

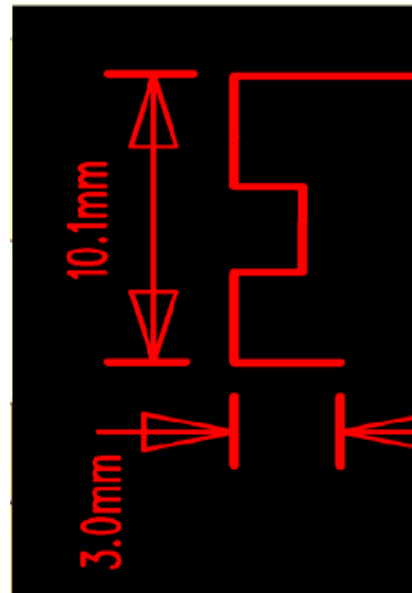
# Report

*By Alfred Grau*

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UCI CENTER FOR RF DESIGN AND CHARACTERIZATION

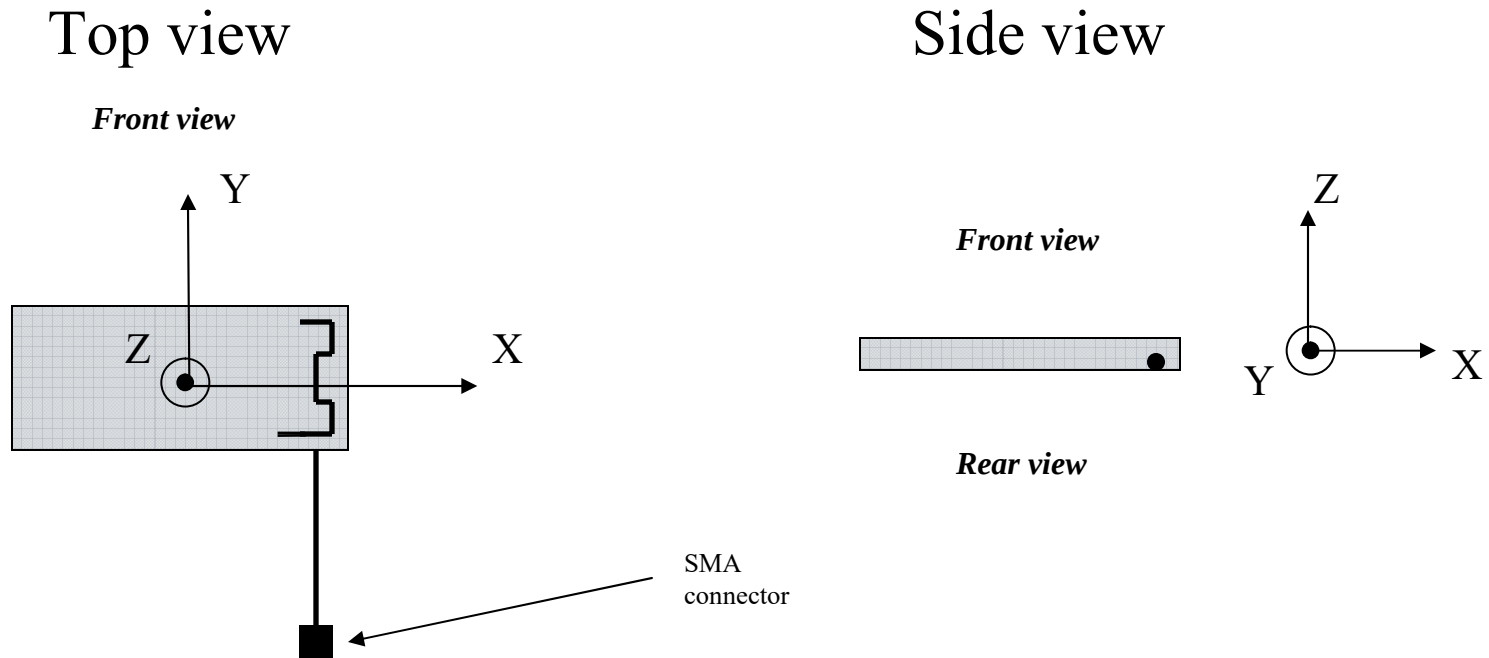
| TEM          | SPEC.                                                                                                               |
|--------------|---------------------------------------------------------------------------------------------------------------------|
| Antenna Type | PCB Antenna                                                                                                         |
| Frequency    | 2400~2480 MHz                                                                                                       |
| Brand        | Hangshi                                                                                                             |
| Manufacturer | Shenzhen Hangshi Technology Co.,Ltd                                                                                 |
| ADD          | Hangshi Technology Park,G<br>Area,Democracy West Industry<br>Park,Shajing ,Bao'an<br>District,Shenzhen,China,518104 |



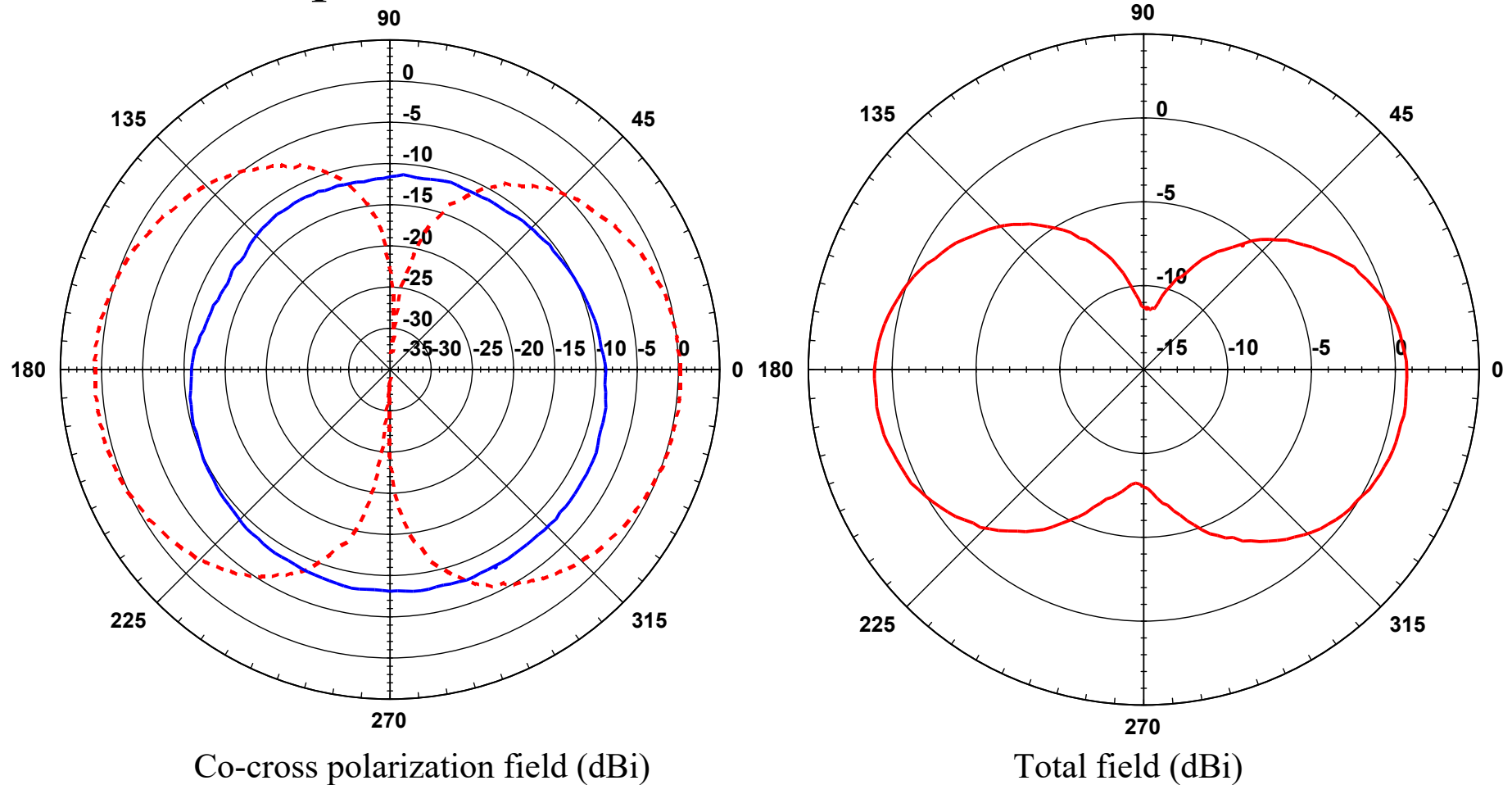
## Tested Products.

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

# Coordinate System Reference: Antenna 1.

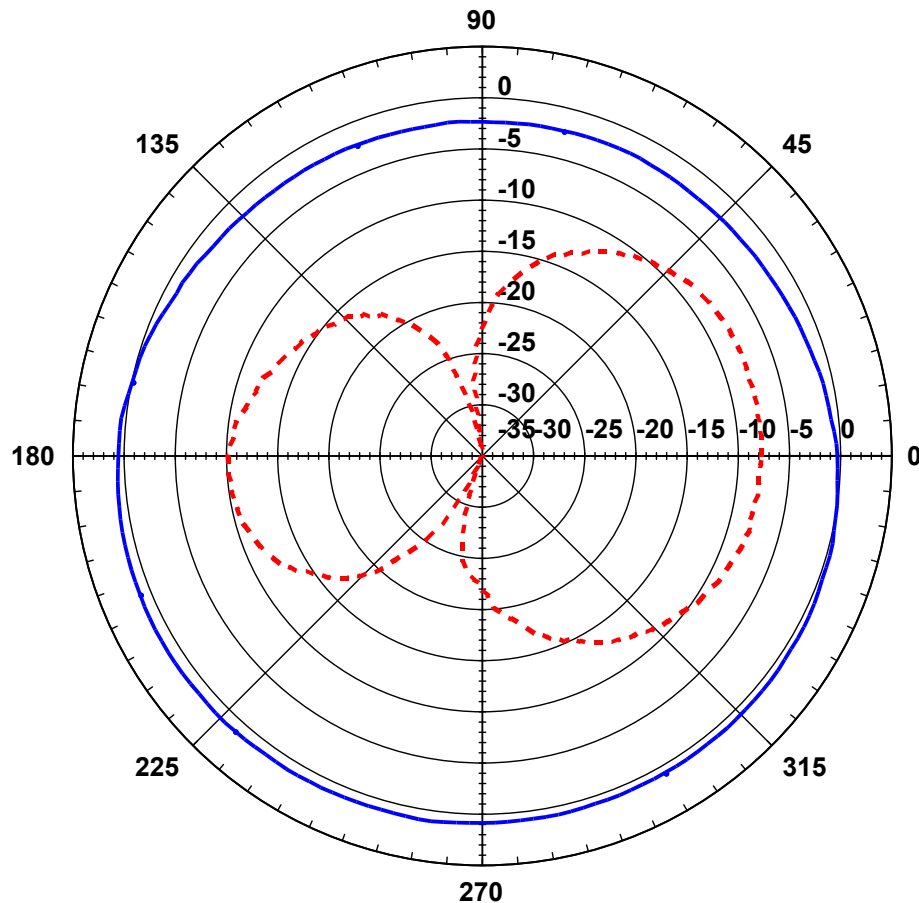


# Radiation pattern: Antenna 1. XZ Plane at $f = 2.402\text{GHz}$



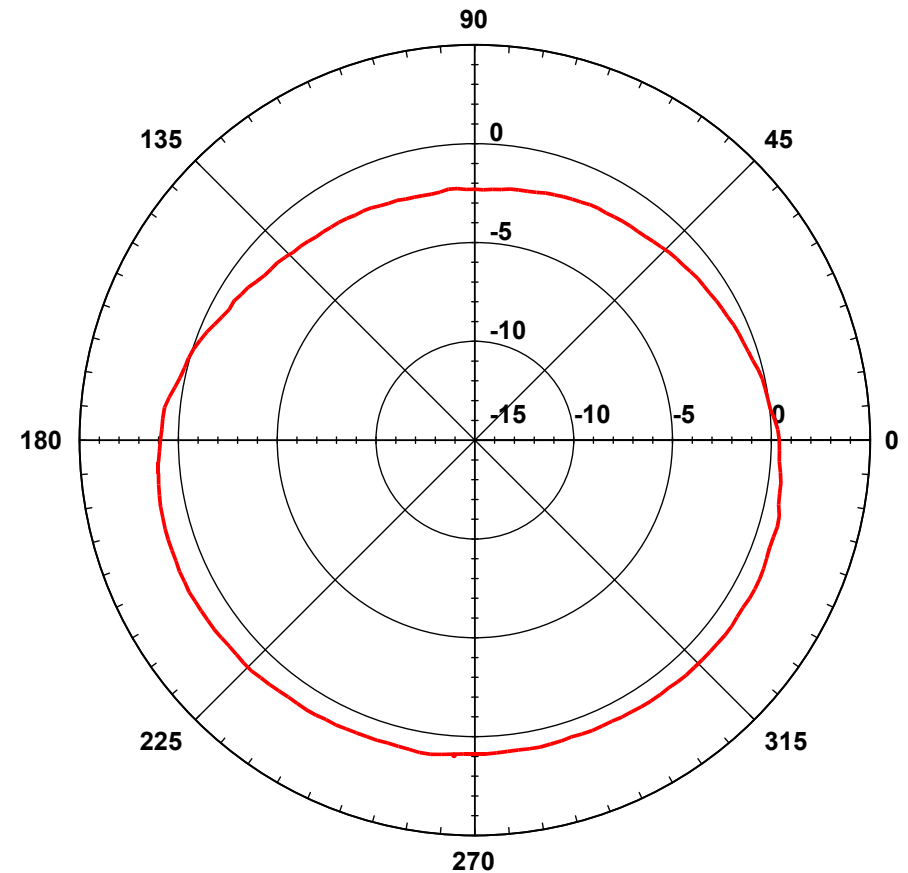
Solid line: vertical polarization  
Dash line: horizontal polarization

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



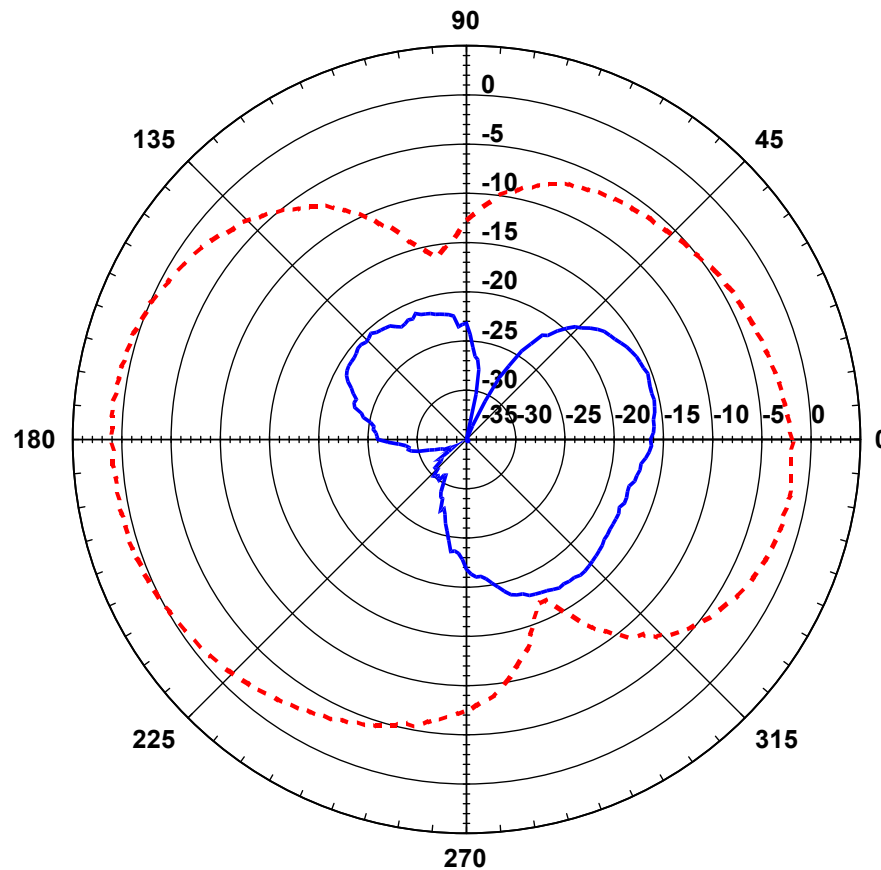
Co-cross polarization field (dBi)

Solid line: vertical polarization  
Dash line: horizontal polarization

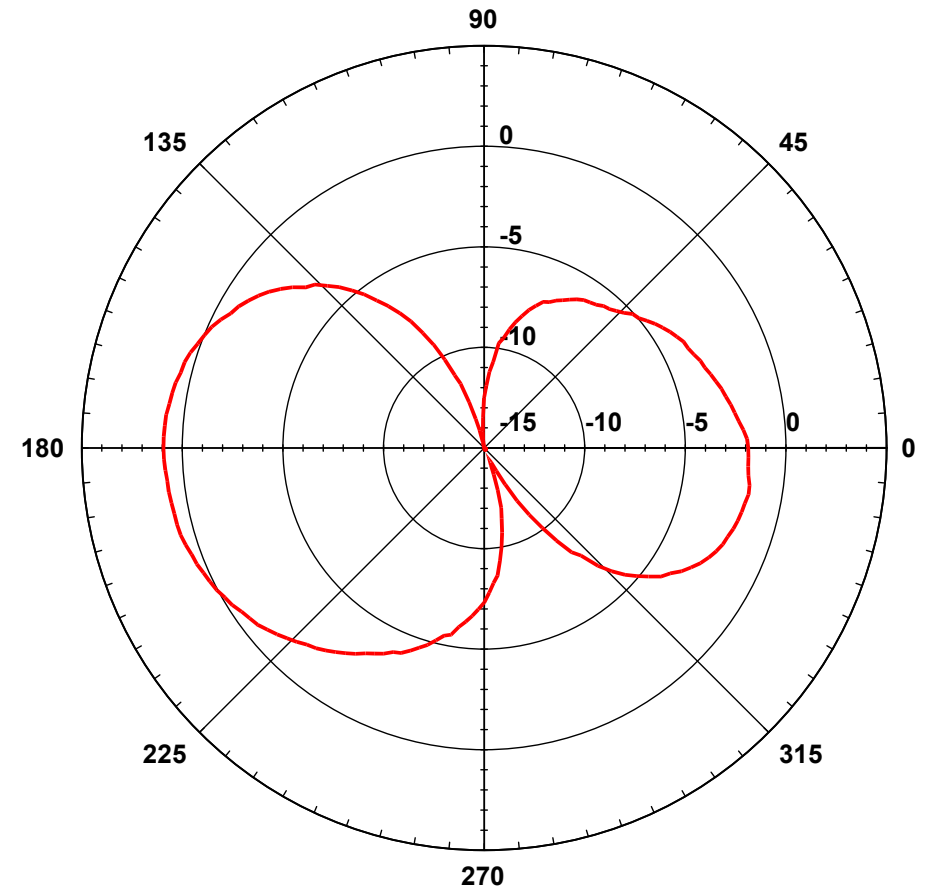


Total field (dBi)

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



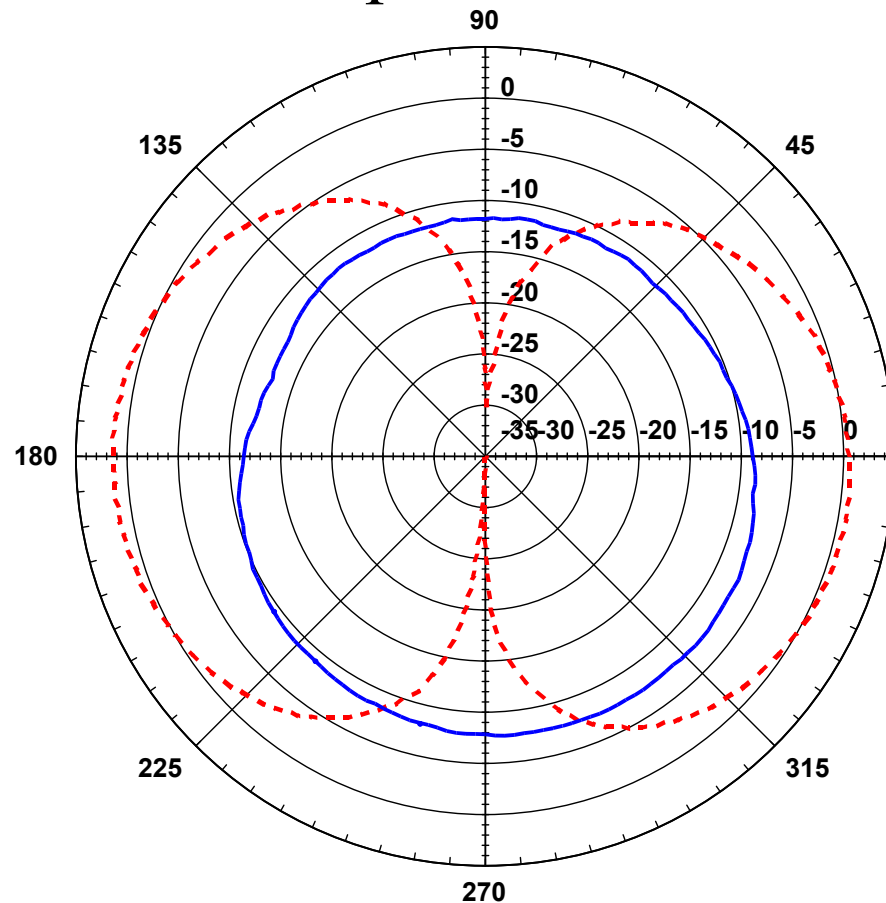
Co-cross polarization field (dBi)



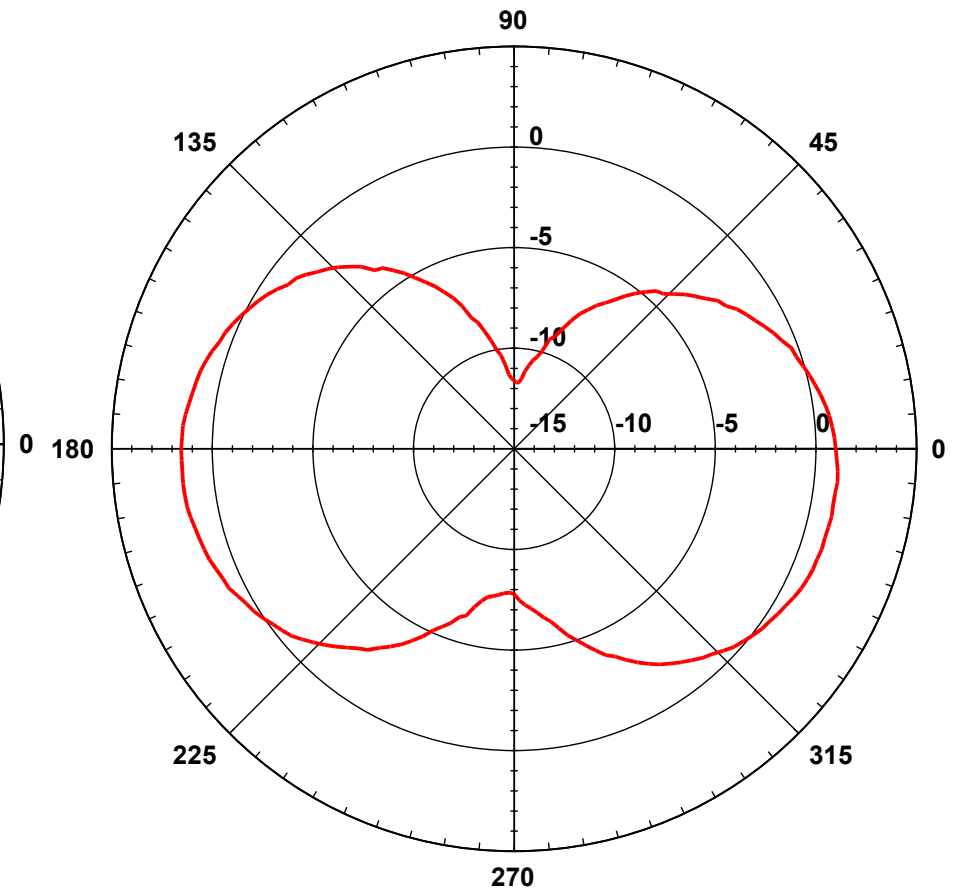
Total field (dBi)

Solid line: vertical polarization  
Dash line: horizontal polarization

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



Co-cross polarization field (dBi)

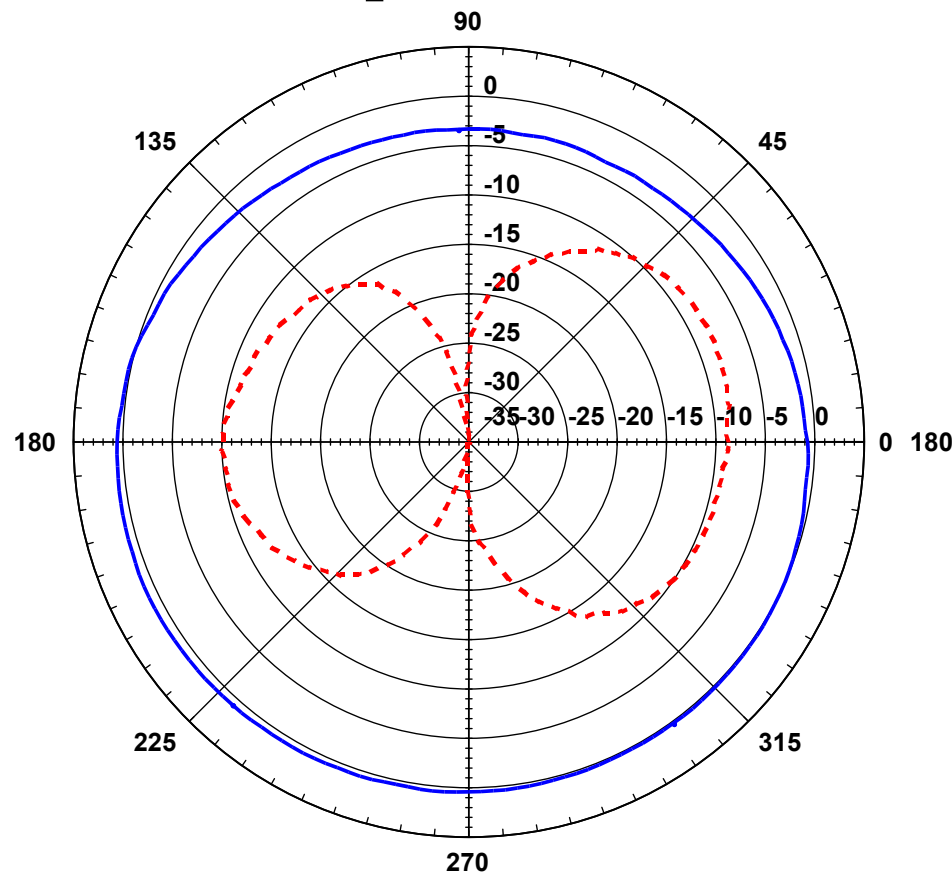


Total field (dBi)

Solid line: vertical polarization  
Dash line: horizontal polarization

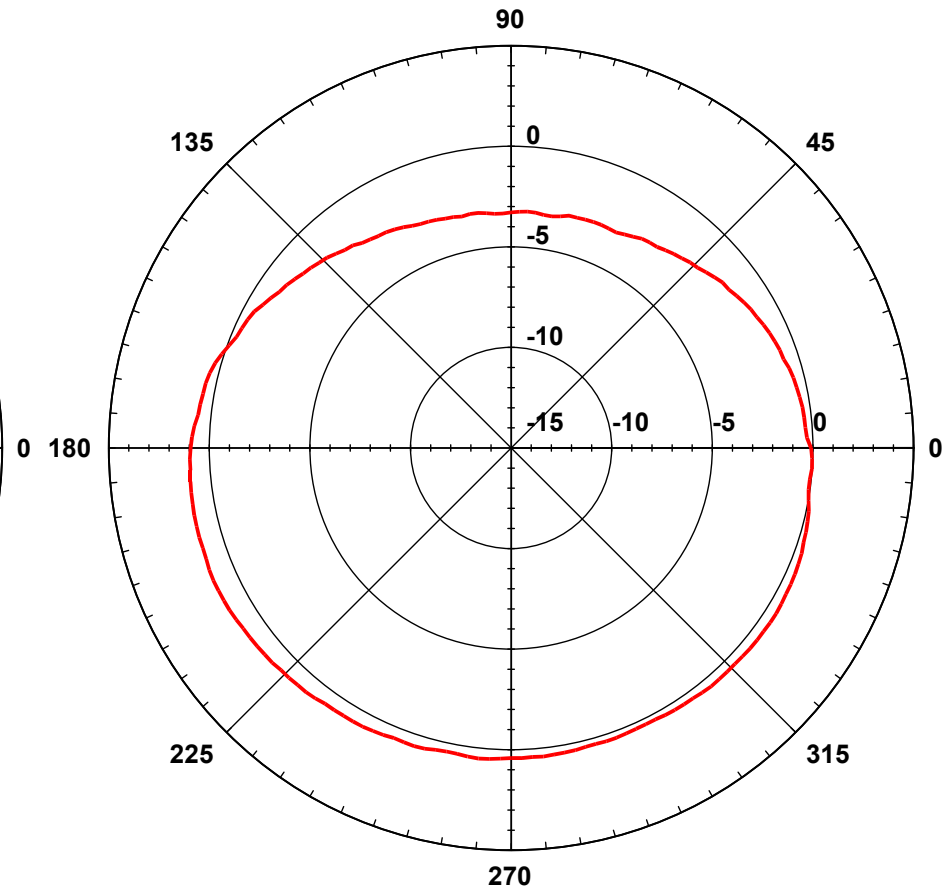


# Radiation pattern: Antenna 1. YZ Plane at $f = 2.441\text{GHz}$



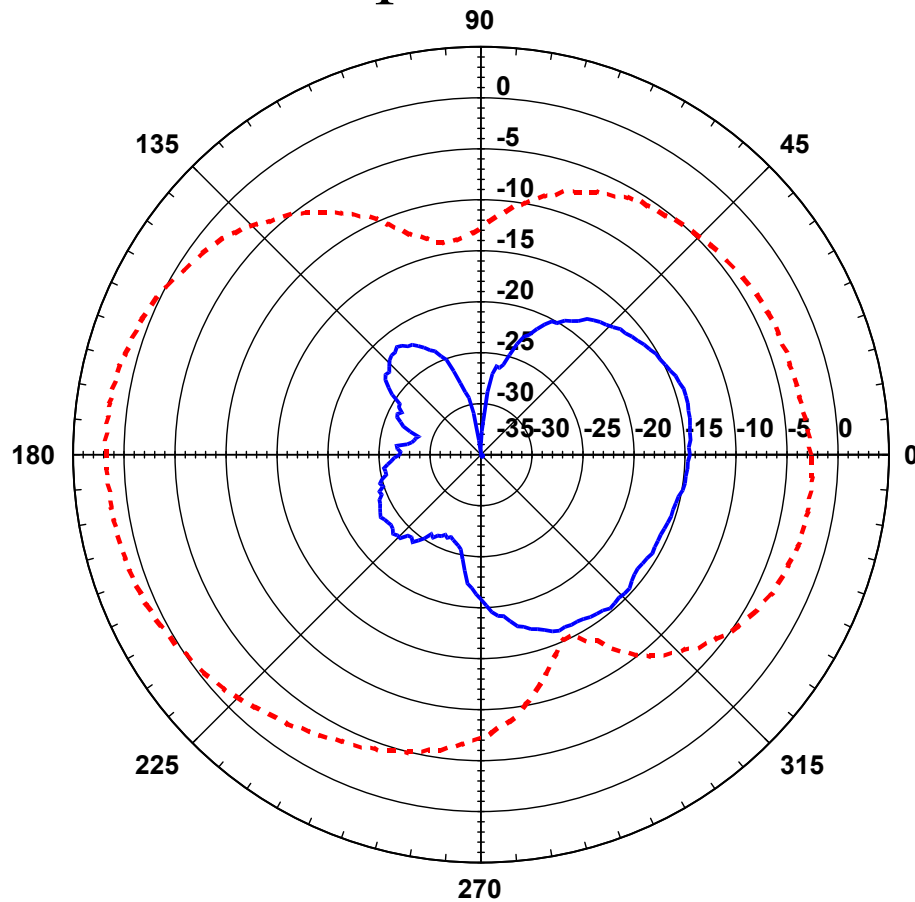
Co-cross polarization field (dBi)

Solid line: vertical polarization  
Dash line: horizontal polarization

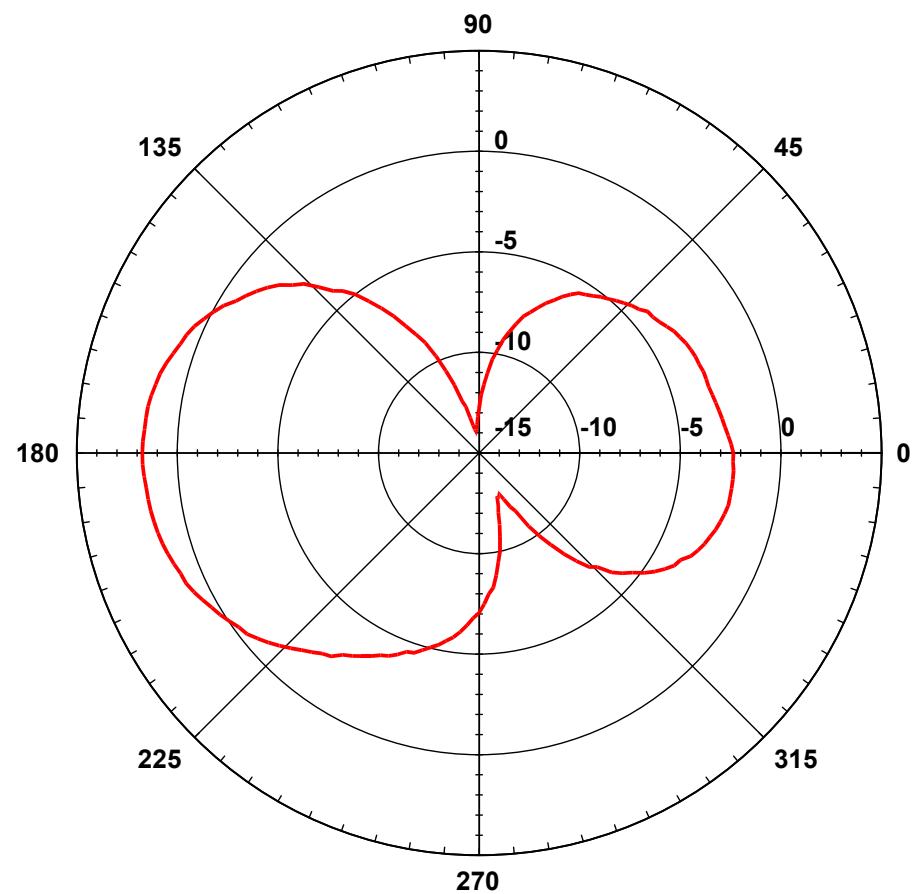


Total field (dBi)

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



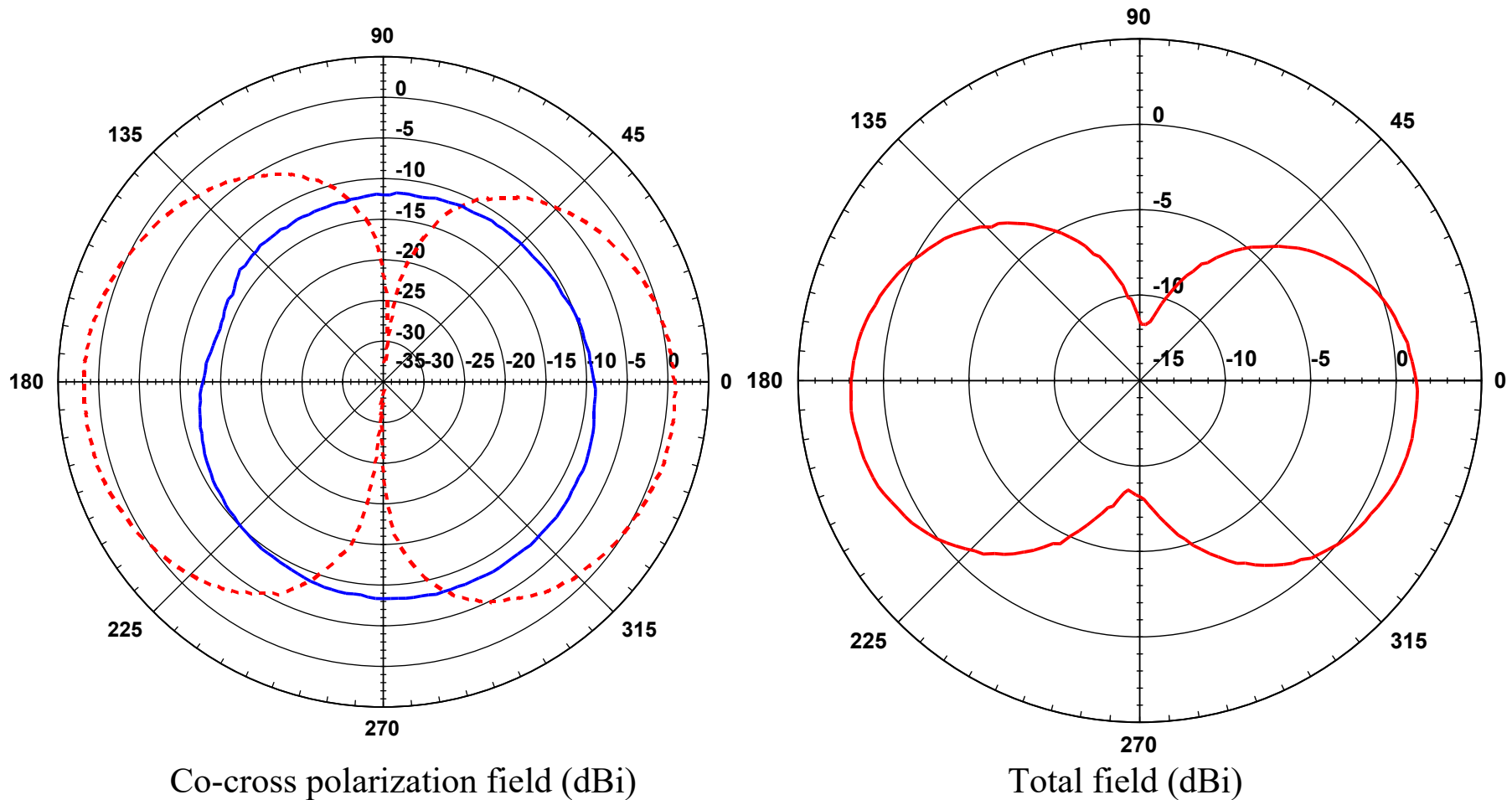
Co-cross polarization field (dBi)



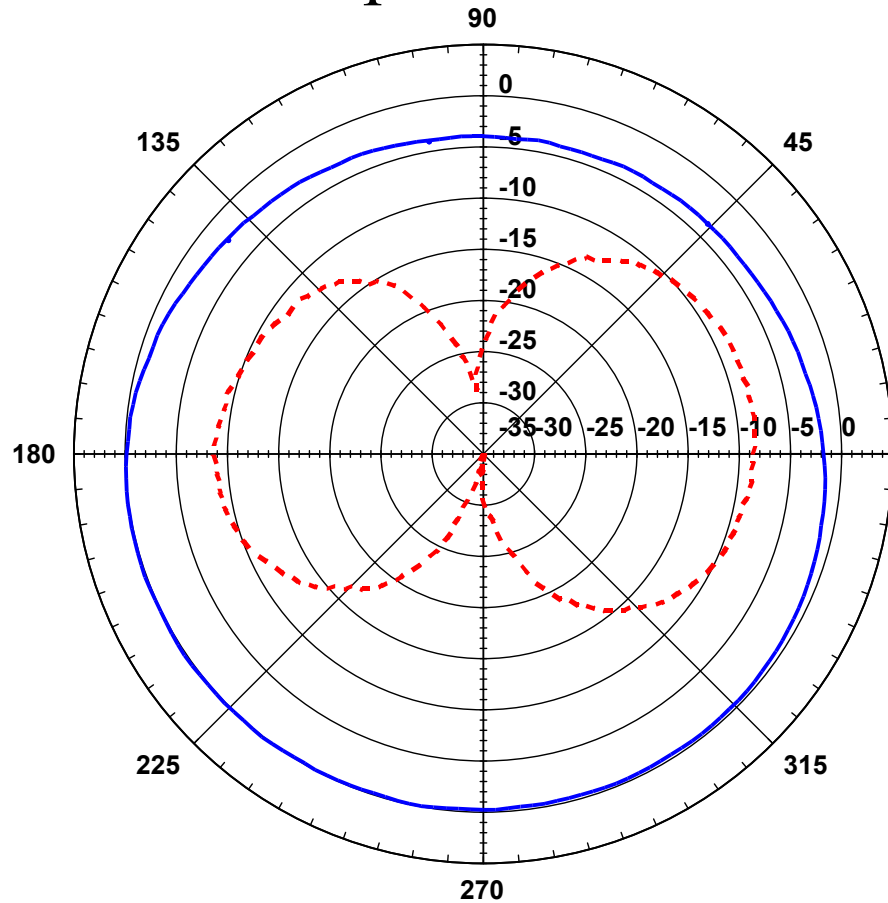
Total field (dBi)

Solid line: vertical polarization  
Dash line: horizontal polarization

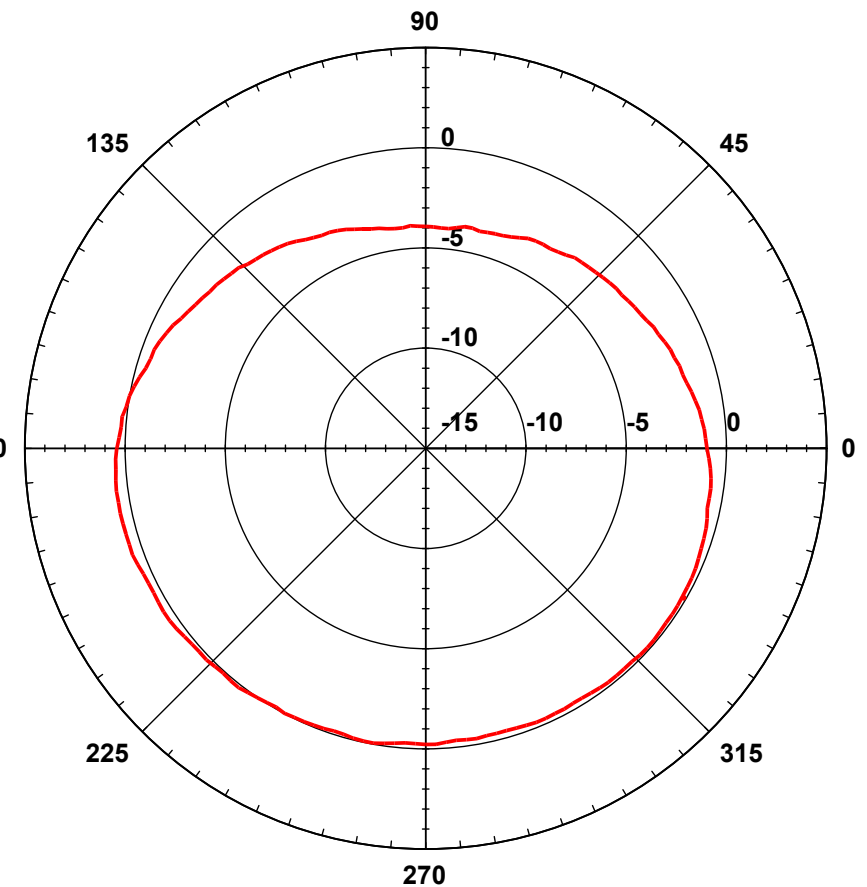
# Radiation pattern: Antenna 1. XZ Plane at $f = 2.480\text{GHz}$



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



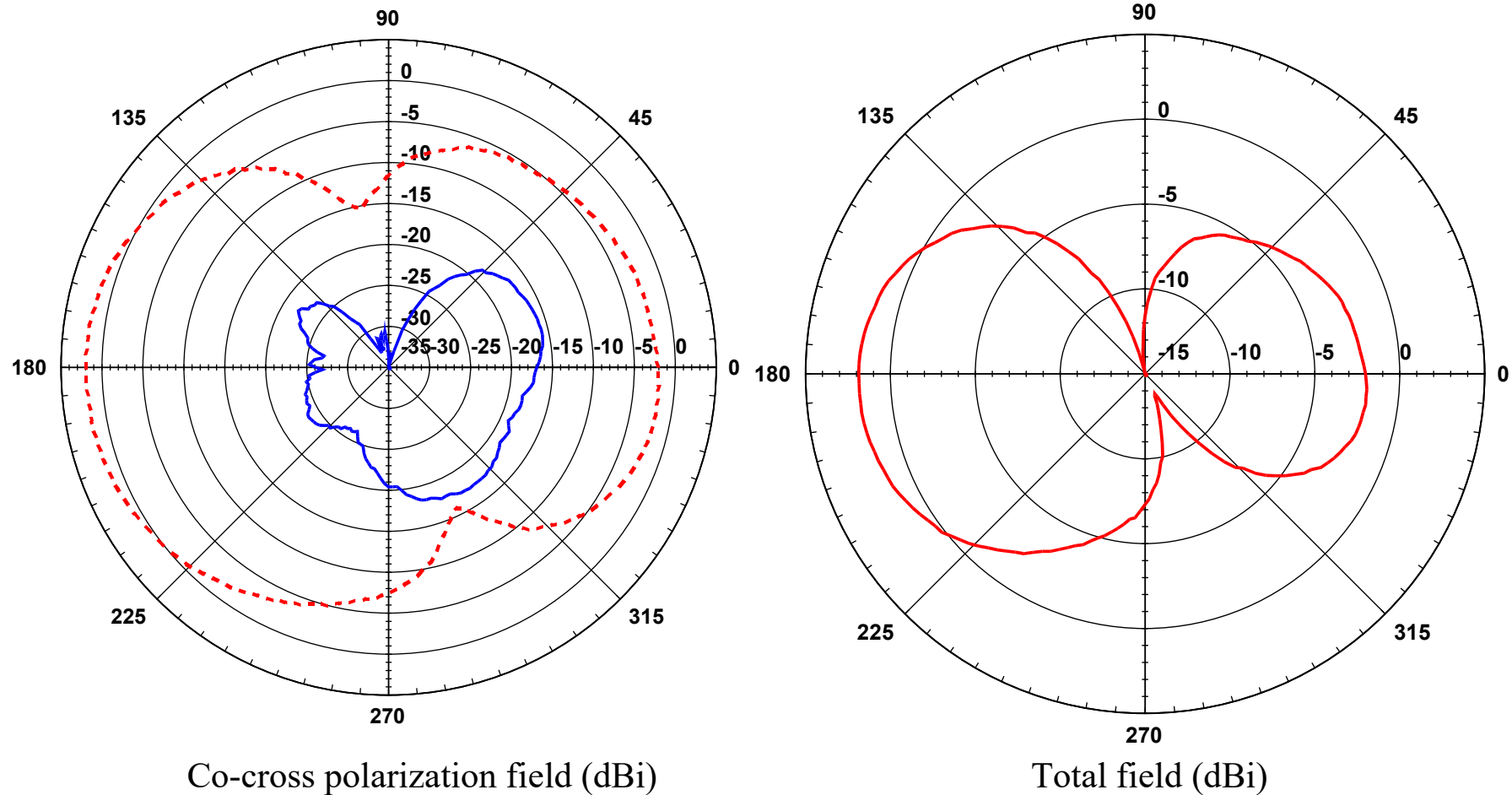
Co-cross polarization field (dBi)



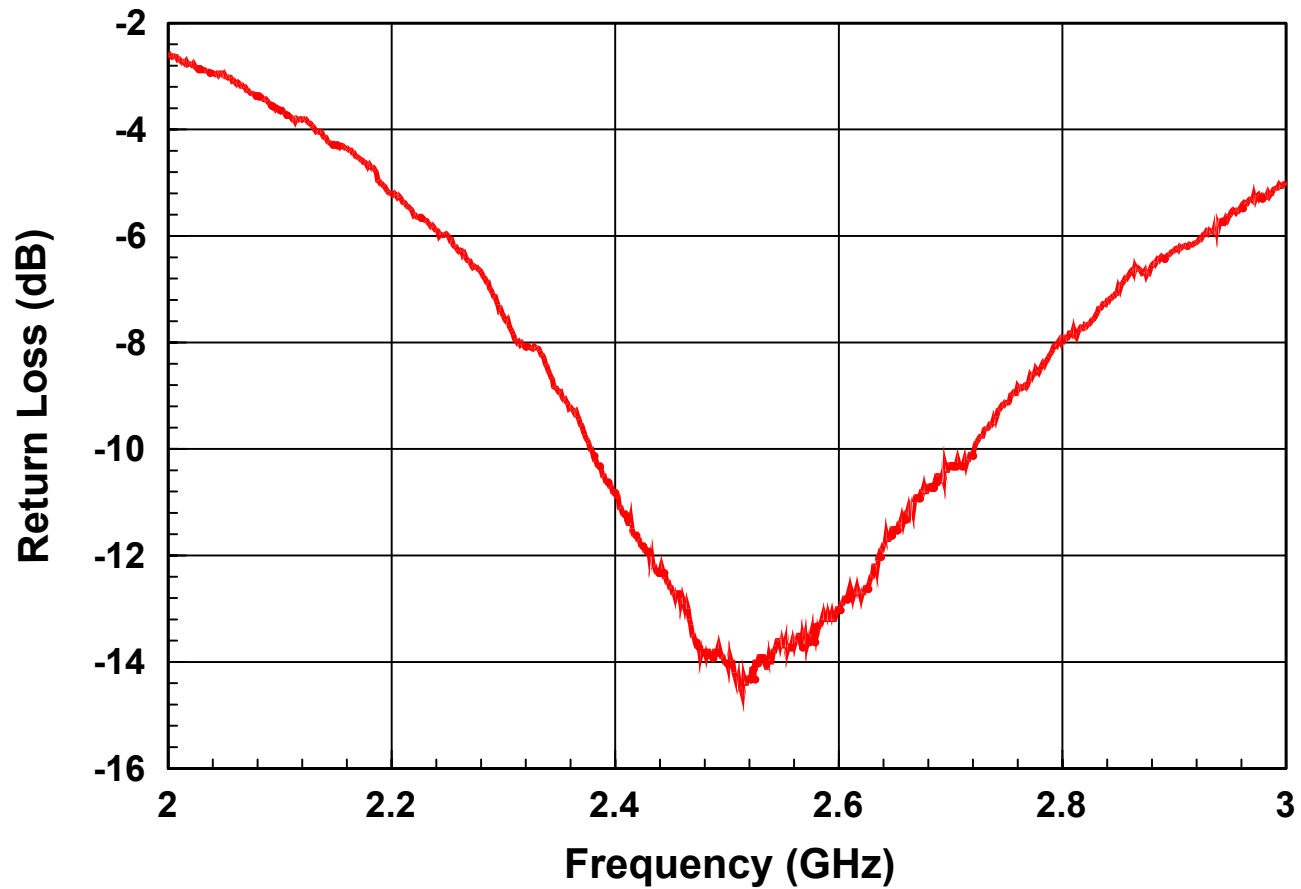
Total field (dBi)

Solid line: vertical polarization  
Dash line: horizontal polarization

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



## Return Loss: Antenna 1



BW(-10dB) 🕒 13.48%

# Measurements summary

|                  | Frequency (GHz) | Plane | Return Loss (dB) | Polarization | Gain max. (dBi) | $\theta$ for Gain max. | $\phi$ for Gain max. |
|------------------|-----------------|-------|------------------|--------------|-----------------|------------------------|----------------------|
| <b>Antenna 1</b> |                 |       |                  |              |                 |                        |                      |
|                  | 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                  |