

Brilliant Technology Antennas

I. Single Channel Unit

February 20, 2024

Allwave Corporation
3860 Del Amo Blvd., Suite 404
Torrance, CA 90503

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A. Test Summary

1. Antenna Under Test

Brilliant Technology: Single channel unit

Three antennas, BLE, Wifi, and Embedded antennas

2. Frequencies

S-band: 2.40, 2.44, 2.48 GHz for BLE, WiFi, and Embedded

C-band: 5.15, 5.35, 5.50, 5.725 GHz for WiFi, and Embedded

3. Test Facility

Allwave's Antenna Chamber B, February 12-15, 2024

4. Measurement Method

Direct Far Field Measurement

5. Test Results

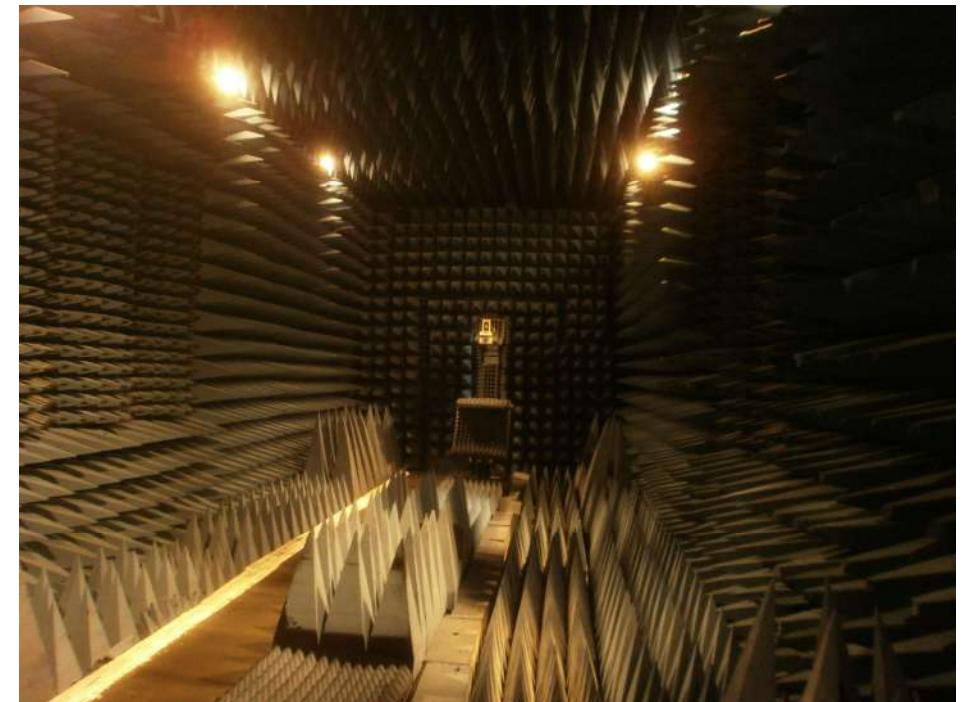
2D elevation and azimuth cuts, YZ, XZ, XY planes, gain calibration and 3D plots

Direct Far Field Measurement

Transmit

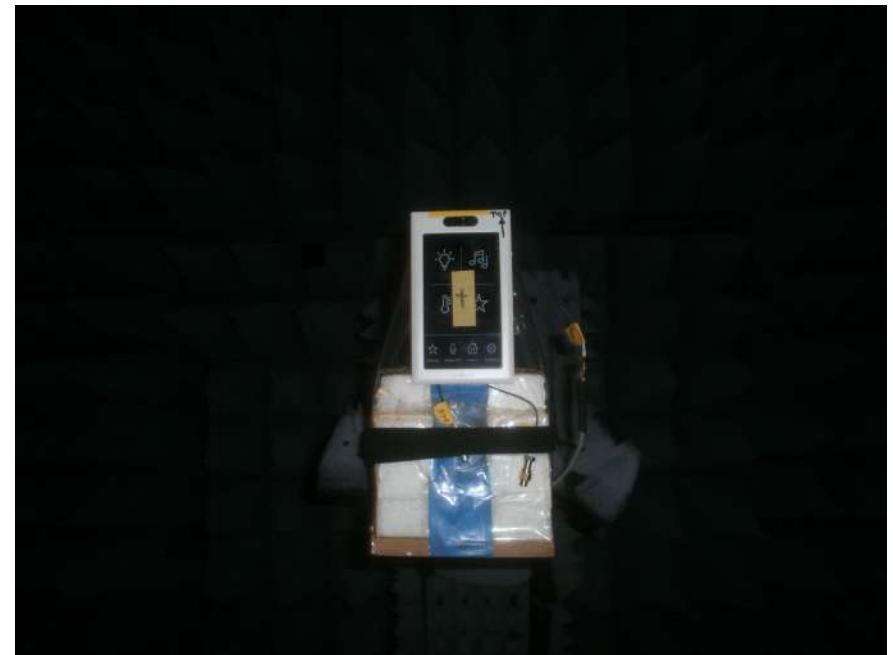
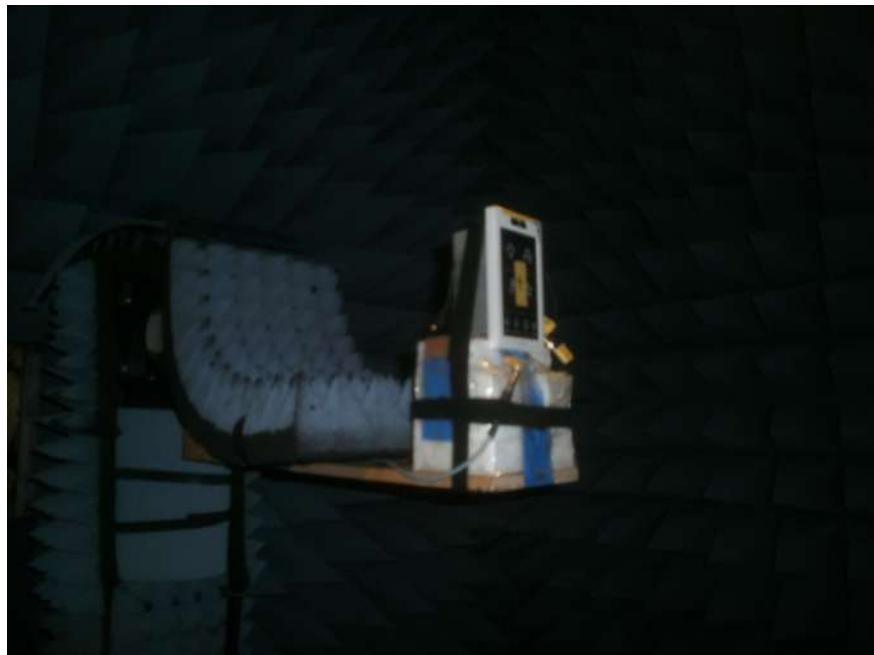


Receive

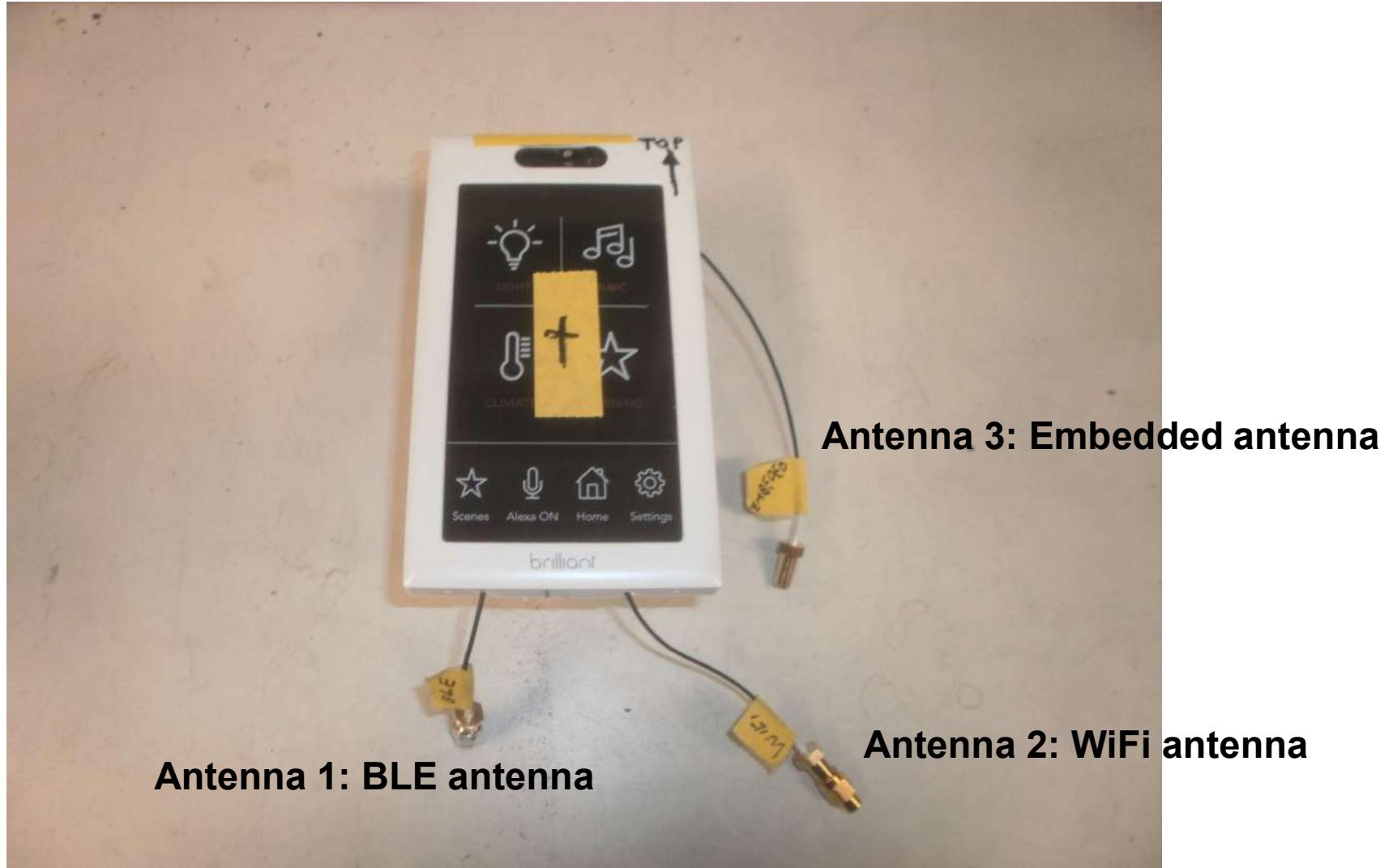


Direct Far Field Measurement

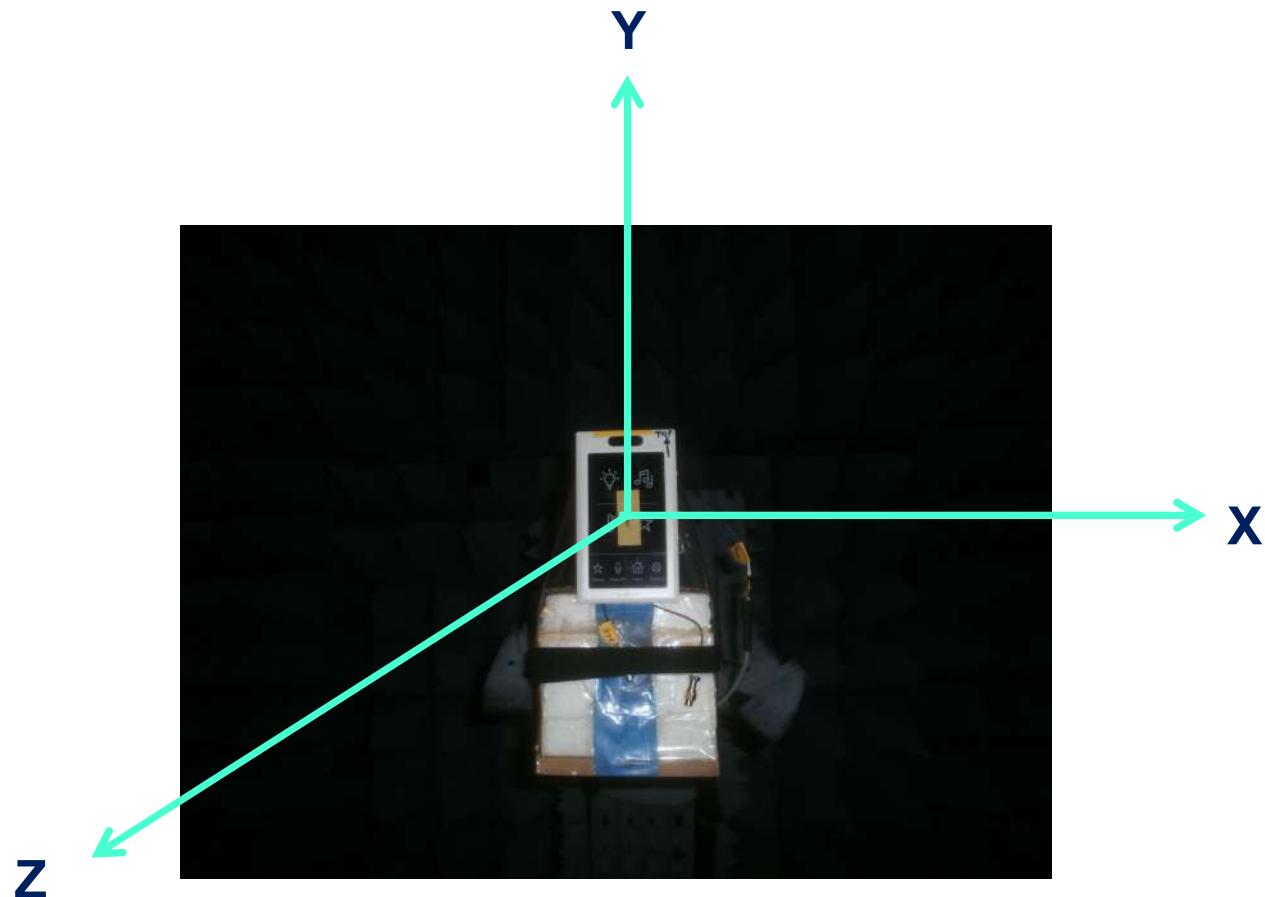
Antenna under test



Single channel unit: Three antennas



Coordinates of antenna patterns



B. Test Results

B.1 Gain Measurements

B.2 Far Field Patterns

B.1 Gain Measurements

1-CH Antenna	1. BLE	2. WiFi	3. Embedded
Freq (GHz)	Gain (dB)	Gain (dB)	Gain (dB)
2.40	- 2.2	- 0.8	0.4
2.44	- 3.0	- 1.6	- 0.4
2.48	- 1.7	- 1.4	1.7
5.15	NA	- 0.4	0.5
5.35	NA	- 2.4	1.3
5.50	NA	- 3.8	1.8
5.725	NA	- 4.7	1.5

B.2 Far Field patterns

1. BLE antenna, S-band
2. WiFi antenna, S-, C-band
3. Embedded antenna, S-, C-band

- a) 2D Elevation cuts, ZX- and ZY-plane
- b) 2D Azimuth cut: XY-Plane
- c) 3D plots

S-band: 2.40, 2.44, 2.48 GHz

C-band: 5.15, 5.35, 5.50, 5.725 GHz

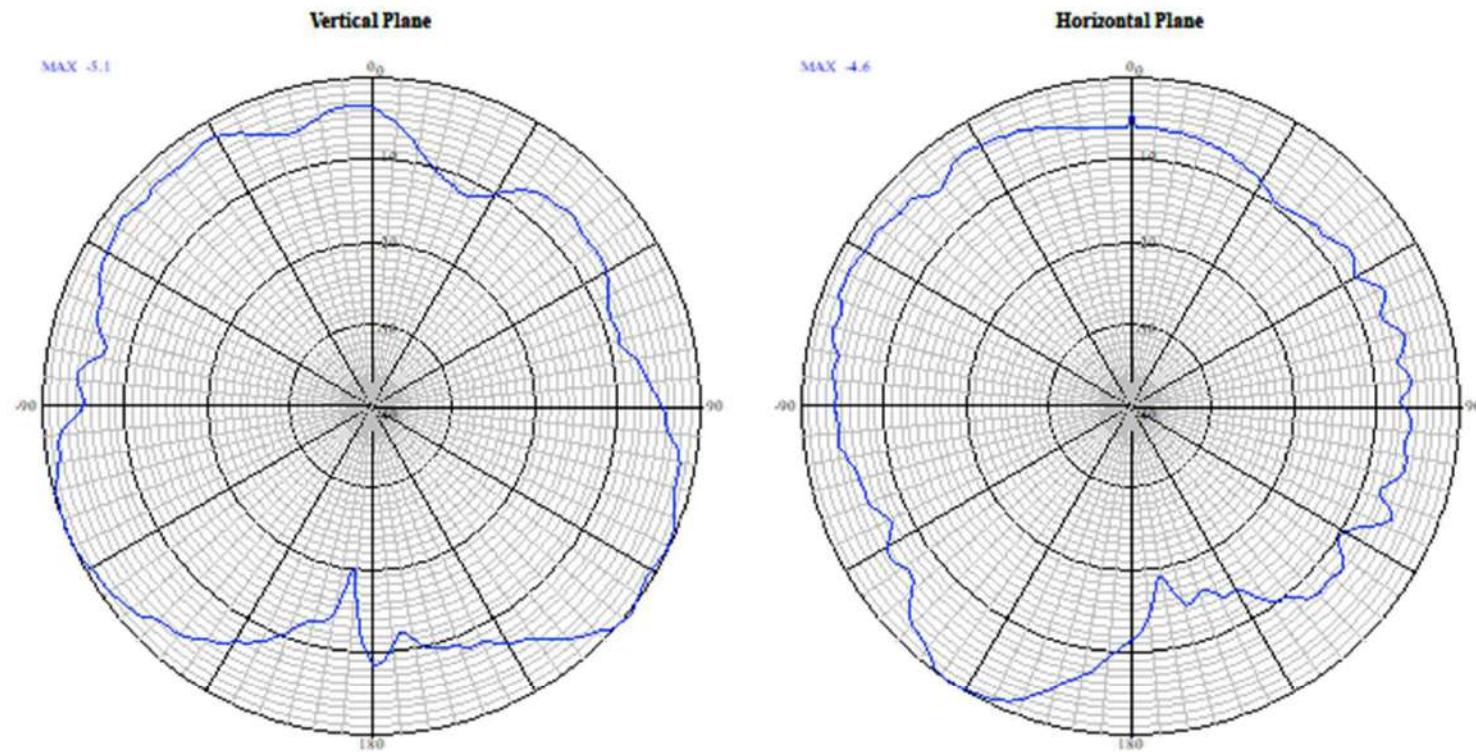
1. BLE antenna

a) 2D Elevation cuts, ZX- and ZY-plane

Freq = 2.40, 2.44, 2.48 GHz

Single Channel Unit
Antenna 1: BLE antenna

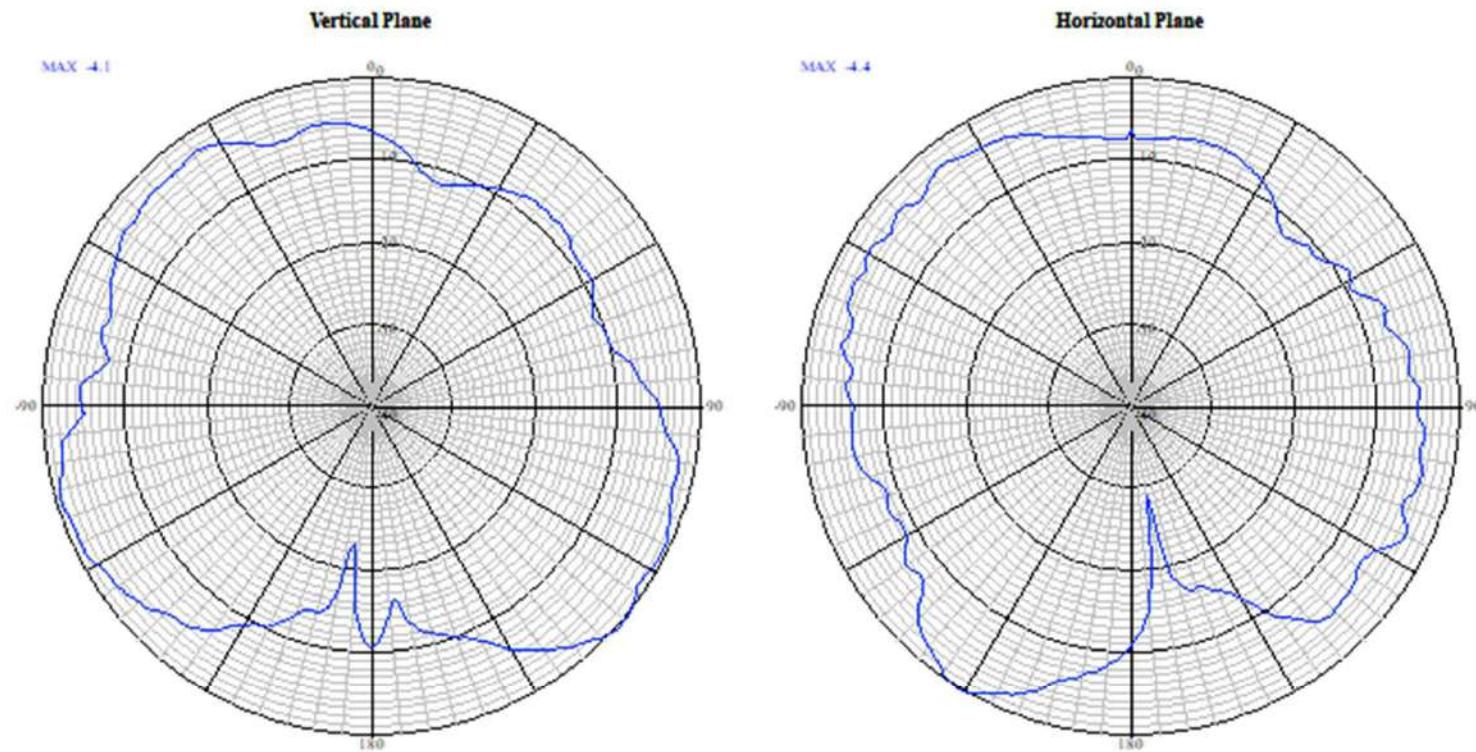
Far-Field Patterns
Frequency: 2.400000



Single Channel Unit
Antenna 1: BLE antenna

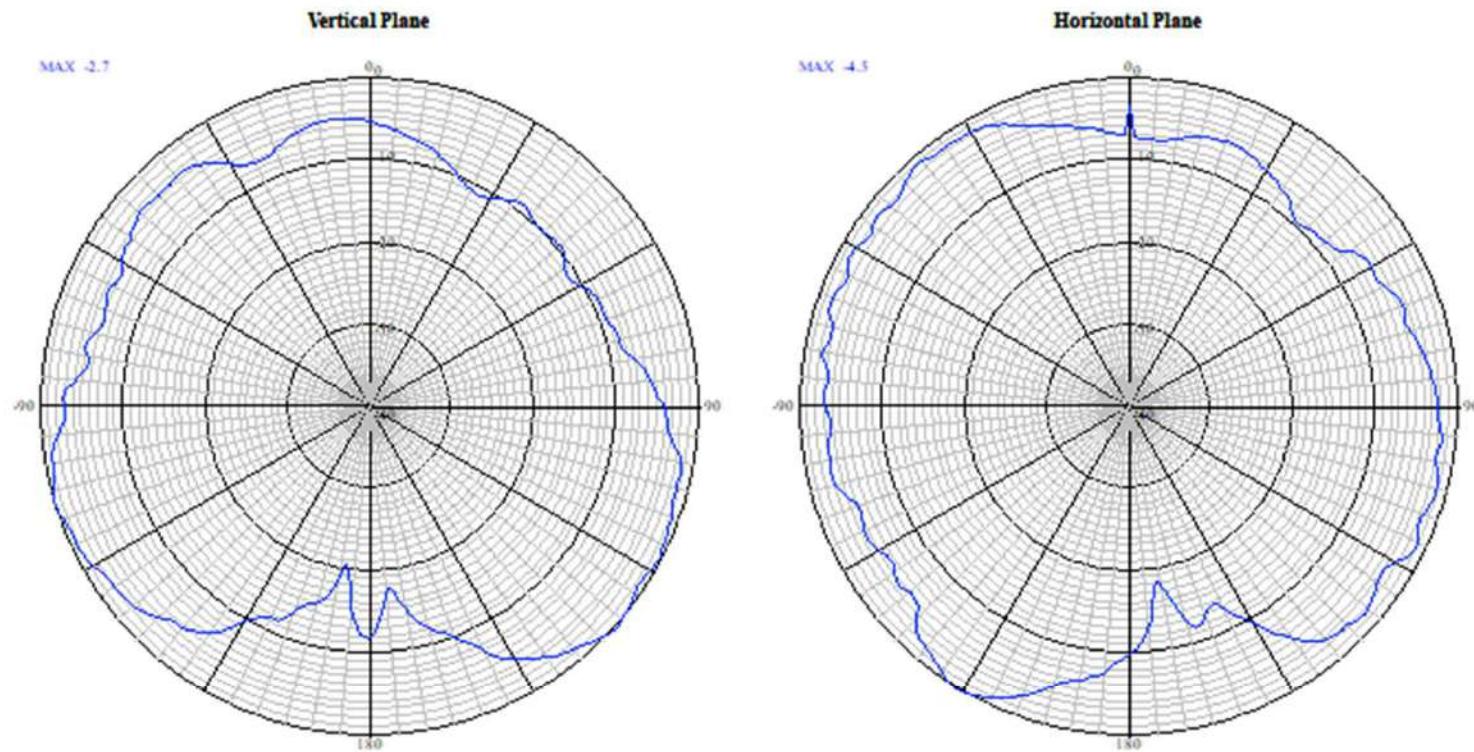
Far-Field Patterns

Frequency: 2.440000



Single Channel Unit
Antenna 1: BLE antenna

Far-Field Patterns
Frequency: 2.480000



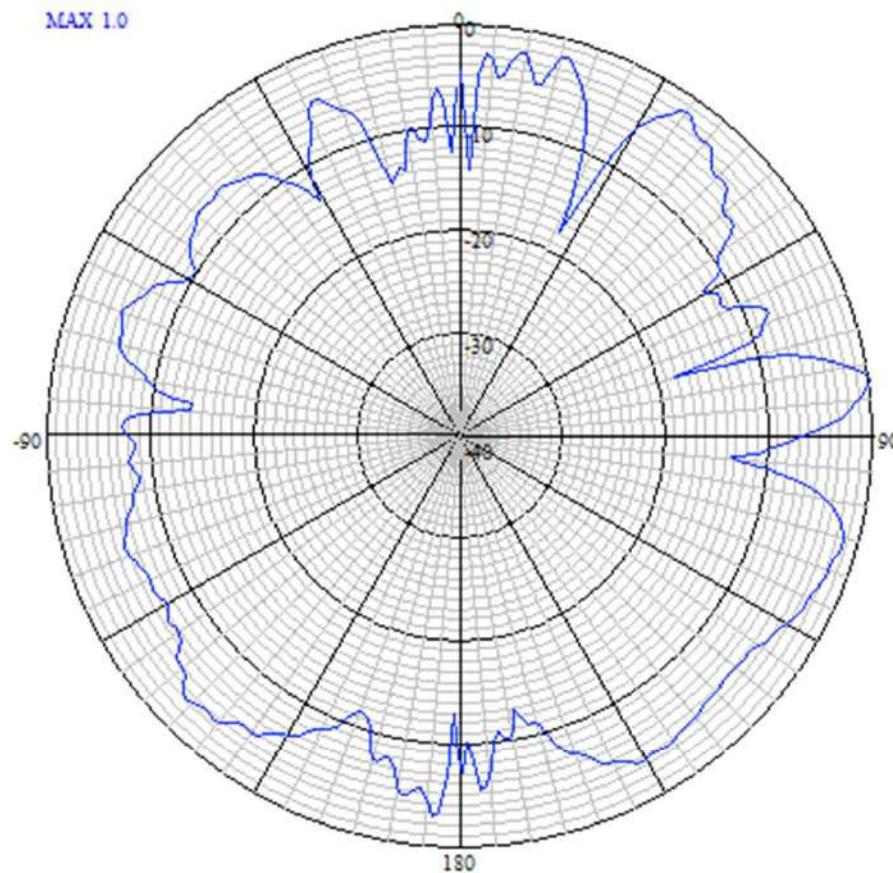
1. BLE antenna

b) 2D Azimuth cut: XY-Plane

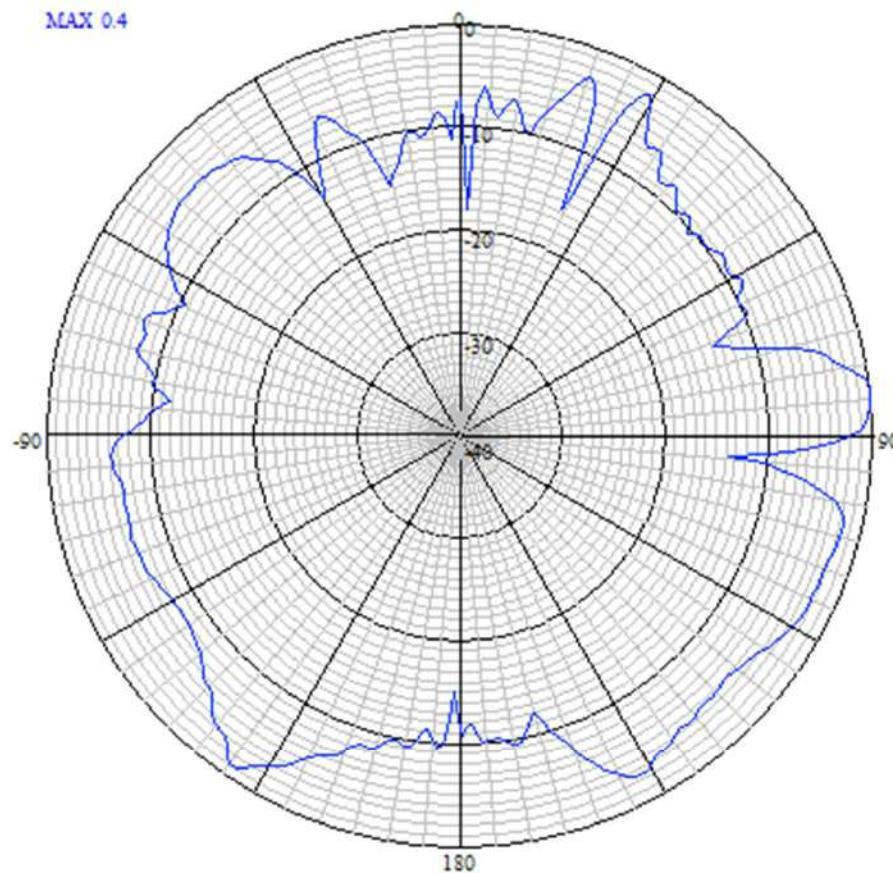
Freq = 2.40, 2.44, 2.48 GHz

Single Channel Unit
Antenna 1: BLE antenna
Far-Field Patterns : 4 Cuts - 2 Radial, 2 Angular
Frequency: 2.400000

Azimuth Cut - XY Plane

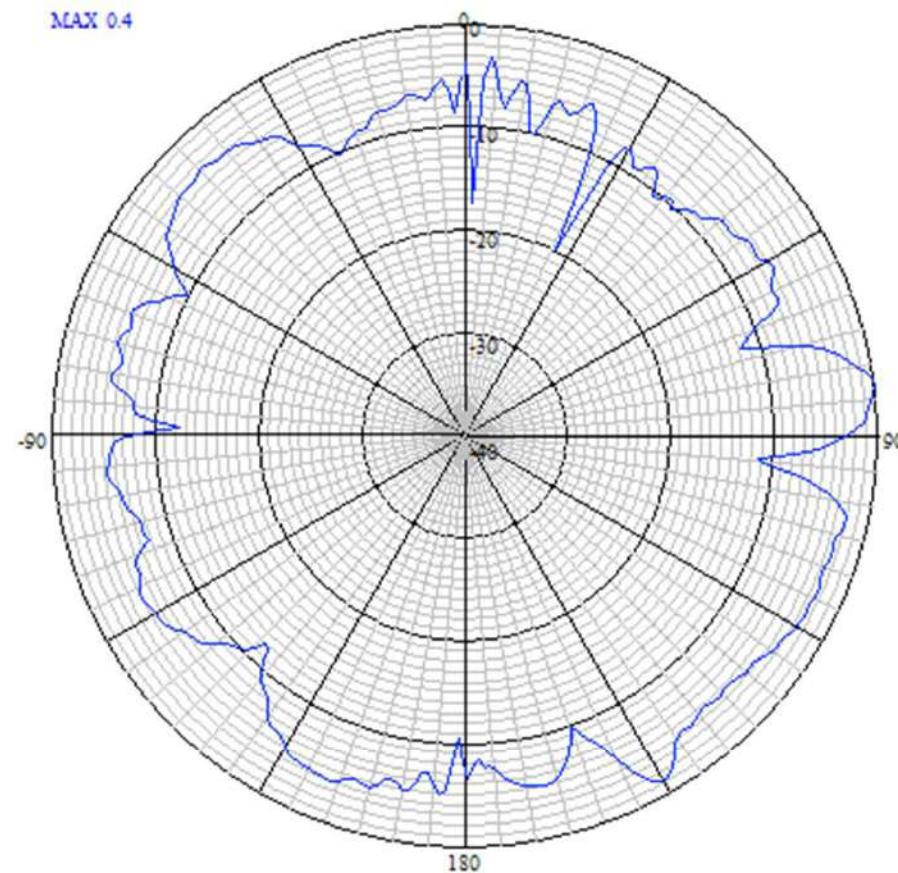


Single Channel Unit
Antenna 1: BLE antenna
Far-Field Patterns : 4 Cuts - 2 Radial, 2 Angular
Frequency: 2.440000
Azimuth Cut - XY Plane



Single Channel Unit
Antenna 1: BLE antenna
Far-Field Patterns : 4 Cuts - 2 Radial, 2 Angular
Frequency: 2.480000

Azimuth Cut - XY Plane

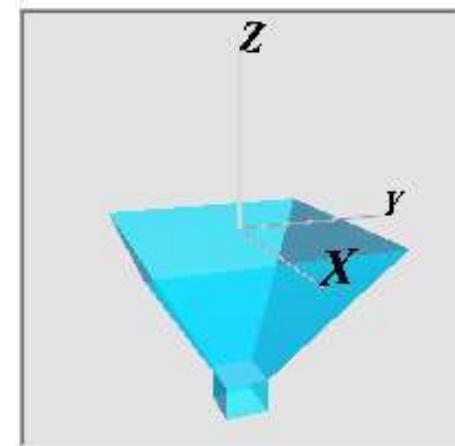
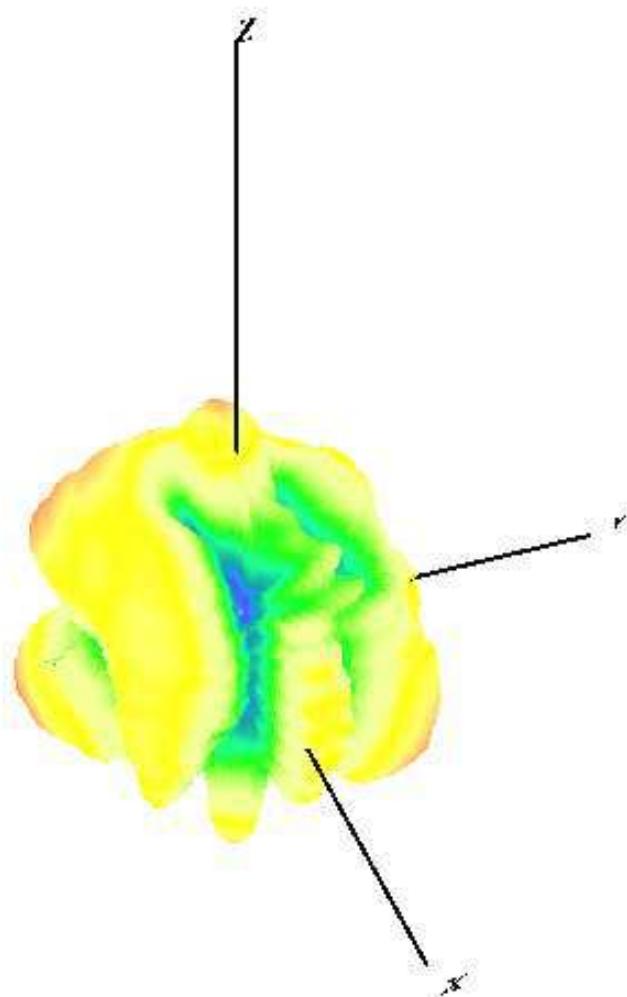


1. BLE antenna

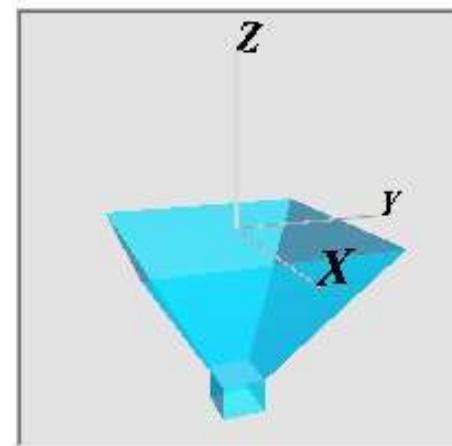
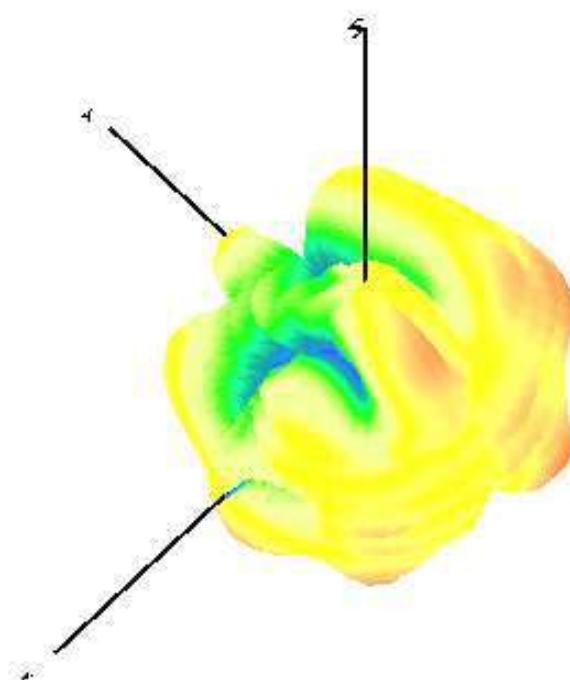
c) 3D plots

Freq = 2.40, 2.44, 2.48 GHz

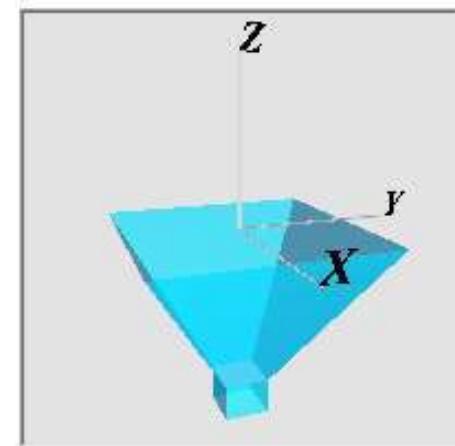
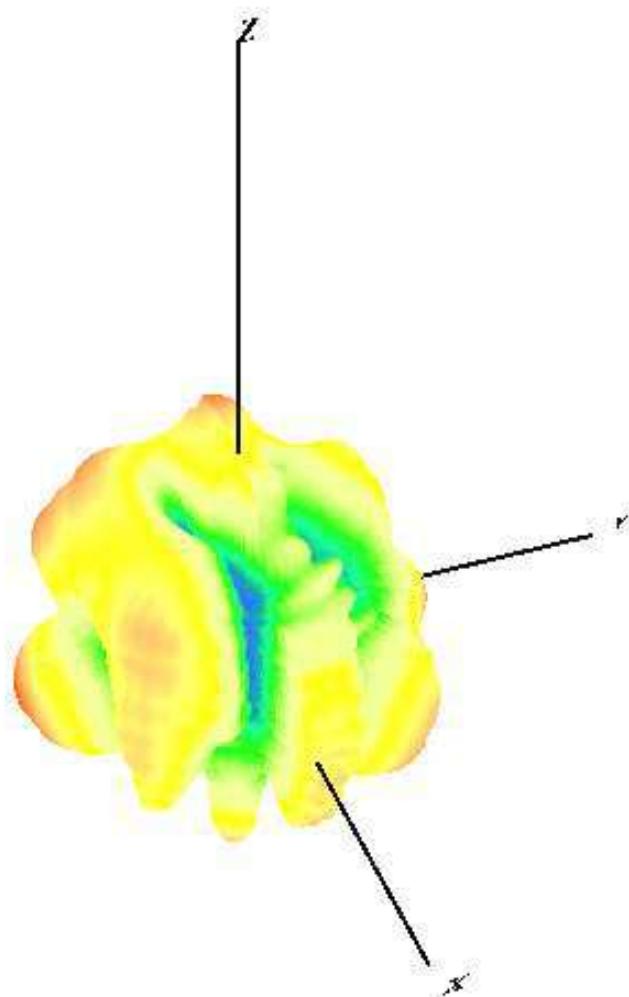
Single Channel Unit
Antenna 1: BLE antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 2.400000



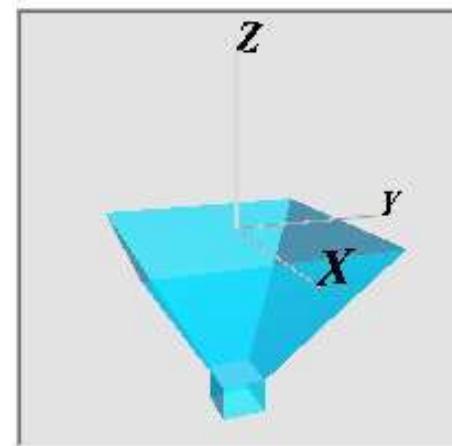
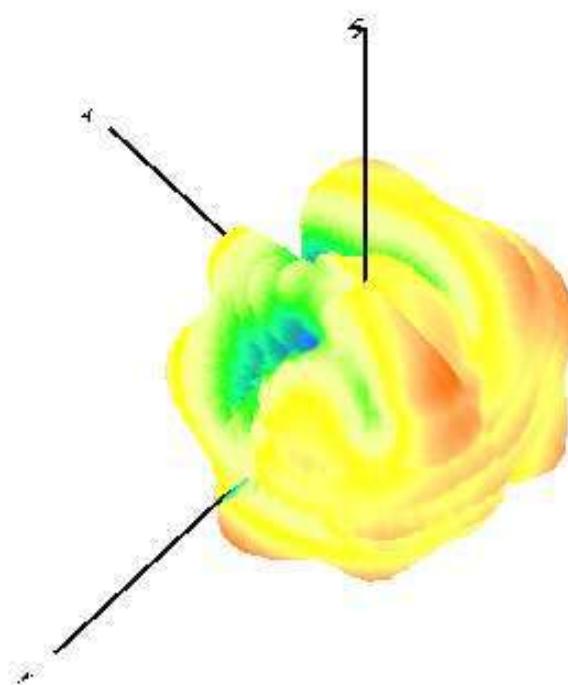
Single Channel Unit
Antenna 1: BLE antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 2.400000



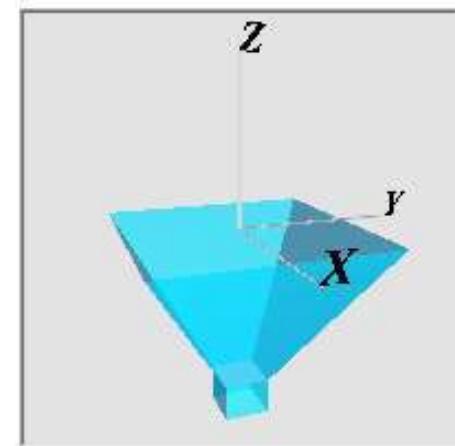
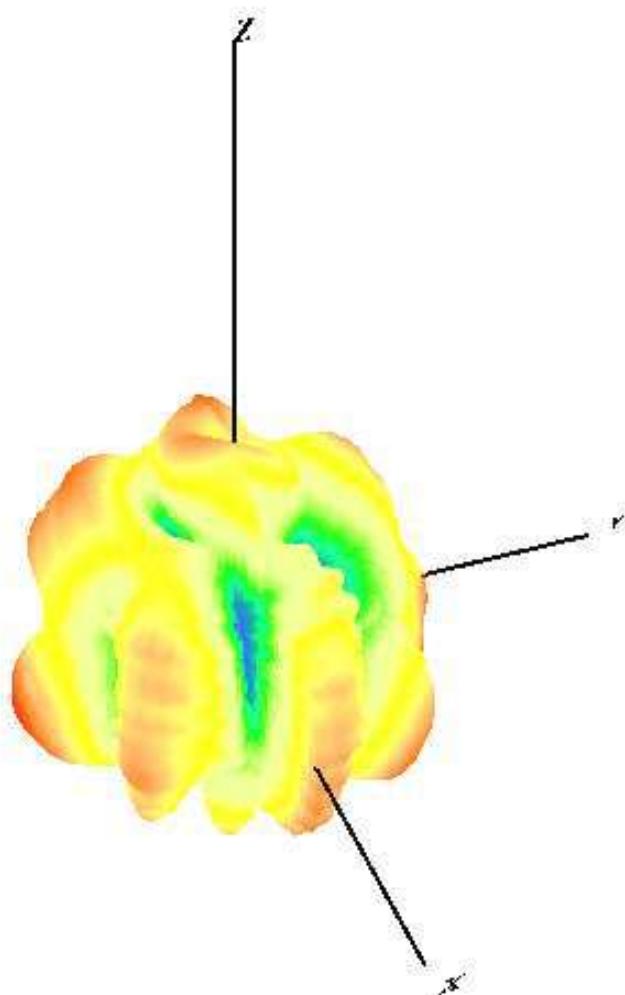
Single Channel Unit
Antenna 1: BLE antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 2.440000



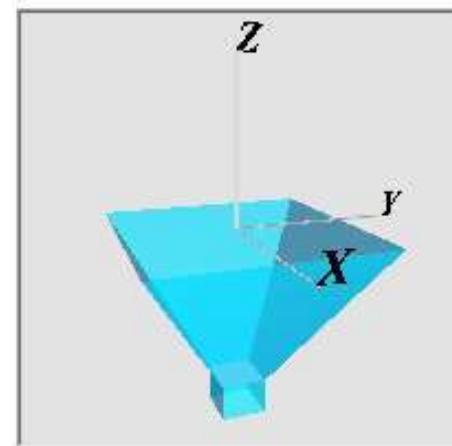
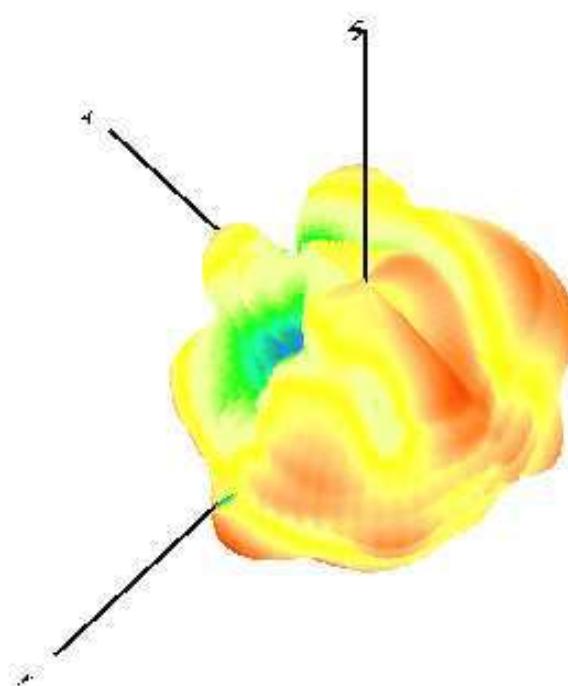
Single Channel Unit
Antenna 1: BLE antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 2.440000



Single Channel Unit
Antenna 1: BLE antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 2.480000



Single Channel Unit
Antenna 1: BLE antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 2.480000

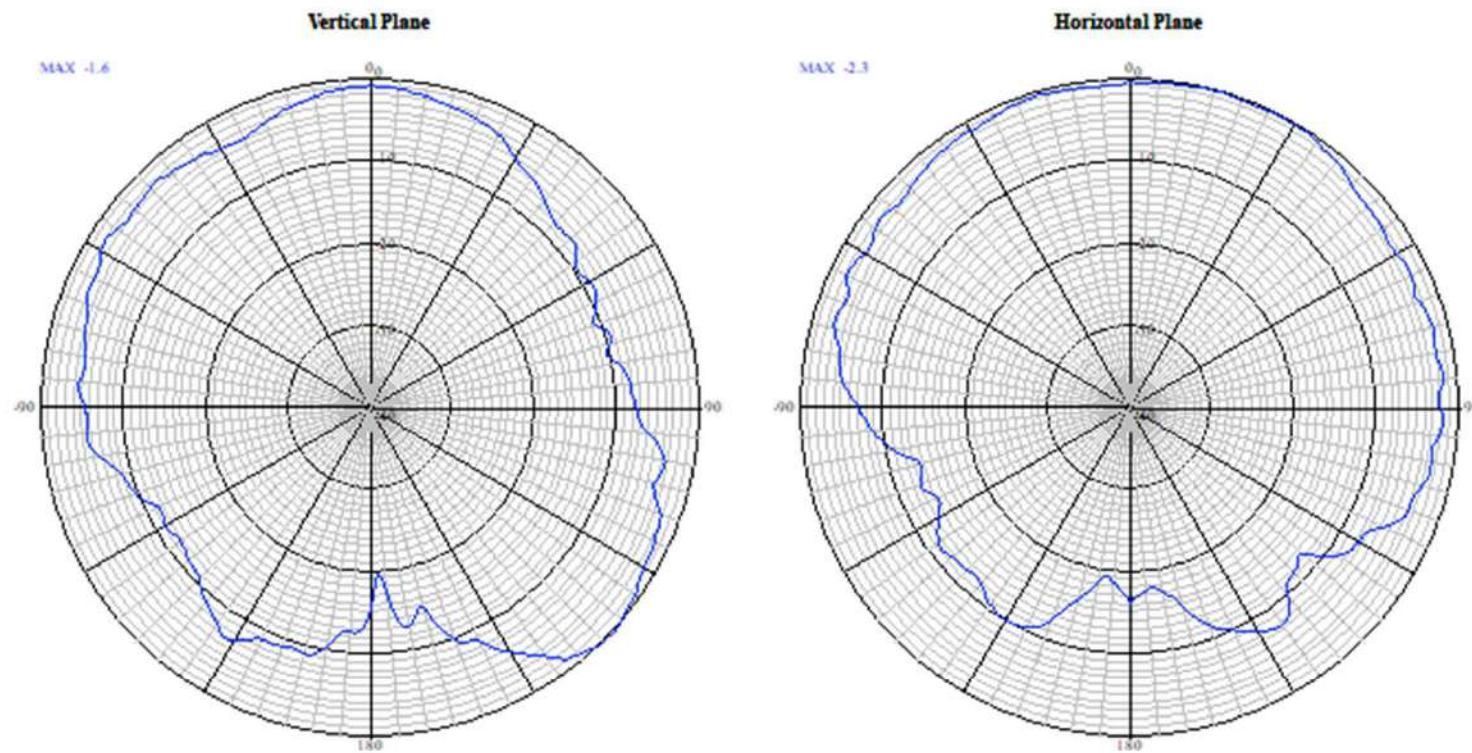


2. Wifi antenna

a) 2D Elevation cuts, ZX- and ZY-plane

Freq = 2.40, 2.44, 2.48, 5.15, 5.35, 5.5, 5.725 GHz

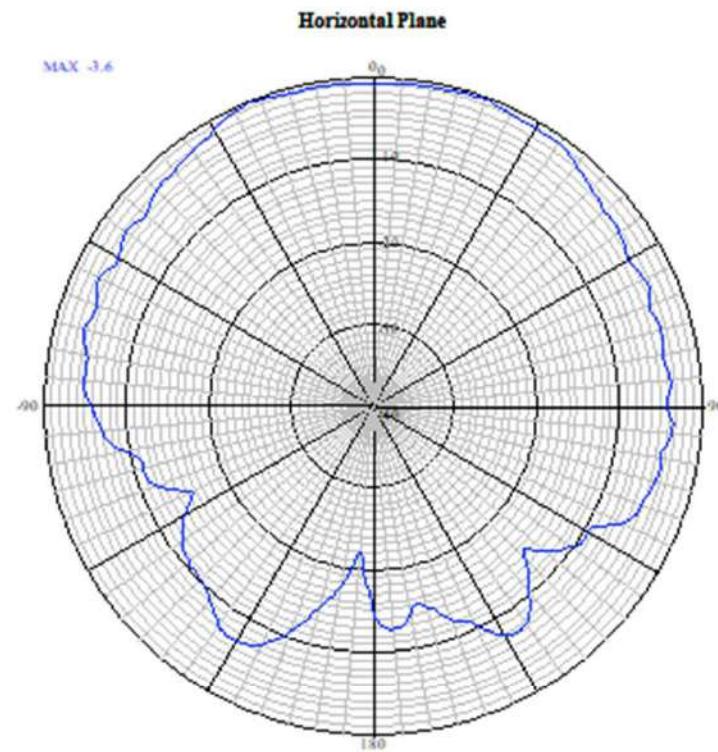
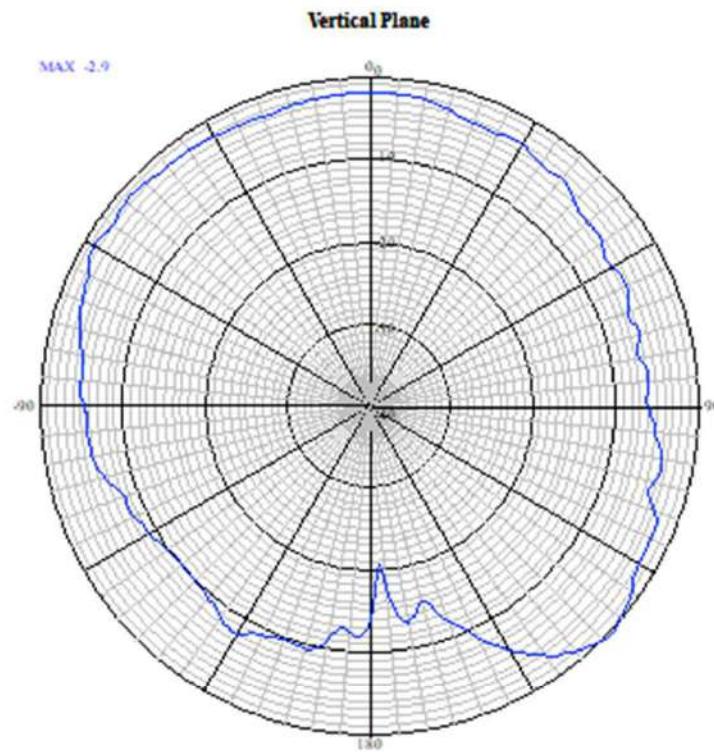
Single Channel Unit
Antenna 2: WiFi antenna
Far-Field Patterns
Frequency: 2.400000



**Single Channel Unit
Antenna 2: WiFi antenna**

Far-Field Patterns

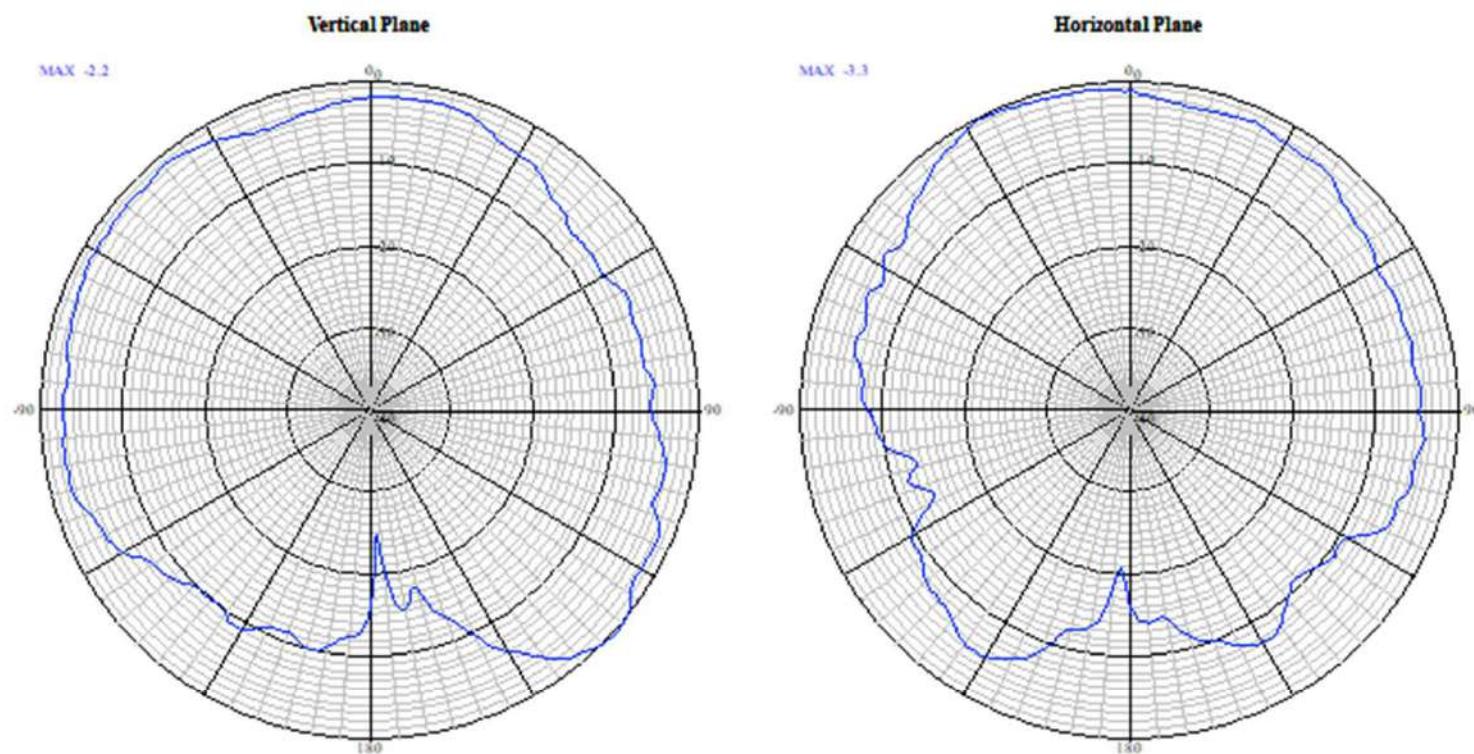
Frequency: 2.440000



**Single Channel Unit
Antenna 2: WiFi antenna**

Far-Field Patterns

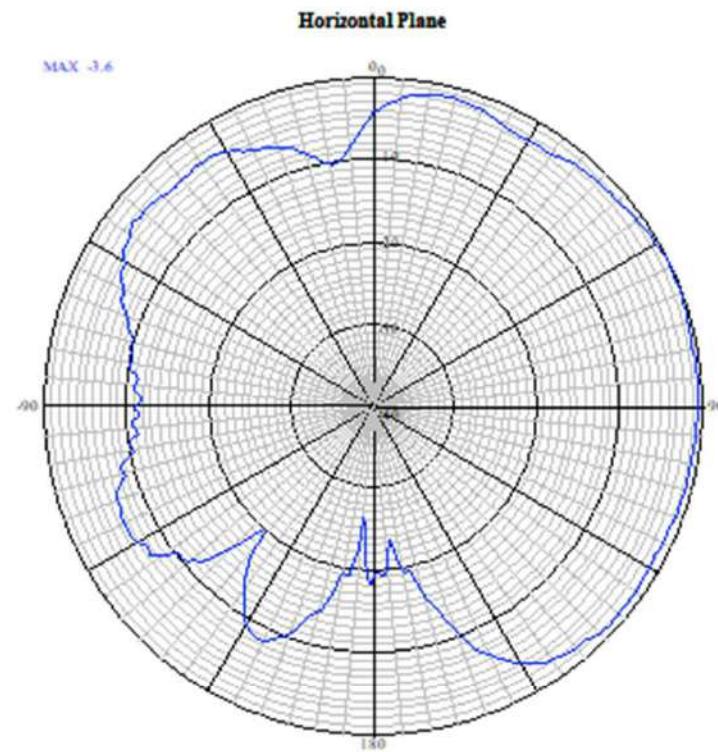
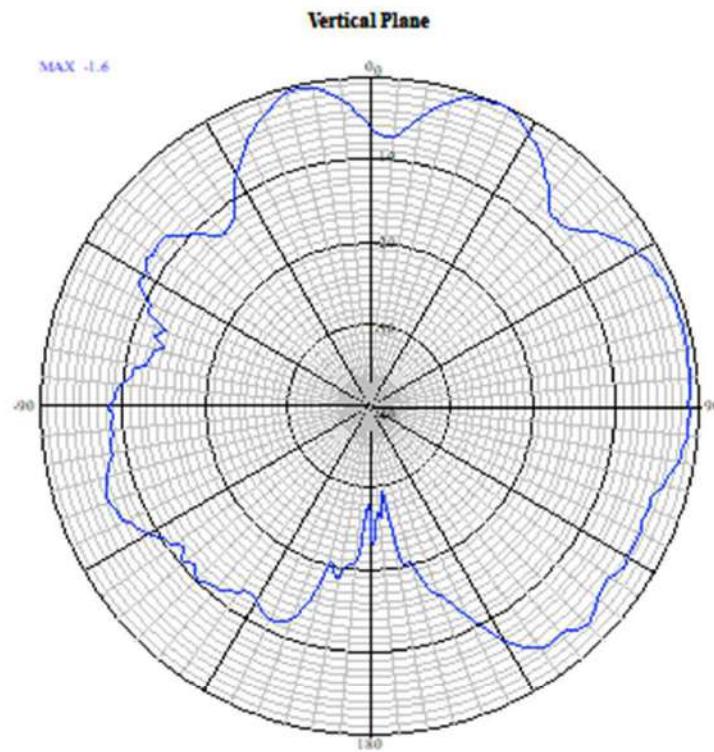
Frequency: 2.480000



**Single Channel Unit
Antenna 2: WiFi antenna**

Far-Field Patterns

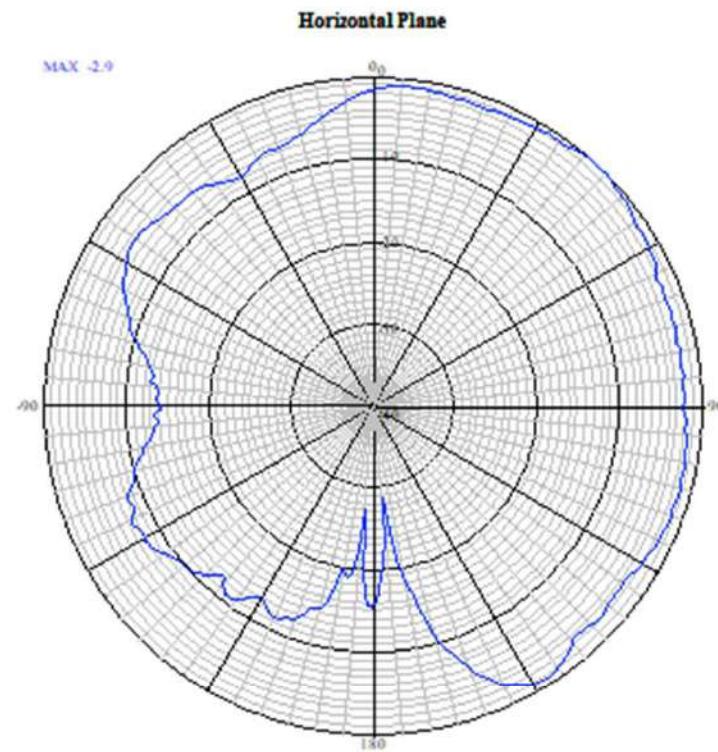
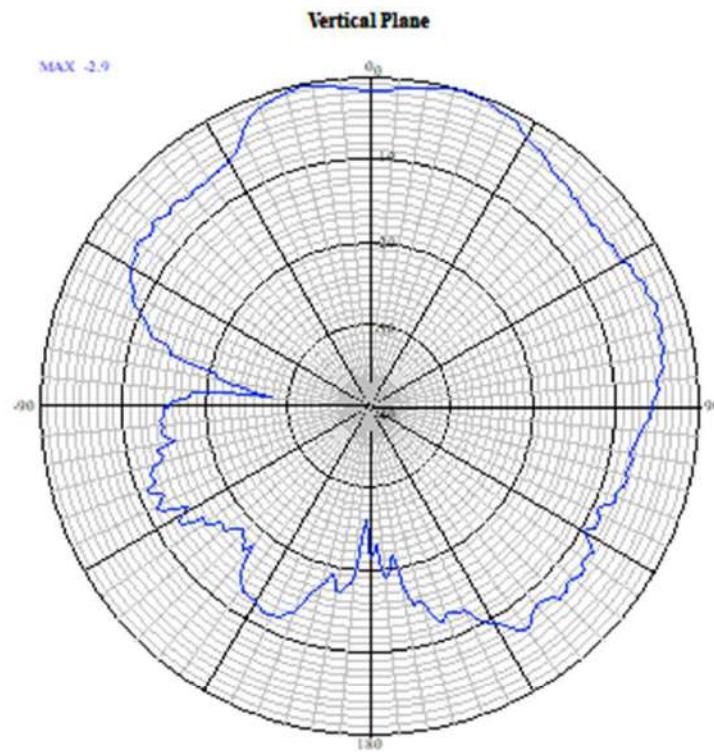
Frequency: 5.150000



**Single Channel Unit
Antenna 2: WiFi antenna**

Far-Field Patterns

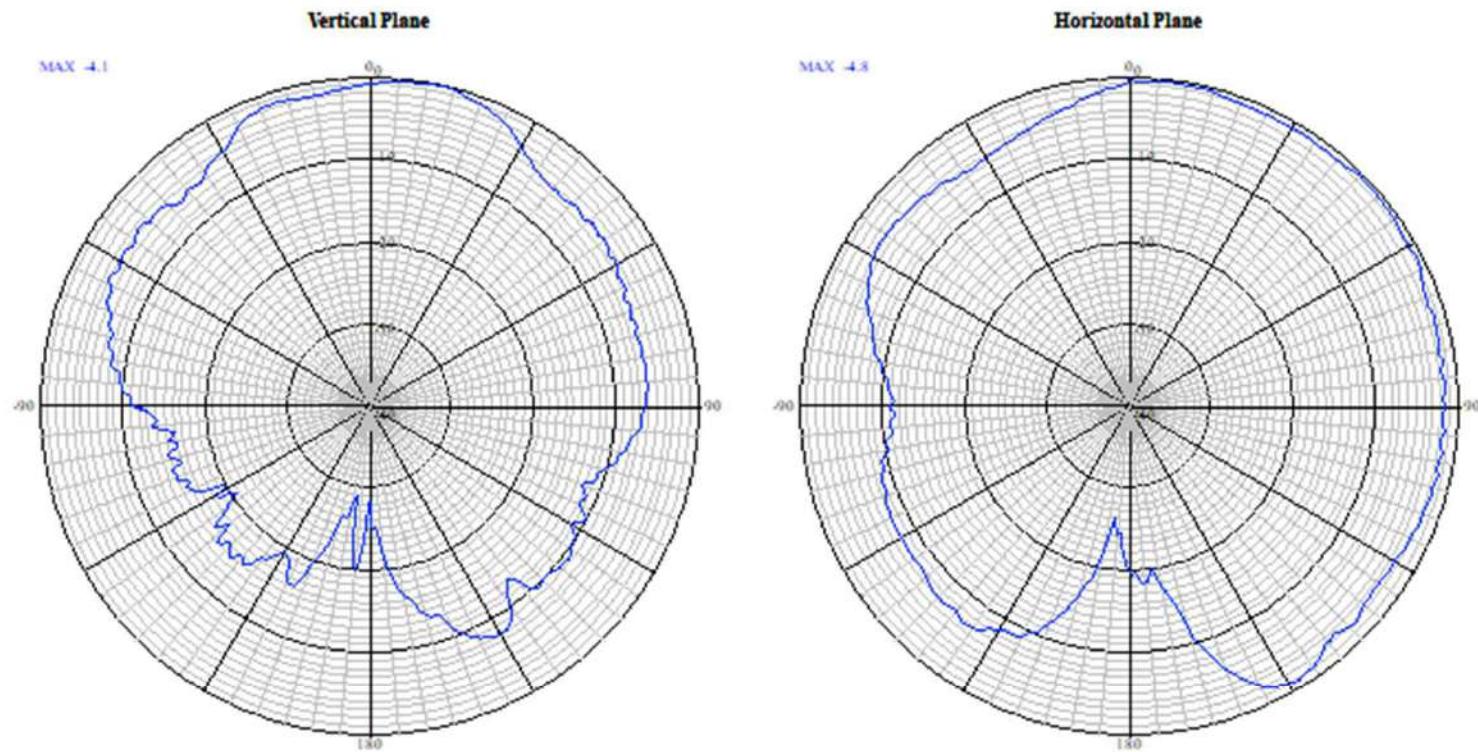
Frequency: 5.350000



**Single Channel Unit
Antenna 2: WiFi antenna**

Far-Field Patterns

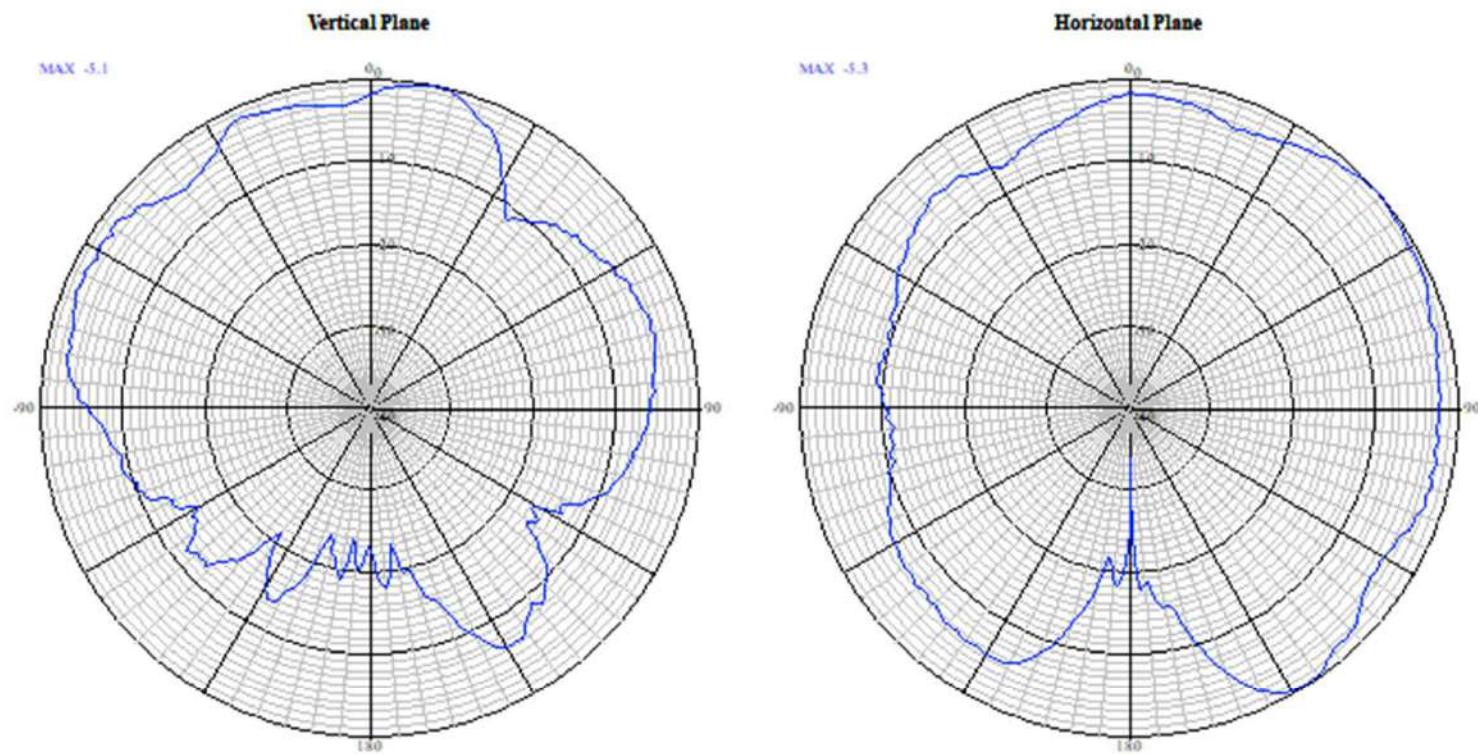
Frequency: 5.500000



**Single Channel Unit
Antenna 2: WiFi antenna**

Far-Field Patterns

Frequency: 5.725000

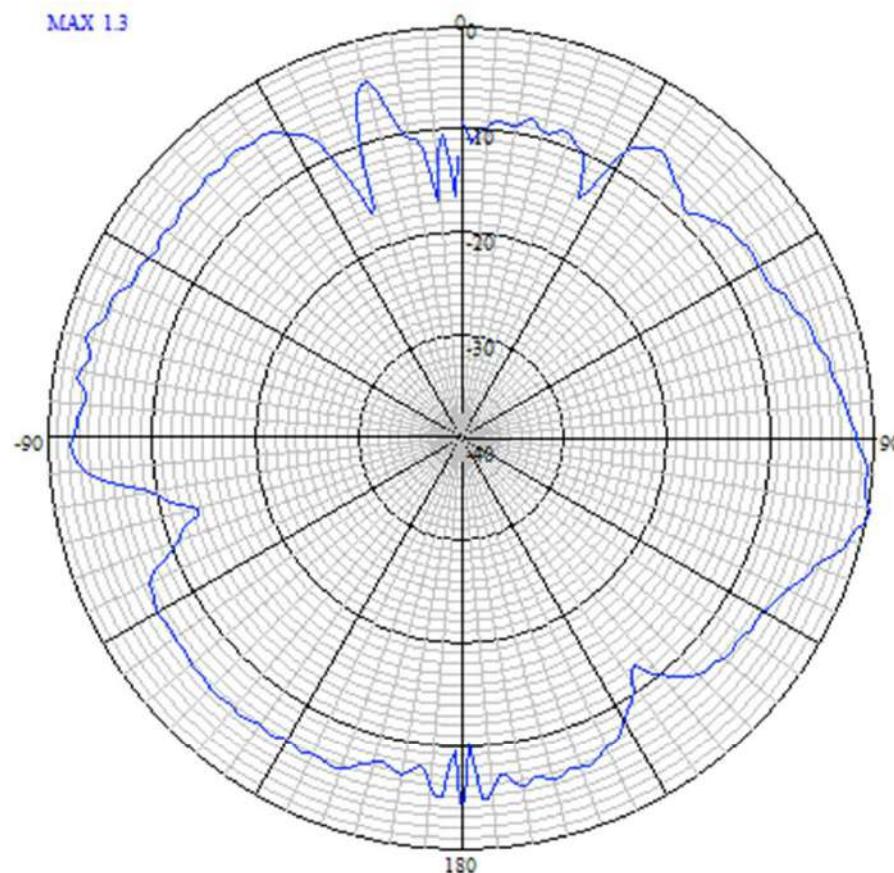


2. WiFi antenna

b) 2D Azimuth cut: XY-Plane

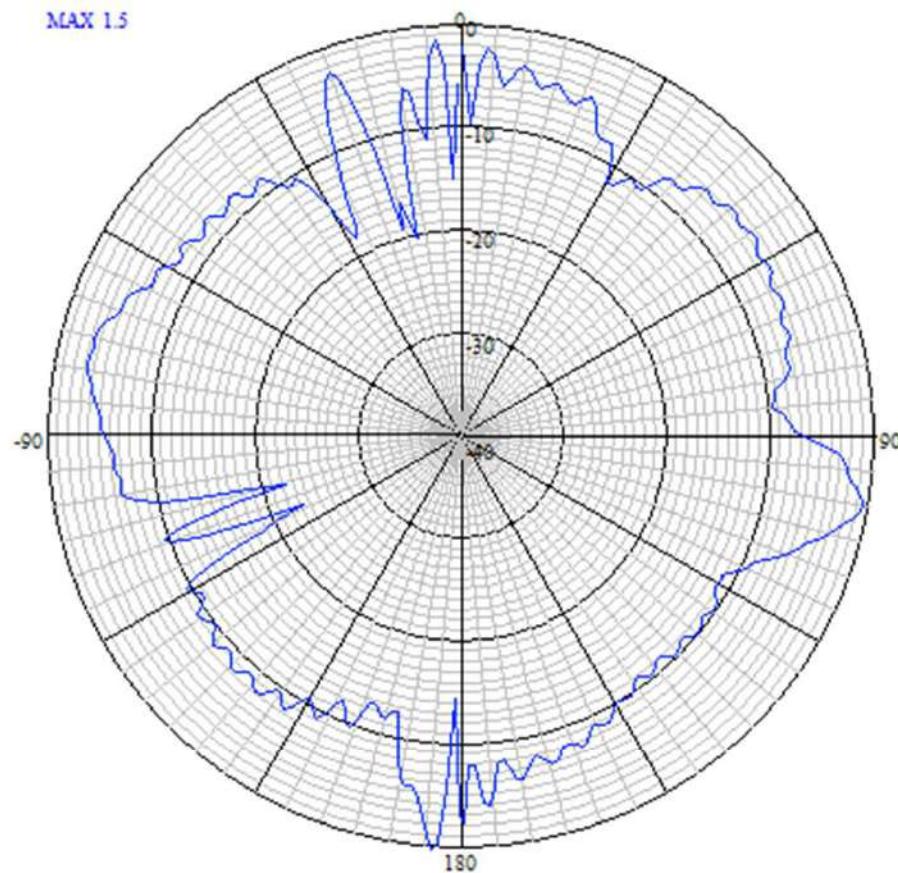
Freq = 2.40, 2.44, 2.48, 5.15, 5.35, 5.5, 5.725 GHz

Single Channel Unit
Antenna 2: WiFi antenna
Far-Field Patterns : 4 Cuts - 2 Radial, 2 Angular
Frequency: 2.400000
Azimuth Cut - XY Plane



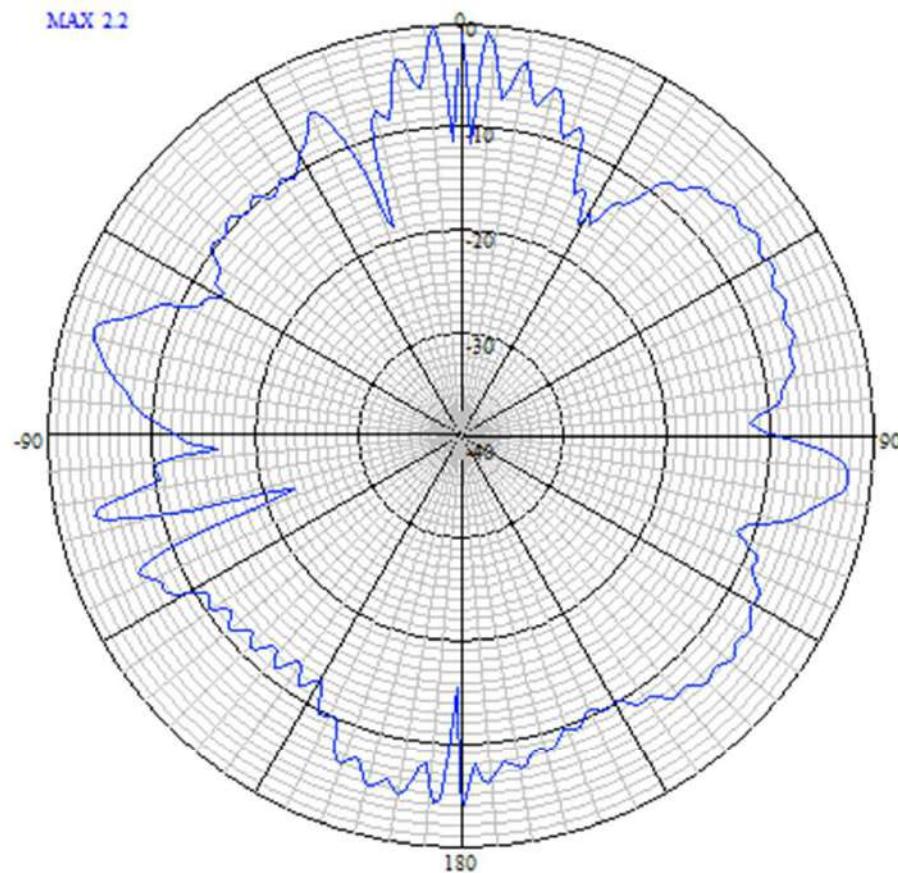
Single Channel Unit
Antenna 2: WiFi antenna
Far-Field Patterns : 4 Cuts - 2 Radial, 2 Angular
Frequency: 2.440000

Azimuth Cut - XY Plane



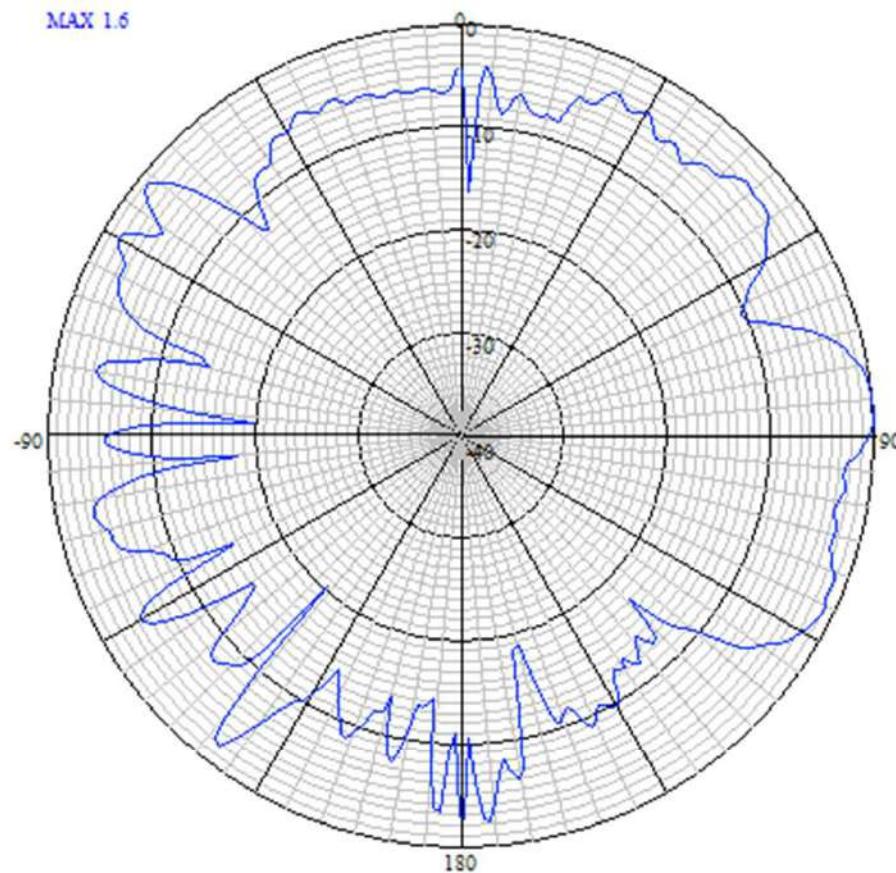
Single Channel Unit
Antenna 2: WiFi antenna
Far-Field Patterns : 4 Cuts - 2 Radial, 2 Angular
Frequency: 2.480000

Azimuth Cut - XY Plane



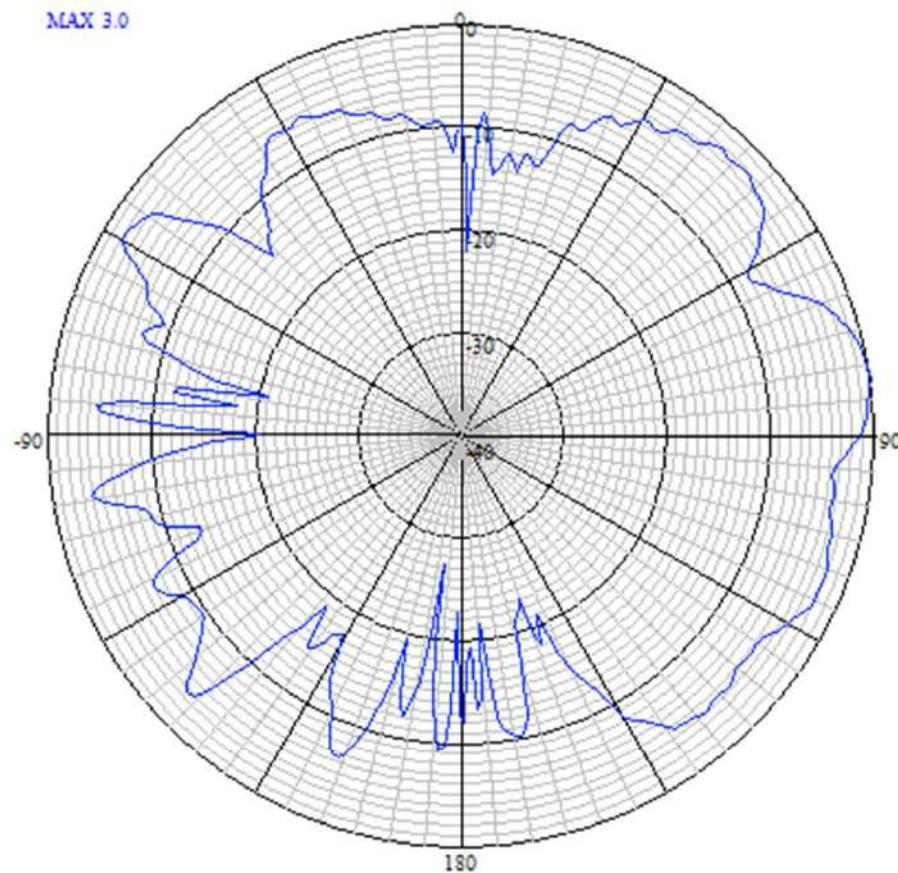
Single Channel Unit
Antenna 2: WiFi antenna
Far-Field Patterns : 4 Cuts - 2 Radial, 2 Angular
Frequency: 5.150000

Azimuth Cut - XY Plane



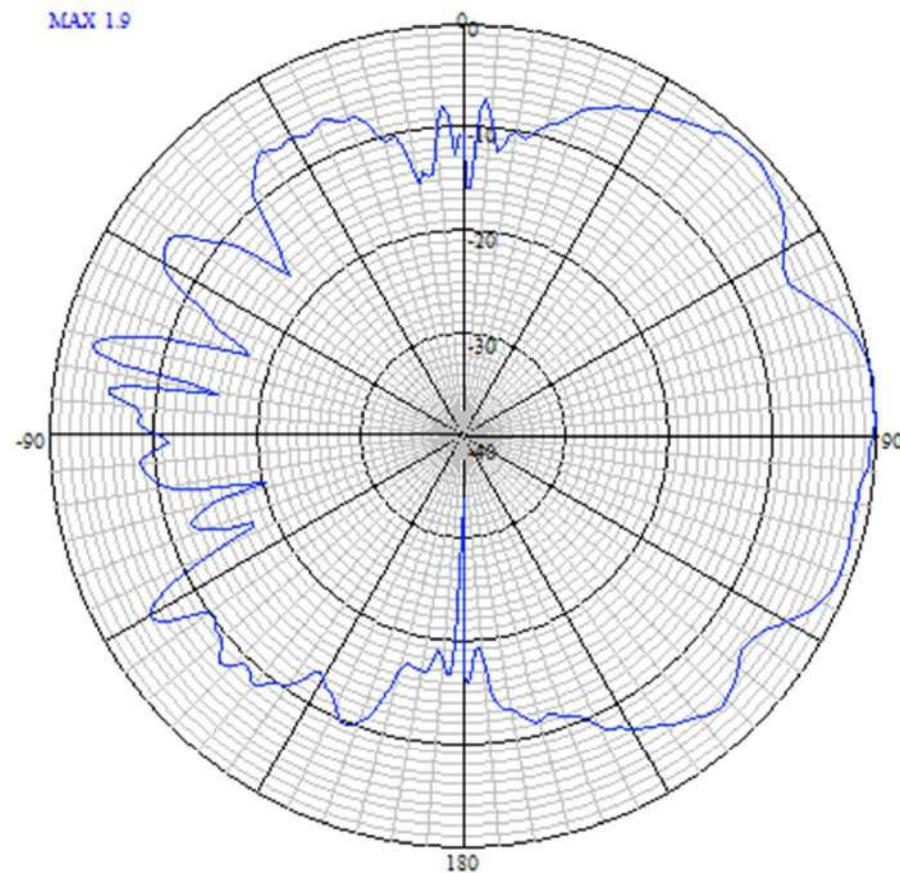
Single Channel Unit
Antenna 2: WiFi antenna
Far-Field Patterns : 4 Cuts - 2 Radial, 2 Angular
Frequency: 5.350000

Azimuth Cut - XY Plane



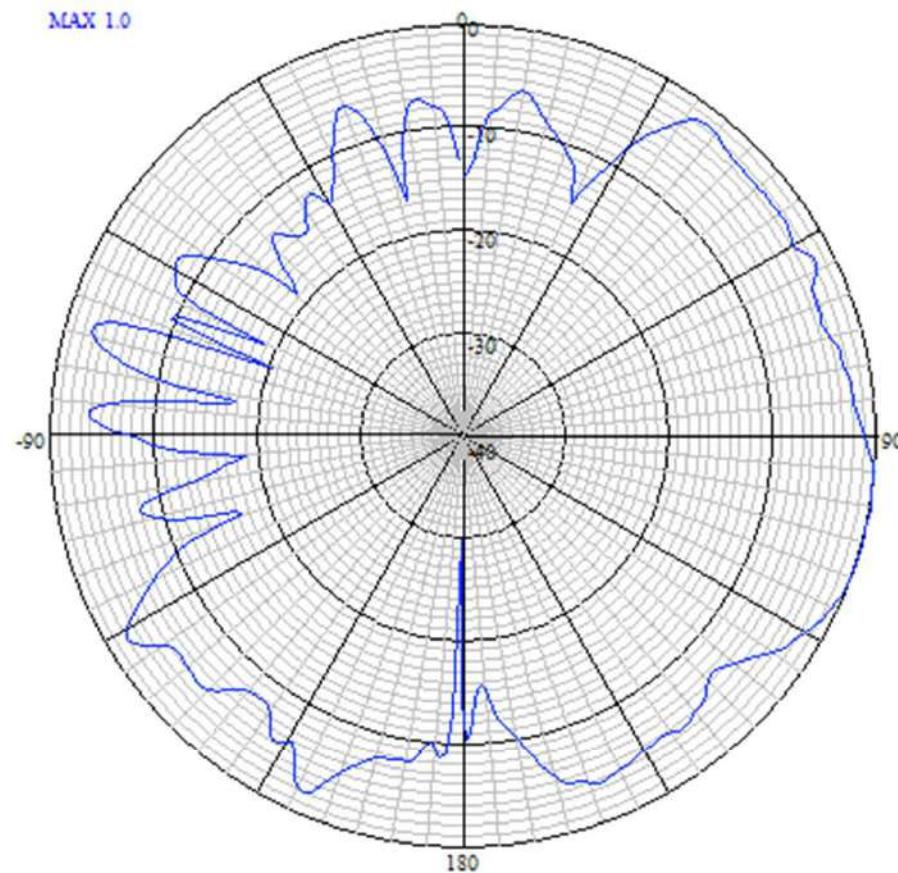
Single Channel Unit
Antenna 2: WiFi antenna
Far-Field Patterns : 4 Cuts - 2 Radial, 2 Angular
Frequency: 5.500000

Azimuth Cut - XY Plane



Single Channel Unit
Antenna 2: WiFi antenna
Far-Field Patterns : 4 Cuts - 2 Radial, 2 Angular
Frequency: 5.725000

Azimuth Cut - XY Plane

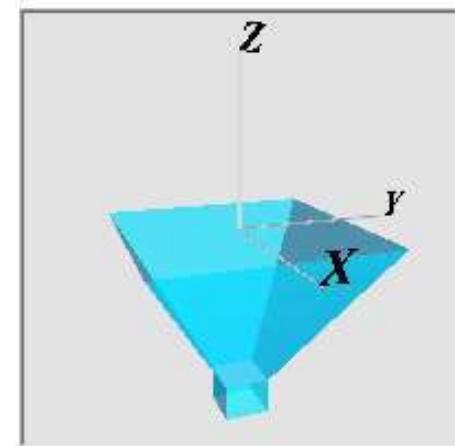
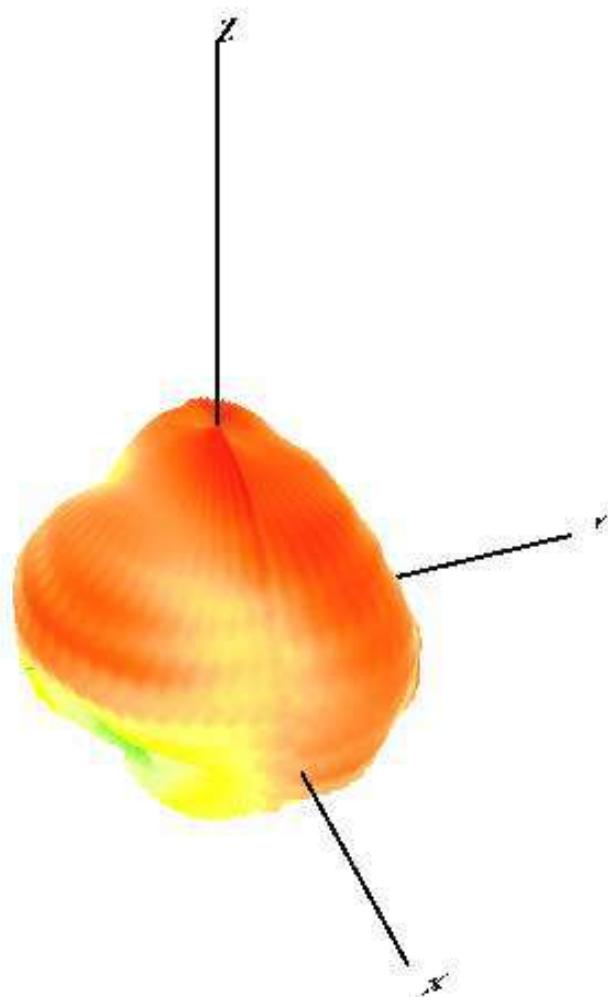


2. WiFi antenna

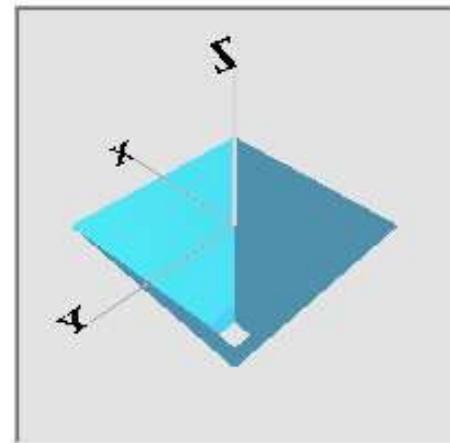
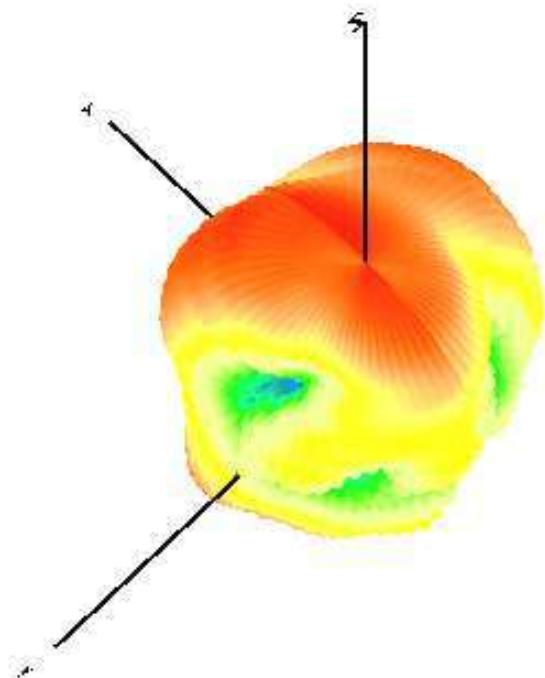
c) 3D plots

Freq = 2.40, 2.44, 2.48, 5.15, 5.35, 5.5, 5.725 GHz

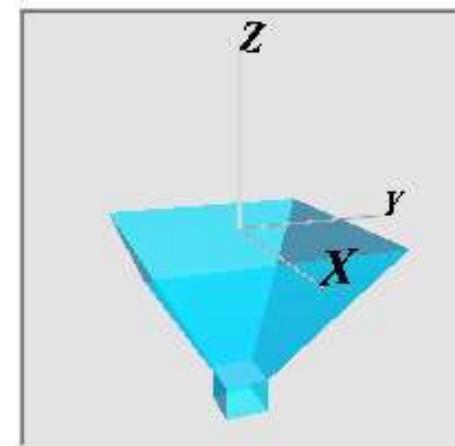
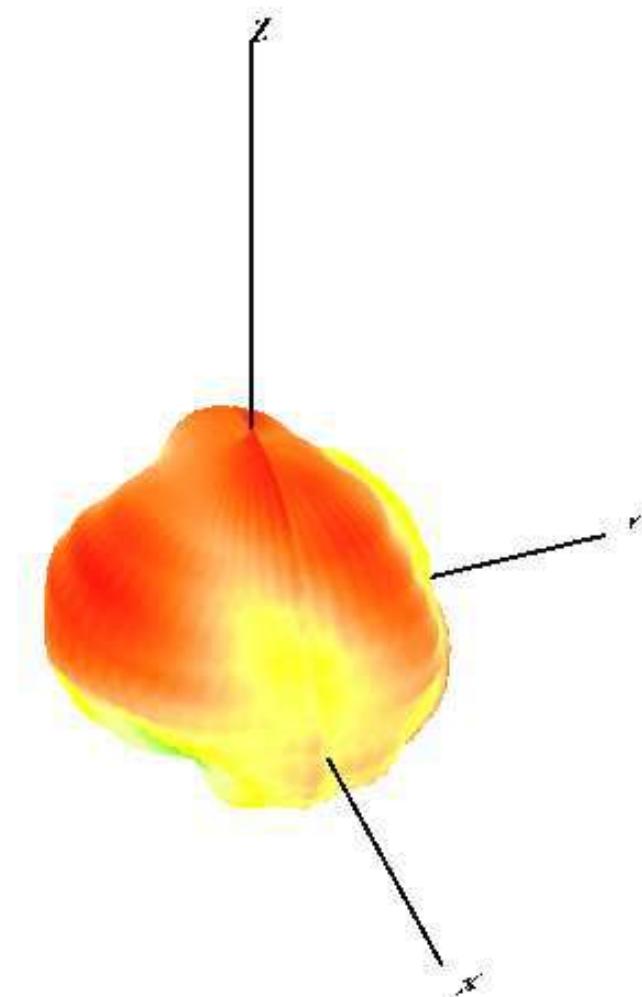
Single Channel Unit
Antenna 2: WiFi antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 2.400000



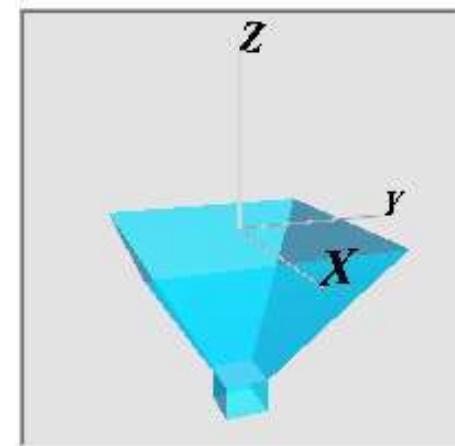
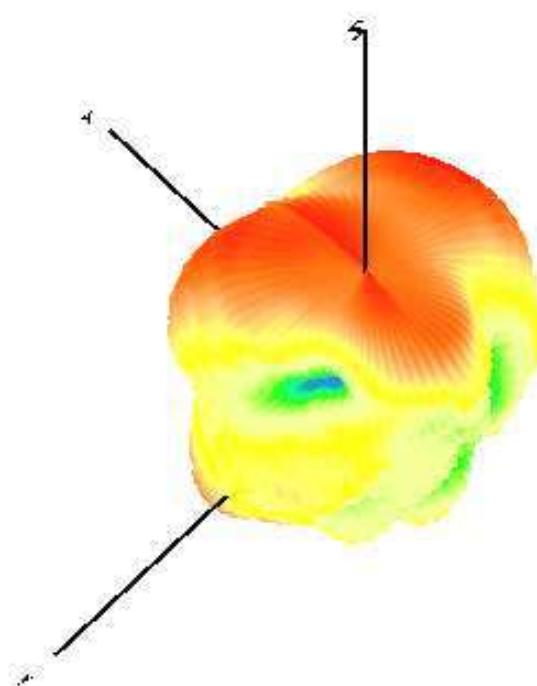
Single Channel Unit
Antenna 2: WiFi antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 2.400000



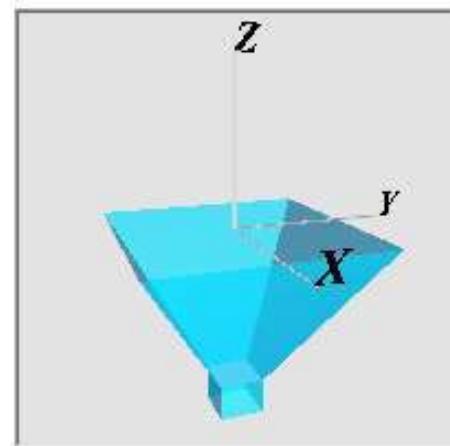
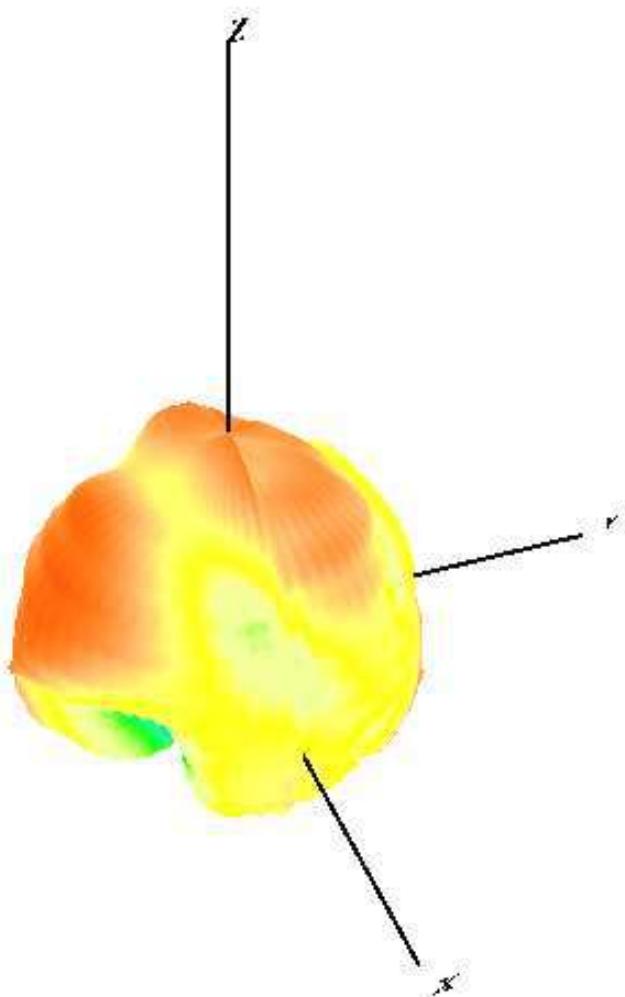
Single Channel Unit
Antenna 2: WiFi antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 2.440000



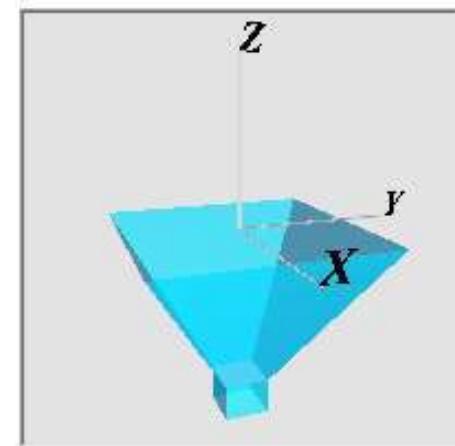
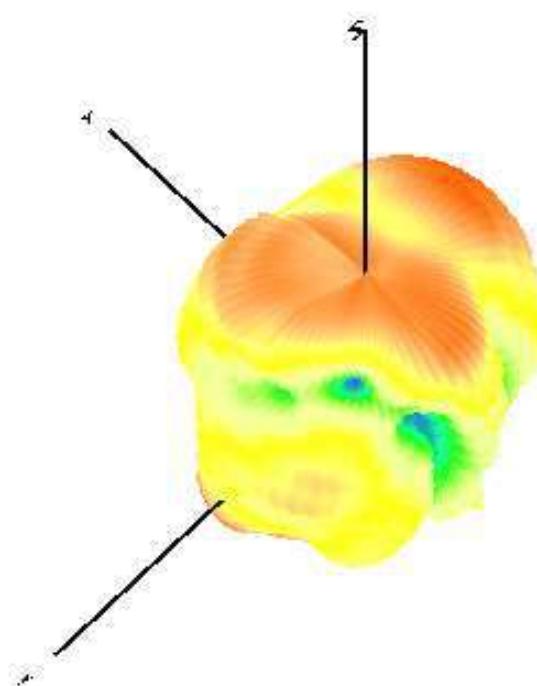
Single Channel Unit
Antenna 2: WiFi antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 2.440000



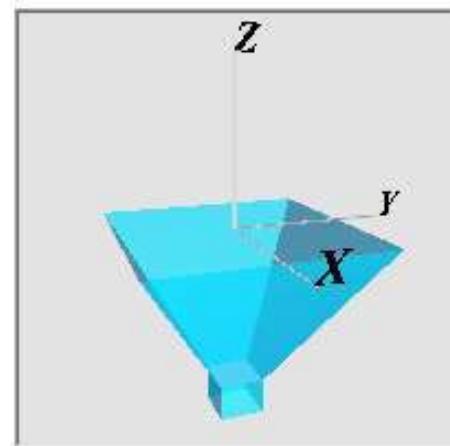
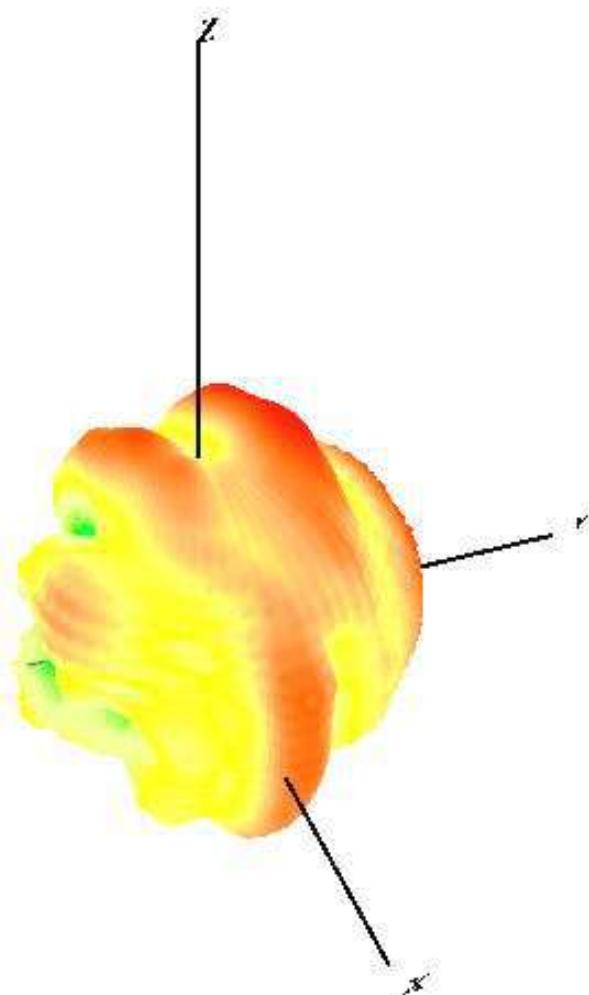
Single Channel Unit
Antenna 2: WiFi antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 2.480000



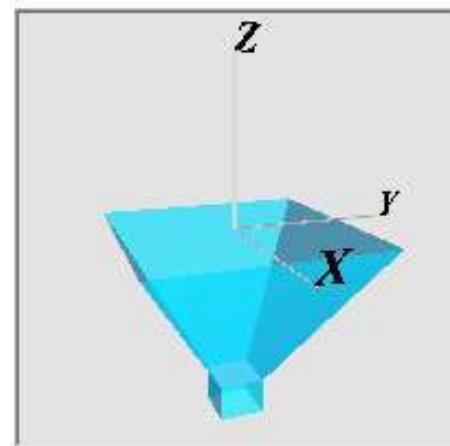
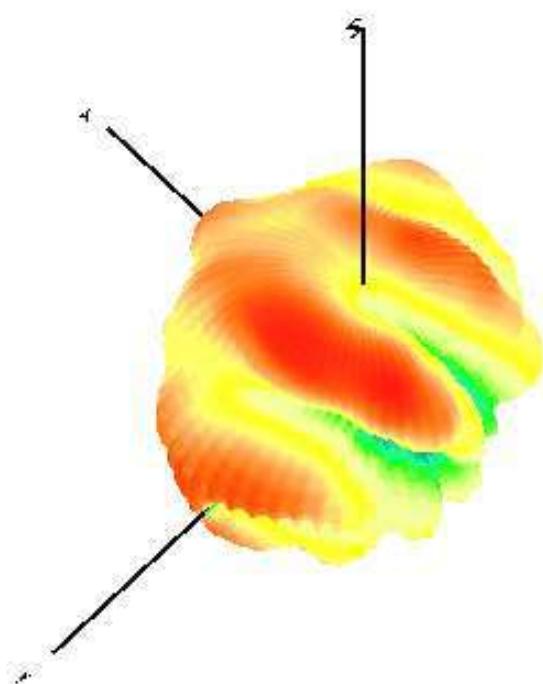
Single Channel Unit
Antenna 2: WiFi antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 2.480000



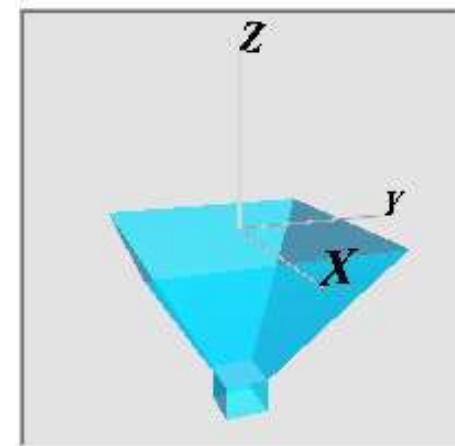
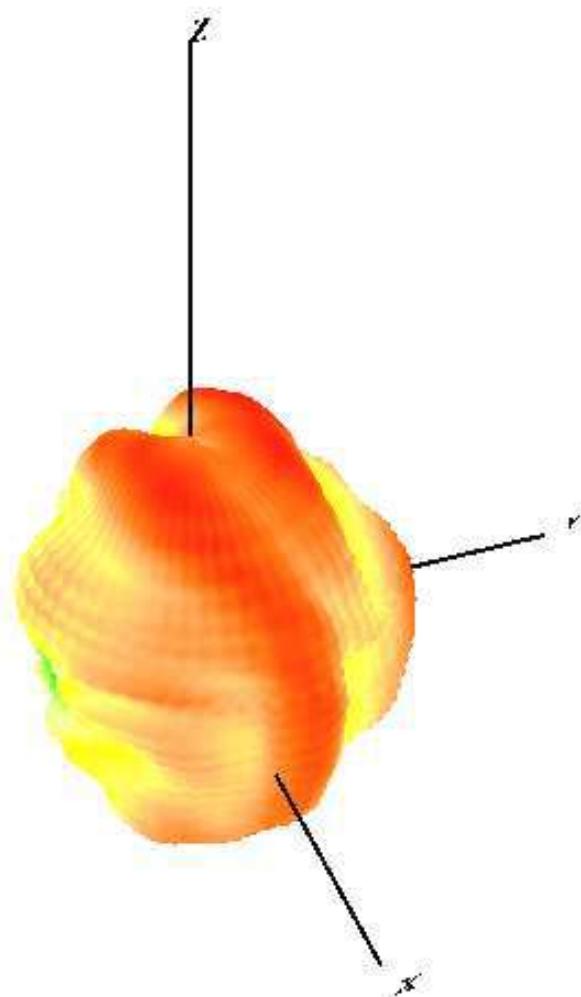
Single Channel Unit
Antenna 2: WiFi antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 5.150000



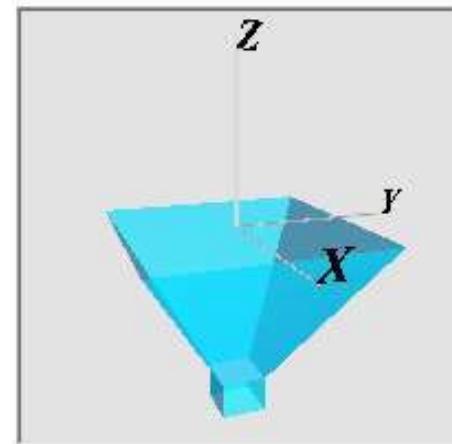
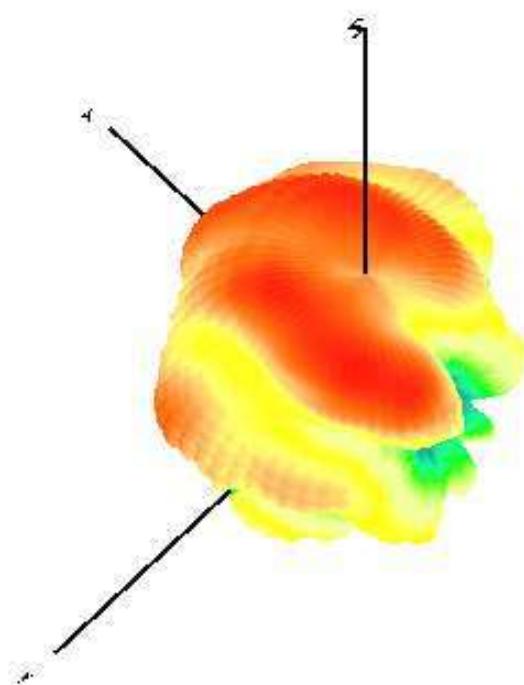
Single Channel Unit
Antenna 2: WiFi antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 5.150000



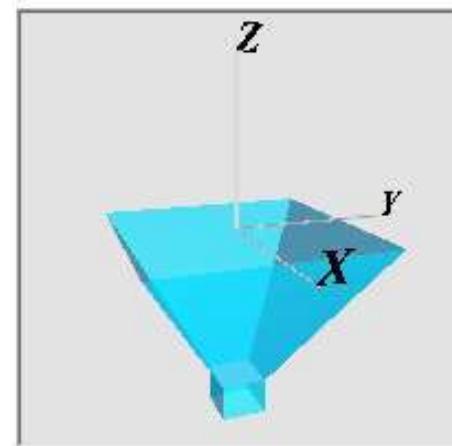
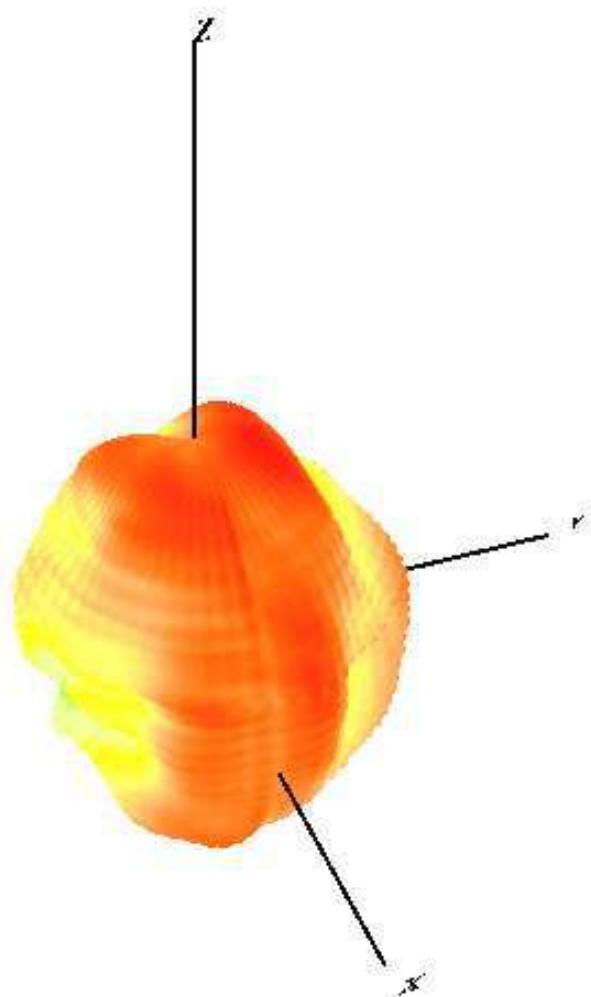
Single Channel Unit
Antenna 2: WiFi antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 5.350000



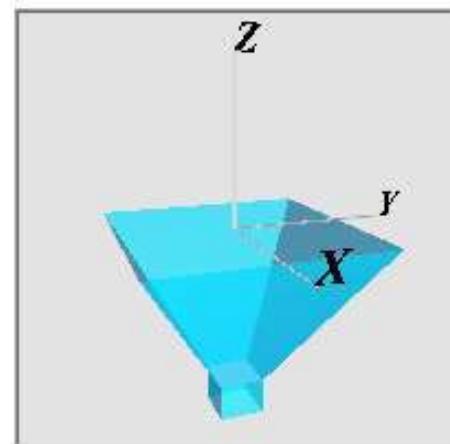
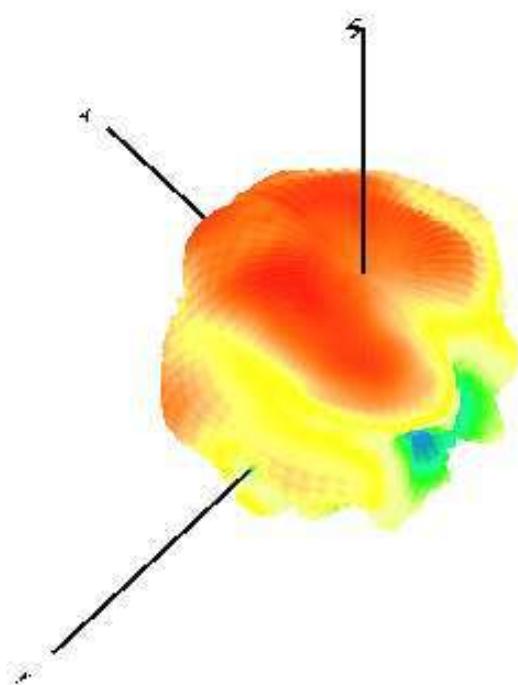
Single Channel Unit
Antenna 2: WiFi antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 5.350000



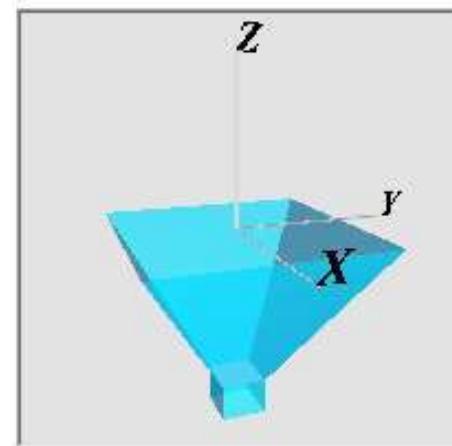
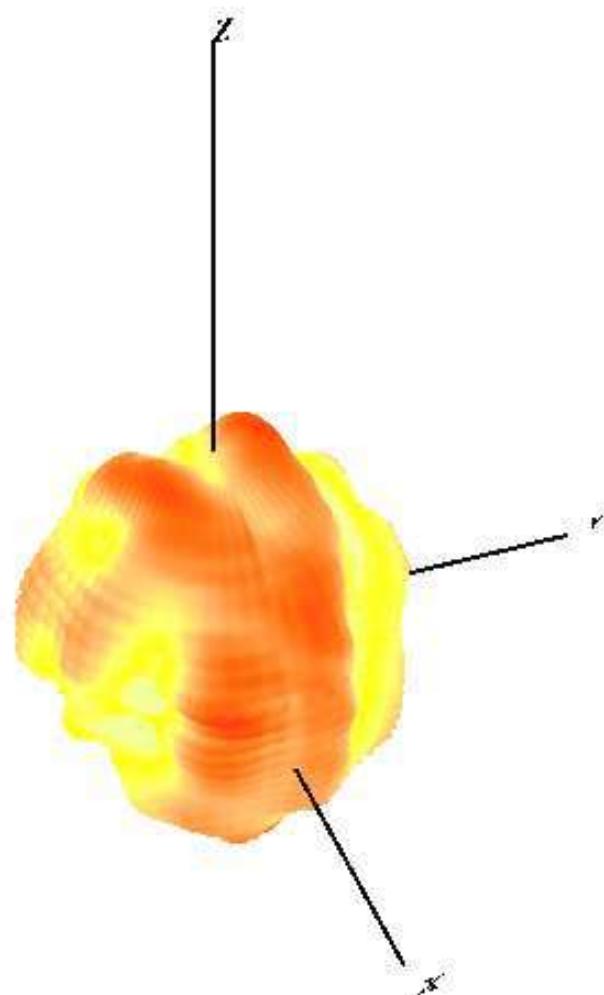
Single Channel Unit
Antenna 2: WiFi antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 5.500000



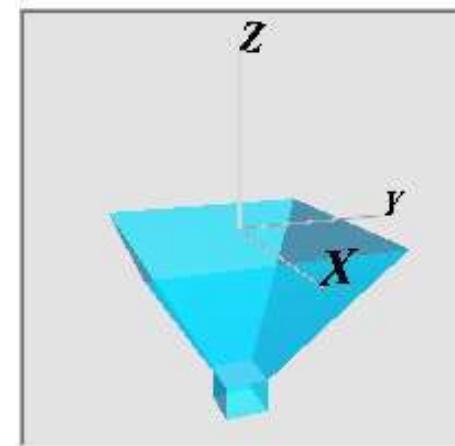
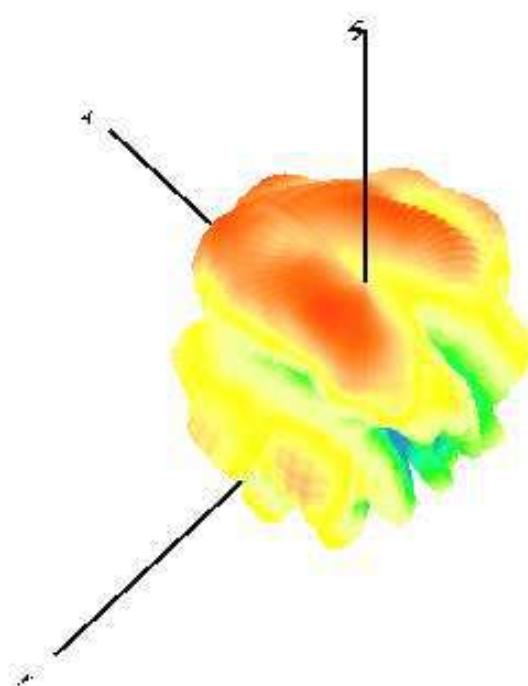
Single Channel Unit
Antenna 2: WiFi antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 5.500000



Single Channel Unit
Antenna 2: WiFi antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 5.725000



Single Channel Unit
Antenna 2: WiFi antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 5.725000



3. Embedded antenna

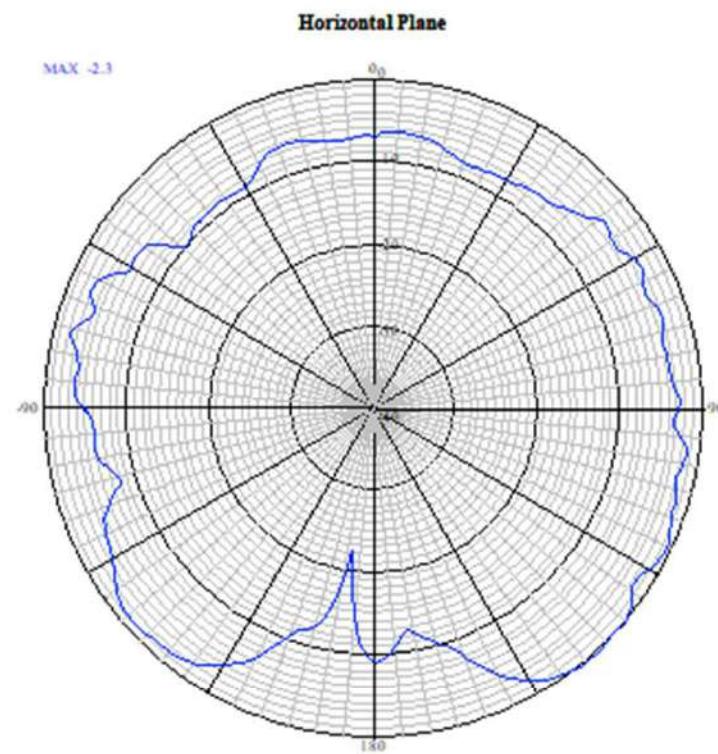
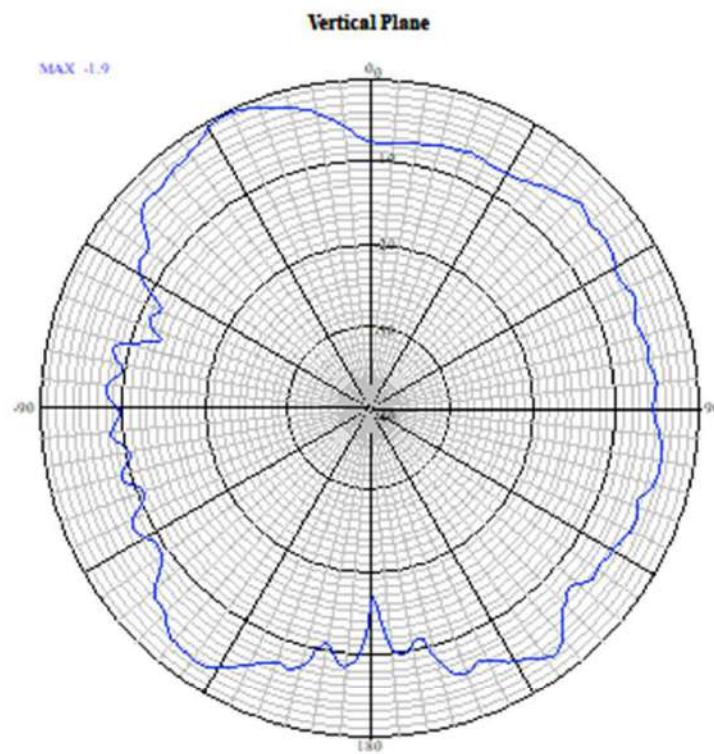
a) 2D Elevation cuts, ZX- and ZY-plane

Freq = 2.40, 2.44, 2.48, 5.15, 5.35, 5.5, 5.725 GHz

Single Channel Unit
Antenna 3: Embedded antenna

Far-Field Patterns

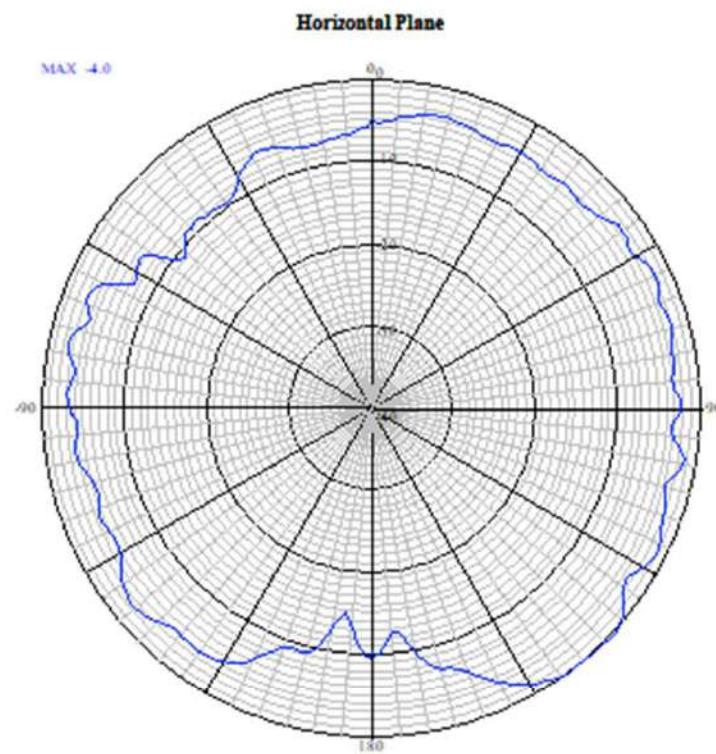
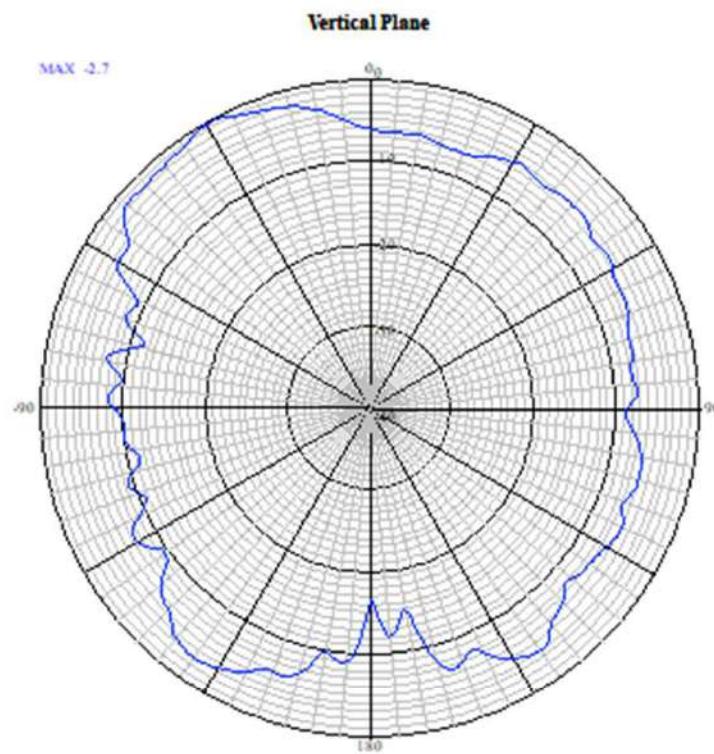
Frequency: 2.400000



Single Channel Unit
Antenna 3: Embedded antenna

Far-Field Patterns

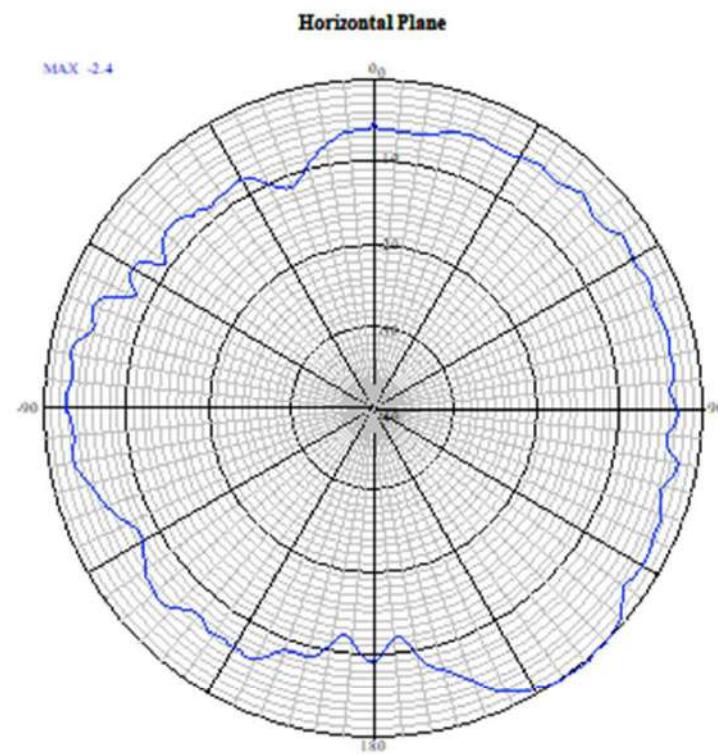
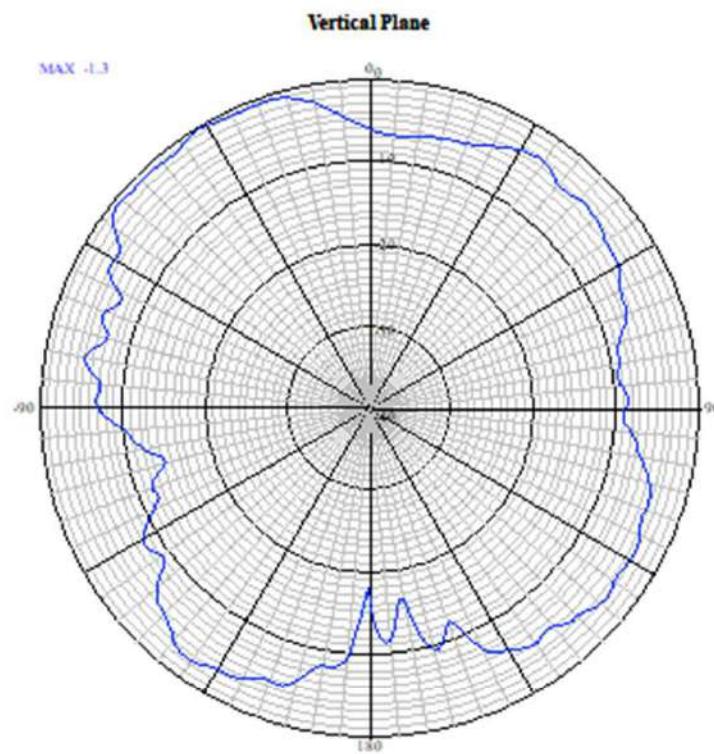
Frequency: 2.440000



Single Channel Unit
Antenna 3: Embedded antenna

Far-Field Patterns

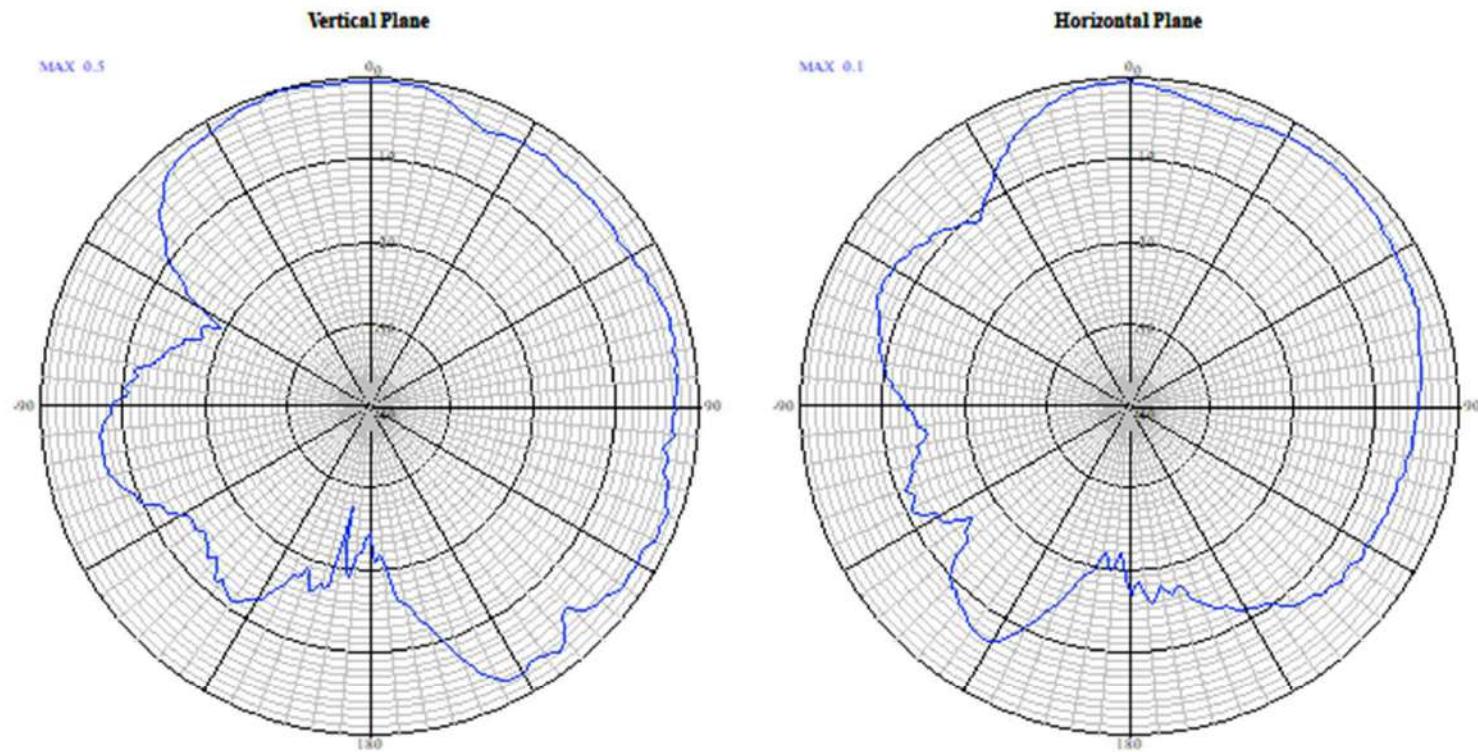
Frequency: 2.480000



Single Channel Unit
Antenna 3: Embedded antenna

Far-Field Patterns

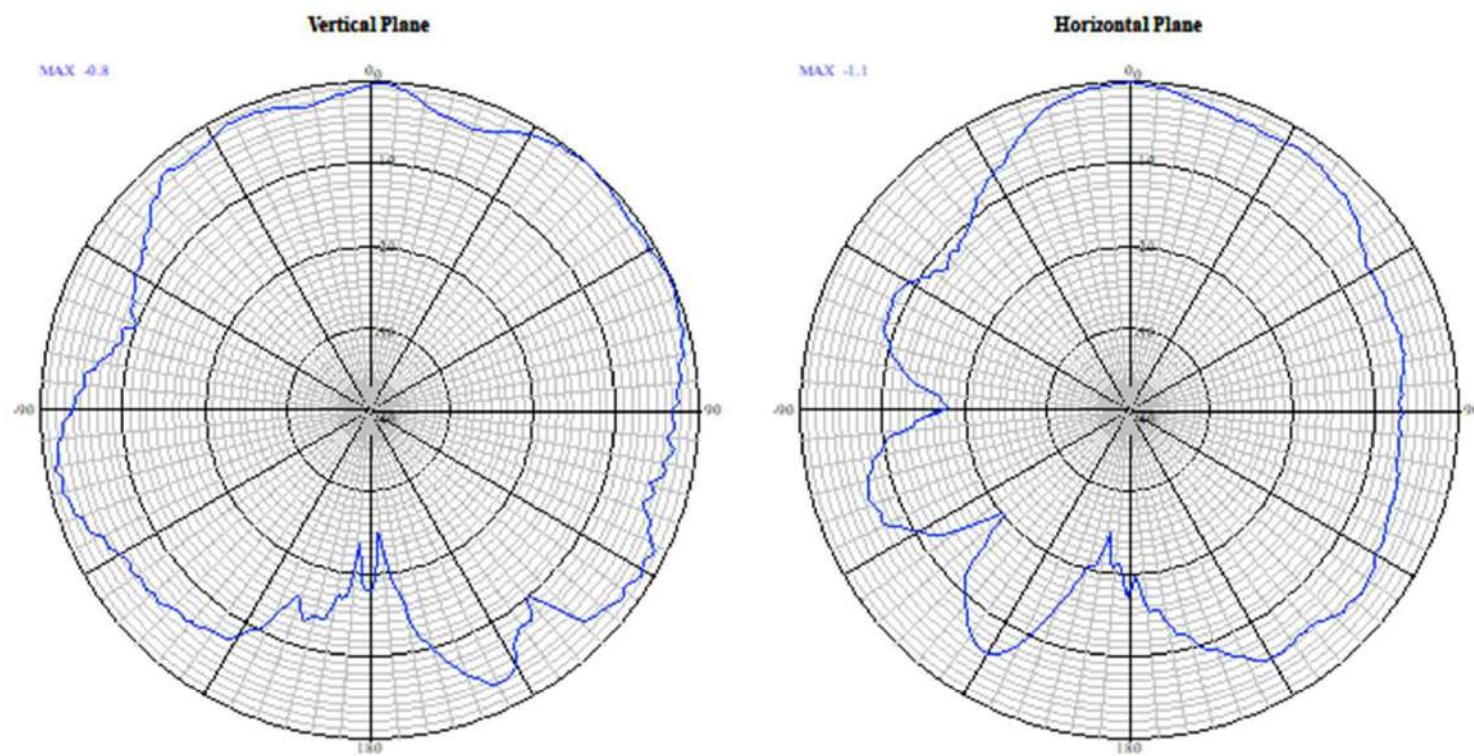
Frequency: 5.150000



**Single Channel Unit
Antenna 3: Embedded antenna**

Far-Field Patterns

Frequency: 5.350000

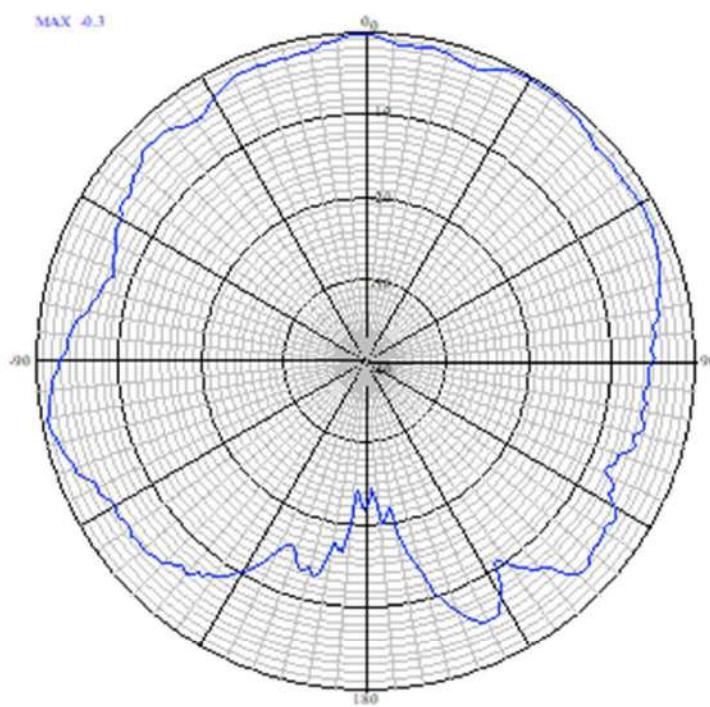


Single Channel Unit
Antenna 3: Embedded antenna

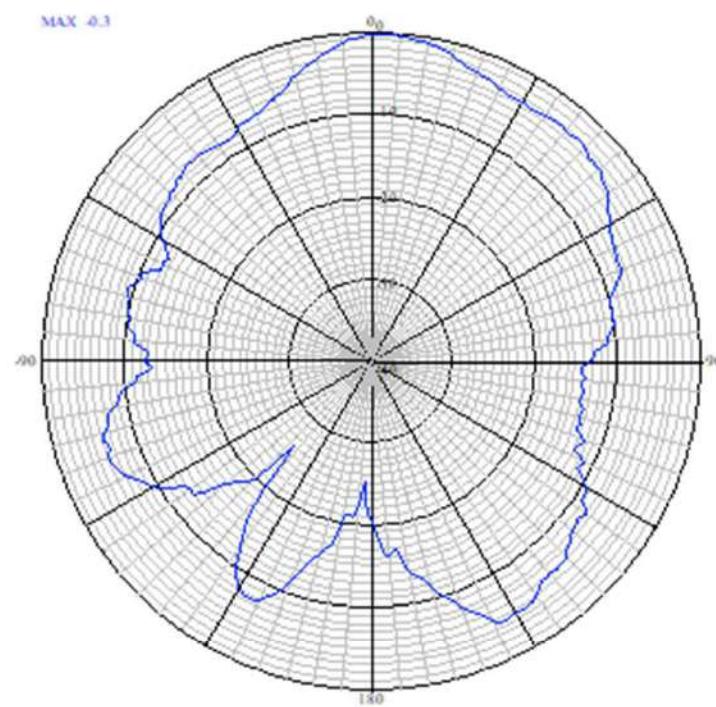
Far-Field Patterns

Frequency: 5.500000

Vertical Plane



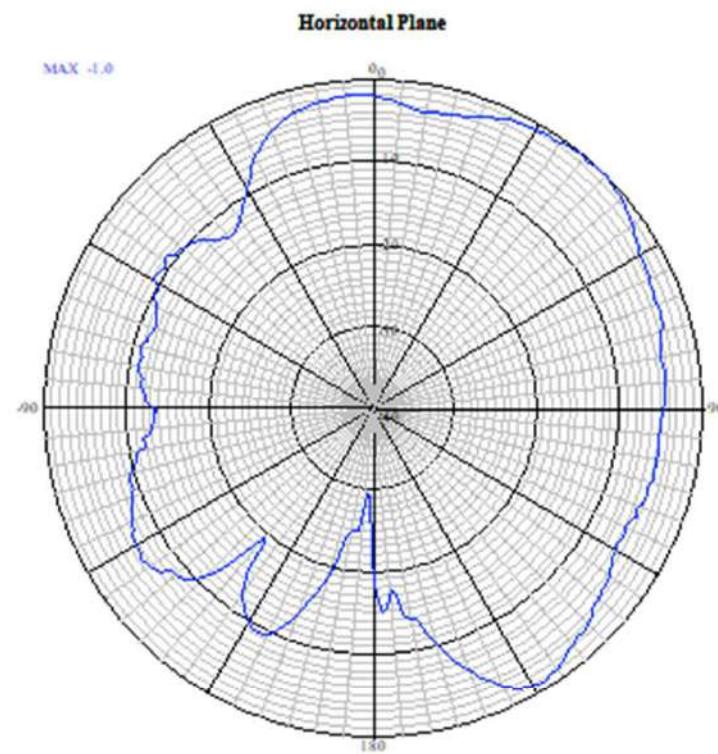
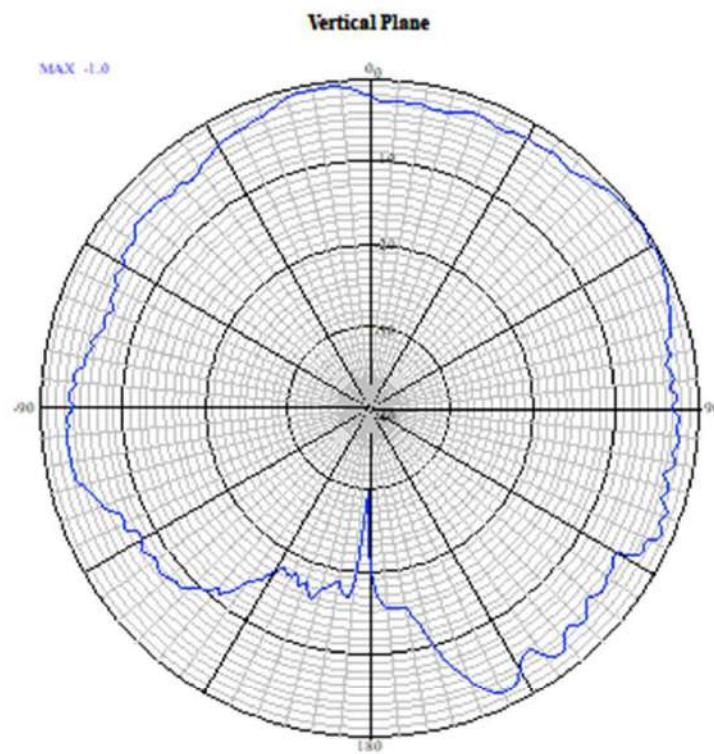
Horizontal Plane



Single Channel Unit
Antenna 3: Embedded antenna

Far-Field Patterns

Frequency: 5.725000



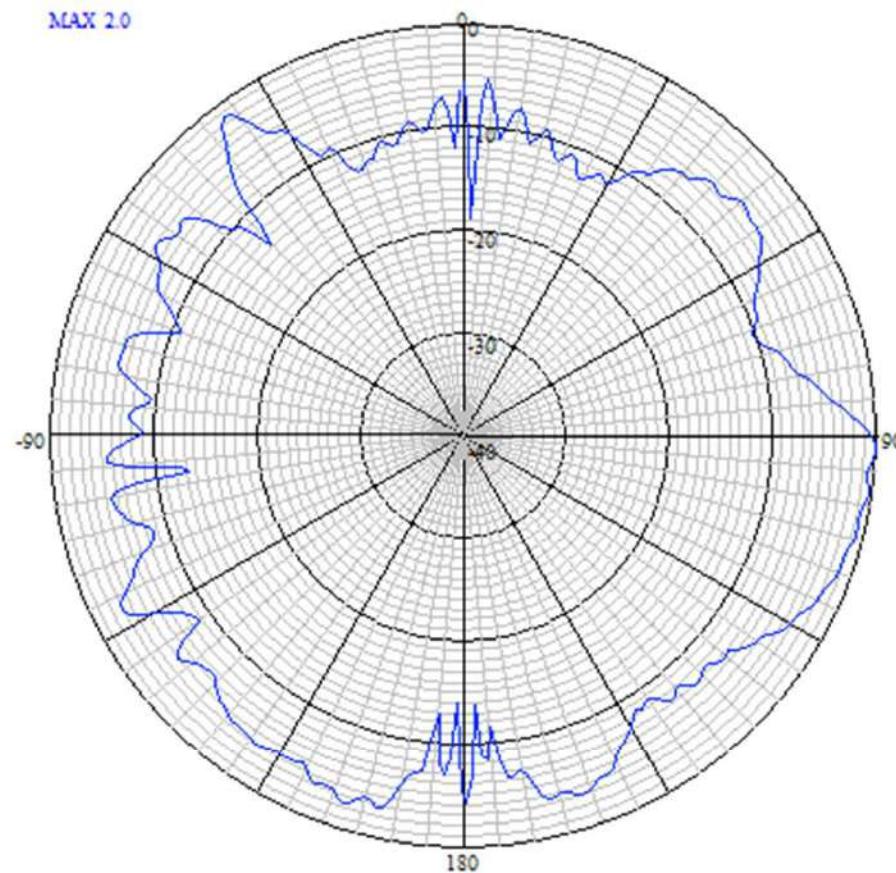
3. Embedded antenna

b) 2D Azimuth cut: XY-Plane

Freq = 2.40, 2.44, 2.48, 5.15, 5.35, 5.5, 5.725 GHz

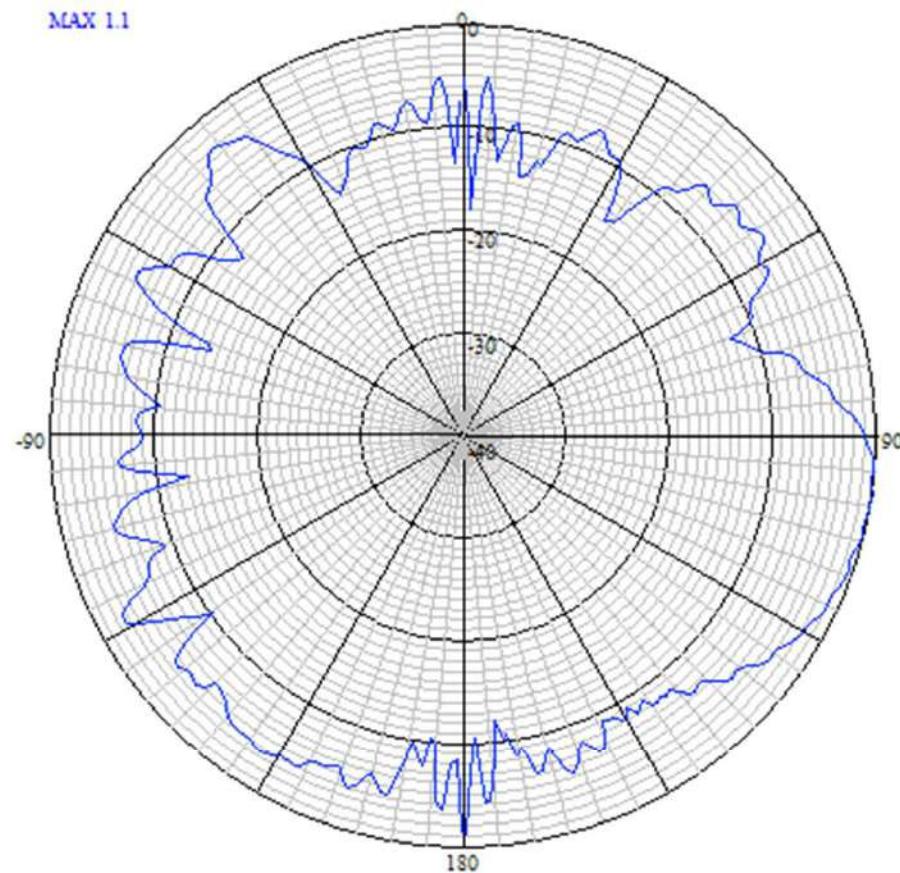
Single Channel Unit
Antenna 3: Embedded antenna
Far-Field Patterns : 4 Cuts - 2 Radial, 2 Angular
Frequency: 2.400000

Azimuth Cut - XY Plane



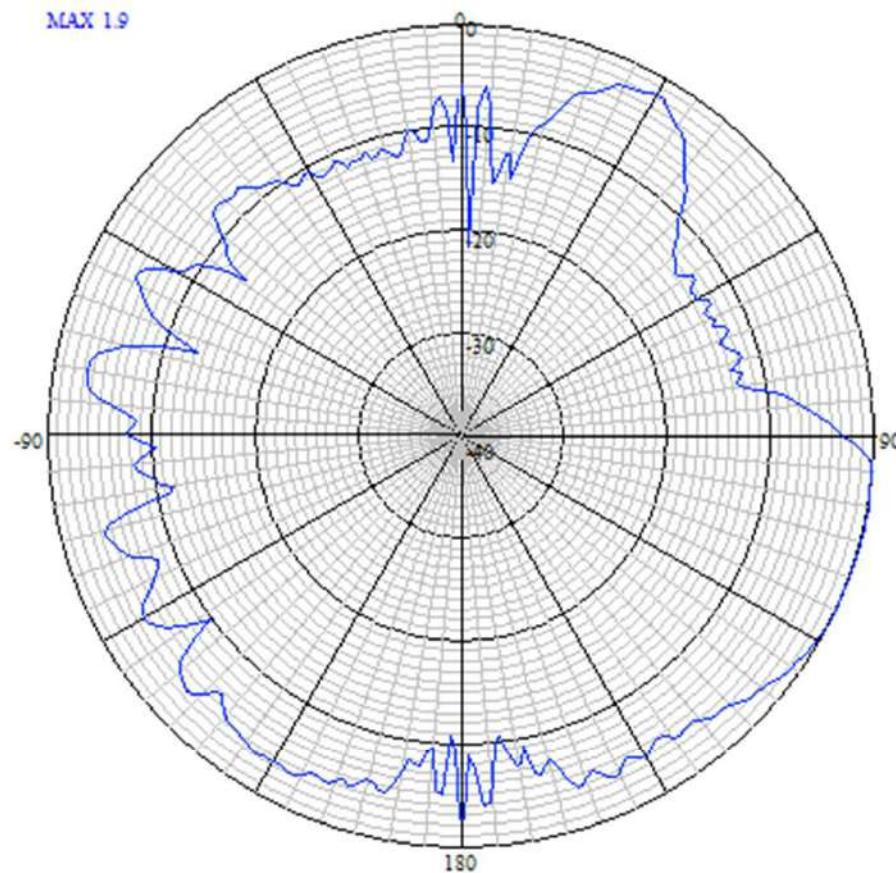
Single Channel Unit
Antenna 3: Embedded antenna
Far-Field Patterns : 4 Cuts - 2 Radial, 2 Angular
Frequency: 2.440000

Azimuth Cut - XY Plane



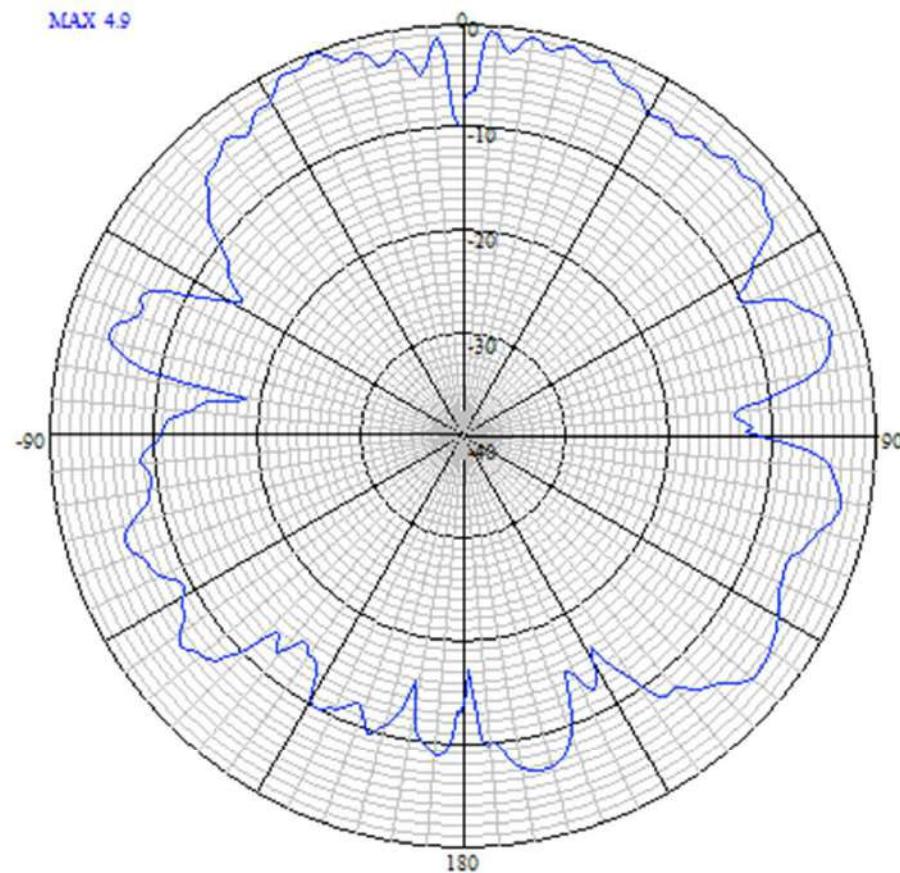
Single Channel Unit
Antenna 3: Embedded antenna
Far-Field Patterns : 4 Cuts - 2 Radial, 2 Angular
Frequency: 2.480000

Azimuth Cut - XY Plane



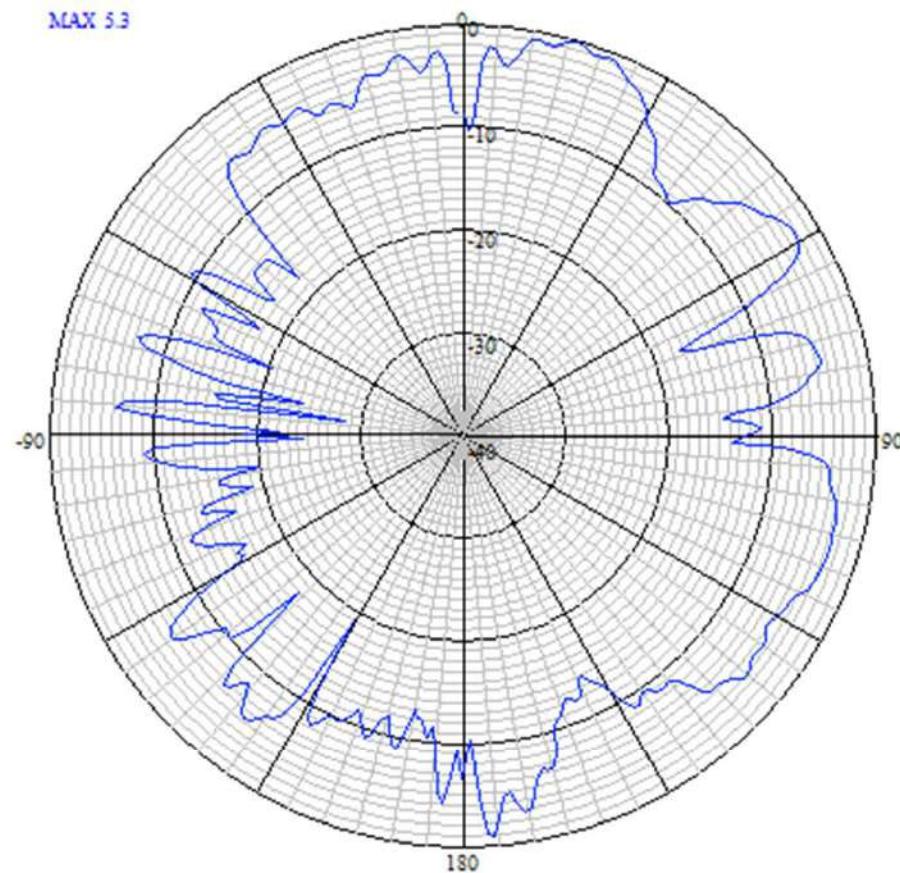
Single Channel Unit
Antenna 3: Embedded antenna
Far-Field Patterns : 4 Cuts - 2 Radial, 2 Angular
Frequency: 5.150000

Azimuth Cut - XY Plane



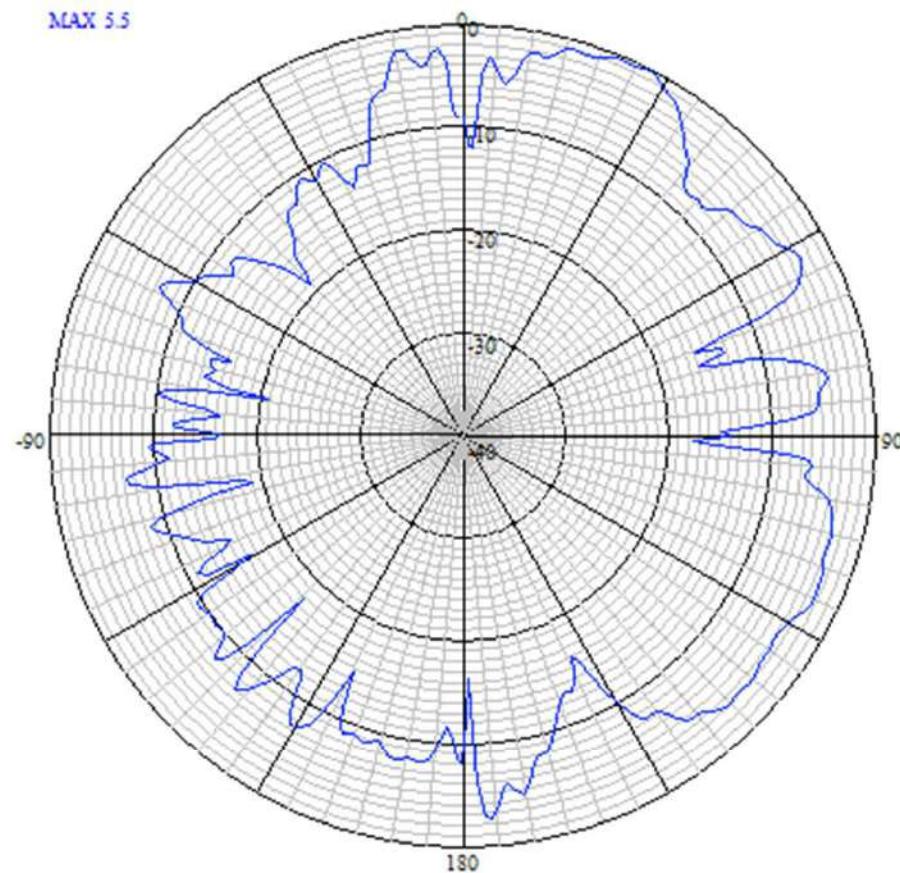
Single Channel Unit
Antenna 3: Embedded antenna
Far-Field Patterns : 4 Cuts - 2 Radial, 2 Angular
Frequency: 5.350000

Azimuth Cut - XY Plane



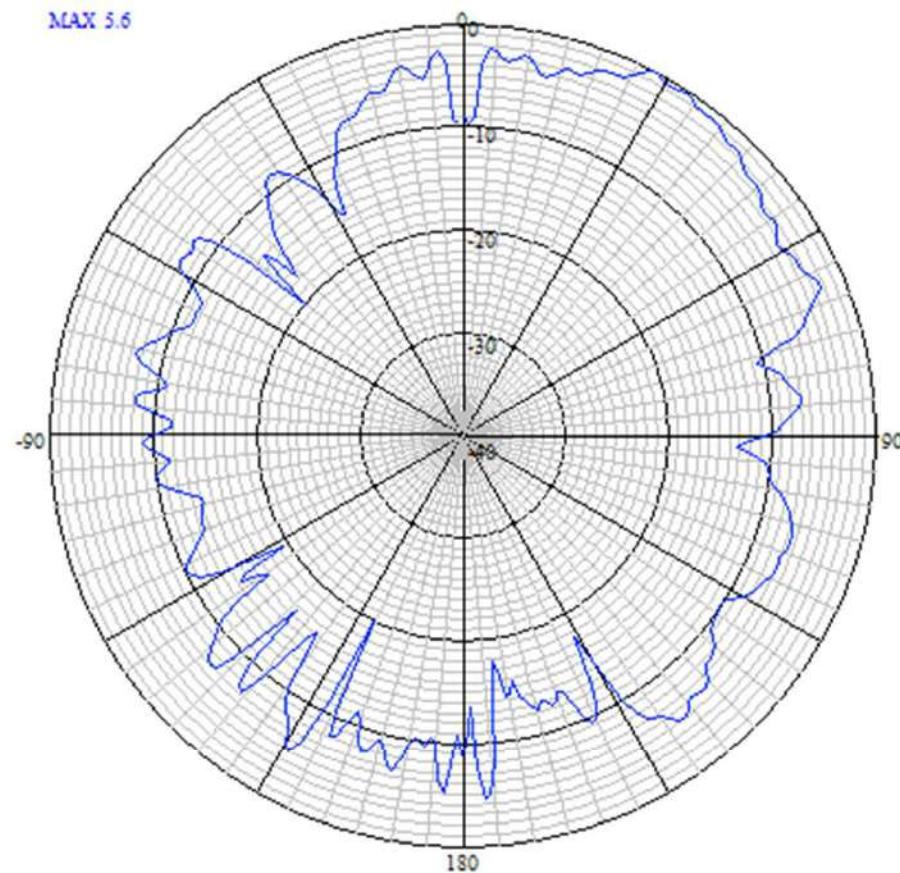
Single Channel Unit
Antenna 3: Embedded antenna
Far-Field Patterns : 4 Cuts - 2 Radial, 2 Angular
Frequency: 5.500000

Azimuth Cut - XY Plane



Single Channel Unit
Antenna 3: Embedded antenna
Far-Field Patterns : 4 Cuts - 2 Radial, 2 Angular
Frequency: 5.725000

Azimuth Cut - XY Plane

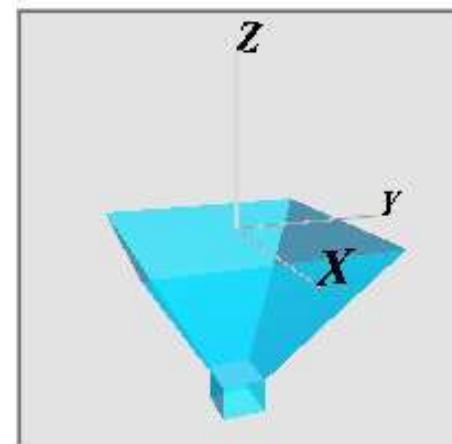
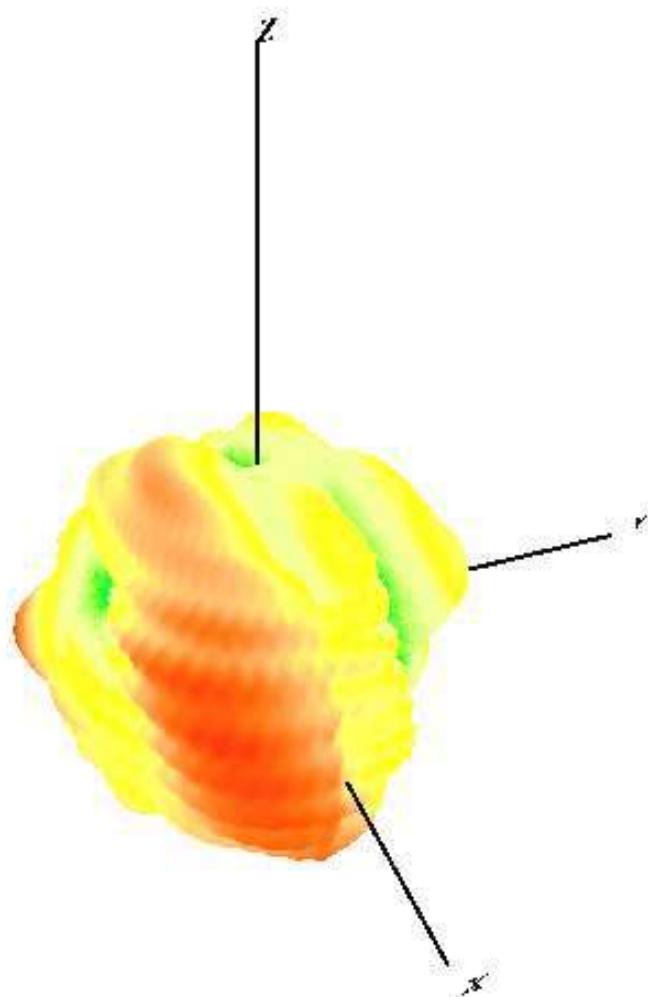


3. Embedded antenna

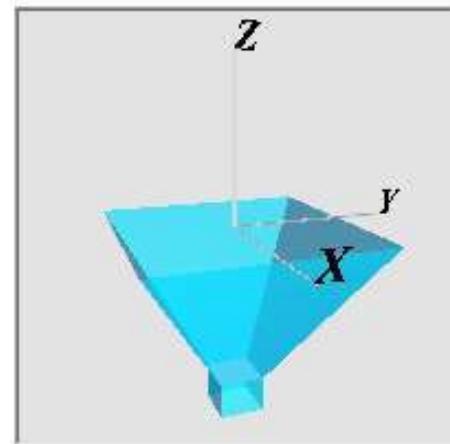
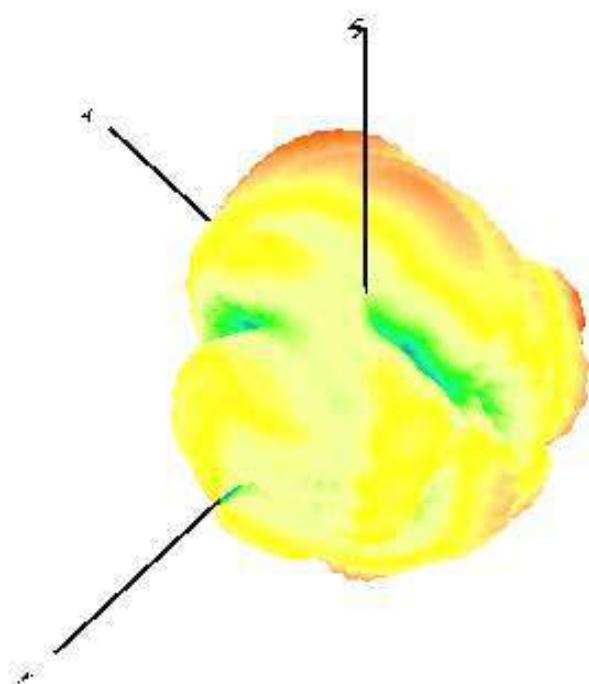
c) 3D plots

Freq = 2.40, 2.44, 2.48, 5.15, 5.35, 5.5, 5.725 GHz

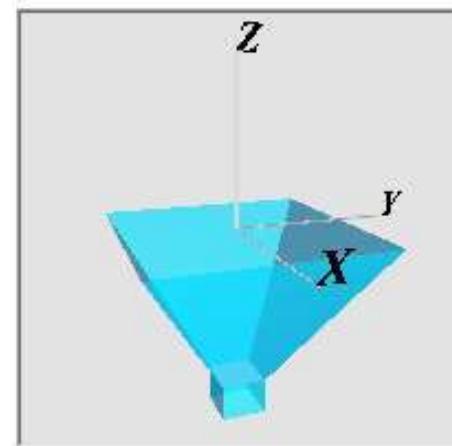
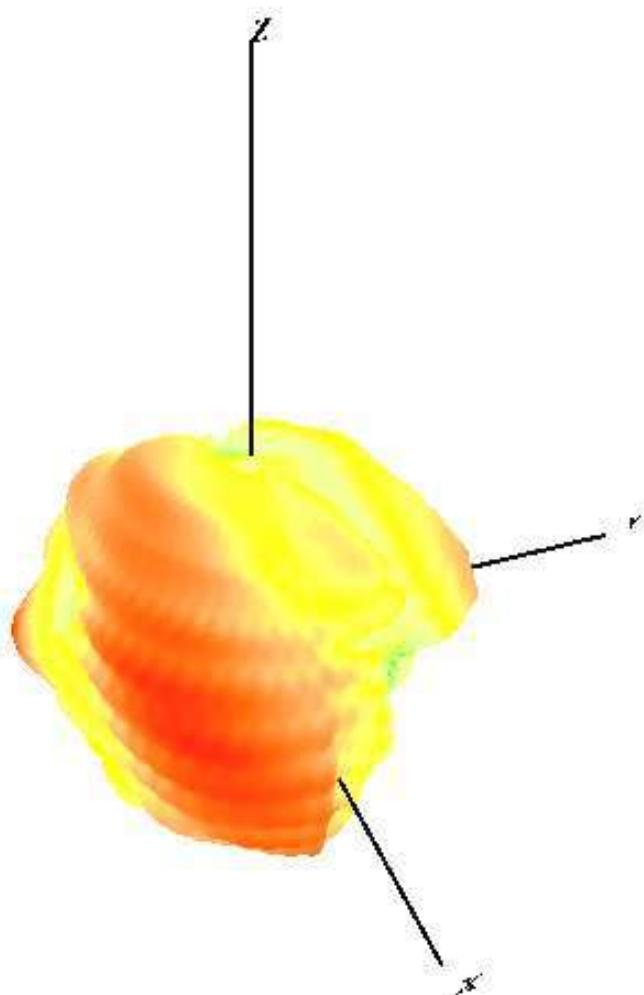
Single Channel Unit
Antenna 3: Embedded antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 2.400000



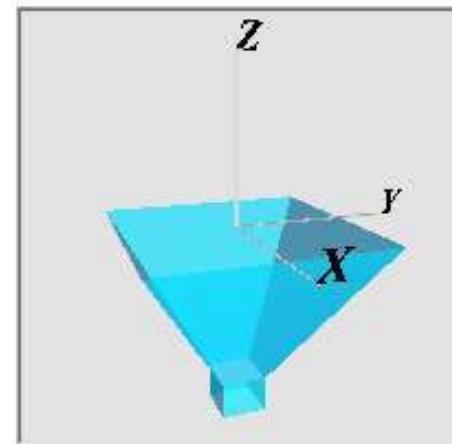
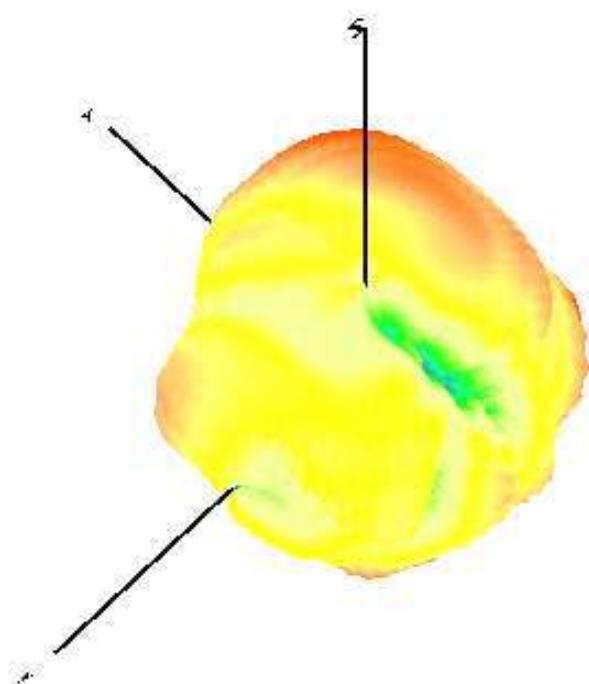
Single Channel Unit
Antenna 3: Embedded antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 2.400000



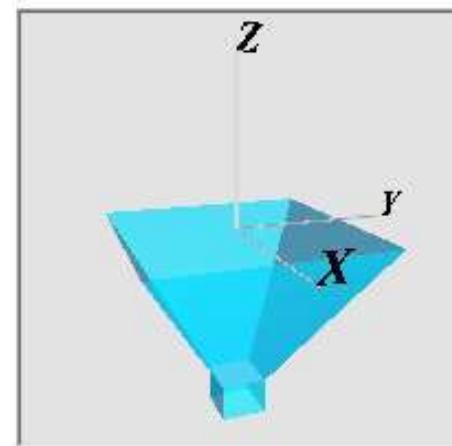
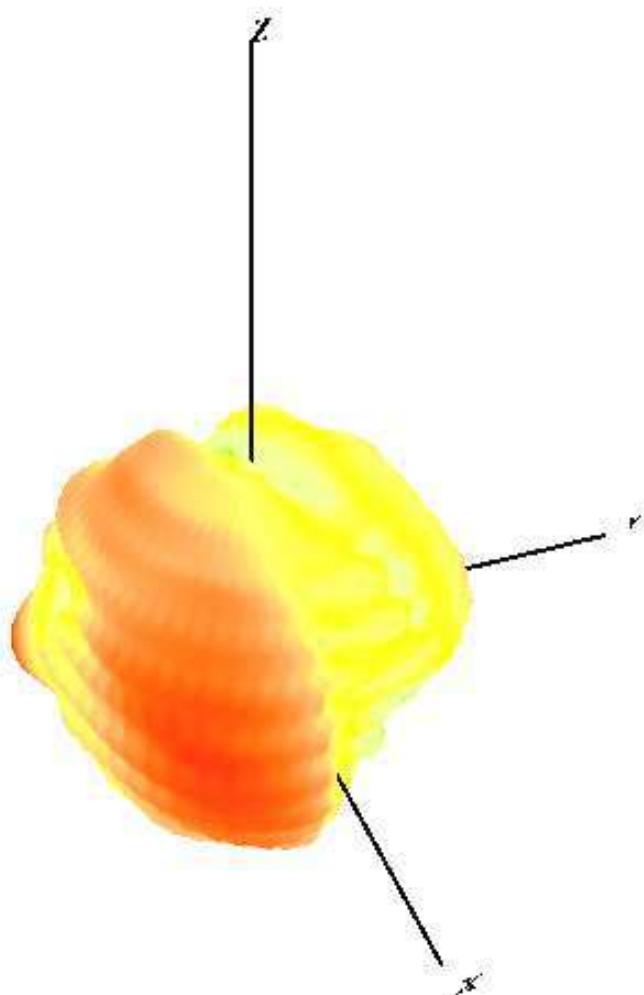
Single Channel Unit
Antenna 3: Embedded antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 2.440000



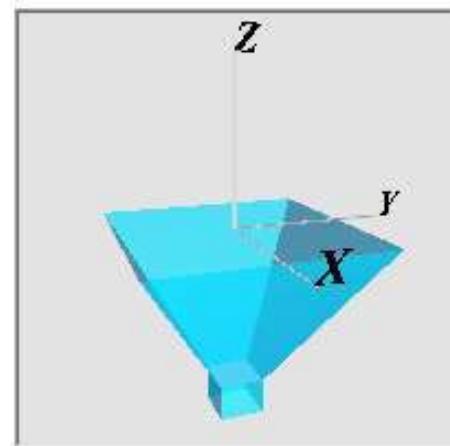
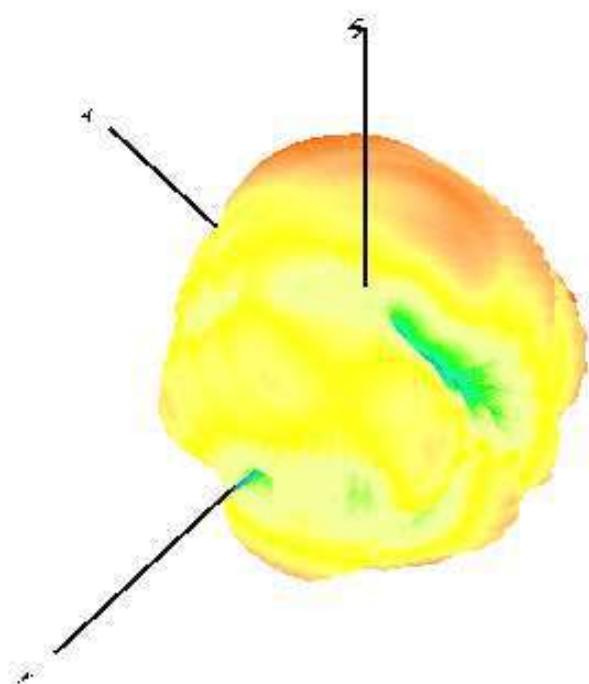
Single Channel Unit
Antenna 3: Embedded antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 2.440000



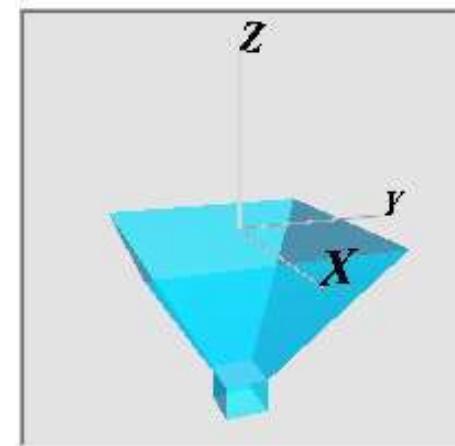
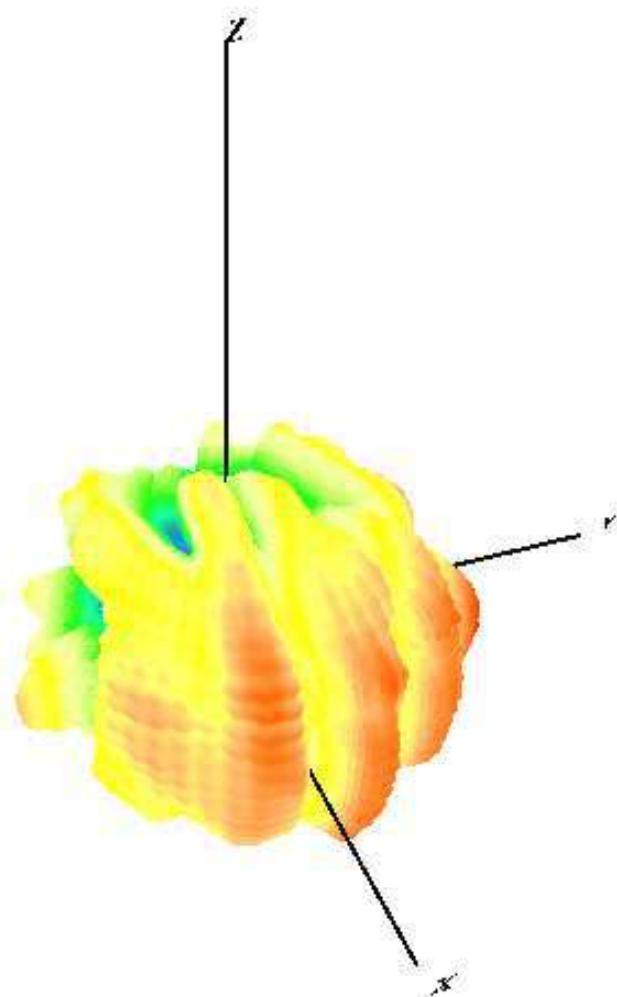
Single Channel Unit
Antenna 3: Embedded antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 2.480000



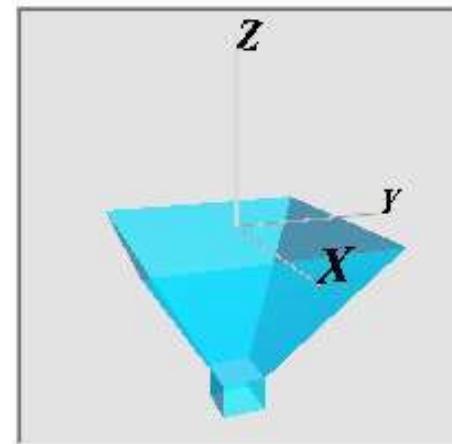
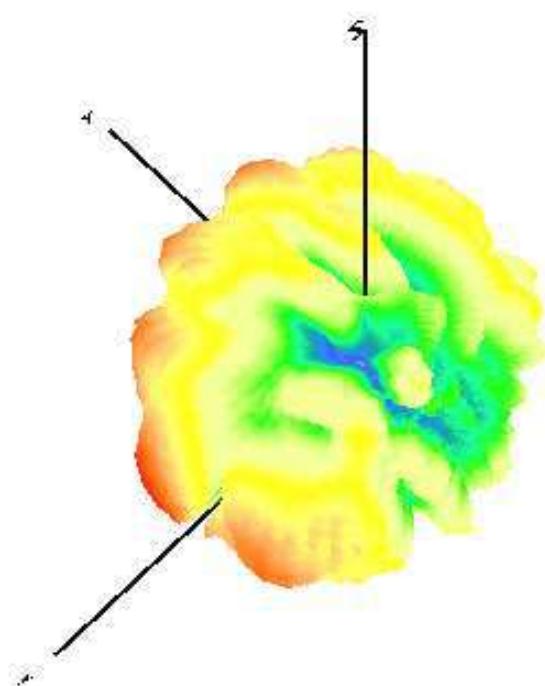
Single Channel Unit
Antenna 3: Embedded antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 2.480000



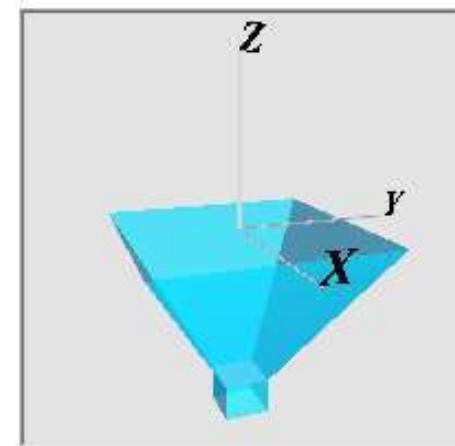
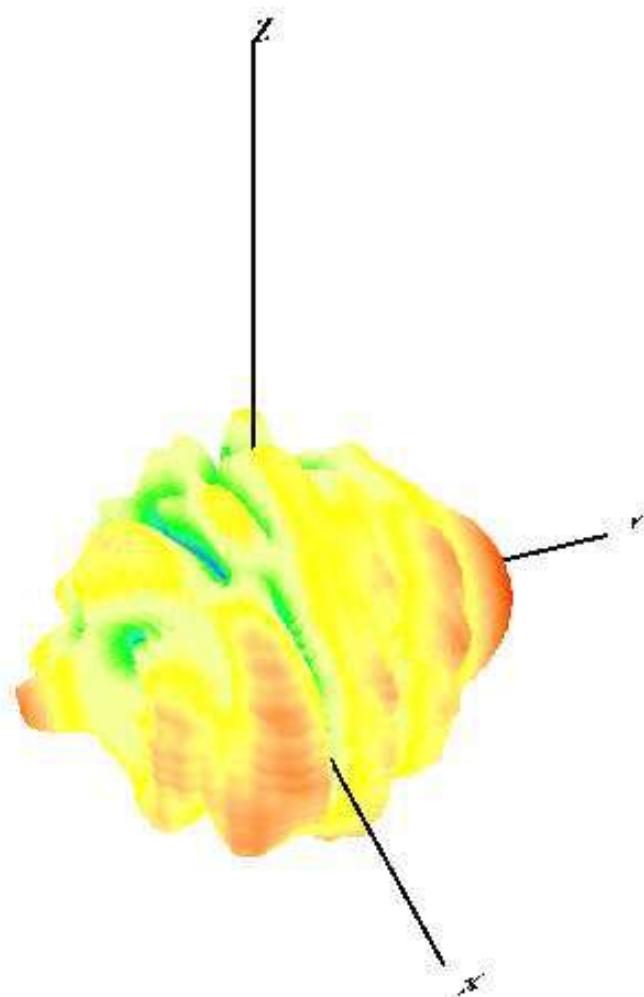
Single Channel Unit
Antenna 3: Embedded antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 5.150000



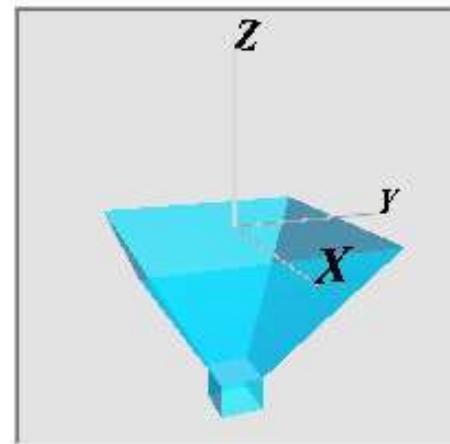
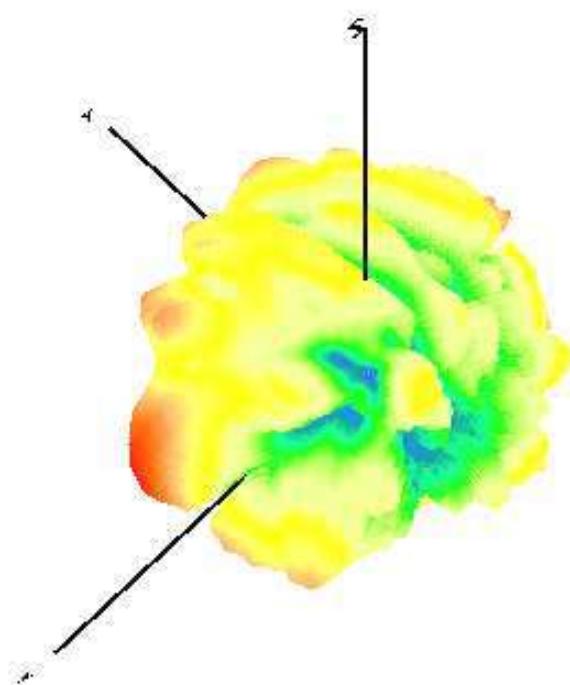
Single Channel Unit
Antenna 3: Embedded antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 5.150000



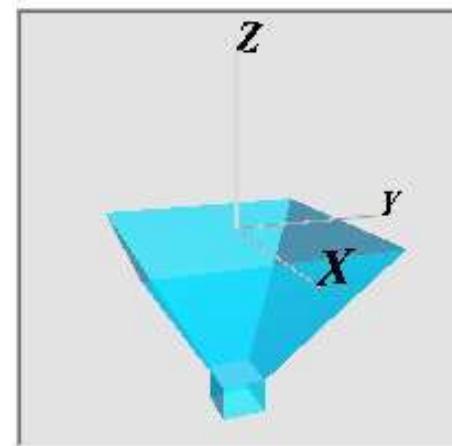
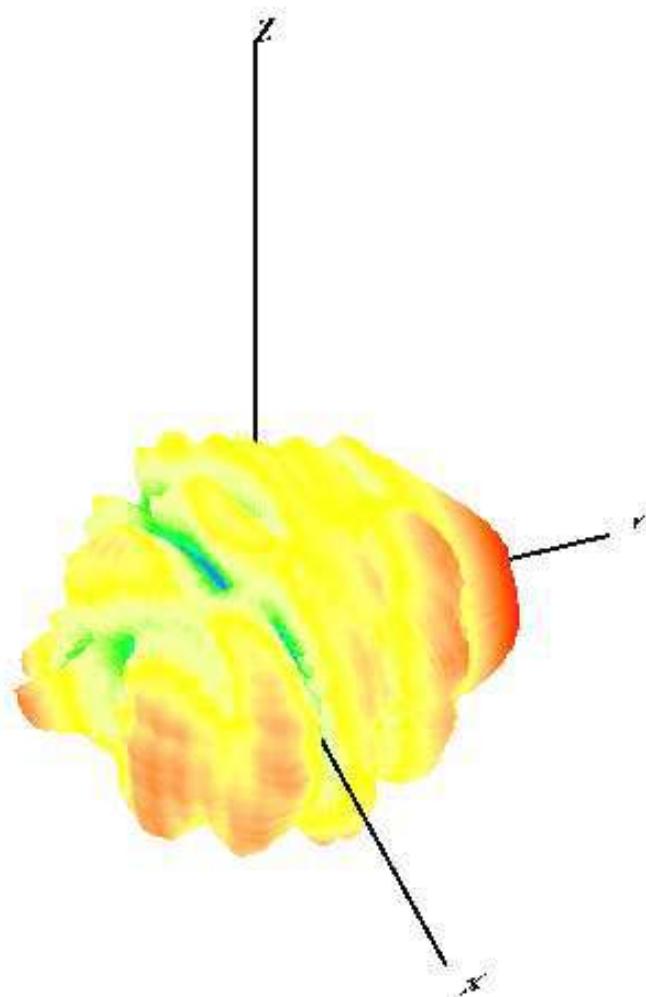
Single Channel Unit
Antenna 3: Embedded antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 5.350000



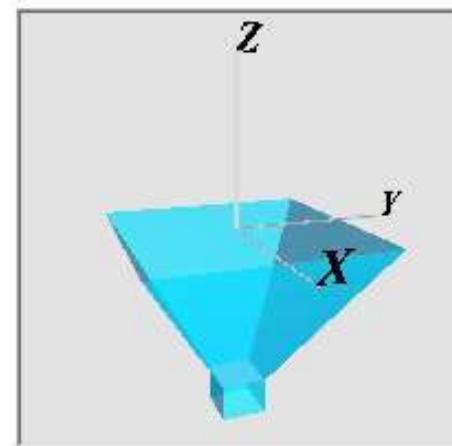
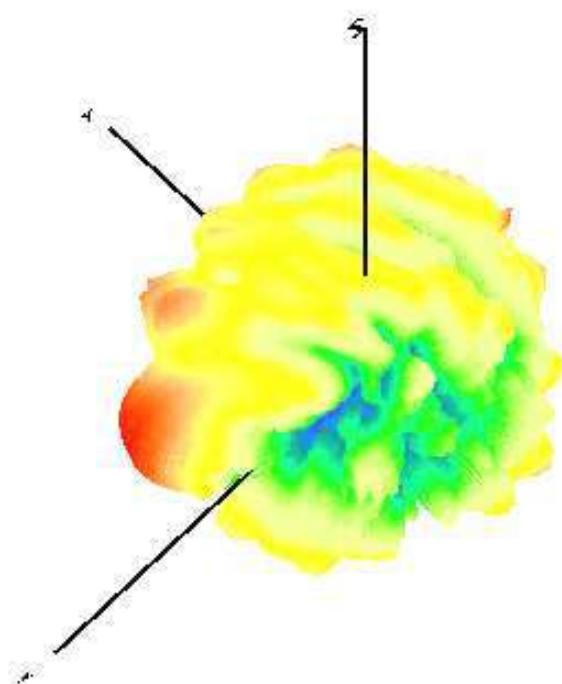
Single Channel Unit
Antenna 3: Embedded antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 5.350000



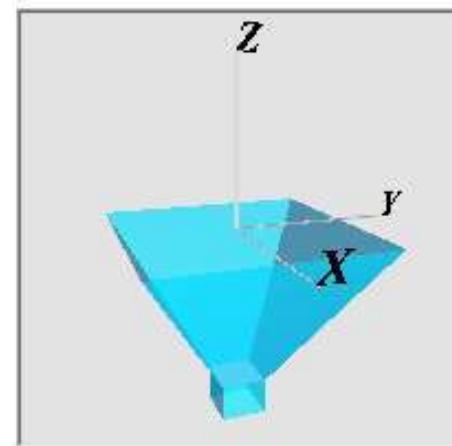
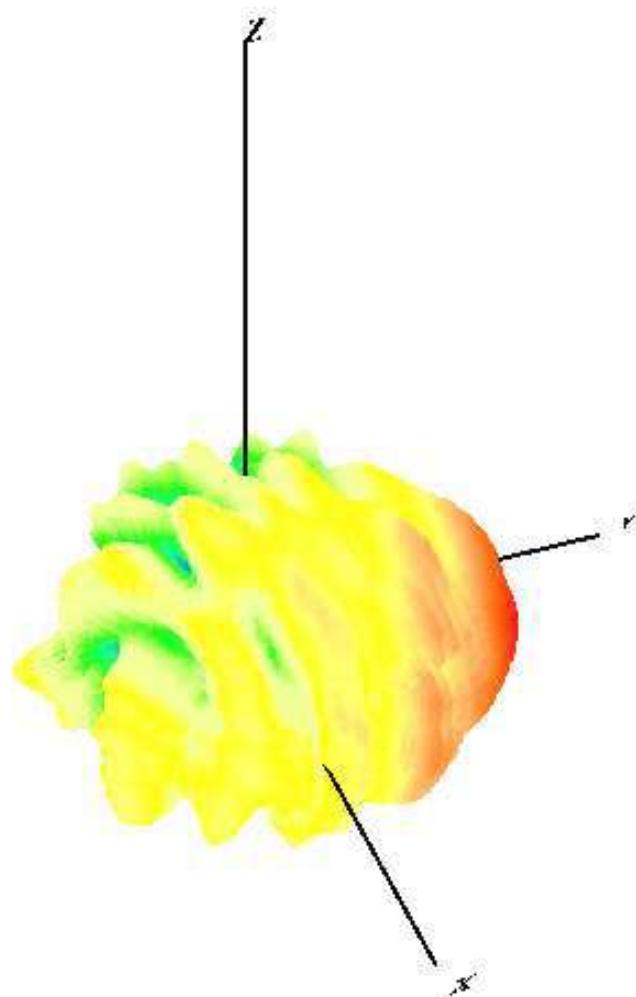
Single Channel Unit
Antenna 3: Embedded antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 5.500000



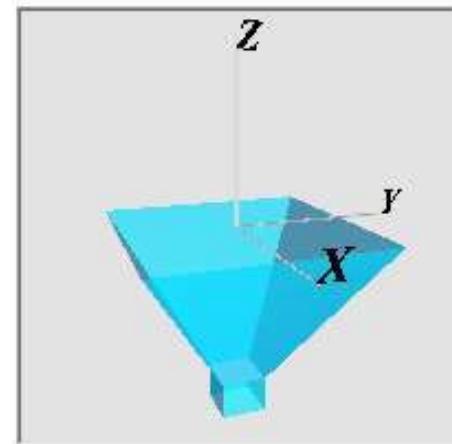
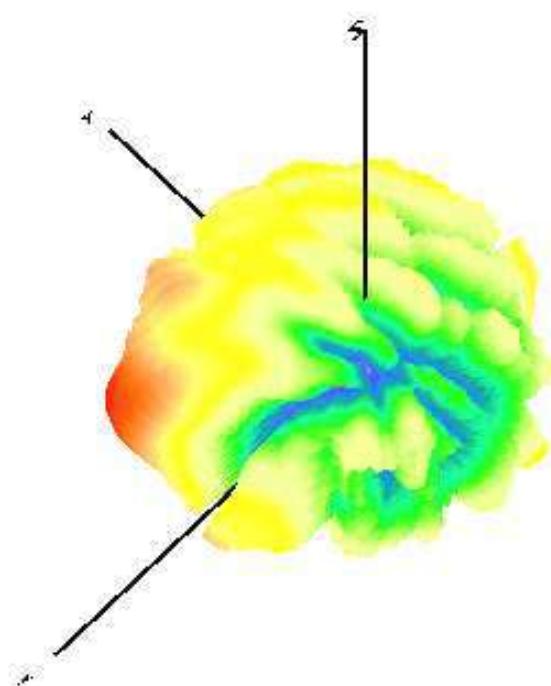
Single Channel Unit
Antenna 3: Embedded antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 5.500000



Single Channel Unit
Antenna 3: Embedded antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 5.725000



Single Channel Unit
Antenna 3: Embedded antenna
Far-Field Patterns : Co - pol, Amp
Frequency: 5.725000



End of Files