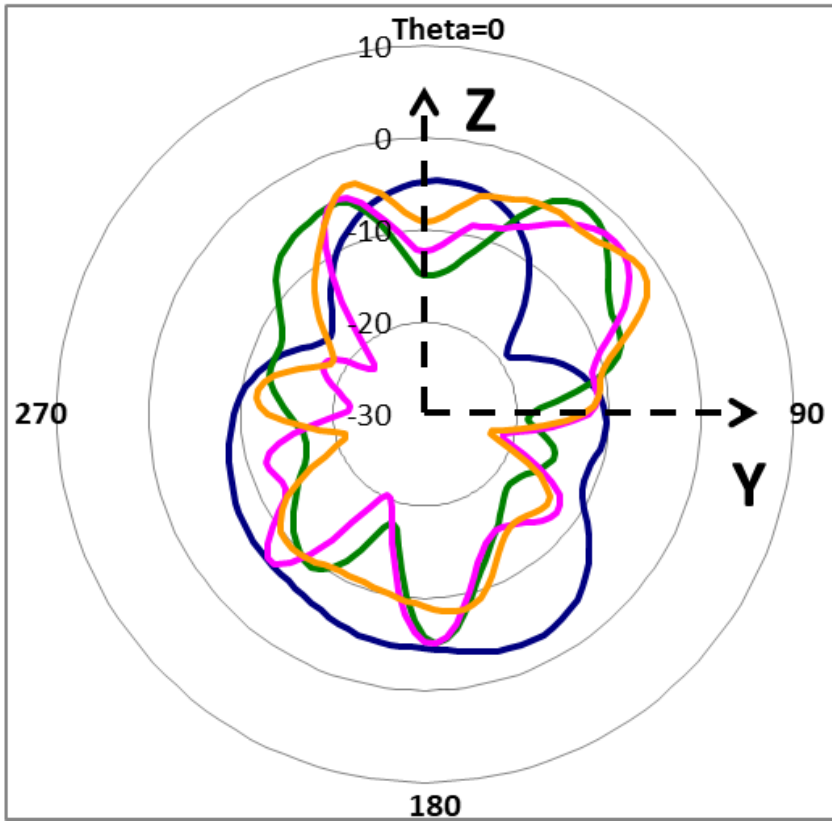
- 2450 MHz_Gain_-0.34
- 5925 MHz_Gain_0.48
- 6500 MHz_Gain_1.22
- 7000 MHz_Gain_1.49

XZ_Pol._Theta_Ant.4



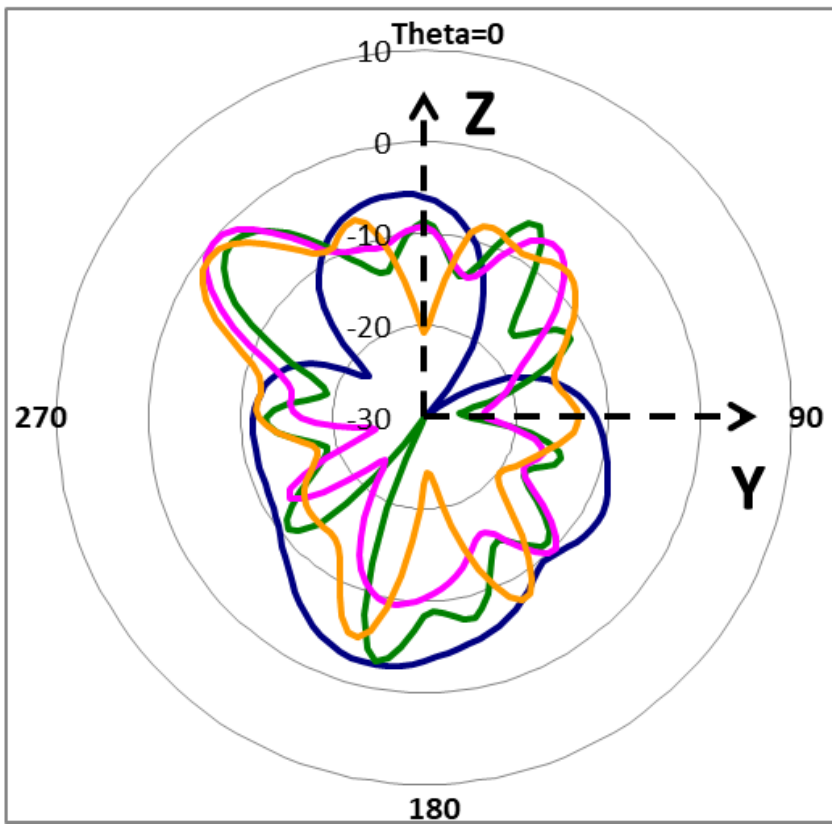
- 2450 MHz_Gain_1.53
- 5925 MHz_Gain_1.26
- 6500 MHz_Gain_0.88
- 7000 MHz_Gain_1.12

YZ_Pol._Phi_Ant.3



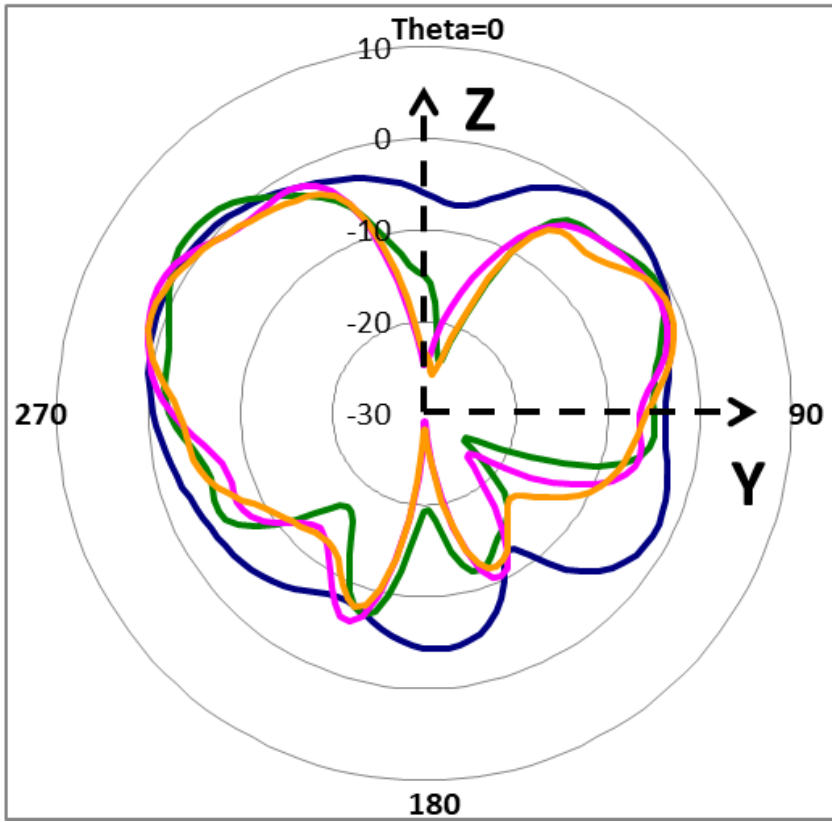
- 2450 MHz_Gain_-2.76
- 5925 MHz_Gain_-1.56
- 6500 MHz_Gain_-2.11
- 7000 MHz_Gain_-1.65

YZ_Pol._Phi_Ant.4



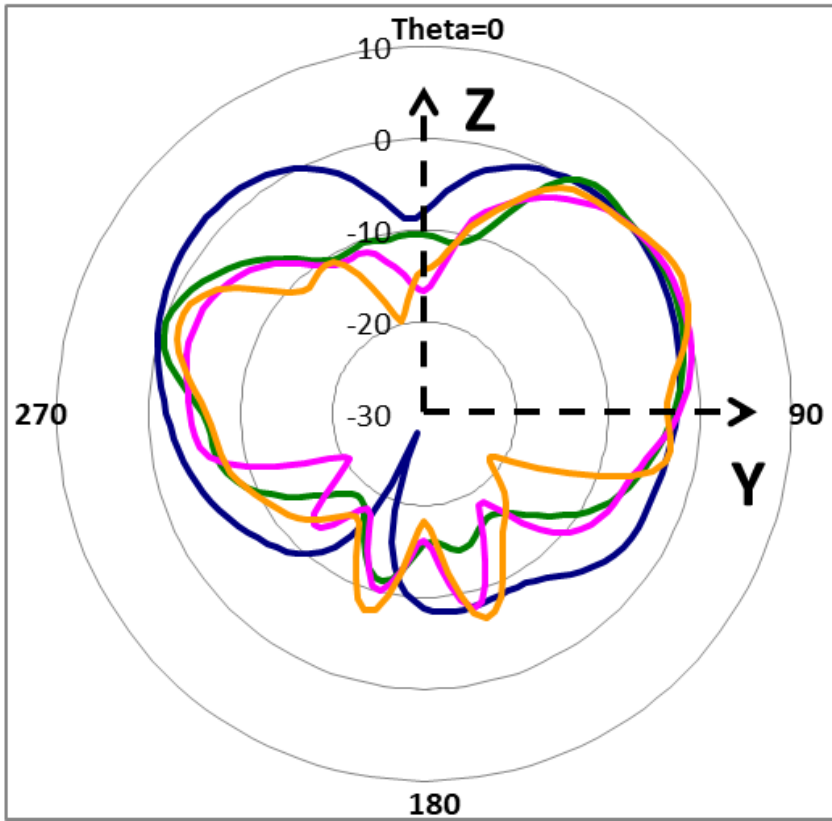
- 2450 MHz_Gain_-2.50
- 5925 MHz_Gain_-1.68
- 6500 MHz_Gain_-0.17
- 7000 MHz_Gain_-0.79

YZ_Pol._Theta_Ant.3



- 2450 MHz_Gain_1.20
- 5925 MHz_Gain_2.26
- 6500 MHz_Gain_2.10
- 7000 MHz_Gain_1.60

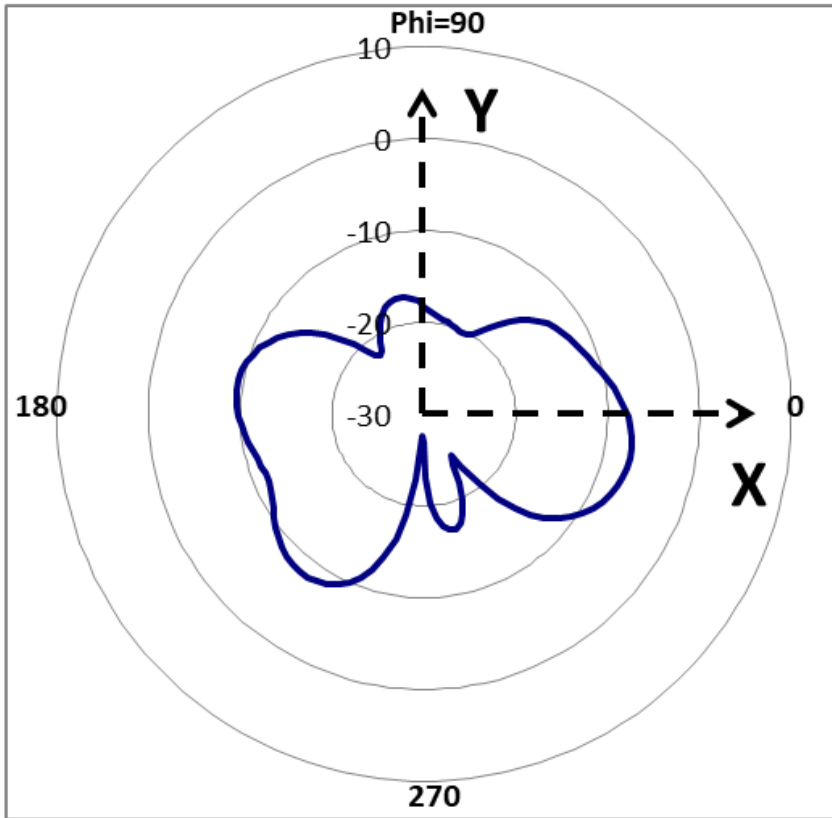
YZ_Pol._Theta_Ant.4



- 2450 MHz_Gain_1.98
- 5925 MHz_Gain_1.06
- 6500 MHz_Gain_0.75
- 7000 MHz_Gain_1.69

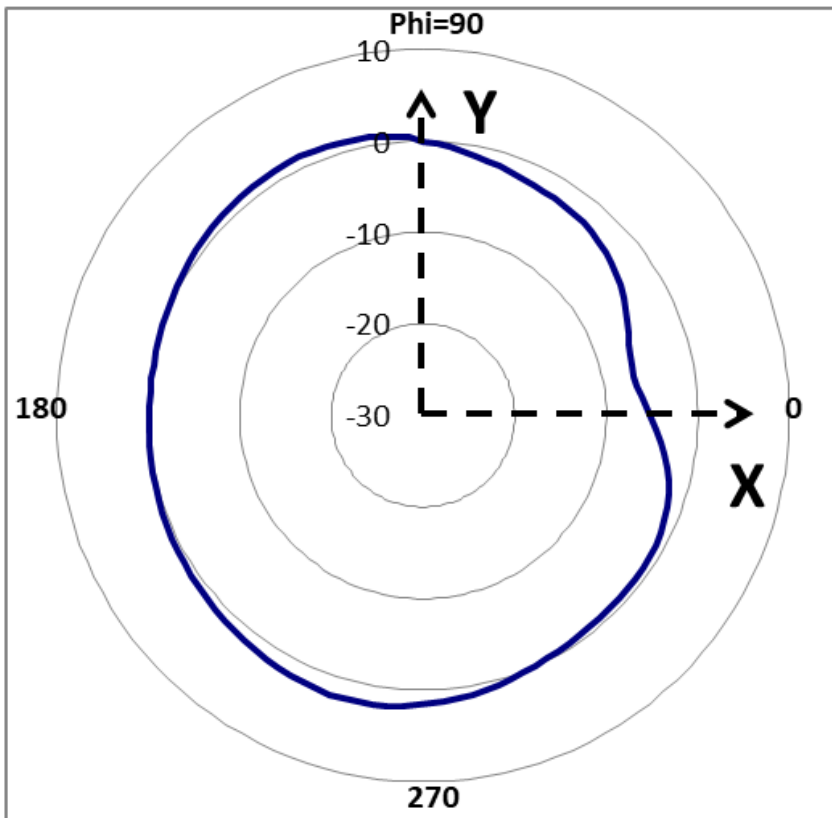
Ant. Position : BLE Ant.5

XY_Pol._Phi_Ant.5



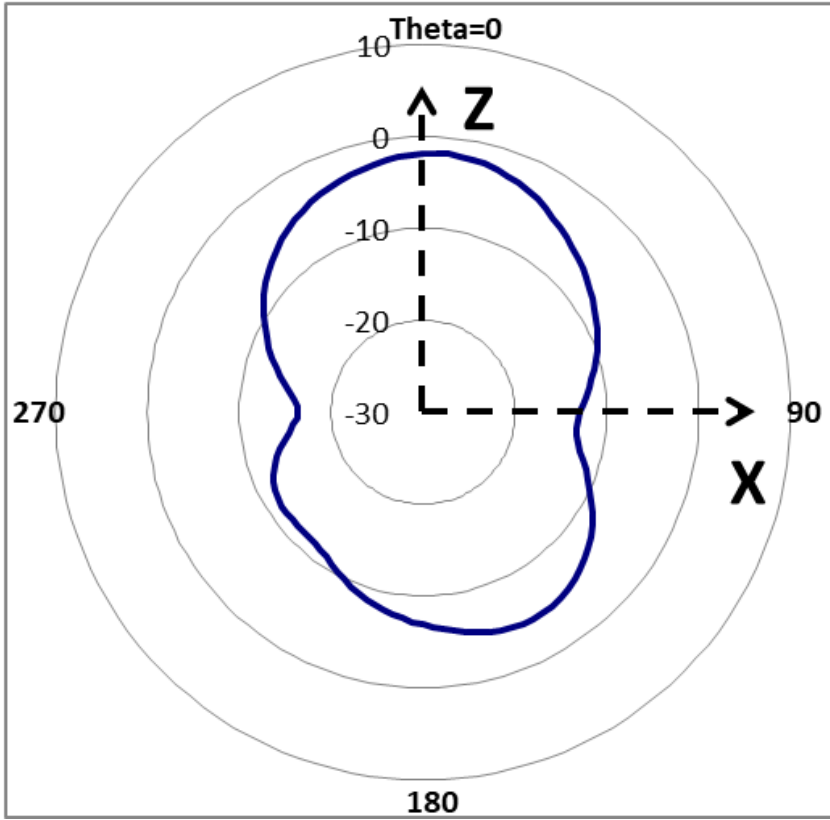
— 2450 MHz_Gain_-7.08

XY_Pol._Theta_Ant.5



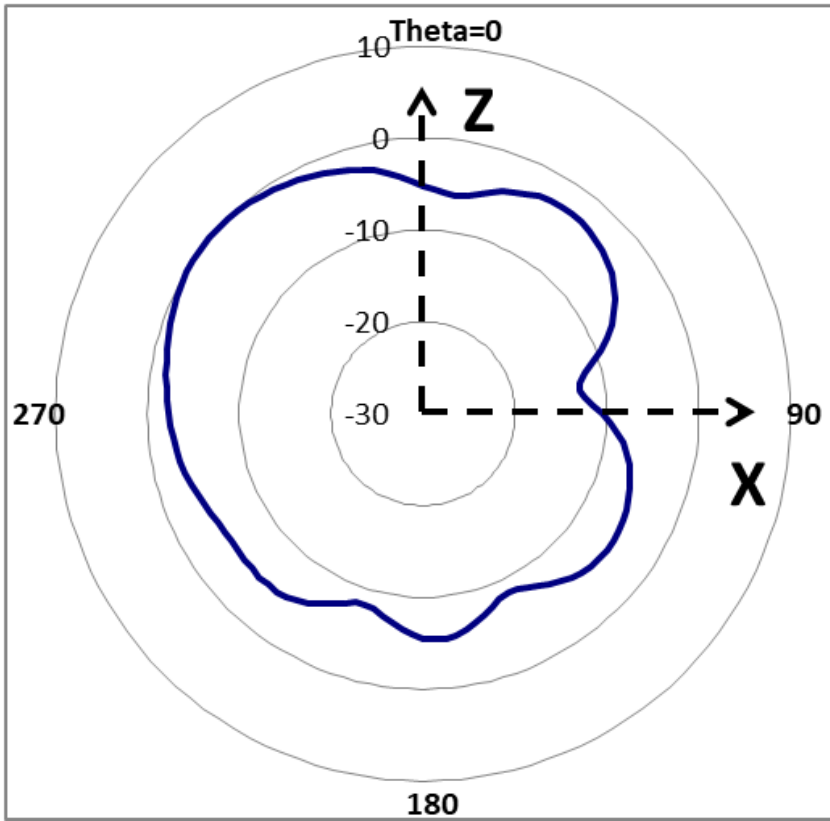
— 2450 MHz_Gain_2.09

XZ_Pol._Phi_Ant.5



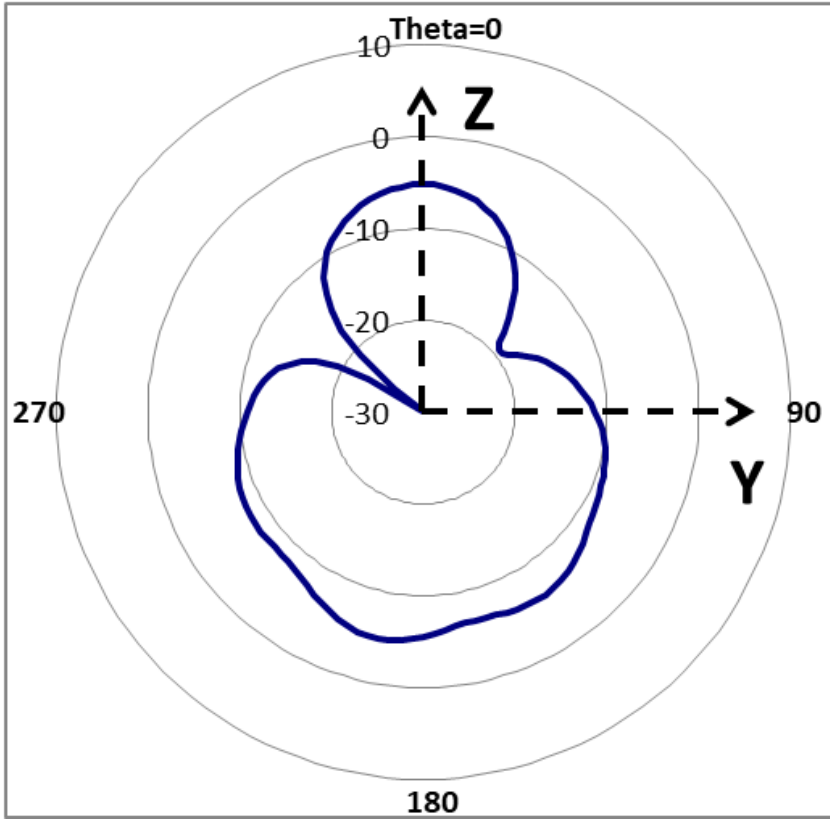
— 2450 MHz_Gain_-1.79

XZ_Pol._Theta_Ant.5



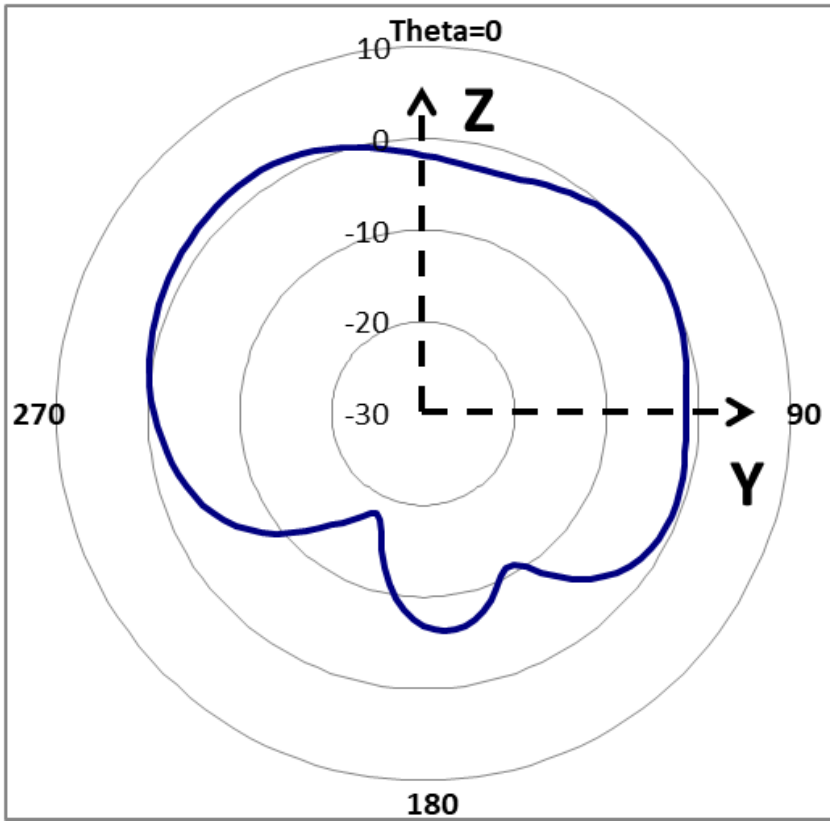
— 2450 MHz_Gain_0.14

YZ_Pol._Phi_Ant.5



— 2450 MHz_Gain_-4.85

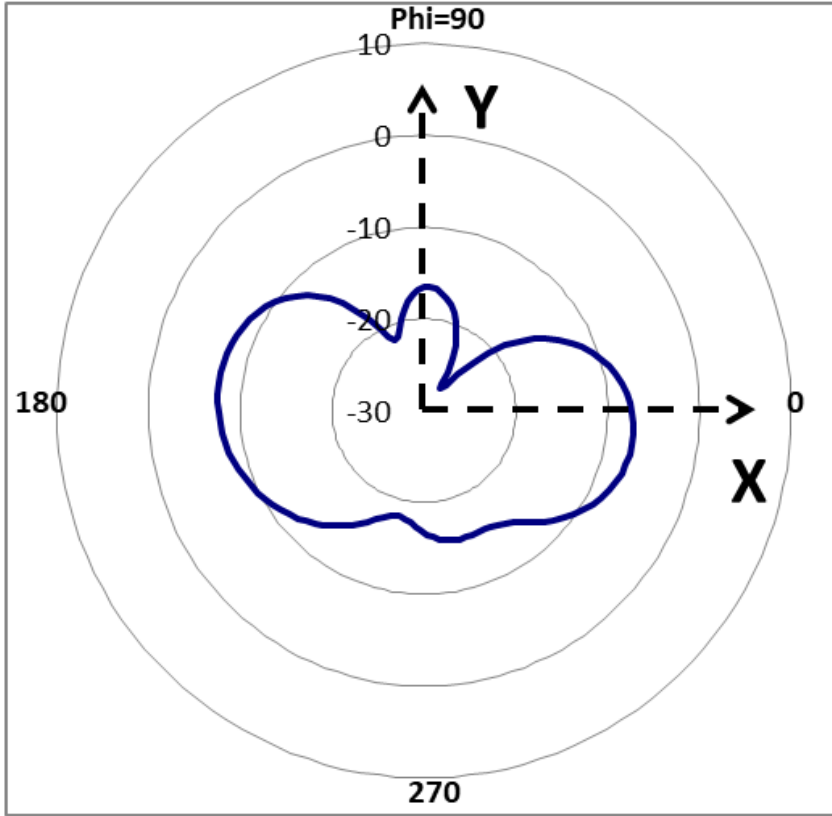
YZ_Pol._Theta_Ant.5



— 2450 MHz_Gain_1.96

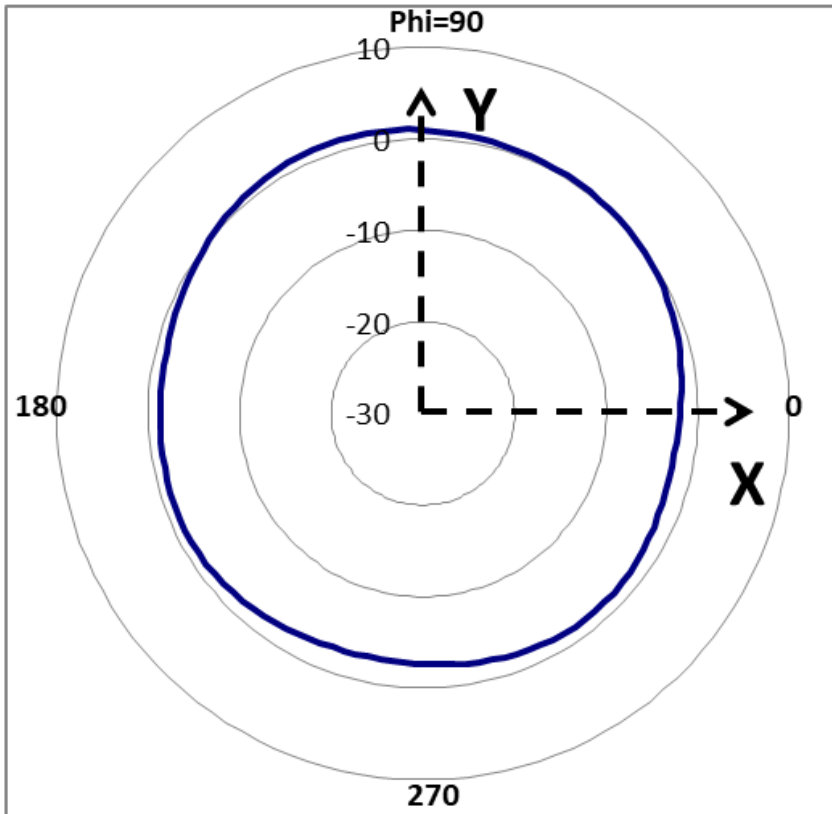
Ant. Position : GPS Ant.6

XY_Pol._Phi_Ant.6



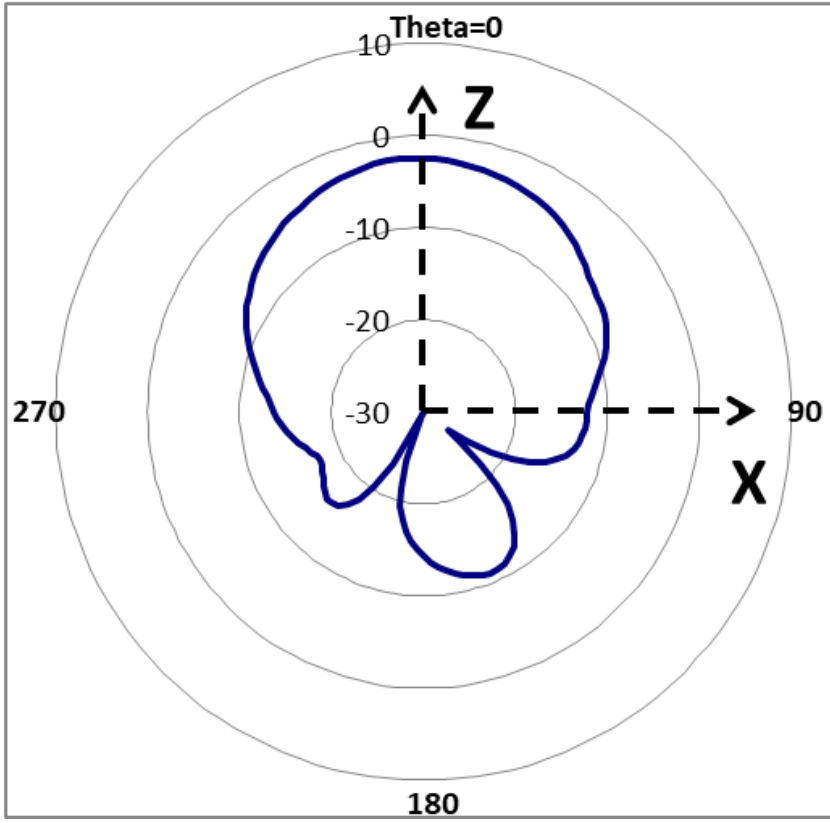
— 1575 MHz_Gain_-7.04

XY_Pol._Theta_Ant.6



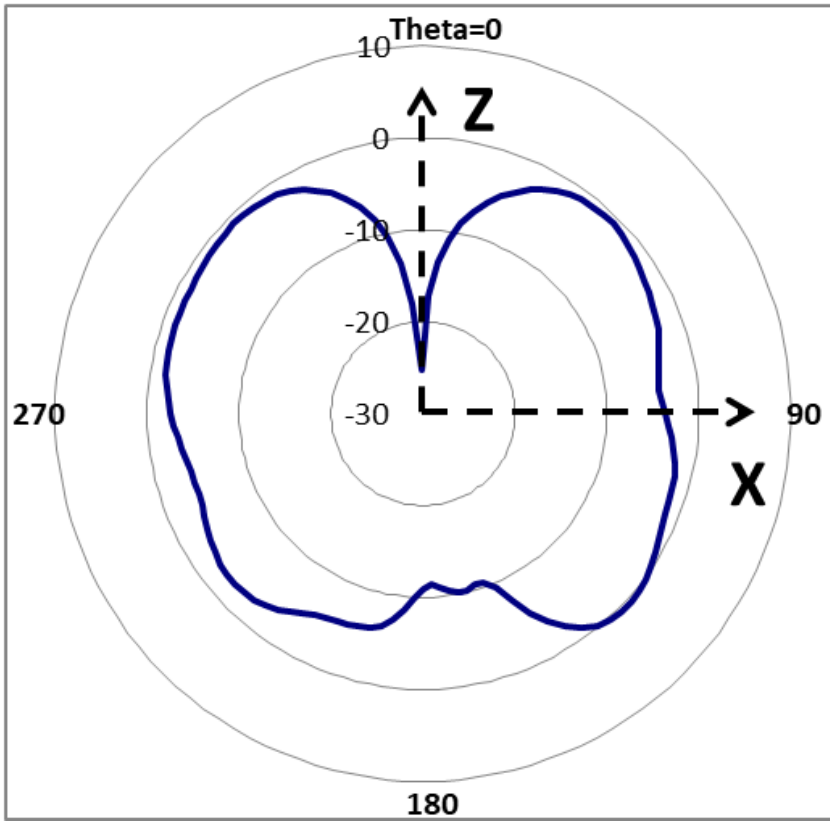
— 1575 MHz_Gain_1.21

XZ_Pol._Phi_Ant.6



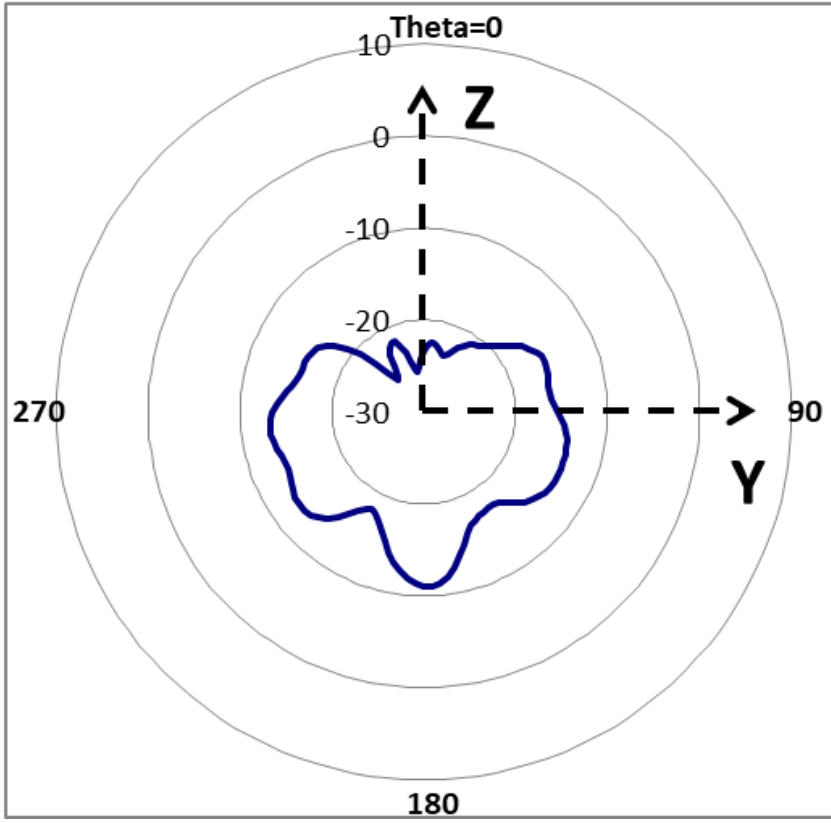
— 1575 MHz_Gain_-2.38

XZ_Pol._Theta_Ant.6



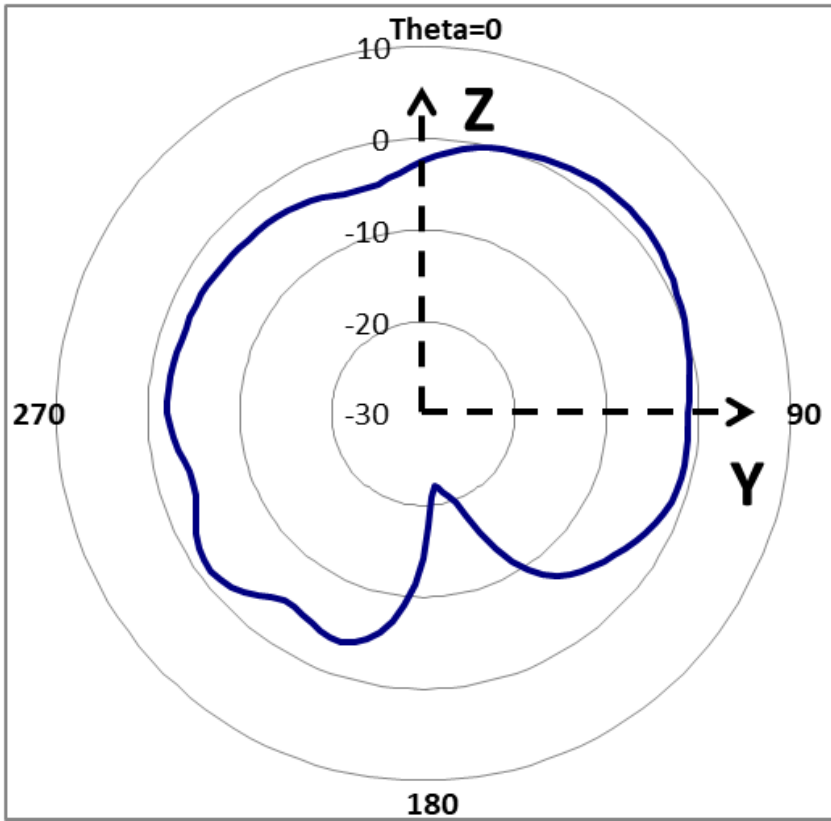
— 1575 MHz_Gain_0.61

YZ_Pol._Phi_Ant.6



— 1575 MHz_Gain_-10.96

YZ_Pol._Theta_Ant.6



— 1575 MHz_Gain_1.65

Table with 180 columns (500MHz, Phase/Angle, 0-180) and 180 rows of numerical data.

Table with 180 columns (500MHz, Phase/Angle, 0-180) and 180 rows of numerical data.

Ant. Position : 2G/5G Ant.2

Table with 170 columns (2G MHz, 5G MHz, Ant. Angle) and multiple rows of numerical data representing antenna performance metrics.

Table with 170 columns (5150 MHz, 2G MHz, 5G MHz, Ant. Angle) and multiple rows of numerical data representing antenna performance metrics.

Table with 170 columns (Theta/Angle, Response) and 170 rows of data for 5580 MHz. Each row contains numerical values for the response at different angles.

Table with 170 columns (Theta/Angle, Response) and 170 rows of data for 5650 MHz. Each row contains numerical values for the response at different angles.

6500 MHz	Theta/Angle	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
0	-4.88	-5.23	-4.82	-4.99	-4.68	-4.32	-3.98	-3.62	-3.23	-2.84	-2.45	-2.06	-1.67	-1.28	-0.89	-0.50	-0.11	0.28	0.67	1.06	1.45	1.84	2.23	2.62	3.01	3.40	3.79	4.18	4.57	4.96	5.35	5.74	6.13	6.52	6.91	7.30	7.69	8.08	8.47	8.86	9.25	9.64	10.03	10.42	10.81	11.20	11.59	11.98	12.37	12.76	13.15	13.54	13.93	14.32	14.71	15.10	15.49	15.88	16.27	16.66	17.05	17.44	17.83	18.22	18.61	19.00	19.39	19.78	20.17	20.56	20.95	21.34	21.73	22.12	22.51	22.90	23.29	23.68	24.07	24.46	24.85	25.24	25.63	26.02	26.41	26.80	27.19	27.58	27.97	28.36	28.75	29.14	29.53	29.92	30.31	30.70	31.09	31.48	31.87	32.26	32.65	33.04	33.43	33.82	34.21	34.60	34.99	35.38	35.77	36.16	36.55	36.94	37.33	37.72	38.11	38.50	38.89	39.28	39.67	40.06	40.45	40.84	41.23	41.62	42.01	42.40	42.79	43.18	43.57	43.96	44.35	44.74	45.13	45.52	45.91	46.30	46.69	47.08	47.47	47.86	48.25	48.64	49.03	49.42	49.81	50.20	50.59	50.98	51.37	51.76	52.15	52.54	52.93	53.32	53.71	54.10	54.49	54.88	55.27	55.66	56.05	56.44	56.83	57.22	57.61	58.00	58.39	58.78	59.17	59.56	59.95	60.34	60.73	61.12	61.51	61.90	62.29	62.68	63.07	63.46	63.85	64.24	64.63	65.02	65.41	65.80	66.19	66.58	66.97	67.36	67.75	68.14	68.53	68.92	69.31	69.70	70.09	70.48	70.87	71.26	71.65	72.04	72.43	72.82	73.21	73.60	73.99	74.38	74.77	75.16	75.55	75.94	76.33	76.72	77.11	77.50	77.89	78.28	78.67	79.06	79.45	79.84	80.23	80.62	81.01	81.40	81.79	82.18	82.57	82.96	83.35	83.74	84.13	84.52	84.91	85.30	85.69	86.08	86.47	86.86	87.25	87.64	88.03	88.42	88.81	89.20	89.59	89.98	90.37	90.76	91.15	91.54	91.93	92.32	92.71	93.10	93.49	93.88	94.27	94.66	95.05	95.44	95.83	96.22	96.61	97.00	97.39	97.78	98.17	98.56	98.95	99.34	99.73	100.12	100.51	100.90	101.29	101.68	102.07	102.46	102.85	103.24	103.63	104.02	104.41	104.80	105.19	105.58	105.97	106.36	106.75	107.14	107.53	107.92	108.31	108.70	109.09	109.48	109.87	110.26	110.65	111.04	111.43	111.82	112.21	112.60	112.99	113.38	113.77	114.16	114.55	114.94	115.33	115.72	116.11	116.50	116.89	117.28	117.67	118.06	118.45	118.84	119.23	119.62	120.01	120.40	120.79	121.18	121.57	121.96	122.35	122.74	123.13	123.52	123.91	124.30	124.69	125.08	125.47	125.86	126.25	126.64	127.03	127.42	127.81	128.20	128.59	128.98	129.37	129.76	130.15	130.54	130.93	131.32	131.71	132.10	132.49	132.88	133.27	133.66	134.05	134.44	134.83	135.22	135.61	136.00	136.39	136.78	137.17	137.56	137.95	138.34	138.73	139.12	139.51	139.90	140.29	140.68	141.07	141.46	141.85	142.24	142.63	143.02	143.41	143.80	144.19	144.58	144.97	145.36	145.75	146.14	146.53	146.92	147.31	147.70	148.09	148.48	148.87	149.26	149.65	150.04	150.43	150.82	151.21	151.60	151.99	152.38	152.77	153.16	153.55	153.94	154.33	154.72	155.11	155.50	155.89	156.28	156.67	157.06	157.45	157.84	158.23	158.62	159.01	159.40	159.79	160.18	160.57	160.96	161.35	161.74	162.13	162.52	162.91	163.30	163.69	164.08	164.47	164.86	165.25	165.64	166.03	166.42	166.81	167.20	167.59	167.98	168.37	168.76	169.15	169.54	169.93	170.32	170.71	171.10	171.49	171.88	172.27	172.66	173.05	173.44	173.83	174.22	174.61	175.00	175.39	175.78	176.17	176.56	176.95	177.34	177.73	178.12	178.51	178.90	179.29	179.68	180.07	180.46	180.85	181.24	181.63	182.02	182.41	182.80	183.19	183.58	183.97	184.36	184.75	185.14	185.53	185.92	186.31	186.70	187.09	187.48	187.87	188.26	188.65	189.04	189.43	189.82	190.21	190.60	190.99	191.38	191.77	192.16	192.55	192.94	193.33	193.72	194.11	194.50	194.89	195.28	195.67	196.06	196.45	196.84	197.23	197.62	198.01	198.40	198.79	199.18	199.57	199.96	200.35	200.74	201.13	201.52	201.91	202.30	202.69	203.08	203.47	203.86	204.25	204.64	205.03	205.42	205.81	206.20	206.59	206.98	207.37	207.76	208.15	208.54	208.93	209.32	209.71	210.10	210.49	210.88	211.27	211.66	212.05	212.44	212.83	213.22	213.61	214.00	214.39	214.78	215.17	215.56	215.95	216.34	216.73	217.12	217.51	217.90	218.29	218.68	219.07	219.46	219.85	220.24	220.63	221.02	221.41	221.80	222.19	222.58	222.97	223.36	223.75	224.14	224.53	224.92	225.31	225.70	226.09	226.48	226.87	227.26	227.65	228.04	228.43	228.82	229.21	229.60	230.00	230.39	230.78	231.17	231.56	231.95	232.34	232.73	233.12	233.51	233.90	234.29	234.68	235.07	235.46	235.85	236.24	236.63	237.02	237.41	237.80	238.19	238.58	238.97	239.36	239.75	240.14	240.53	240.92	241.31	241.70	242.09	242.48	242.87	243.26	243.65	244.04	244.43	244.82	245.21	245.60	245.99	246.38	246.77	247.16	247.55	247.94	248.33	248.72	249.11	249.50	249.89	250.28	250.67	251.06	251.45	251.84	252.23	252.62	253.01	253.40	253.79	254.18	254.57	254.96	255.35	255.74	256.13	256.52	256.91	257.30	257.69	258.08	258.47	258.86	259.25	259.64	260.03	260.42	260.81	261.20	261.59	261.98	262.37	262.76	263.15	263.54	263.93	264.32	264.71	265.10	265.49	265.88	266.27	266.66	267.05	267.44	267.83	268.22	268.61	269.00	269.39	269.78	270.17	270.56	270.95	271.34	271.73	272.12	272.51	272.90	273.29	273.68	274.07	274.46	274.85	275.24	275.63	276.02	276.41	276.80	277.19	277.58	277.97	278.36	278.75	279.14	279.53	279.92	280.31	280.70	281.09	281.48	281.87	282.26	282.65	283.04	283.43	283.82	284.21	284.60	284.99	285.38	285.77	286.16	286.55	286.94	287.33	287.72	288.11	288.50	288.89	289.28	289.67	290.06	290.45	290.84	291.23	291.62	292.01	292.40	292.79	293.18	293.57	293.96	294.35	294.74	295.13	295.52	295.91	296.30	296.69	297.08	297.47	297.86	298.25	298.64	299.03	299.42	299.81	300.20	300.59	300.98	301.37	301.76	302.15	302.54	302.93	303.32	303.71	304.10	304.49	304.88	305.27	305.66	306.05	306.44	306.83	307.22	307.61	308.00	308.39	308.78	309.17	309.56	309.95	310.34	310.73	311.12	311.51	311.90	312.29	312.68	313.07	313.46	313.85	314.24	314.63	315.02	315.41	315.80	316.19	316.58	316.97	317.36	317.75	318.14	318.53	318.92	319.31	319.70	320.09	320.48	320.87	321.26	321.65	322.04	322.43	322.82	323.21	323.60	323.99	324.38	324.77	325.16	325.55	325.94	326.33	326.72	327.11	327.50	327.89	328.28	328.67	329.06	329.45	329.84	330.23	330.62	331.01	331.40	331.79	332.18	332.57	332.96	333.35	333.74	334.13	334.52	334.91	335.30	335.69	336.08	336.47	336.86	337.25	337.64	338.03	338.42	338.81	339.20	339.59	339.98	340.37	340.76	341.15	341.54	341.93	342.32	342.71	343.10	343.49	343.88	344.27	344.66	345.05	345.44	345.83	346.22	346.61	347.00	347.39	347.78	348.17	348.56	348.95	349.34	349.73	350.12	350.51	350.90	351.29	351.68	352.07	352.46	352.85	353.24	353.63	354.02	354.41	354.80	355.19	355.58	355.97	356.36	356.75	357.14	357.53	357.92	358.31	358.70	359.09	359.48	359.87	360.26	360.65	361.04	361.43	361.82	362.21	362.60	362.99	363.38	363.77	364.16	364.55	364.94	365.33	365.72	366.11	366.50	366.89	367.28	367.67	368.06	368.45	368.84	369.23	369.62	370.01	370.40	370.79	371.18	371.57	371.96	372.35	372.74	373.13	373.52	373.91	374.30	374.69	375.08	375.47	375.86	376.25	376.64	377.03	377.42	377.81	378.20	378.59	378.98	379.37	379.76	380.15	380.54	380.93	381.32	381.71	382.10	382.49	382.88	383.27	383.66	384.05	384.44	384.83	385.22	385.61	386.00	386.39	386.78	387.17	387.56	387.95	388.34	388.73	389.12	389.51	389.90	390.29	390.68	391.07	391.46	391.85	392.24	392.63	393.02	393.41	393.80	394.19	394.58	394.97	395.36	395.75	396.14	396.53	396.92	397.31	397.70	398.09	398.48	398.87	399.26	399.65	400.04	400.43	400.82	401.21	401.60	401.99	402.38	402.77	403.16	403.55	403.94	404.33	404.72	405.11	405.50	405.89	406.28	406.67	407.06	407.45	407.84	408.23	408.62	409.01	409.40	409.79	410.18	410.57	410.96	411.35	411.74	412.13	412.52	412.91	413.30	413.69	414.08	414.47	414.86	415.25	415.64	416.03	416.42	416.81	417.20	417.59	417.98	4

