

Aruba ANT-635A

Passive Measurement Report

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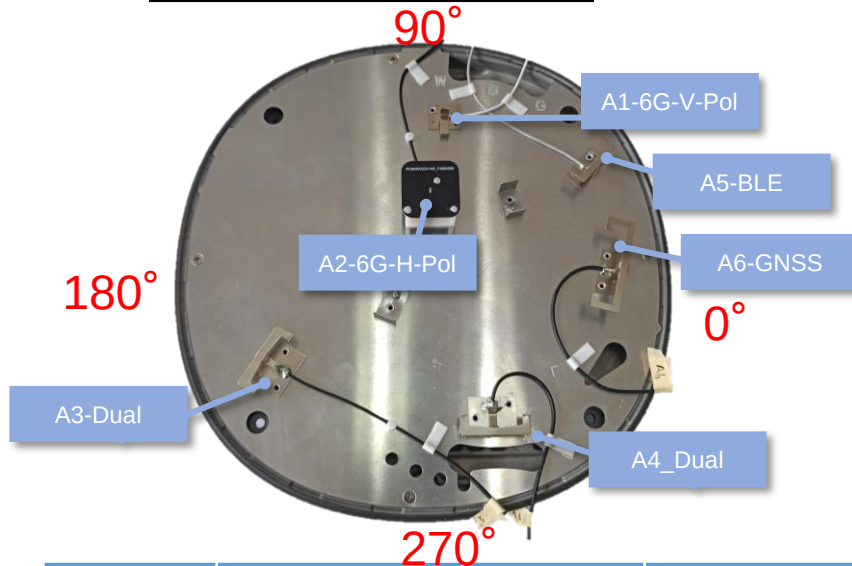
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Revision History

Released Date	Version	Record
2020/07/10	Rev.01	Initial solution
2020/09/01	Rev.02	Improve the solution
2020/12/07	Rev.03	Improve the solution
2020/12/25	Rev.04	Improve the solution
2021/01/13	Rev.05	Improve the solution
2021/01/17	Rev.06	Improve the solution
2021/01/27	Rev.07	Improve the solution
2021/02/09	Rev.08	Improve the solution
2021/02/24	Rev.09	Improve the solution
2021/03/19	Rev.10	Improve the solution
2021/04/08	Rev.11	Improve the solution
2021/05/24	Rev.12	Update the polarization type

Antenna Placement & Solution

Antenna Placement



Cable layout Solution

Antenna	Part Number	ANT Type	Size(L*W*H)	Cable length(mm)	Polarization type	Cable type
A1	ANT-635-6G1	Loop	16*16.9*9.2mm	70	Vertical Polarization	IPEX-1
A2	ANT-635-6G2	Dipole	25*26*0.8mm	135	Horizontal polarization	IPEX-1
A3	ANT-635-Dual1	Loop	28*16.4*13.3mm	115	Vertical Polarization	IPEX-1
A4	ANT-635-Dual2	Loop	28*16.4*13.3mm	91	Vertical Polarization	IPEX-1
A5	ANT-635-BLE	Loop	23*10.4*11.9mm	110	Vertical Polarization	IPEX-1
A6	ANT-635-GNSS	Loop	41*12.54*12.9mm	115	Vertical Polarization	IPEX-1

Results summary

Results summary at 2.4G

Antenna	Detail	A3-Dual			A4-Dual			A5-BLE		
Frequency	2.4G-2.49G	2.4G	2.45G	2.49G	2.4G	2.45G	2.49G	2.4G	2.45G	2.49G
Efficiency	>70%	78	83	83	81	79	72	76	80	79
Peak Gain for 3D	3dBi<Peak Gain<5dBi	2.6	3.1	3.0	3.3	3.4	4.6	2.9	2.9	2.9
Horizontal cut Gain Flatness	90°	5.4	6.9	8.4	6.8	6.6	4.7	5.0	6.9	5.3
	80°	6.8	8.4	9.0	6.5	6.0	4.9	5.2	7.3	8.9
	70°	5.2	6.6	5.7	6.1	5.9	6.8	5.2	7.3	7.7
	60°	6.1	6.1	5.7	5.6	6.3	8.1	5.2	7.3	5.7
Horizontal cut Average Gain	90°	-2.0	-1.8	-2.3	-2.2	-2.9	-2.8	-0.7	-1.8	-1.3
	80°	-1.3	-1.1	-1.5	-1.2	-1.7	-1.5	0.0	-1.1	-0.7
	70°	-0.4	-0.2	-0.4	-0.1	-0.4	-0.3	0.5	-0.5	0.1
	60°	0.3	0.2	0.3	0.7	-0.1	0.2	0.7	-0.3	0.5

Results summary

Results summary at 5G

Antenna	Detail	A3-Dual			A4-Dual		
Frequency	5.15G-5.85G	5.15G	5.5G	5.85G	5.15G	5.5G	5.85G
Efficiency	>70%	77	81	75	75	80	75
Peak Gain	3dBi<Peak Gain<5.5dBi	5.1	5.8	5.9	6.1	7.0	6.7
Horizontal cut Gain Flatness	90°	11.2	11.7	11.6	8.9	10.3	11.1
	80°	11.4	12.3	13.2	9.7	9.8	12.1
	70°	9.5	13.6	13.0	8.2	11.5	9.6
	60°	8.5	10.9	12.5	13.3	14.8	12.3
Horizontal cut Average Gain	90°	-1.2	-1.3	-1.7	-1.8	-2.0	-1.9
	80°	0.4	0.3	0.0	-0.2	-0.2	-0.1
	70°	1.6	1.7	1.1	1.1	0.7	1.4
	60°	1.9	2.1	1.1	1.0	0.6	1.5

Results summary

Results summary at 6G

Antenna	Detail	A1-6G			A2-6G		
Frequency	5.9G-7.2G	5.9G	6.5G	7.125G	5.9G	6.5G	7.125G
Efficiency	>70%	75	69	75	64	61	60
Peak Gain	3dBi<Peak Gain<5.5dBi	6.0	6.1	6.3	3.0	3.0	3.6
Horizontal cut Gain Flatness	90°	11.1	10.5	12.7	3.7	5.5	7.9
	80°	11.3	10.6	12.0	3.1	5.2	8.3
	70°	13.4	11.7	13.4	3.1	6.6	10.1
	60°	14.2	12.6	13.8	5.3	11.3	9.4
Horizontal cut Average Gain	90°	-2.0	-1.9	-2.5	-1.0	-0.5	-0.1
	80°	0.0	-0.3	-0.6	1.4	1.6	1.4
	70°	1.1	0.6	1.0	2.5	1.9	0.8
	60°	1.3	0.9	1.6	1.7	-0.4	-1.9

Results summary

Results summary at GNSS

Antenna	Detail	A6-GNSS		
Frequency	1.56G-1.61G	1.56G	1.575G	1.61G
Efficiency	>70%	84	84	77
Peak Gain	3dBi<Peak Gain<5.5dBi	3.6	3.6	3.3
Horizontal cut Gain Flatness	90°	5.1	4.9	4.7
	80°	5.6	5.1	5.0
	70°	6.0	5.4	6.3
	60°	6.6	6.9	8.1
Horizontal cut Average Gain	90°	-0.5	-0.5	-0.8
	80°	0.1	0.1	-0.2
	70°	0.6	0.6	0.2
	60°	0.8	0.8	0.4

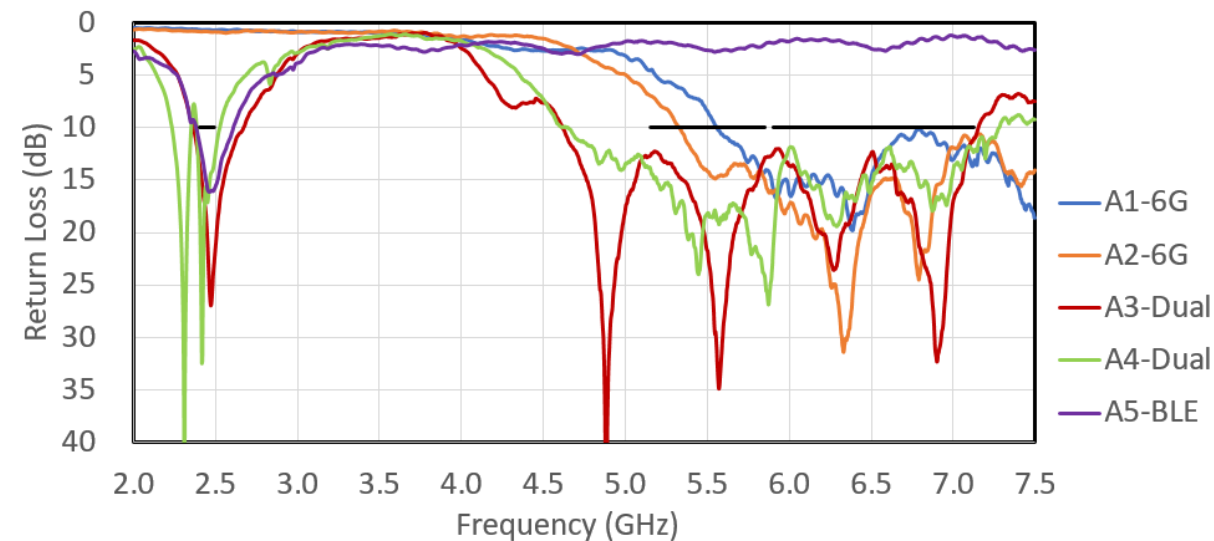
Results summary

Results summary at Uncorrelated Gain

	Gain(dBi)
	Uncorrelated
2.4G WIFI	2.9
5G WIFI	4.9
6G WIFI	4.3
BLE	3.0
GPS	3.7

Measurement data

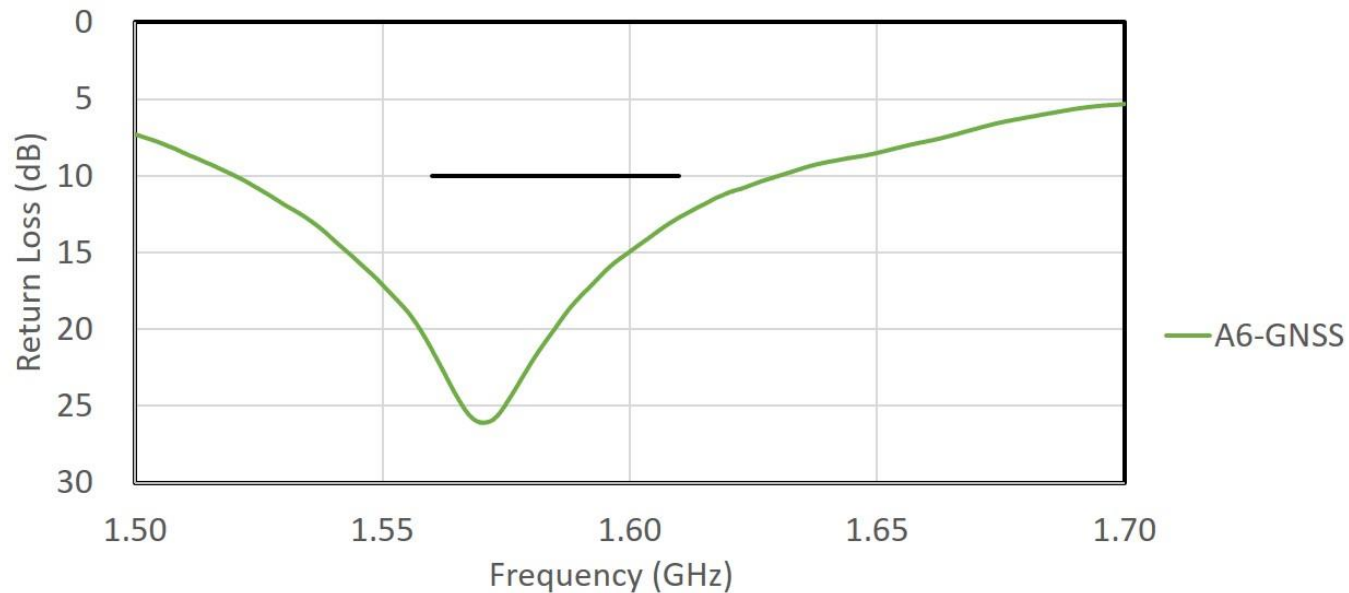
S-parameter: Return loss for WiFi&BLE



Return loss (dB)	A1	A2	A3	A4	A5
2400MHz	/	/	13.5	17.2	11.5
2490MHz	/	/	22.9	13.4	15.8
5150MHz	/	/	12.6	14.1	/
5500MHz	/	/	21.7	18.3	/
5850MHz	/	/	12.9	24.1	/
5900MHz	15.7	16.2	/	/	/
6500MHz	14.9	16.3	/	/	/
7125MHz	13.5	11.2	/	/	/

Measurement data

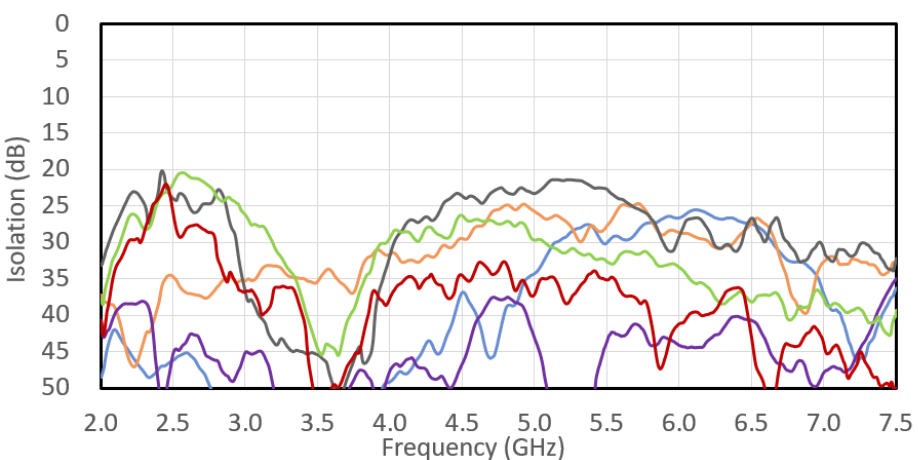
S-parameter:Return loss for GNSS



Return loss (dB)	A6
1560MHz	21.4
1575MHz	24.9
1610MHz	12.7

Measurement data

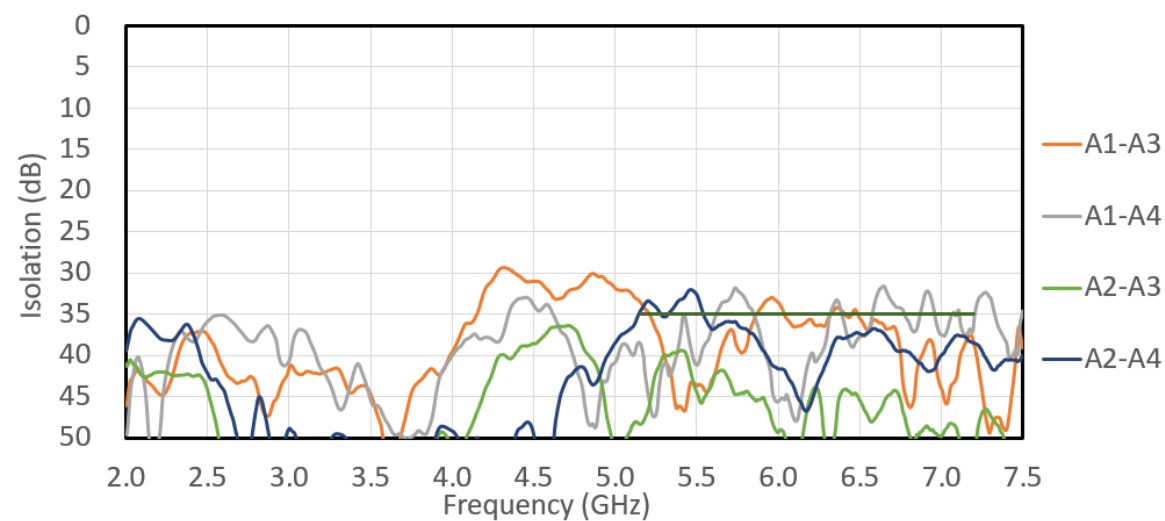
S-parameter:Isolation 2.4G&5G&6G



	Isolation (dB)	A1-A2	A1-A5	A2-A5	A3-A4	A3-A5	A4-A5
	2400MHz	47.3	38.1	50.4	22.1	24.0	23.7
	2490MHz	46.3	34.6	46.3	23.7	23.3	24.7
A1-A2	5150MHz	29.9	26.4	59.1	21.3	30.9	35.4
A1-A5	5500MHz	30.0	27.7	43.6	22.7	32.7	35.1
A2-A5	5850MHz	27.2	28.5	44.0	28.2	33.2	46.7
A3-A4	5900MHz	26.6	28.9	43.1	30.6	33.2	45.8
A3-A5	6500MHz	27.4	27.4	40.7	26.6	38.2	43.1
A4-A5	7200MHz	45.3	32.3	46.6	31.8	39.3	47.6

Measurement data

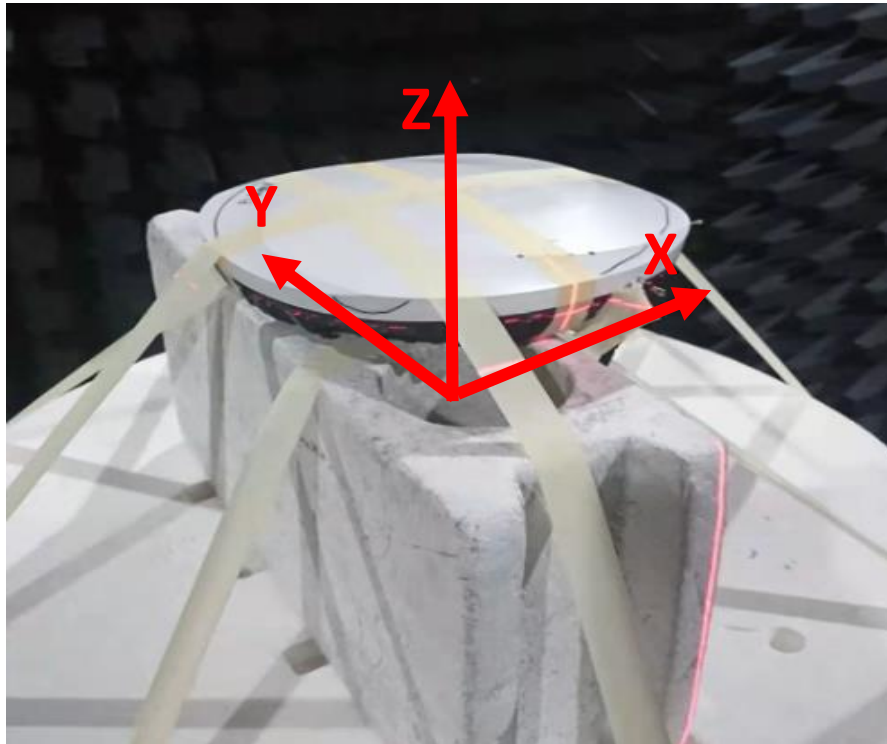
S-parameter:Isolation 5G&6G



Isolation (dB)	A1-A3	A1-A4	A2-A3	A2-A4
5150MHz	33.5	38.5	48.4	34.7
5500MHz	43.7	41.2	44.4	32.5
5900MHz	34.1	38.5	45.2	39.2
6500MHz	35.5	37.8	45.4	37.3
7200MHz	38.5	35.9	51.5	38.5

2D Radiation Pattern

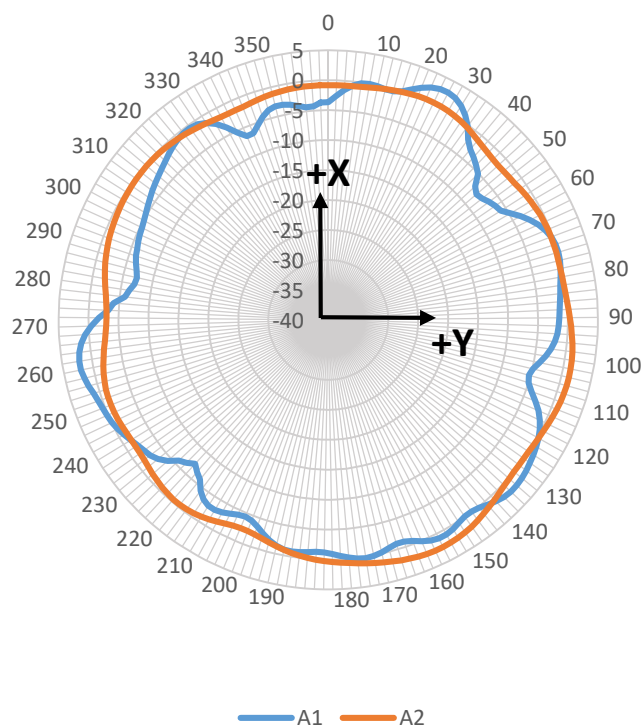
Test Setup for Radiation Pattern Measurement



2D Radiation Pattern

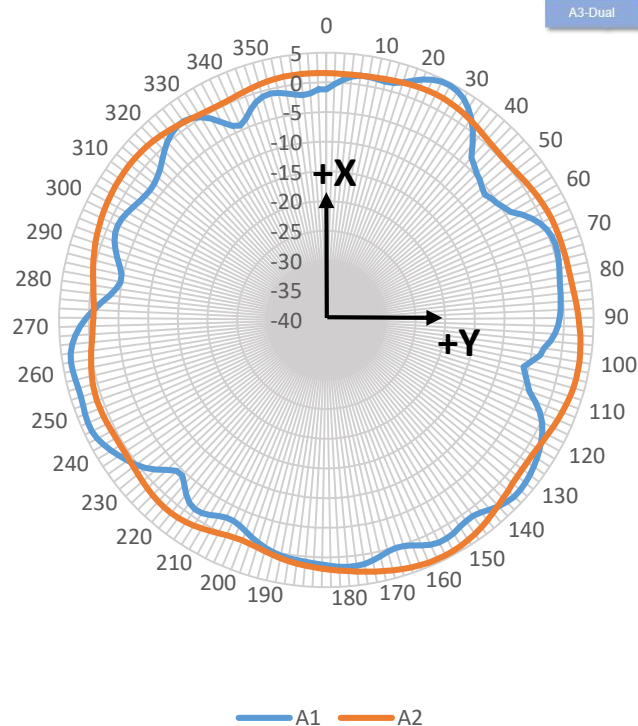
Radiation Pattern at 6.5G Azimuth XY

Azimuth (XY) @6.5GHz

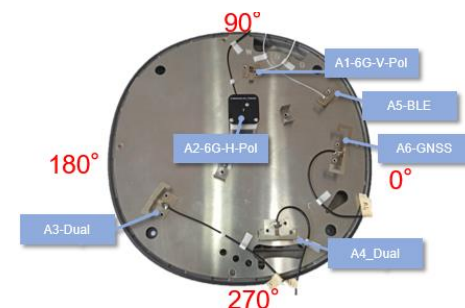


H-cut 90°

Azimuth (XY) @6.5GHz



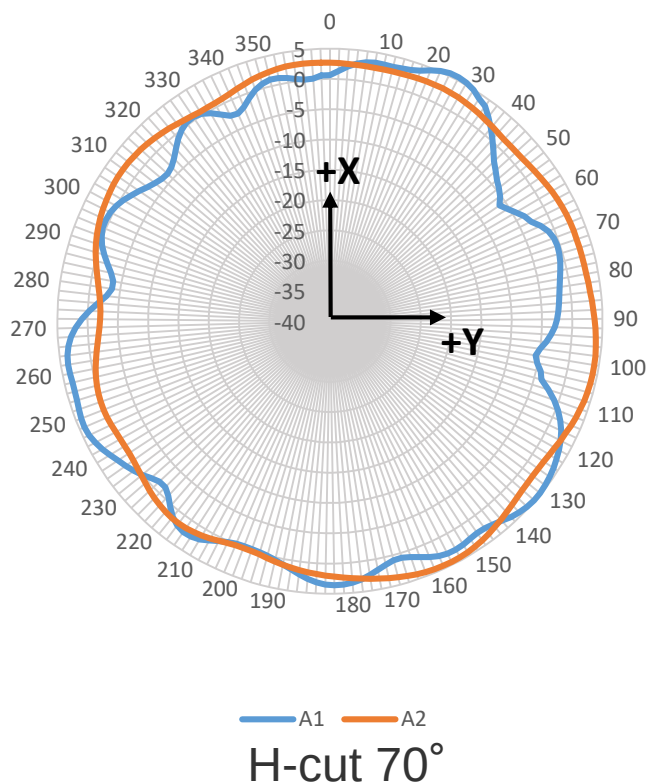
H-cut 80°



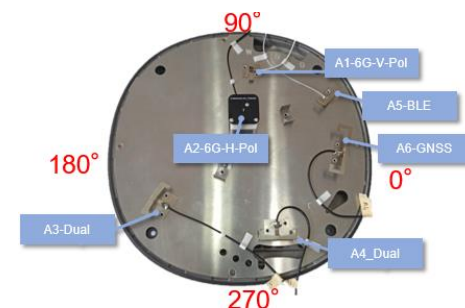
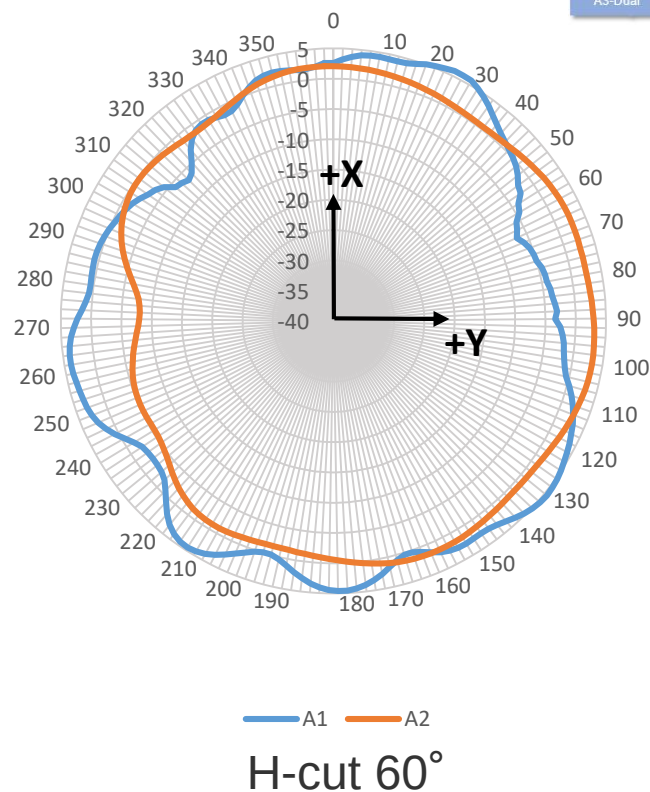
2D Radiation Pattern

Radiation Pattern at 6.5G Azimuth XY

Azimuth (XY) @6.5GHz



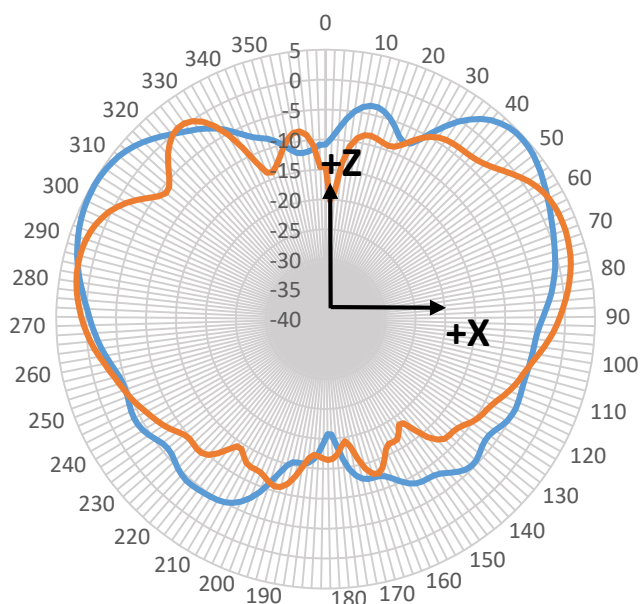
Azimuth (XY) @6.5GHz



2D Radiation Pattern

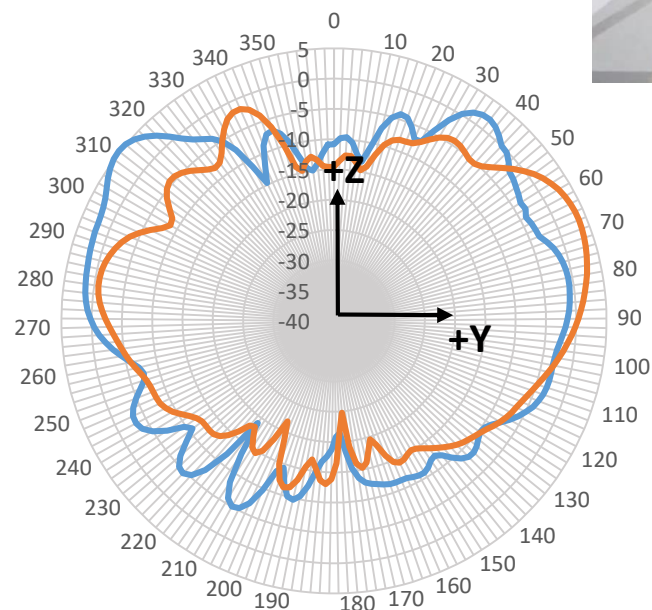
Radiation Pattern at 6.5G Elevation

Side to Side (XZ) @6.5GHz

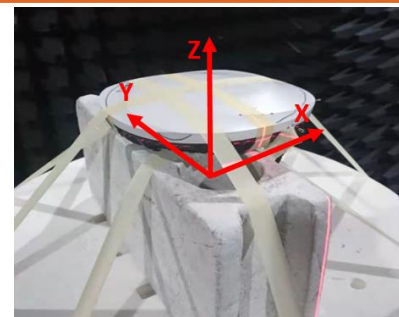


— A1 — A2
Side to Side (XZ)

Front to Back (YZ) @6.5GHz



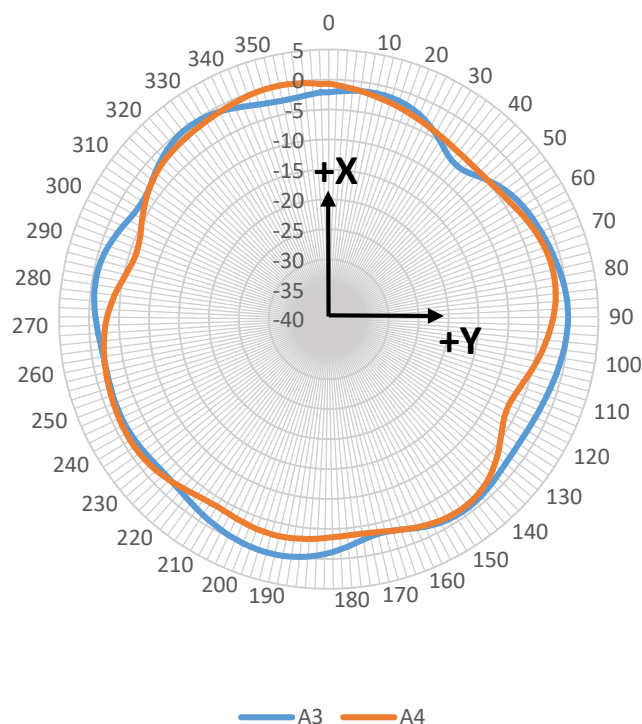
— A1 — A2
Front to Back (YZ)



2D Radiation Pattern

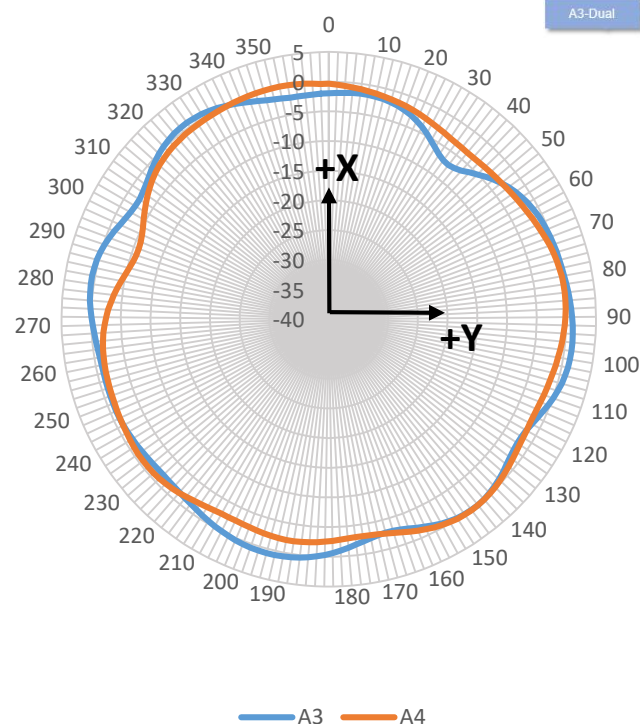
Radiation Pattern at 2.45G Azimuth XY

Azimuth (XY) @2.45GHz

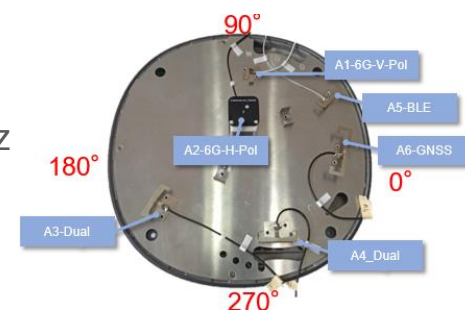


H-cut 90°

Azimuth (XY) @2.45GHz



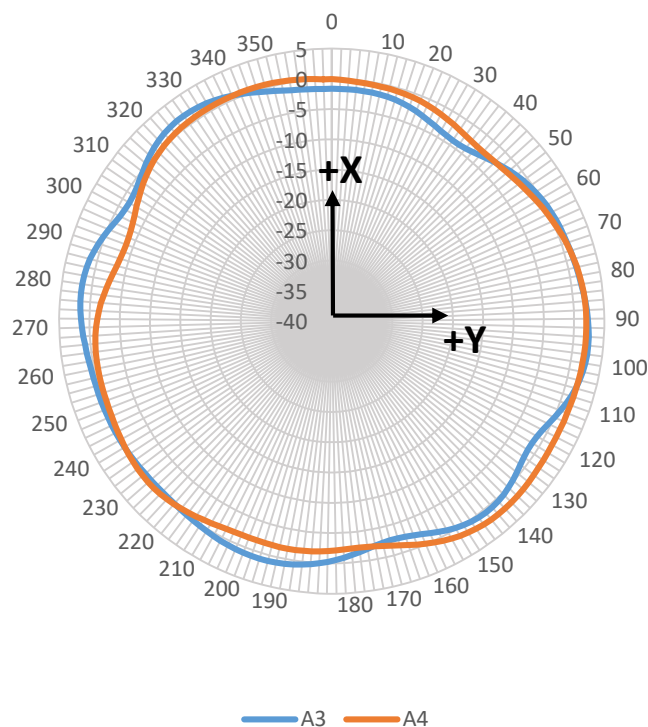
H-cut 80°



2D Radiation Pattern

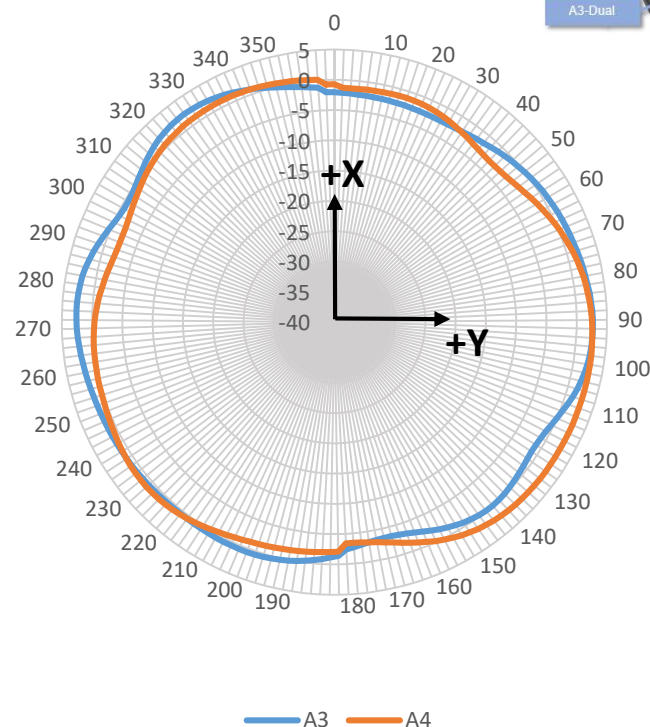
Radiation Pattern at 2.45G Azimuth XY

Azimuth (XY) @2.45GHz

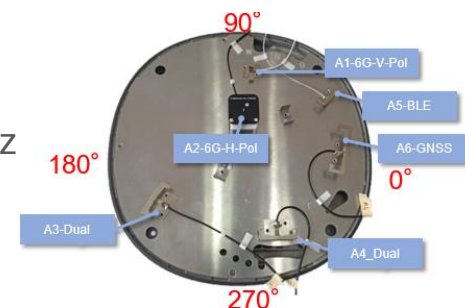


H-cut 70°

Azimuth (XY) @2.45GHz



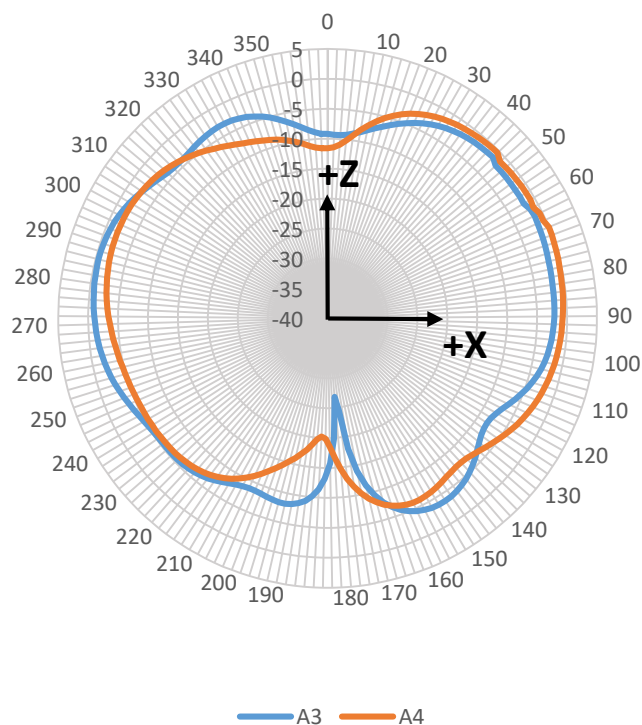
H-cut 60°



2D Radiation Pattern

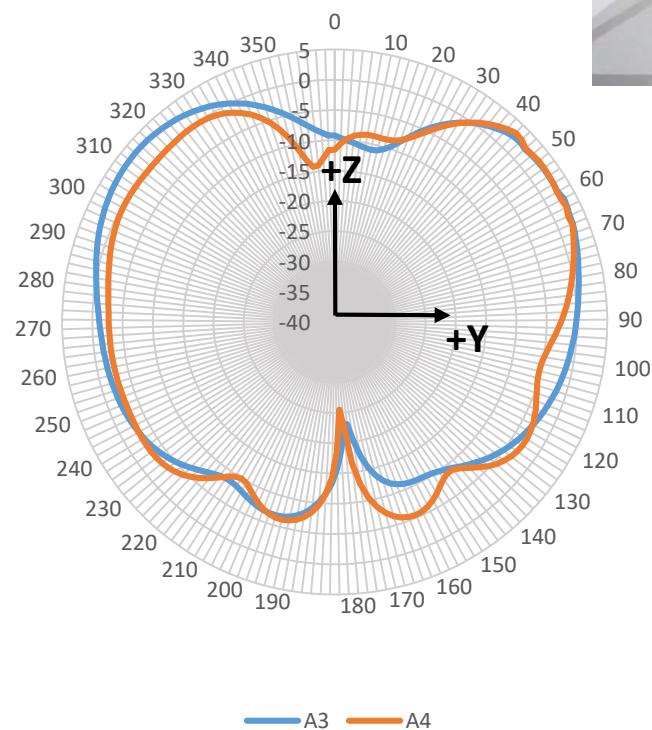
Radiation Pattern at 2.45G Elevation

Side to Side (XZ) @2.45GHz

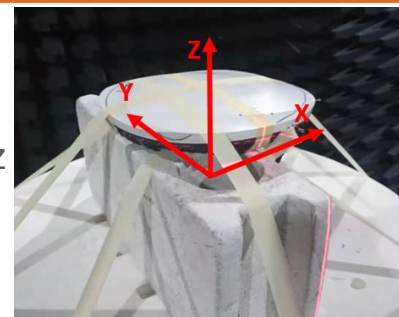


Side to Side (XZ)

Front to Back (YZ) @2.45GHz



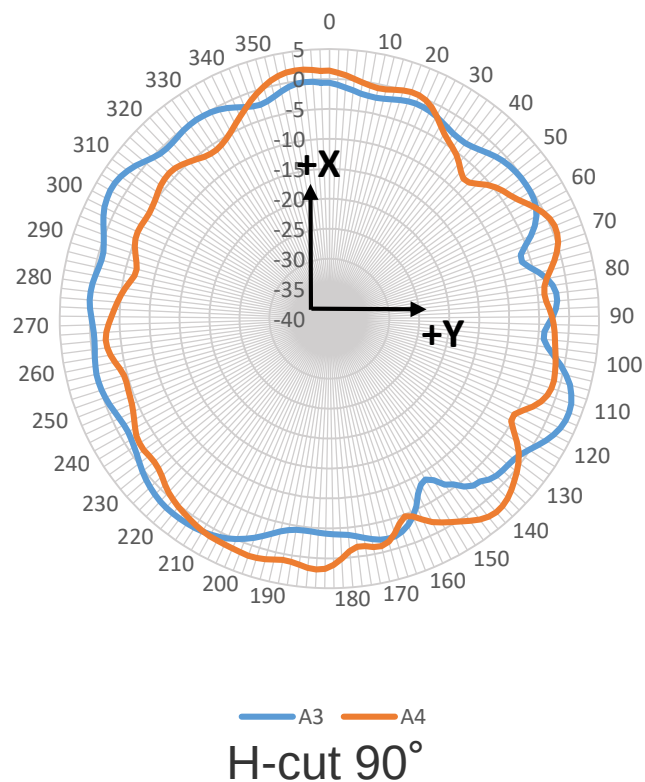
Front to Back (YZ)



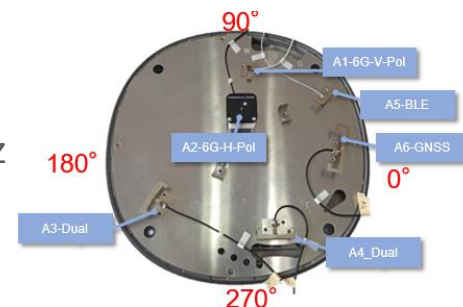
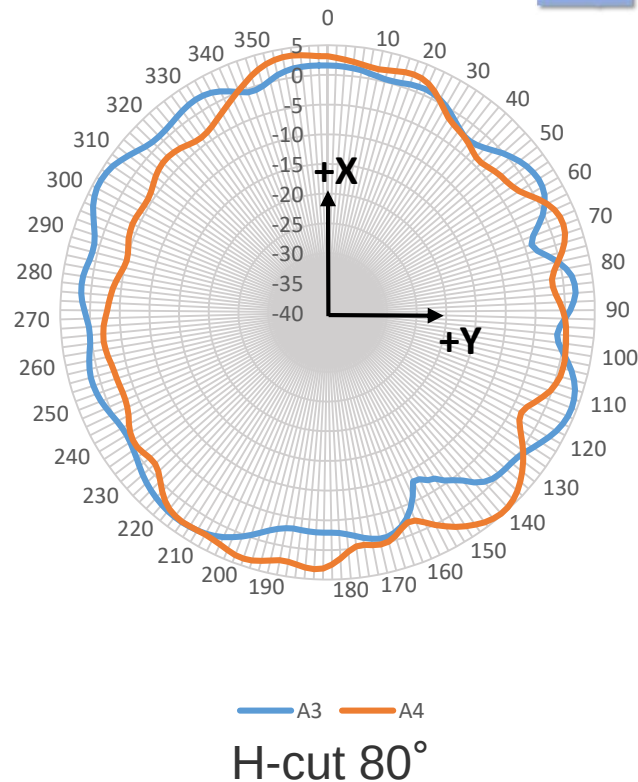
2D Radiation Pattern

Radiation Pattern at 5.5G Azimuth XY

Azimuth (XY) @5.5GHz



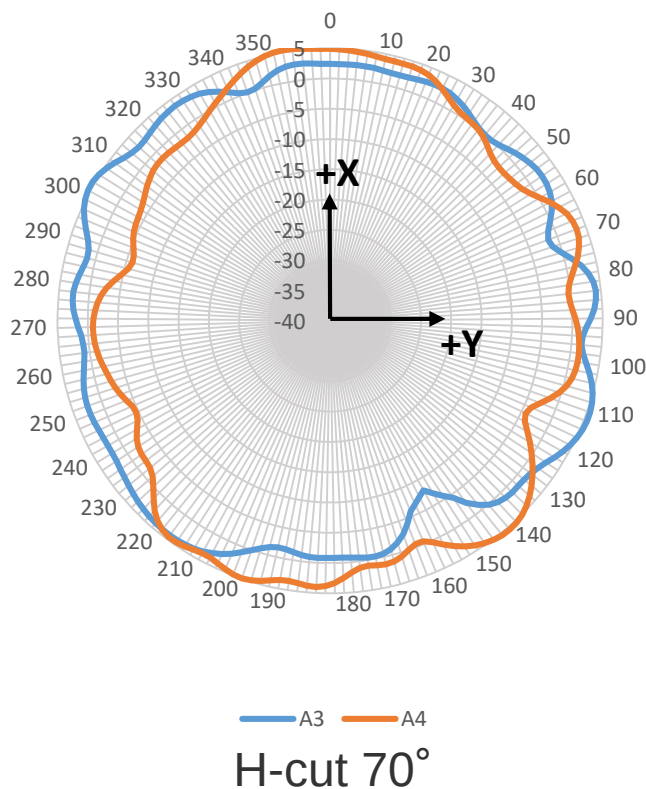
Azimuth (XY) @5.5GHz



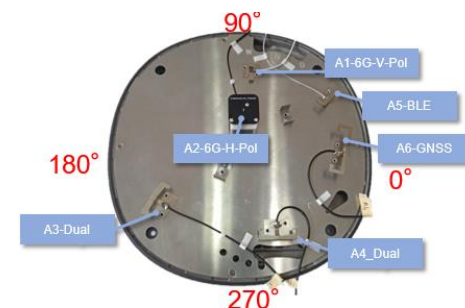
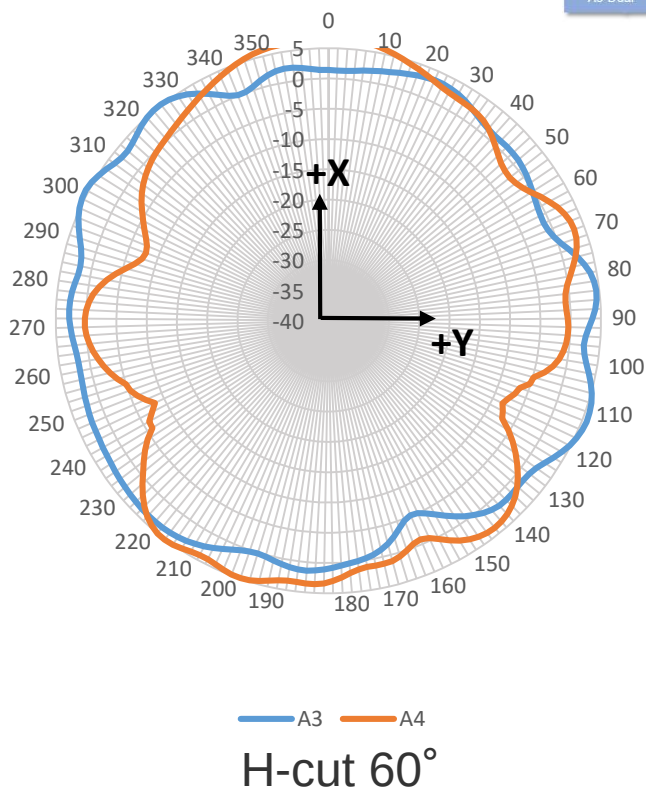
2D Radiation Pattern

Radiation Pattern at 5.5G Azimuth XY

Azimuth (XY) @5.5GHz



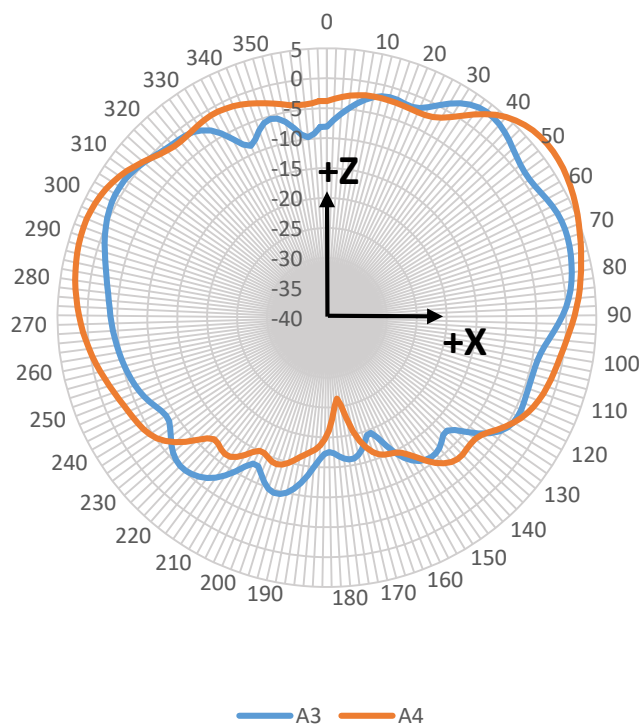
Azimuth (XY) @5.5GHz



2D Radiation Pattern

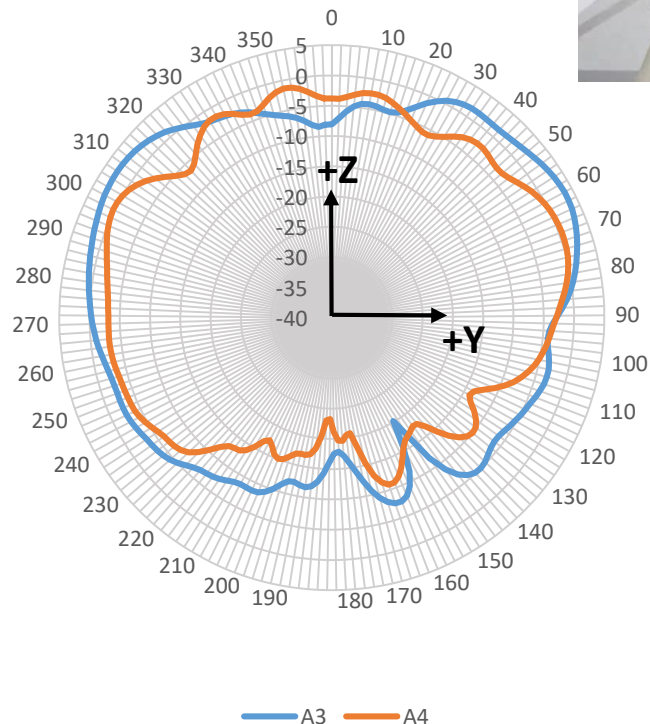
Radiation Pattern at 5.5G Elevation

Side to Side (XZ) @5.5GHz

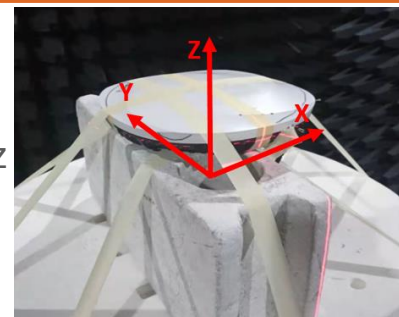


Side to Side (XZ)

Front to Back (YZ) @5.5GHz

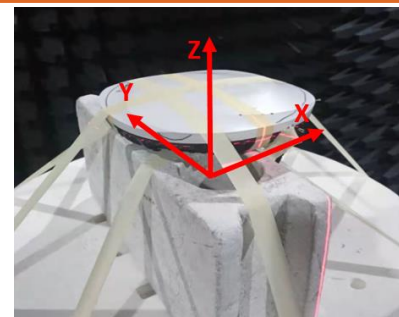


Front to Back (YZ)

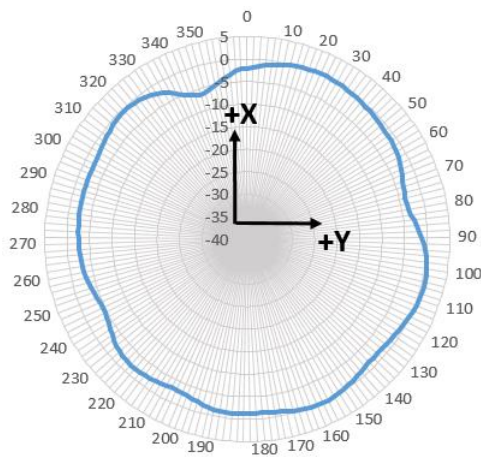


2D Radiation Pattern BLE

Radiation Pattern at 2.45G

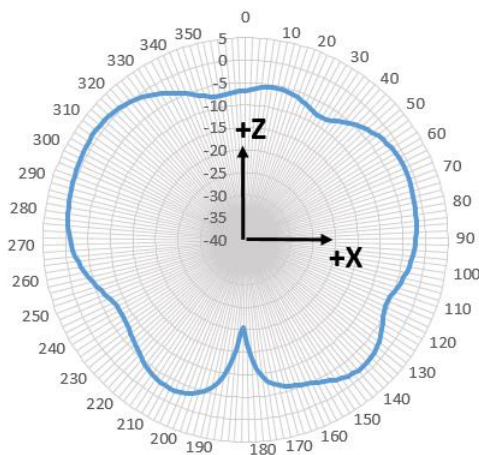


Azimuth (XY) @2.45GHz



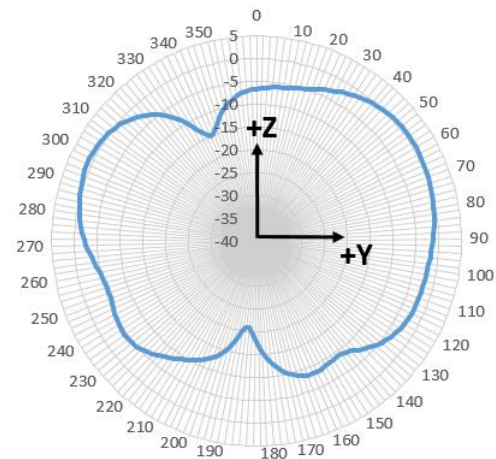
Azimuth (XY)

Side to Side (XZ) @2.45GHz



Side to Side (XZ)

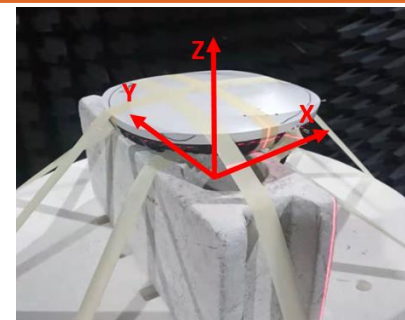
Front to Back (YZ) @2.45GHz



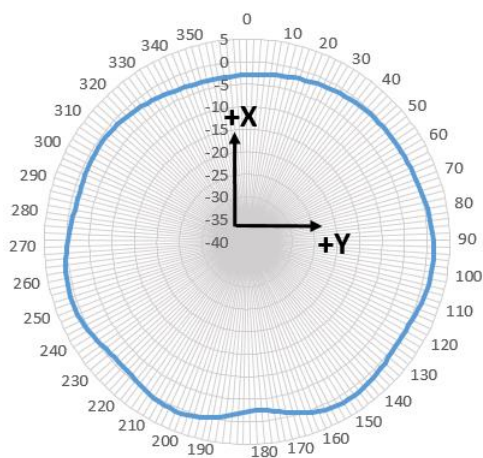
Front to Back (YZ)

2D Radiation Pattern GNSS

Radiation Pattern at 1.575G



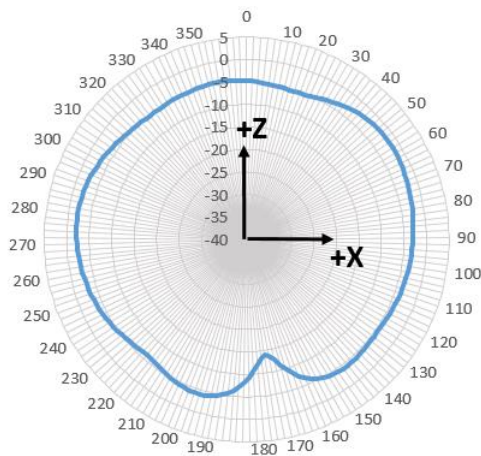
Azimuth (XY) @1.575GHz



— A5

Azimuth (XY)

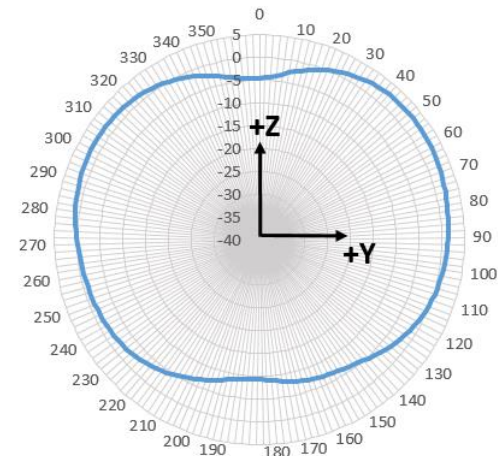
Side to Side (XZ) @1.575GHz



— A5

Side to Side (XZ)

Front to Back (YZ) @1.575GHz



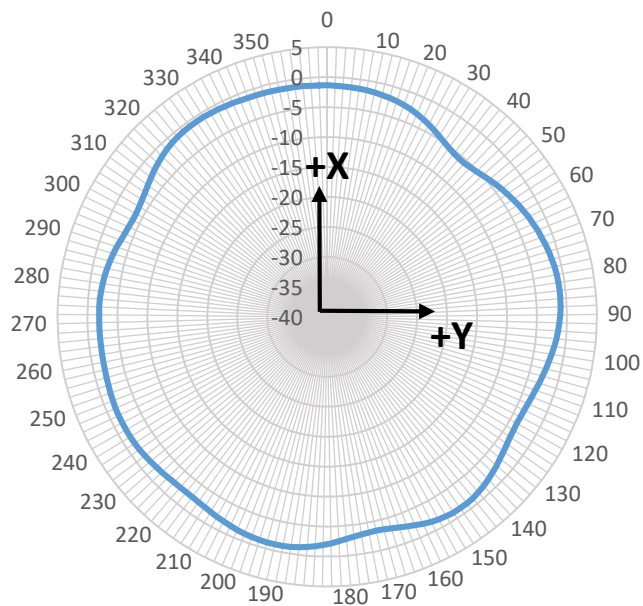
— A5

Front to Back (YZ)

2D Radiation Pattern Uncorrelated

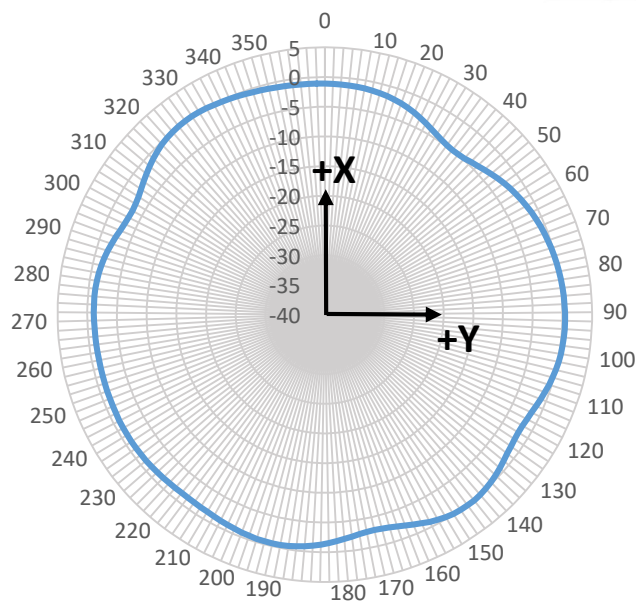
Radiation Pattern at 2.45G

Azimuth (XY) @2.45GHz

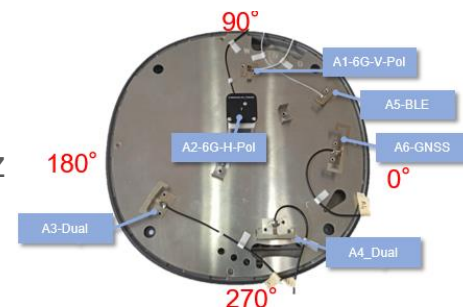


— Uncorrelated Gain
H-cut 90°

Azimuth (XY) @2.45GHz



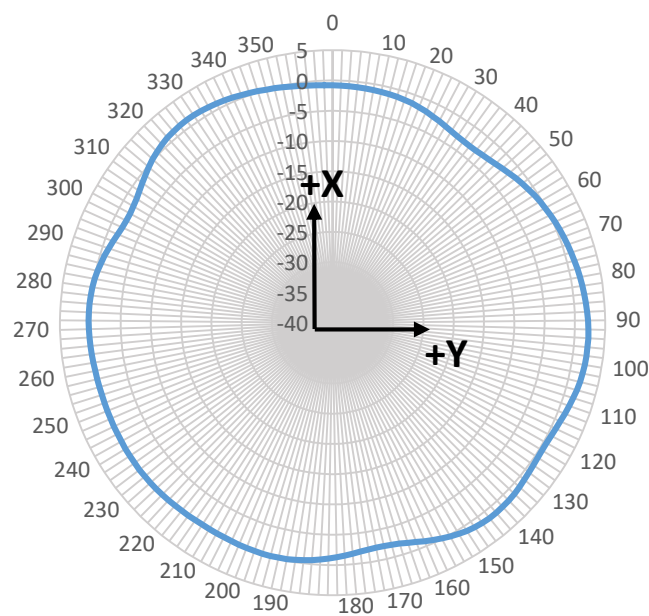
— Uncorrelated Gain
H-cut 80°



2D Radiation Pattern Uncorrelated

Radiation Pattern at 2.45G

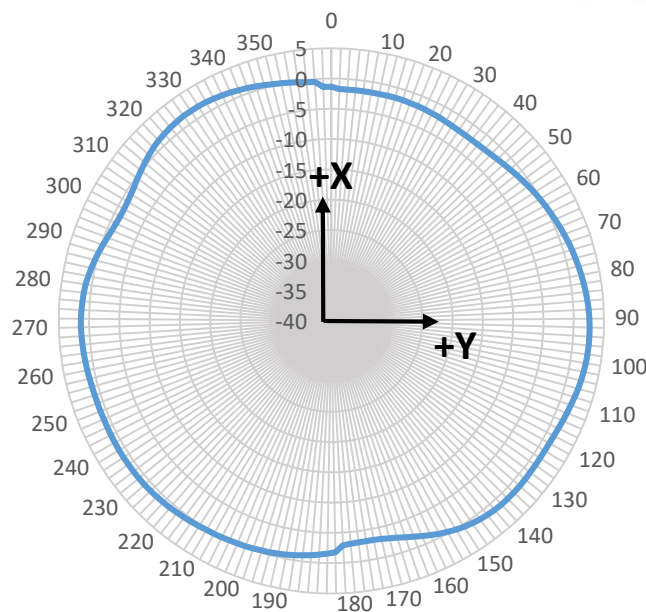
Azimuth (XY) @2.45GHz



— Uncorrelated Gain

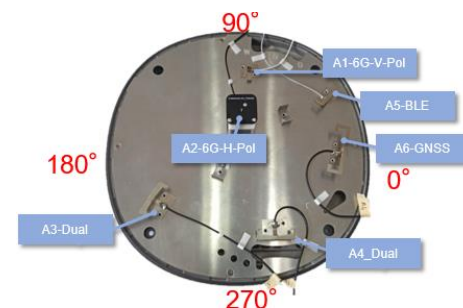
H-cut 70°

Azimuth (XY) @2.45GHz



— Uncorrelated Gain

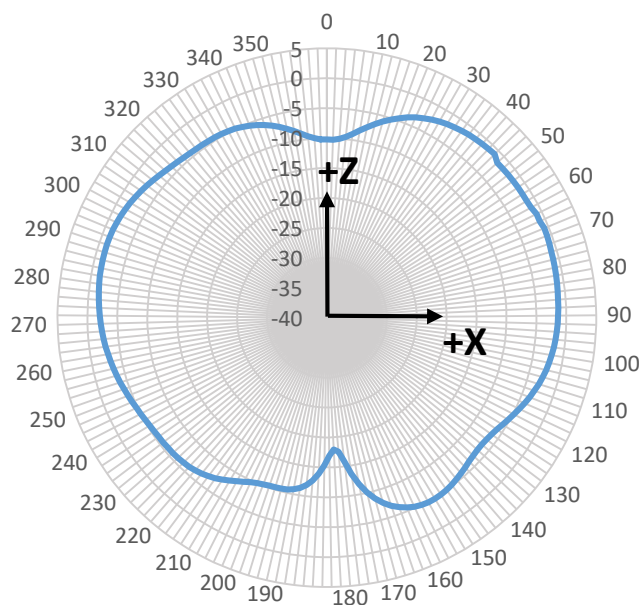
H-cut 60°



2D Radiation Pattern Uncorrelated

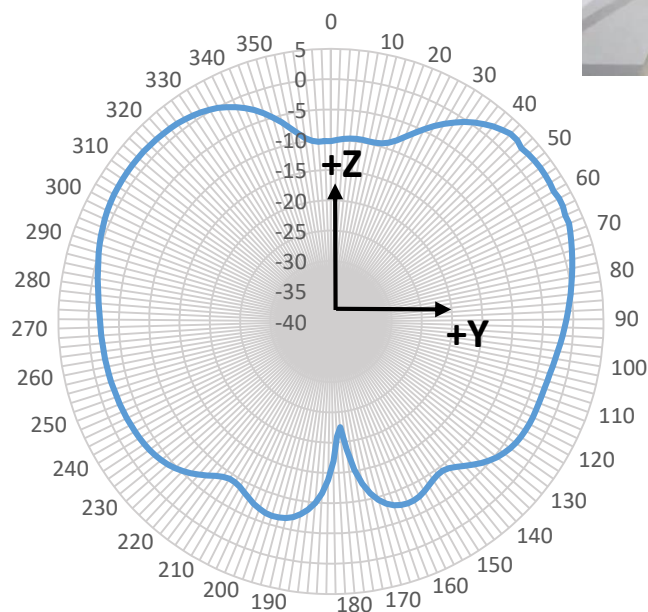
Radiation Pattern at 2.45G Elevation

Side to Side (XZ) @2.45GHz

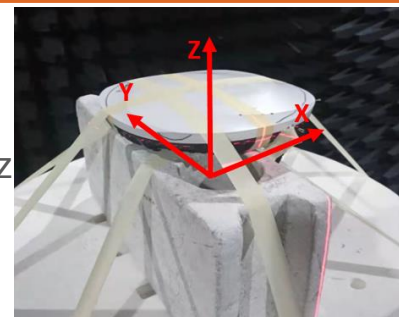


— Uncorrelated Gain
Side to Side (XZ)

Front to Back (YZ) @2.45GHz



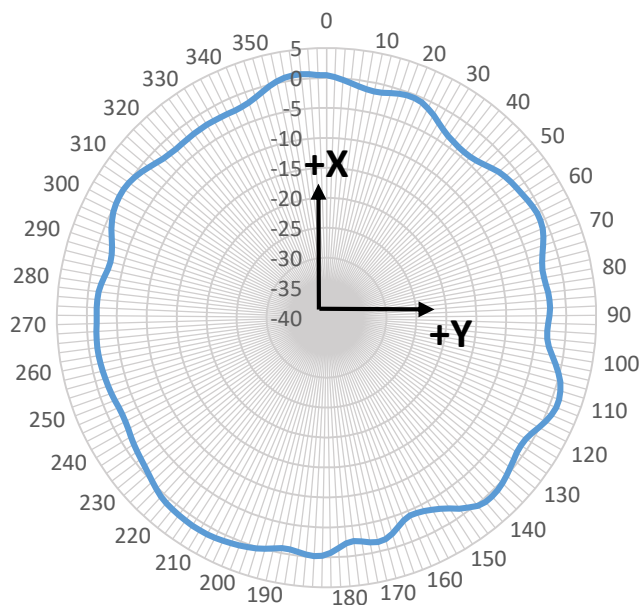
— Uncorrelated Gain
Front to Back (YZ)



2D Radiation Pattern Uncorrelated

Radiation Pattern at 5.5G

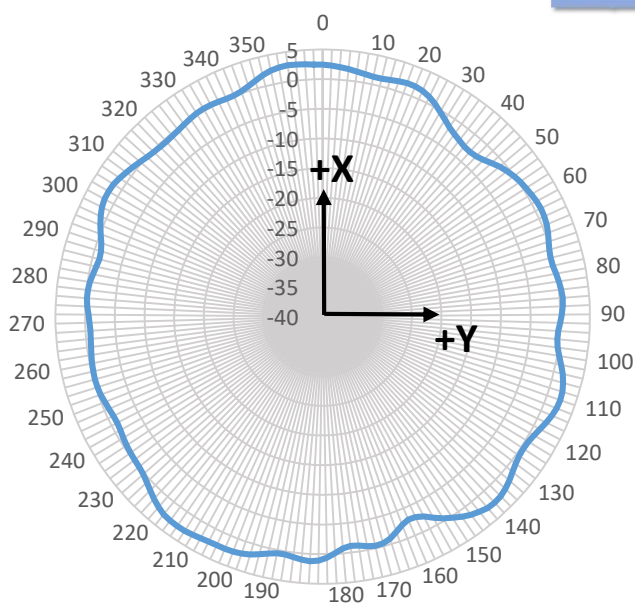
Azimuth (XY) @5.5GHz



— Uncorrelated Gain

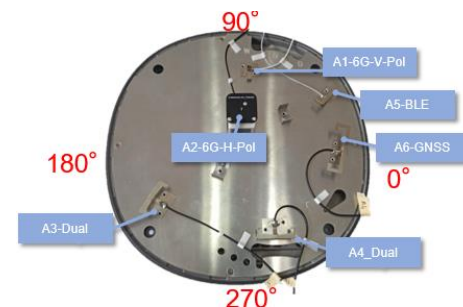
H-cut 90°

Azimuth (XY) @5.5GHz



— Uncorrelated Gain

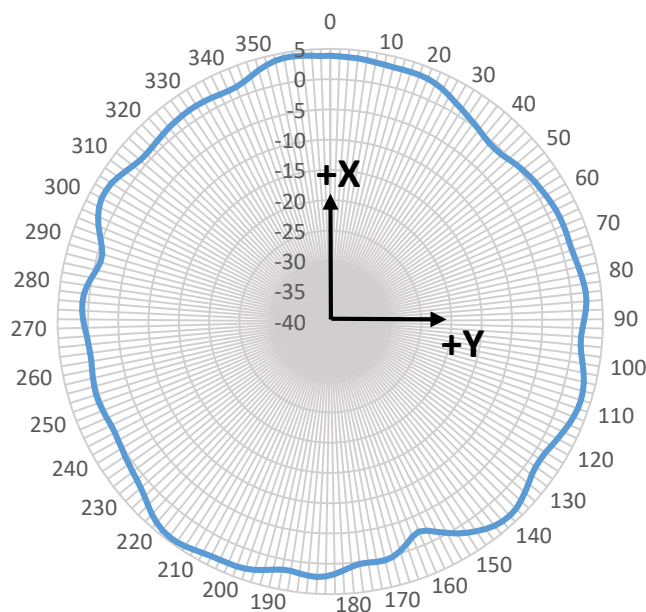
H-cut 80°



2D Radiation Pattern Uncorrelated

Radiation Pattern at 5.5G

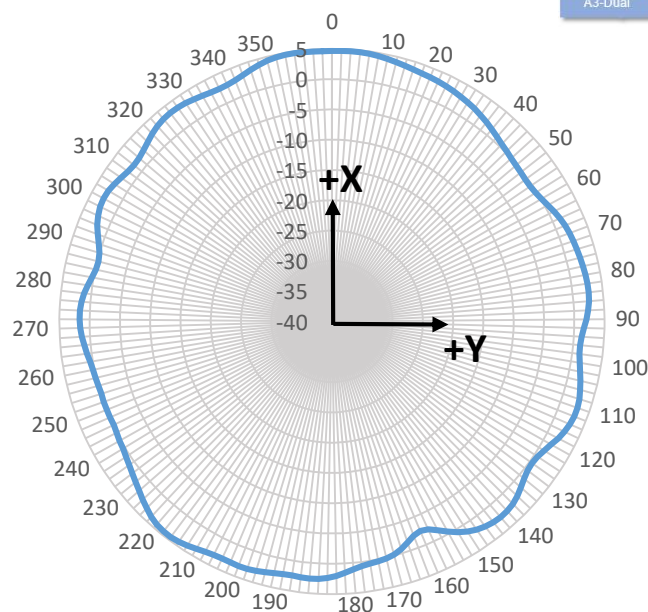
Azimuth (XY) @5.5GHz



— Uncorrelated Gain

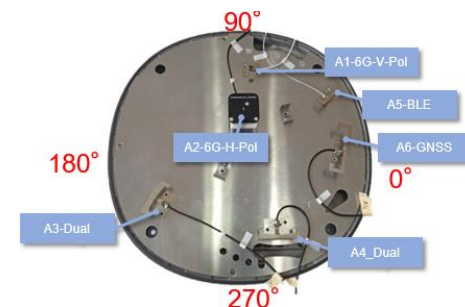
H-cut 70°

Azimuth (XY) @5.5GHz



— Uncorrelated Gain

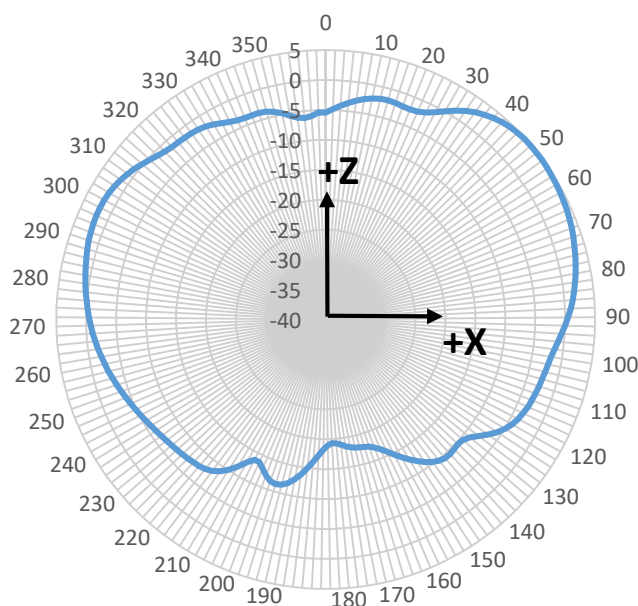
H-cut 60°



2D Radiation Pattern Uncorrelated

Radiation Pattern at 5.5G Elevation

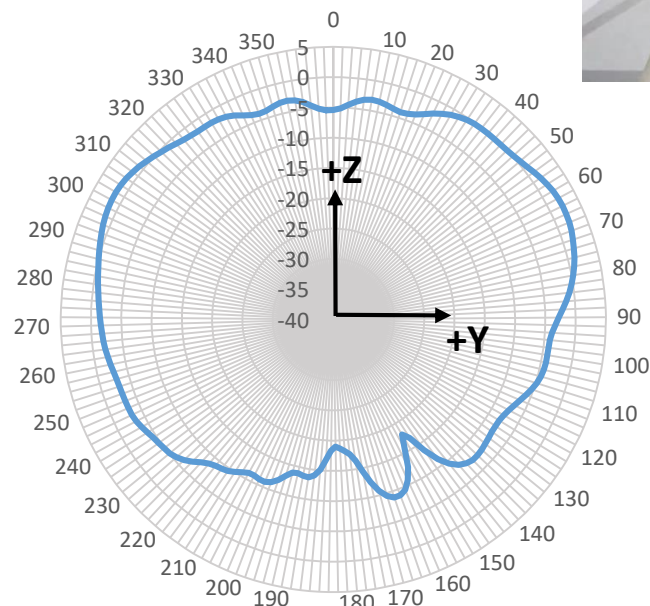
Side to Side (XZ) @5.5GHz



— Uncorrelated Gain

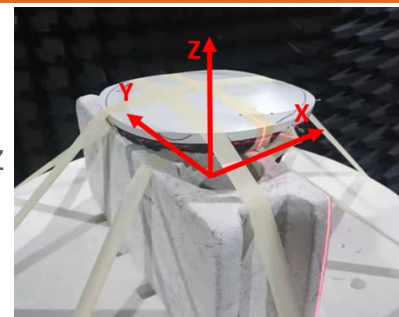
Side to Side (XZ)

Front to Back (YZ) @5.5GHz



— Uncorrelated Gain

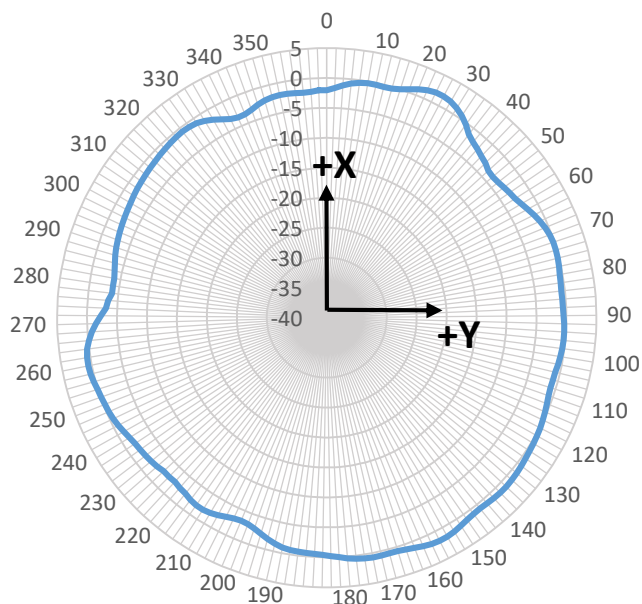
Front to Back (YZ)



2D Radiation Pattern Uncorrelated

Radiation Pattern at 6.5G

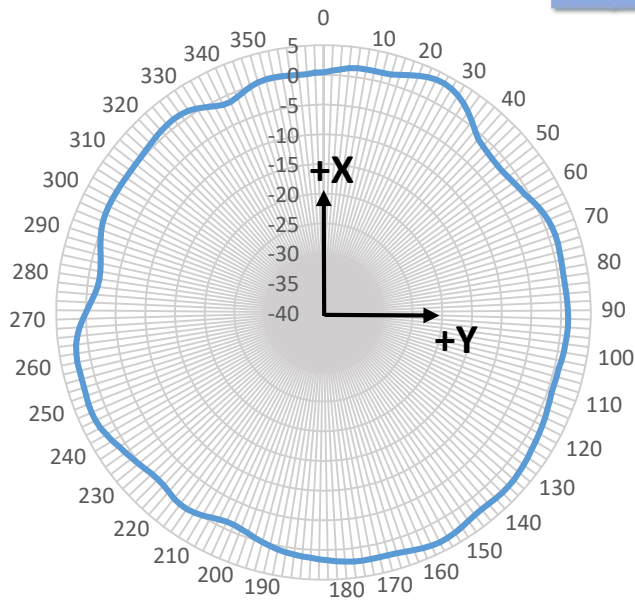
Azimuth (XY) @6.5GHz



— Uncorrelated Gain

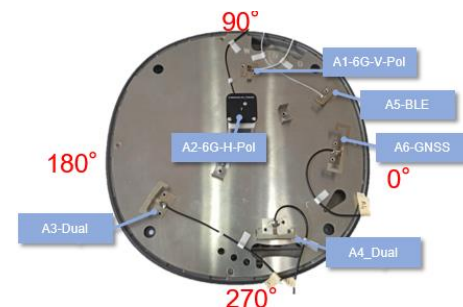
H-cut 90°

Azimuth (XY) @6.5GHz



— Uncorrelated Gain

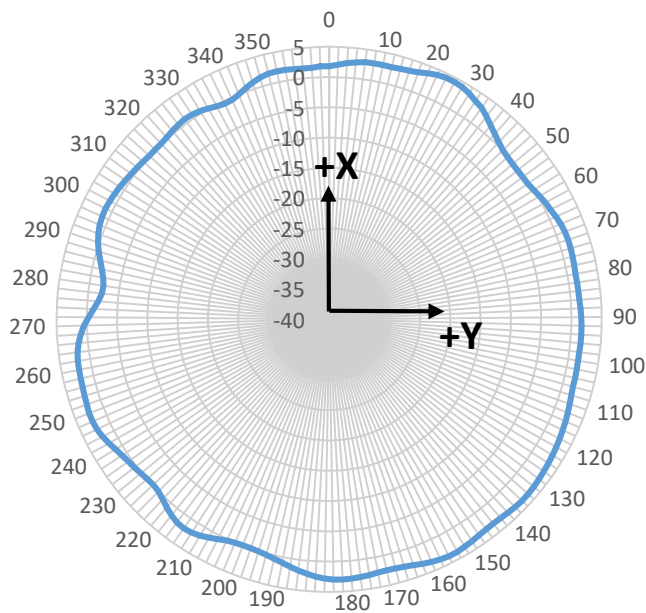
H-cut 80°



2D Radiation Pattern Uncorrelated

Radiation Pattern at 6.5G

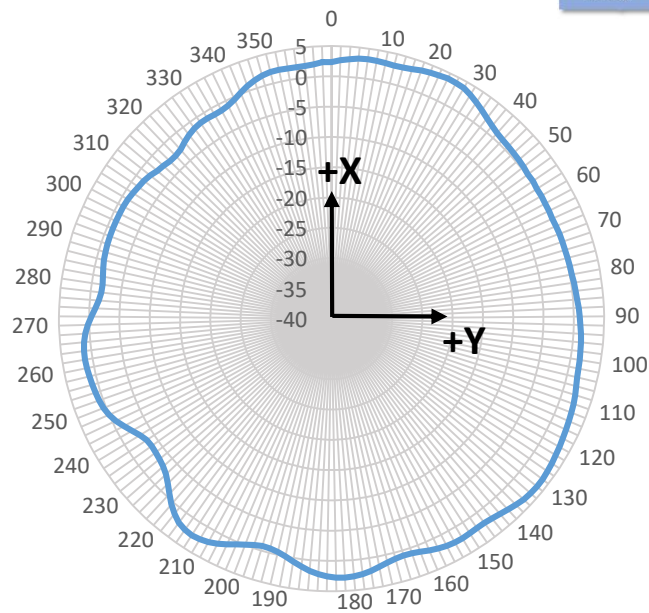
Azimuth (XY) @6.5GHz



— Uncorrelated Gain

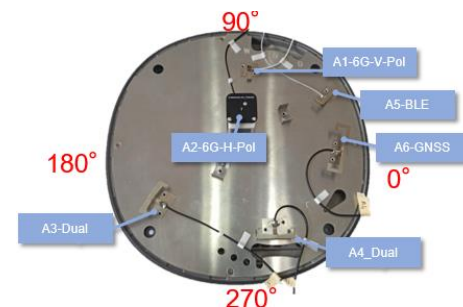
H-cut 70°

Azimuth (XY) @6.5GHz



— Uncorrelated Gain

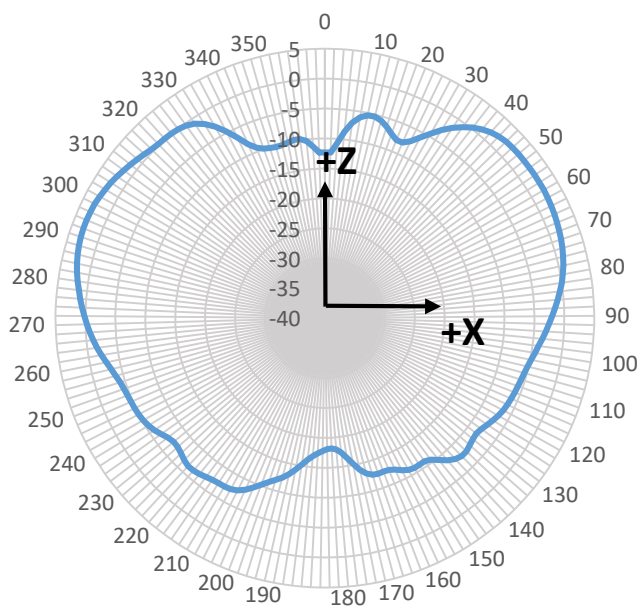
H-cut 60°



2D Radiation Pattern Uncorrelated

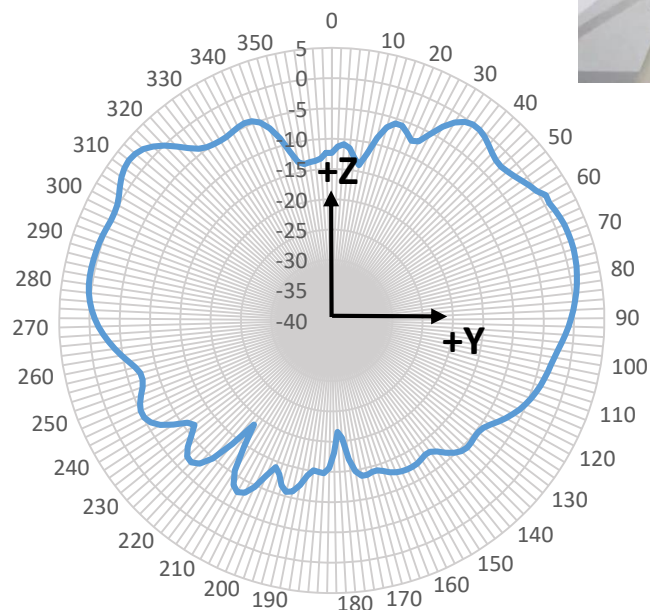
Radiation Pattern at 6.5G Elevation

Side to Side (XZ) @6.5GHz

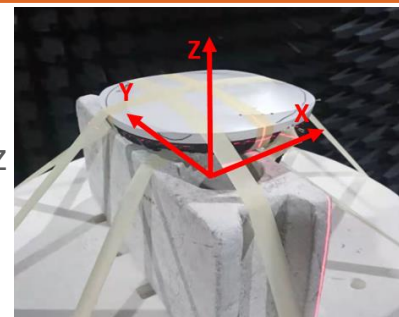


— Uncorrelated Gain
Side to Side (XZ)

Front to Back (YZ) @6.5GHz



— Uncorrelated Gain
Front to Back (YZ)



Appendix

Raw Data

Datasheet