
Report for Broadcom

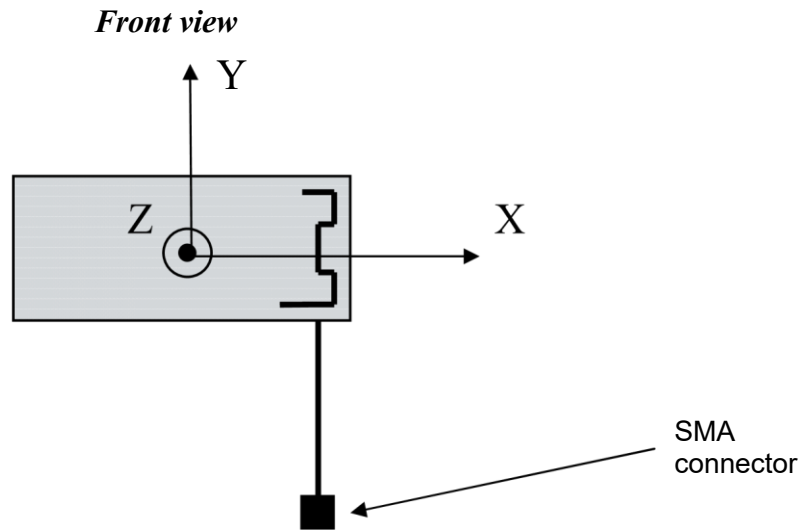
By Alfred Grau

Tested Products.

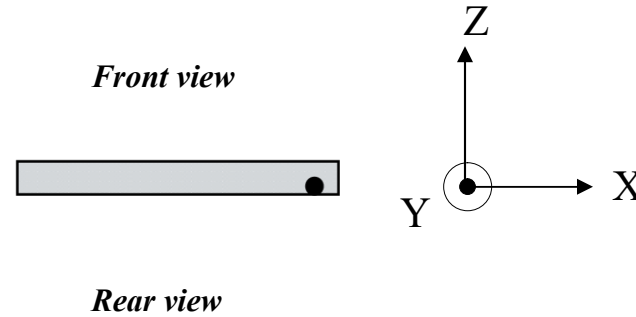
- Antenna 1: integrated antenna.
 - Frequency = 2.402GHz.
 - Frequency = 2.441GHz.
 - Frequency = 2.480GHz.

Coordinate System Reference: Antenna 1.

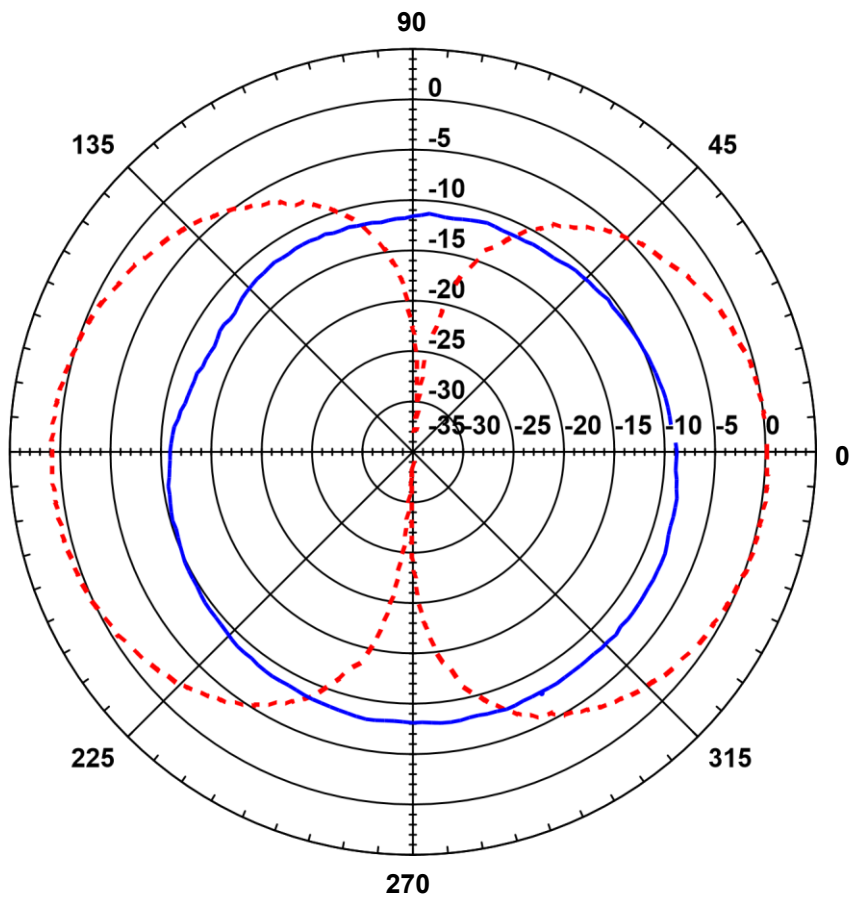
Top view



Side view

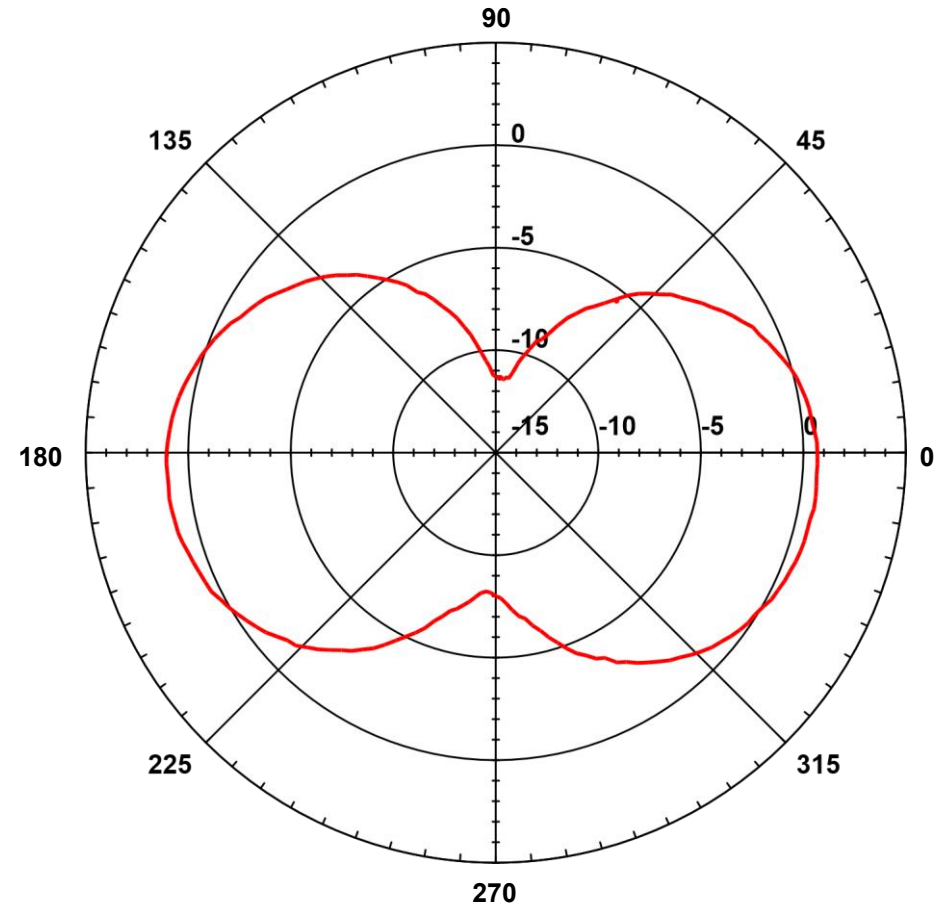


Radiation pattern: Antenna 1. XZ Plane at $f = 2.402\text{GHz}$



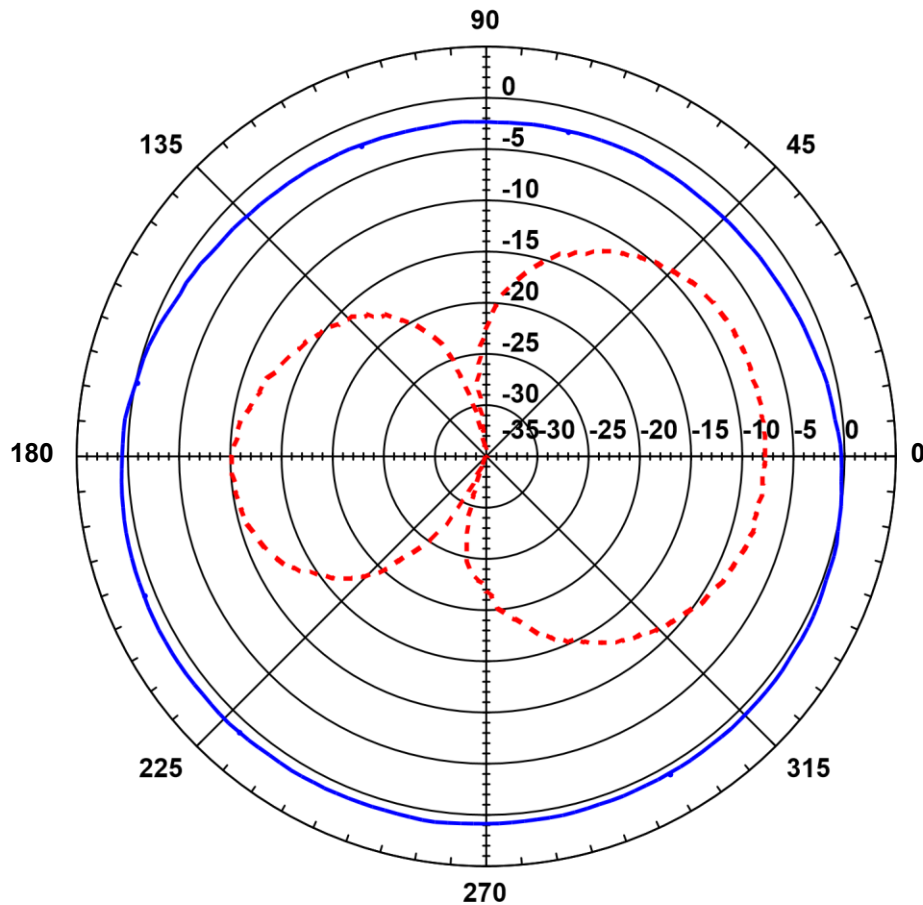
Co-cross polarization field (dBi)

Solid line: vertical polarization
Dash line: horizontal polarization



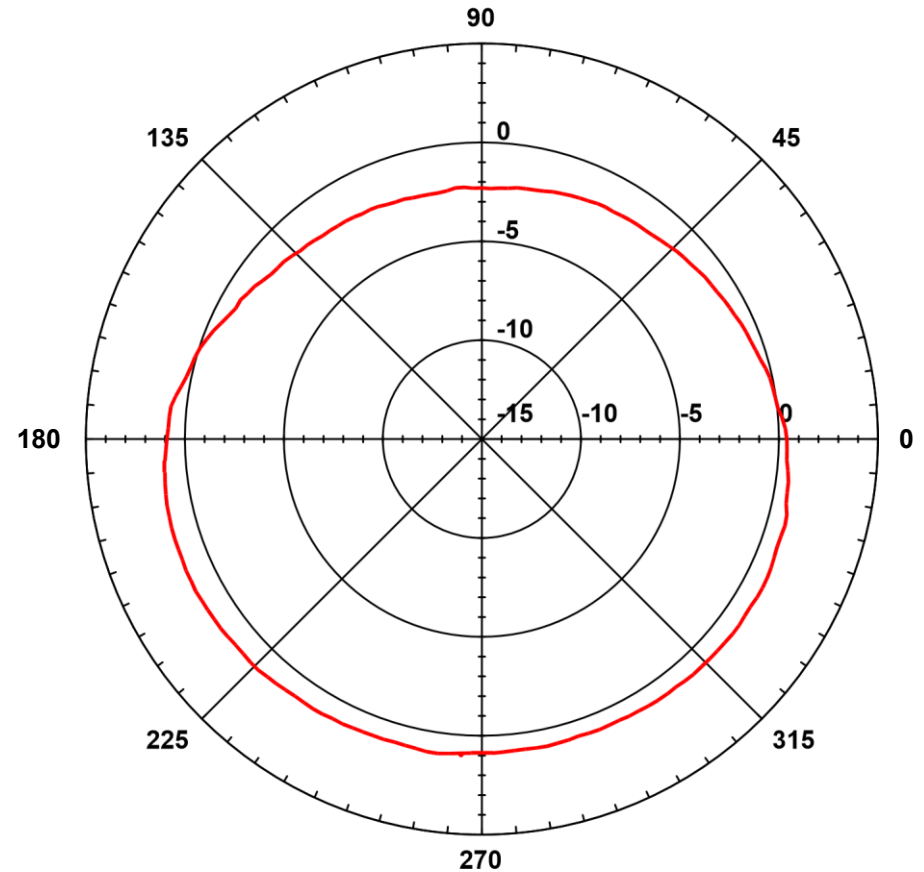
Total field (dBi)

Radiation pattern: Antenna 1. YZ Plane at $f = 2.402\text{GHz}$



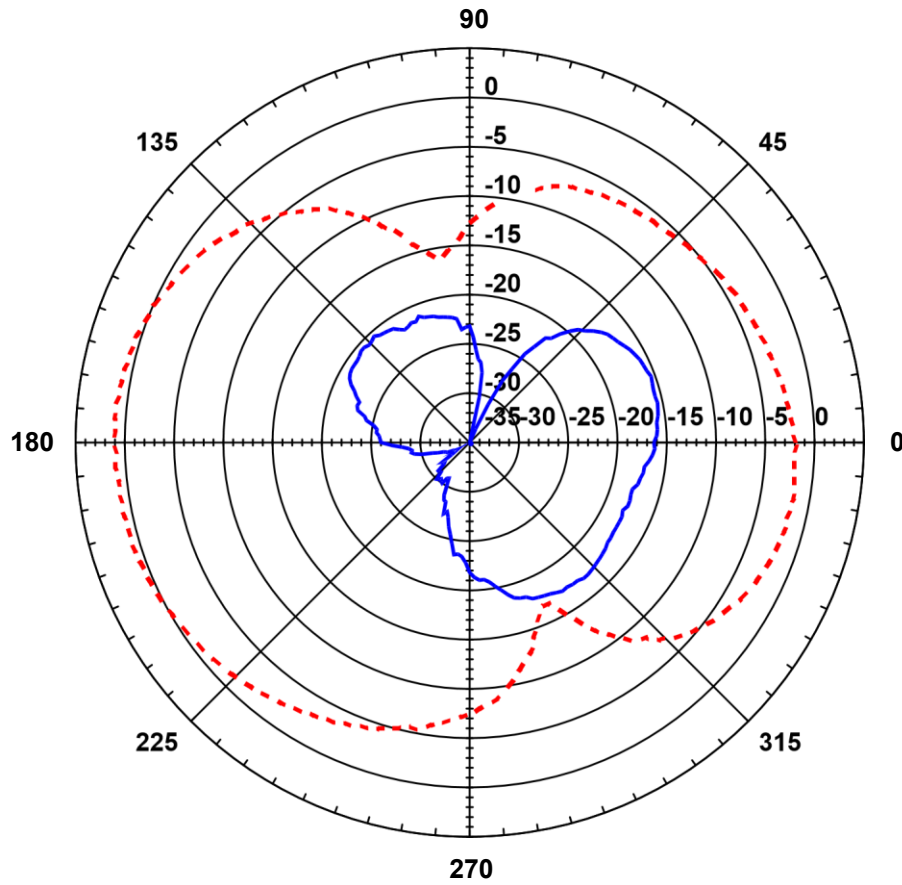
Co-cross polarization field (dBi)

Solid line: vertical polarization
Dash line: horizontal polarization



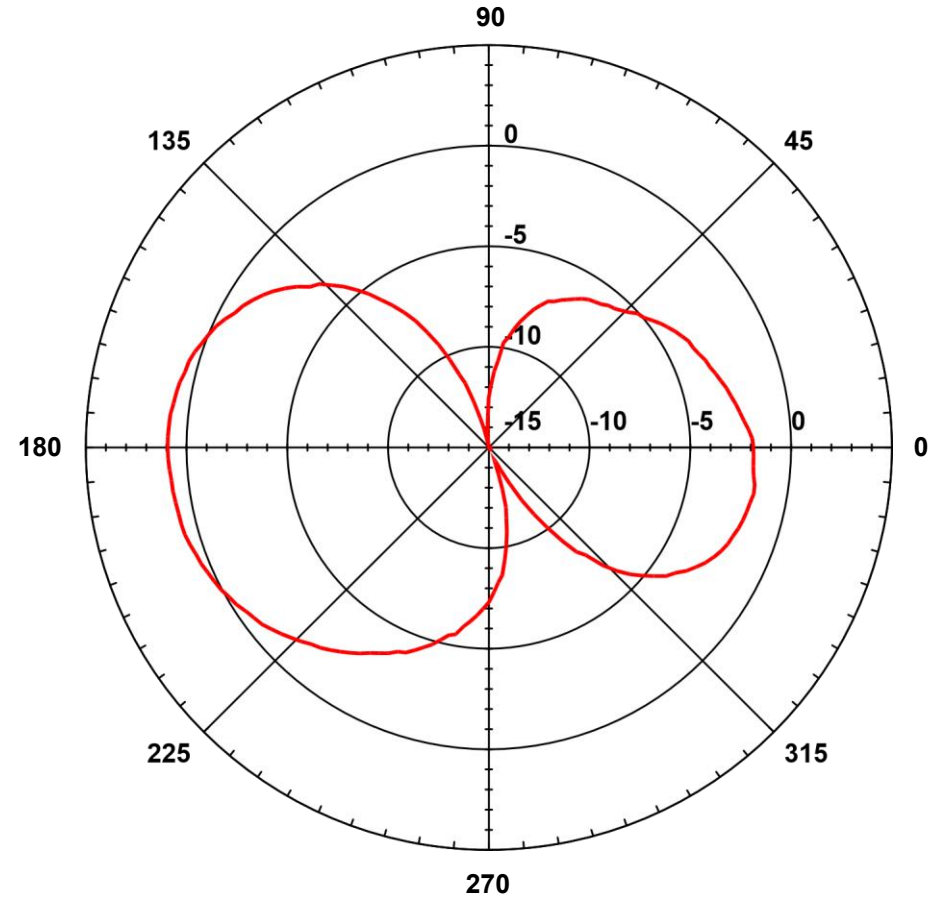
Total field (dBi)

Radiation pattern: Antenna 1. XY Plane at $f = 2.402\text{GHz}$



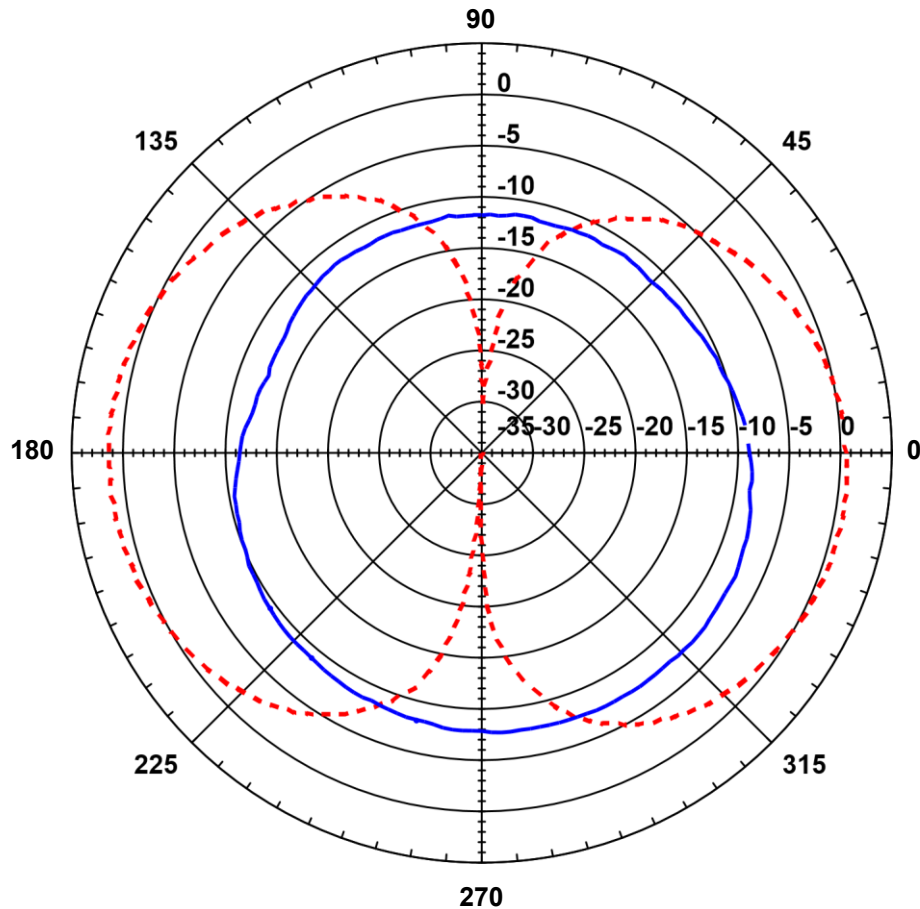
Co-cross polarization field (dBi)

Solid line: vertical polarization
Dash line: horizontal polarization



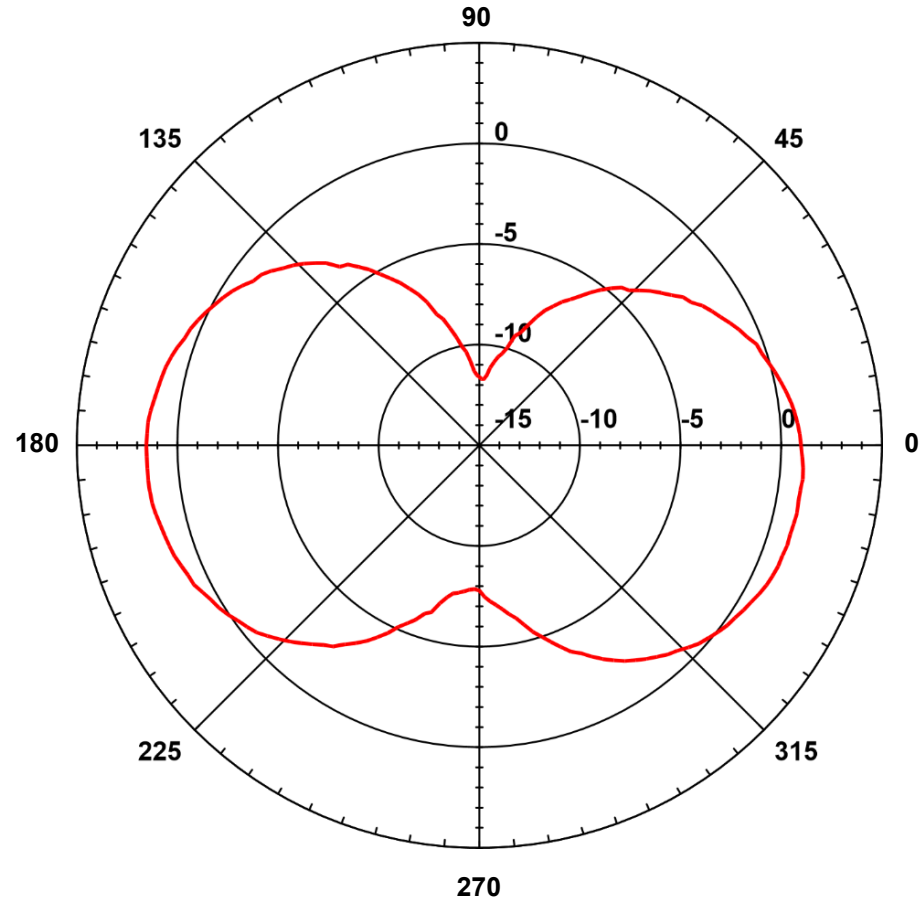
Total field (dBi)

Radiation pattern: Antenna 1. XZ Plane at $f = 2.441\text{GHz}$



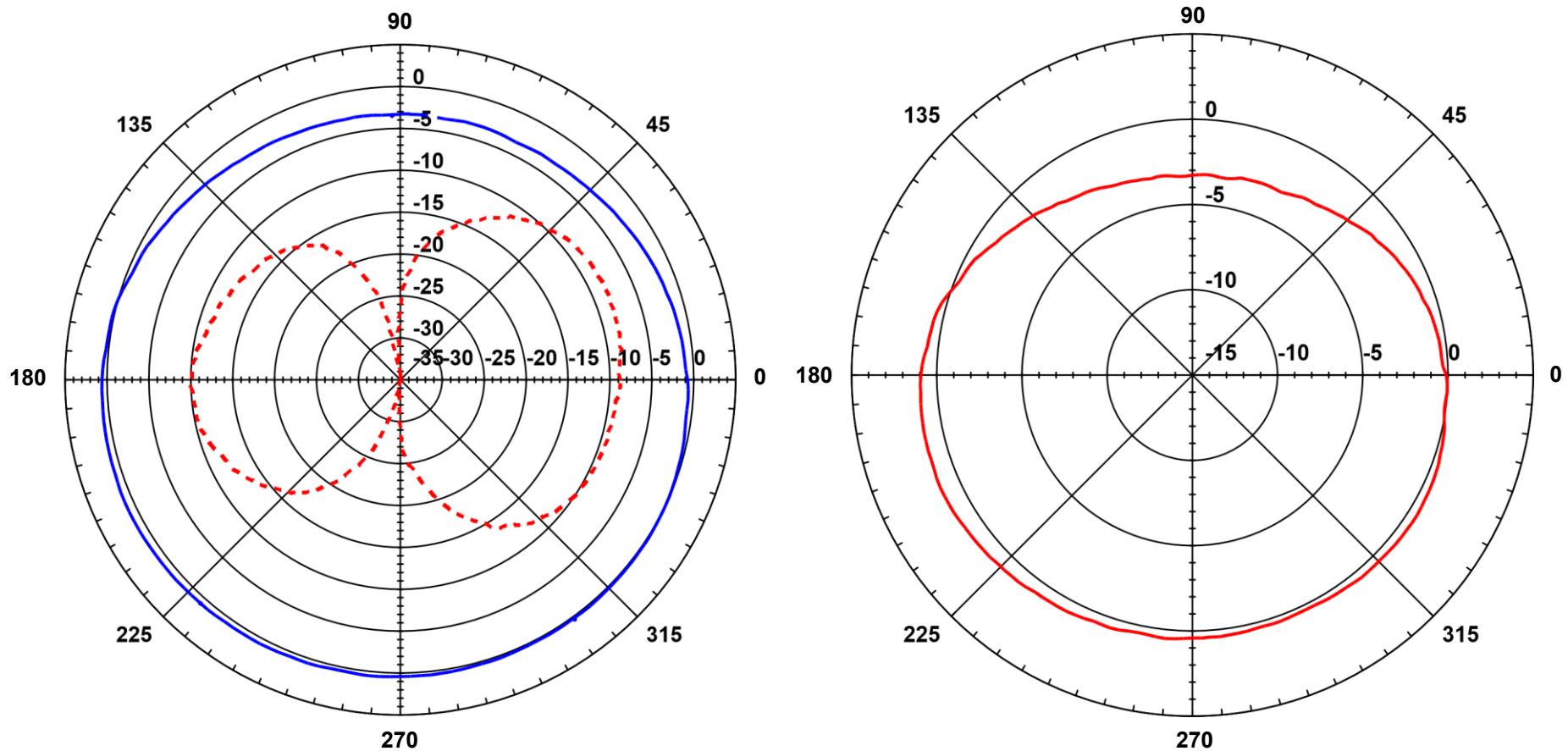
Co-cross polarization field (dBi)

Solid line: vertical polarization
Dash line: horizontal polarization



Total field (dBi)

Radiation pattern: Antenna 1. YZ Plane at $f = 2.441\text{GHz}$

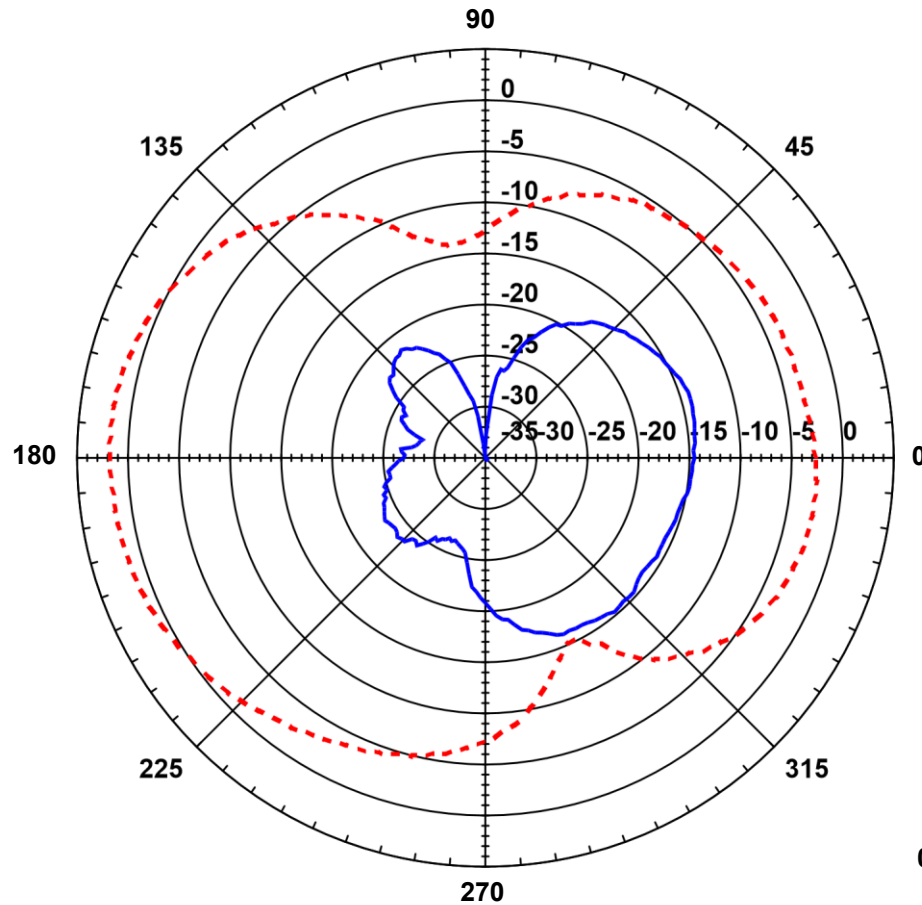


Co-cross polarization field (dBi)

Total field (dBi)

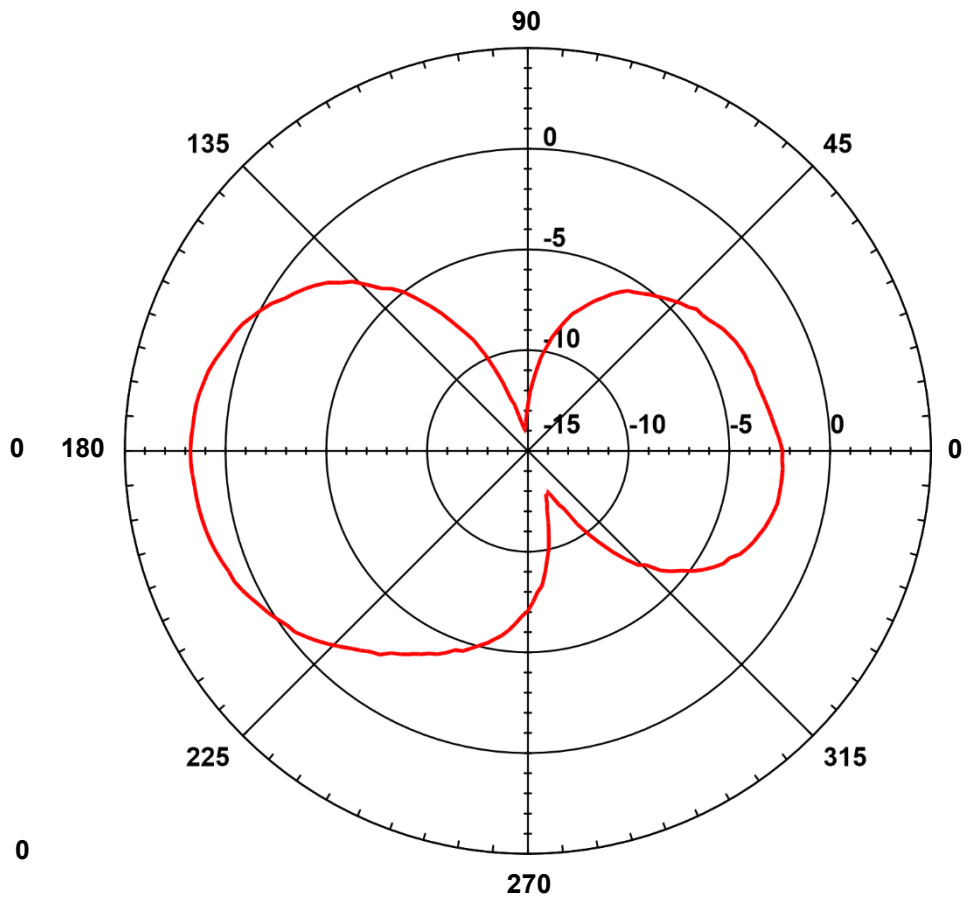
Solid line: vertical polarization
Dash line: horizontal polarization

Radiation pattern: Antenna 1. XY Plane at $f = 2.441\text{GHz}$



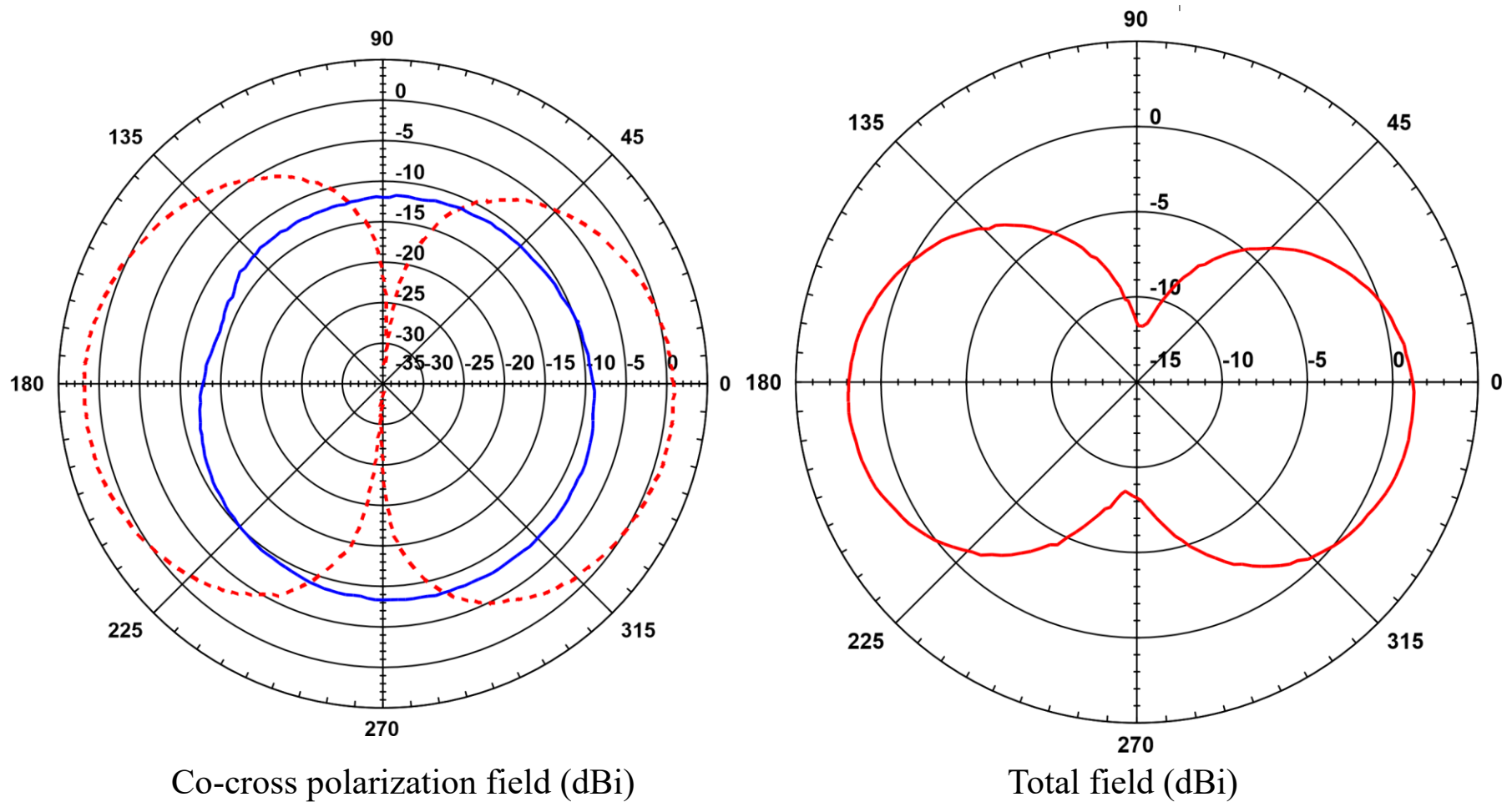
Co-cross polarization field (dBi)

Solid line: vertical polarization
Dash line: horizontal polarization

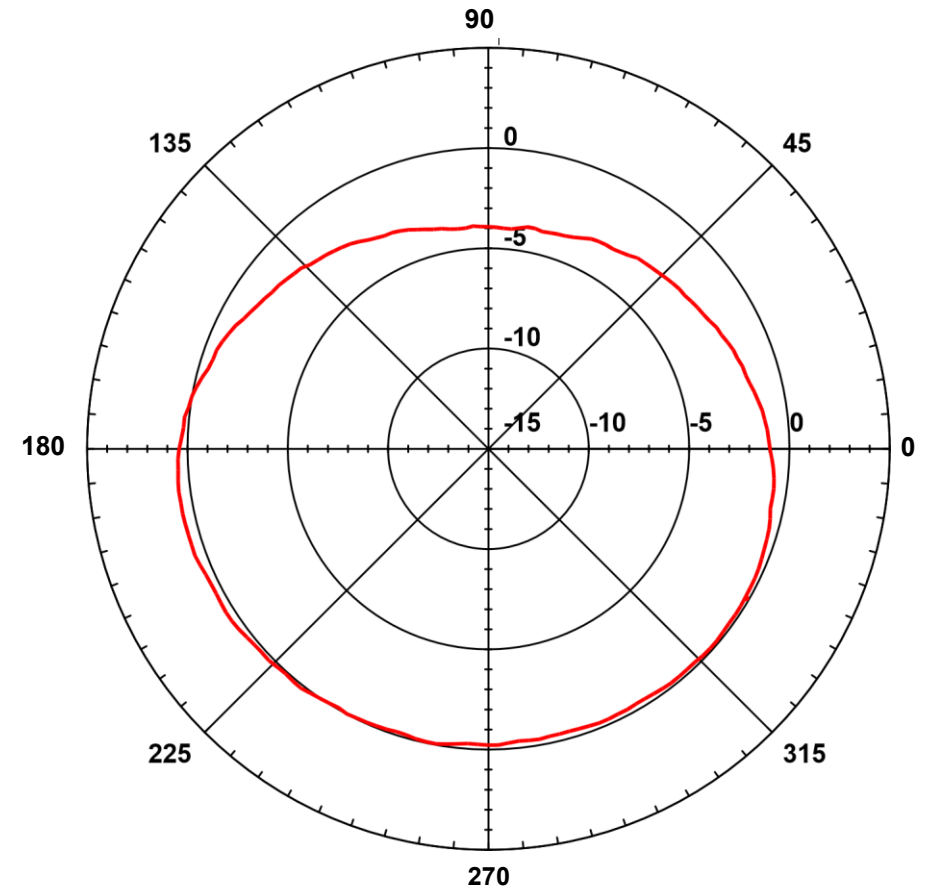
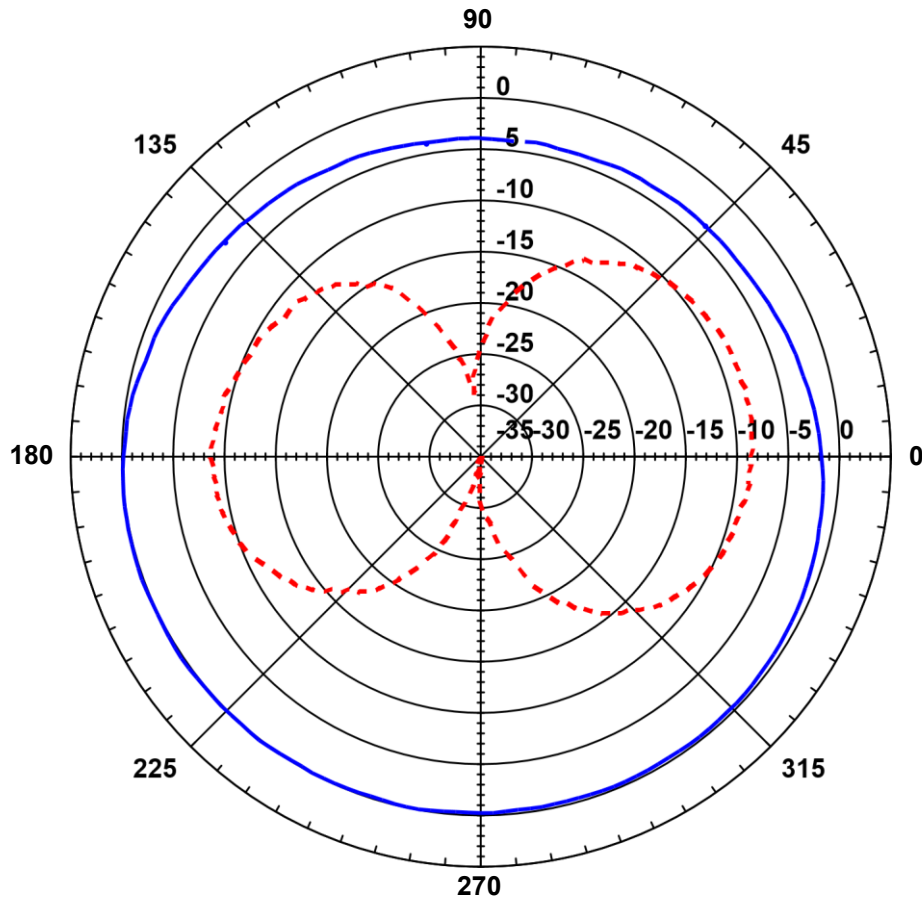


Total field (dBi)

Radiation pattern: Antenna 1. XZ Plane at $f = 2.480\text{GHz}$

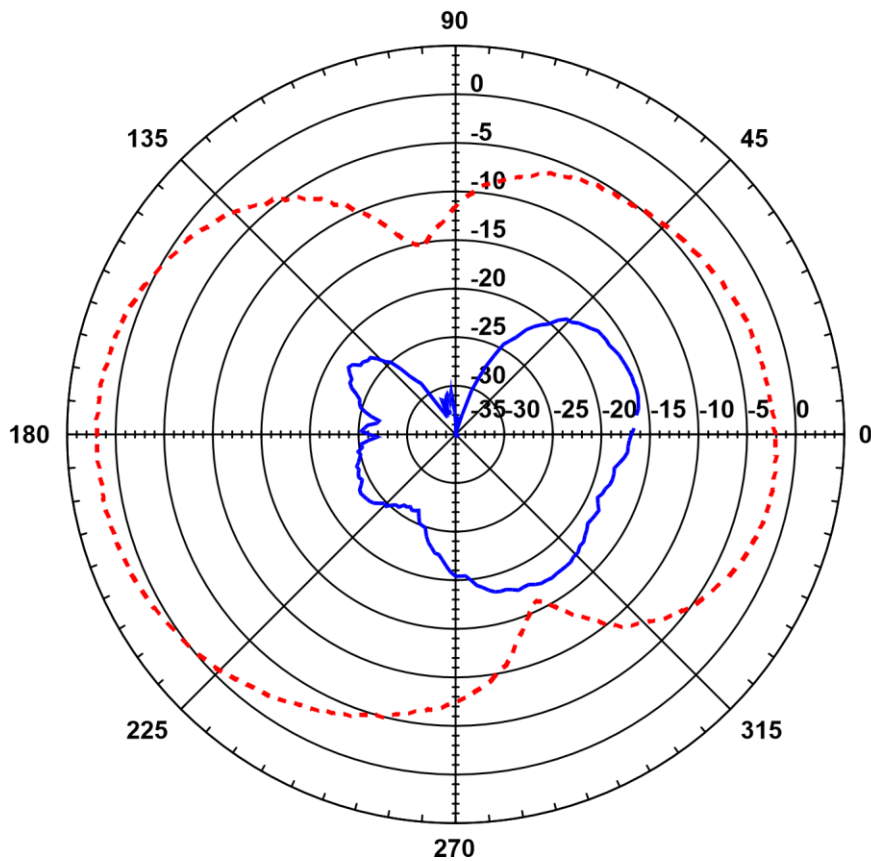


Radiation pattern: Antenna 1. YZ Plane at $f = 2.480\text{GHz}$

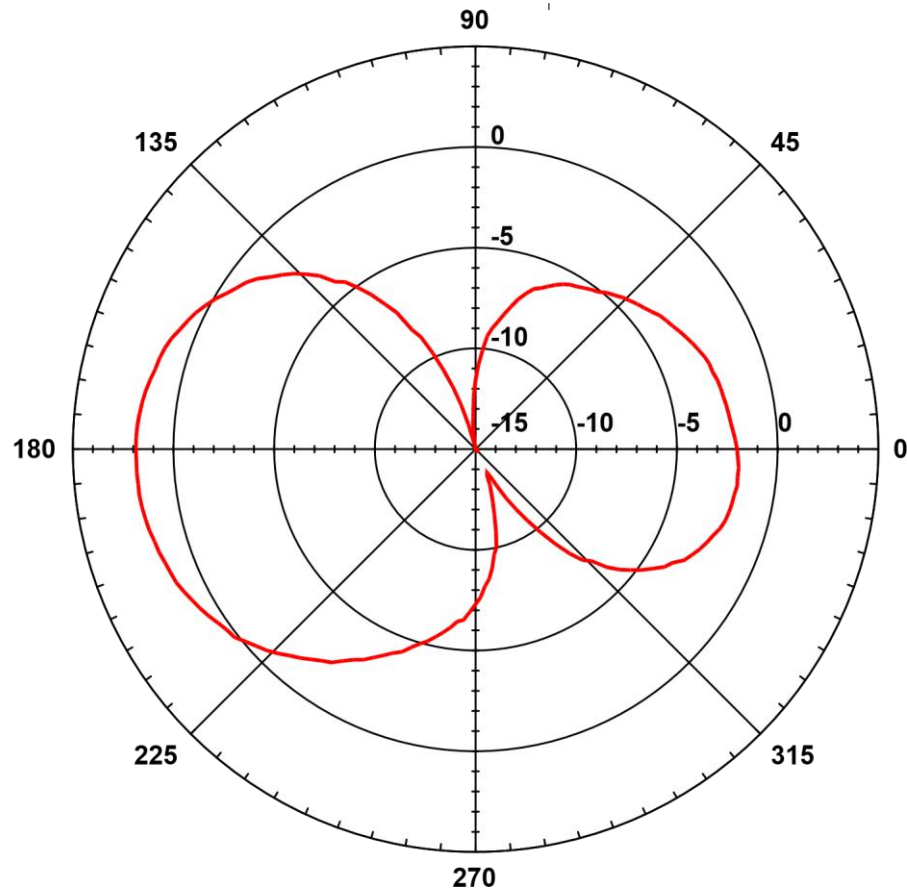


Solid line: vertical polarization
Dash line: horizontal polarization

Radiation pattern: Antenna 1. XY Plane at $f = 2.480\text{GHz}$



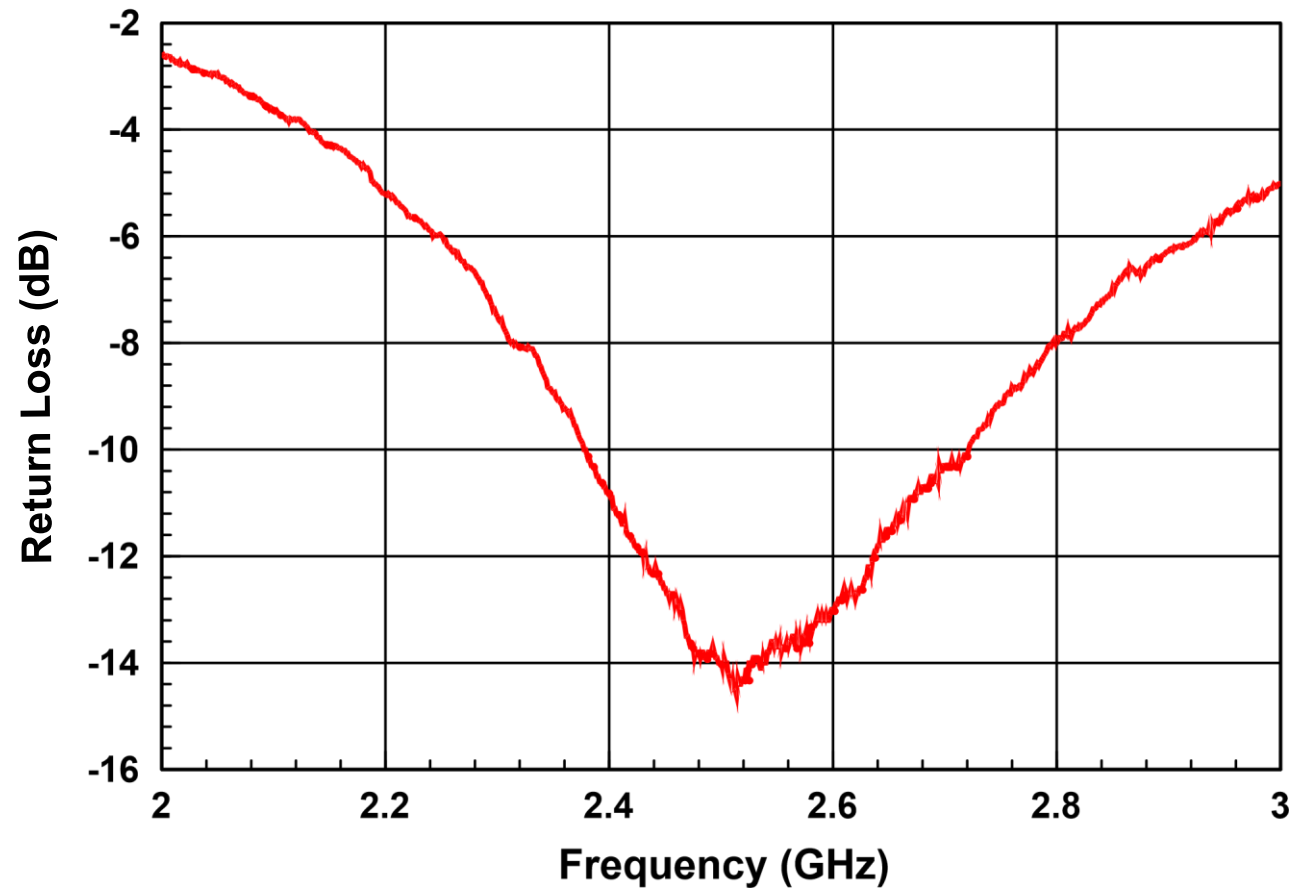
Co-cross polarization field (dBi)





Total field (dBi)

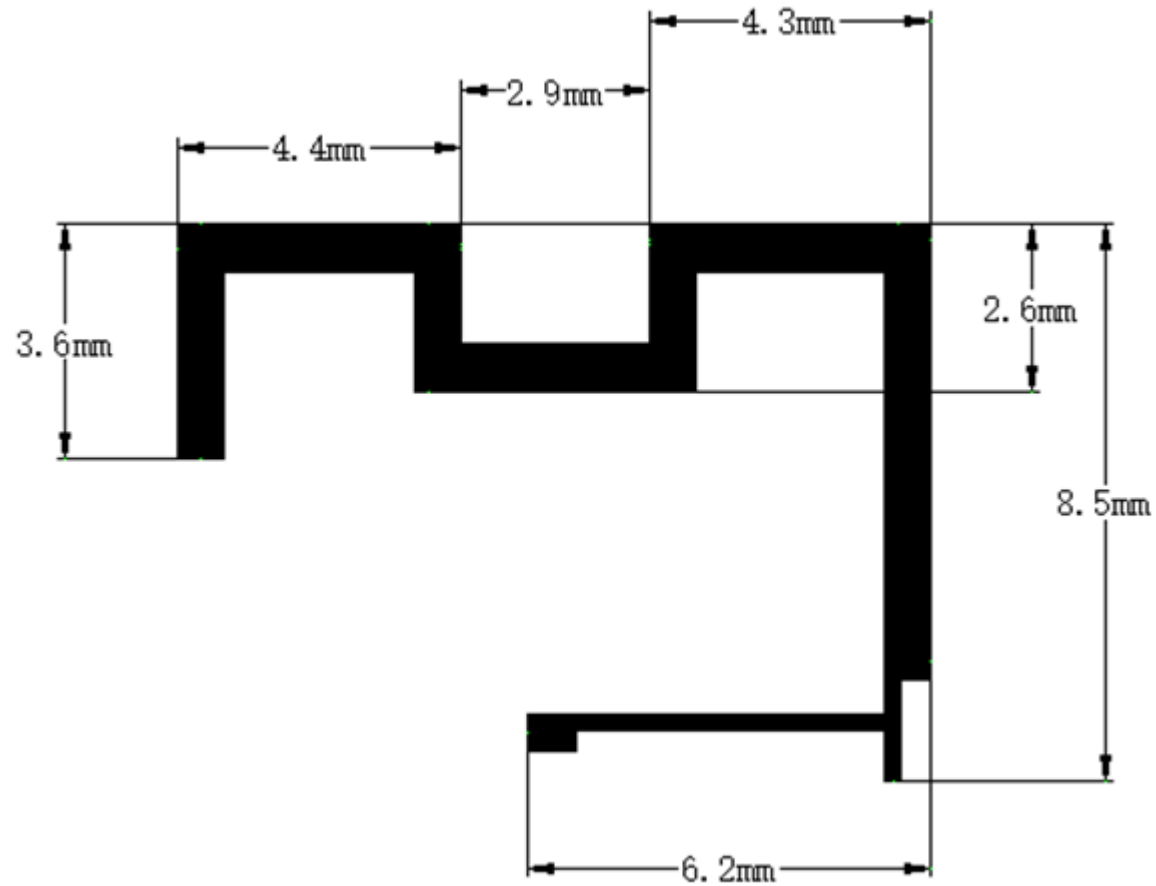
Solid line: vertical polarization
Dash line: horizontal polarization

Return Loss: Antenna 1



BW(-10dB)   13.48%

RF antenna diagram



Measurements summary

Antenna 1	Antenna model	Antenna Type	Operation Band	Frequency (GHz)	Plane	Return Loss (dB)	Polarization	Gain max. (dBi)	θ for Gain max.	ϕ for Gain max.
	HLK_AT1	PCB Antenna	2402~2480mHz	2.402	XZ	-10.90	Vertical	-7.8	290	
				2.402	XZ	-10.90	Horizontal	0.786	182	
				2.402	YZ	-10.90	Vertical	1.21	226	
				2.402	YZ	-10.90	Horizontal	-7.75	10	
				2.402	XY	-10.90	Vertical	-15.4		20
				2.402	XY	-10.90	Horizontal	0.93		180
				2.441	XZ	-12.20	Vertical	-7.36	318	
				2.441	XZ	-12.20	Horizontal	1.32	180	
				2.441	YZ	-12.20	Vertical	0.981	204	
				2.441	YZ	-12.20	Horizontal	-8.23	24	
				2.441	XY	-12.20	Vertical	-14.1		-14
				2.441	XY	-12.20	Horizontal	1.74		180
				2.48	XZ	-13.80	Vertical	-7.95	312	
				2.48	XZ	-13.80	Horizontal	1.81	186	
				2.48	YZ	-13.80	Vertical	0.204	214	
				2.48	YZ	-13.80	Horizontal	-8.38	8	
				2.48	XY	-13.80	Vertical	-15.8		12
				2.48	XY	-13.80	Horizontal	1.87		180

Manufacturer: Shenzhen Hailuck Electronic Technology Co., Ltd.