

# Antenna Design for Wireless Router

(BELKIN case)

V1.02

<b>Document Number</b>	<b>NE3-10087</b>
<b>1<sup>st</sup> Released Date</b>	<b>12/13/2010</b>
<b>Last Released Date</b>	<b>12/22/2010</b>
<b>Author</b>	<b>Dora Su</b>
<b>Review by</b>	<b>Romeo Chou</b>

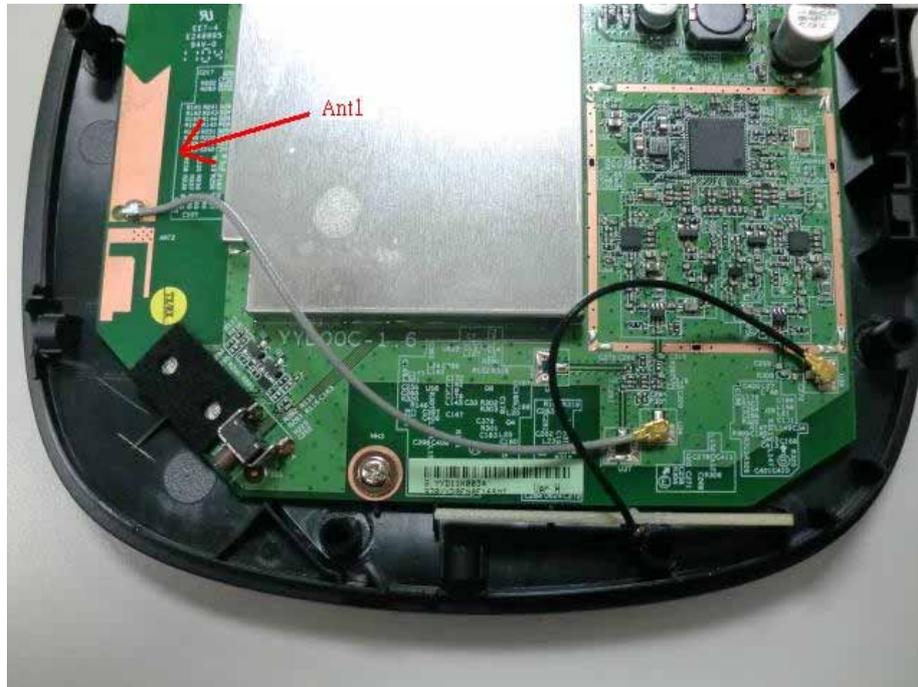


## Specification

<b>Rough description</b>	2G antenna for a Wireless AP. Isolation between antennas must be under 20dB minus.	
<b>Item</b>	<b>Initial Specification</b>	<b>Final Specification</b>
<b>Dimensions</b>	PCB : Ant1 49(L)*9(W)*1.6(H)mm Ant2 49(L)*9(W)*1.6(H)mm	
<b>Impedance</b>	50	
<b>Test environment</b>	With Housing	
<b>Spectrum</b>	802.11bg	
<b>Freq. Range</b>	2.4~2.5GHz	
<b>Antenna type</b>	PCB	
<b>Gain</b>	dBi	
<b>VSWR</b>	1.92 : 1	
<b>Radiation</b>	Omni	
<b>Polarization</b>	Linear	
<b>HPBW / H</b>	None	
<b>HPBW / E</b>	None	
<b>Rad. efficiency</b>	>80%	
<b>Connector type</b>	I-PEX	
<b>Cable type</b>	1.13	
<b>Cable length</b>	None	
<b>Isolation</b>	20dB	

# 1. Antenna picture

Ant1



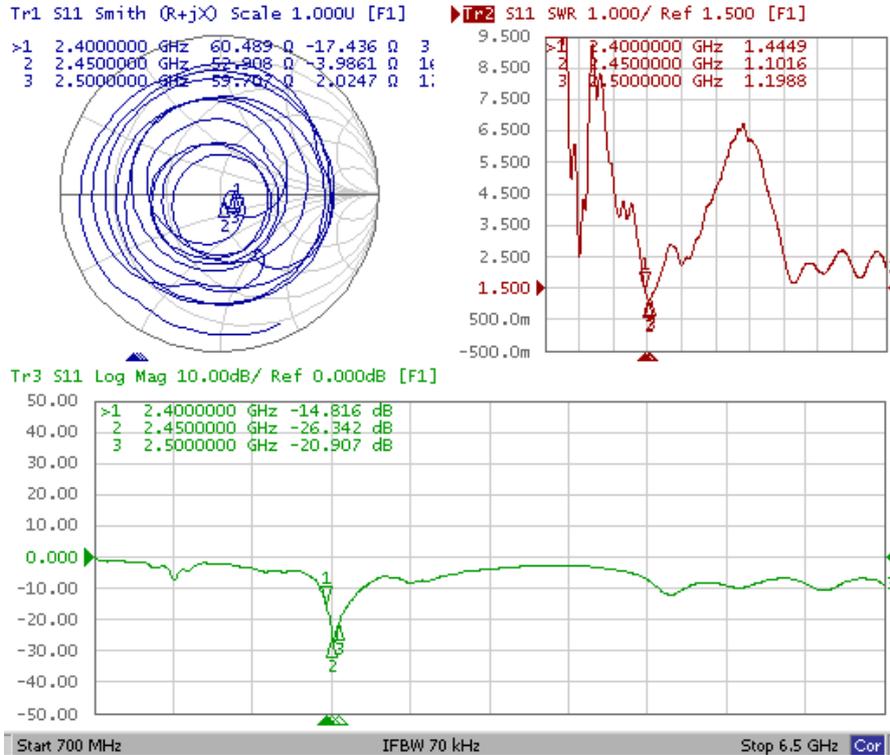
Ant2



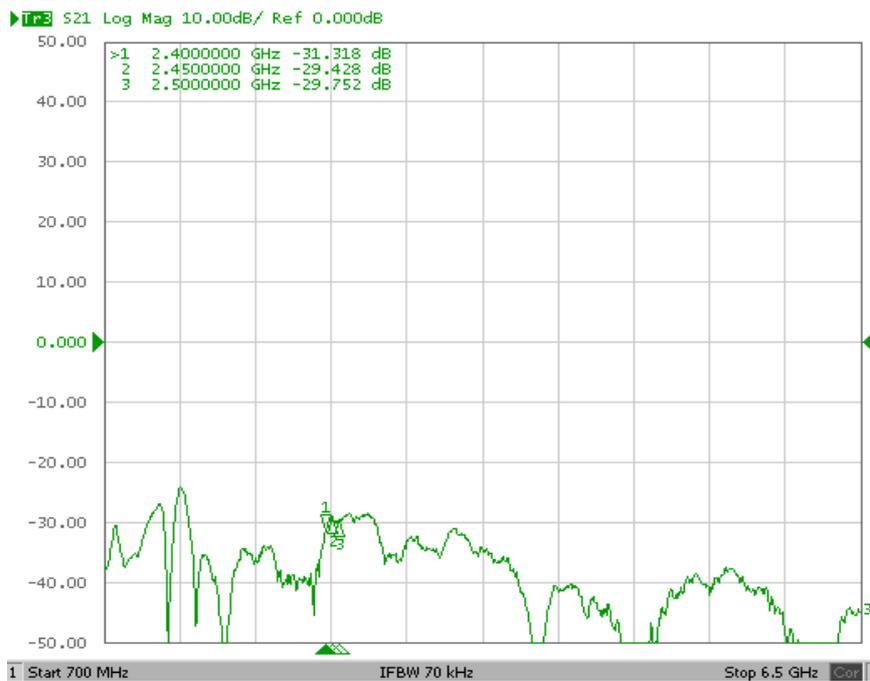
## 2 S-parameter test results

### 2.1 Ant1 S11 and S12 Test Results

#### 2.1.1 S11

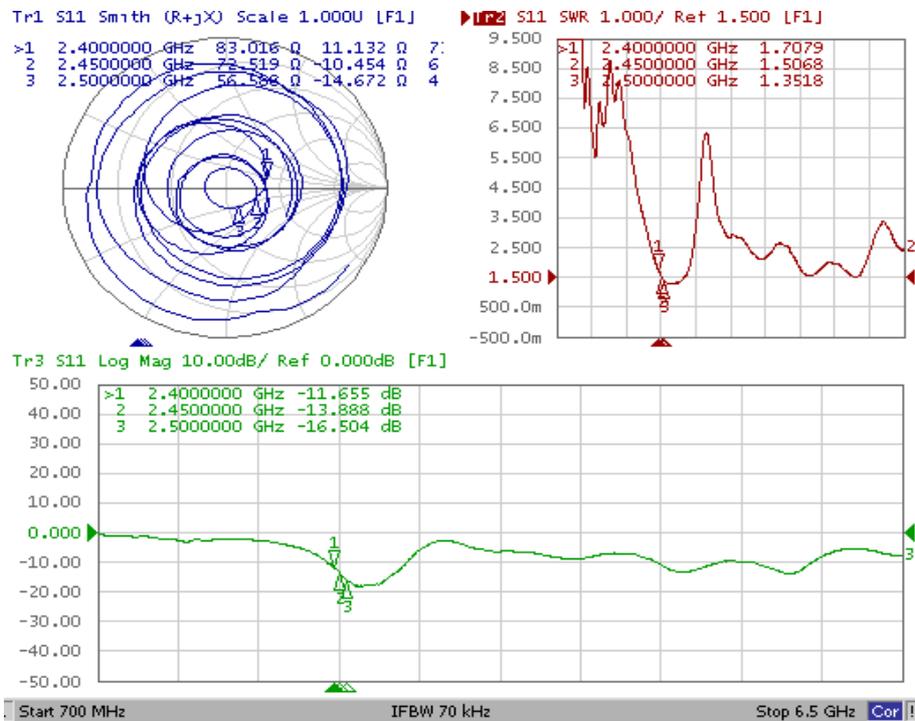


#### 2.1.2 S12

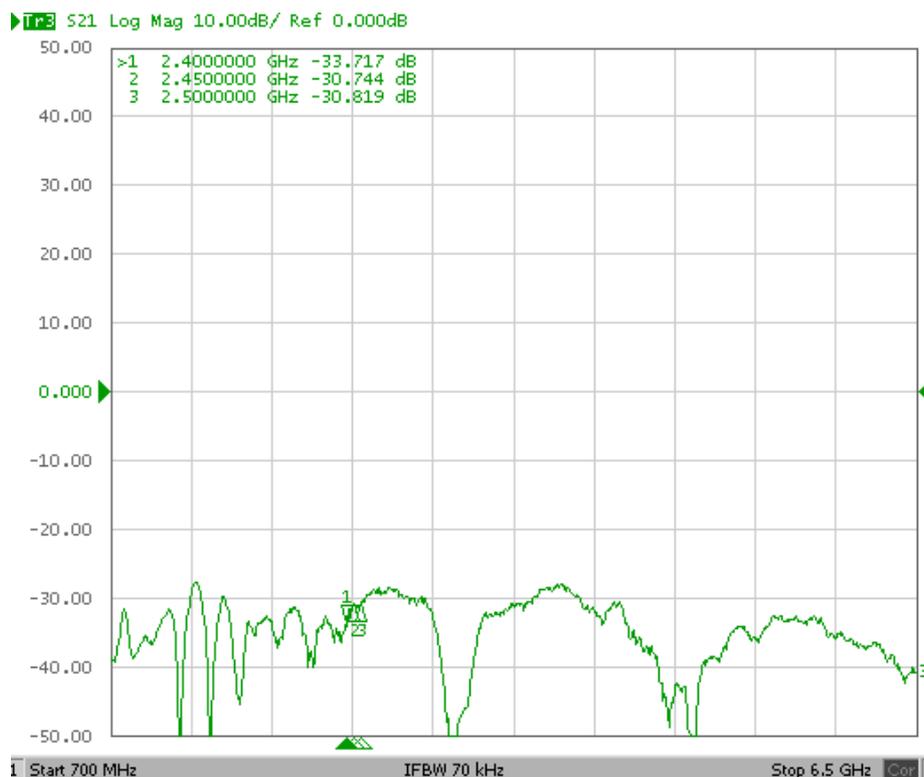


## 2.2 Ant2 S11 and S12 Test Results

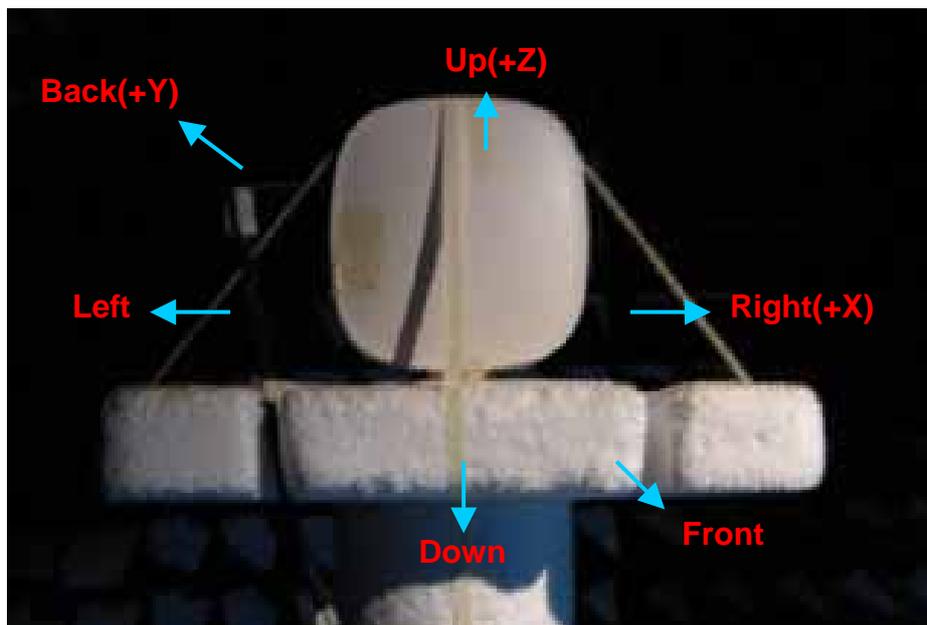
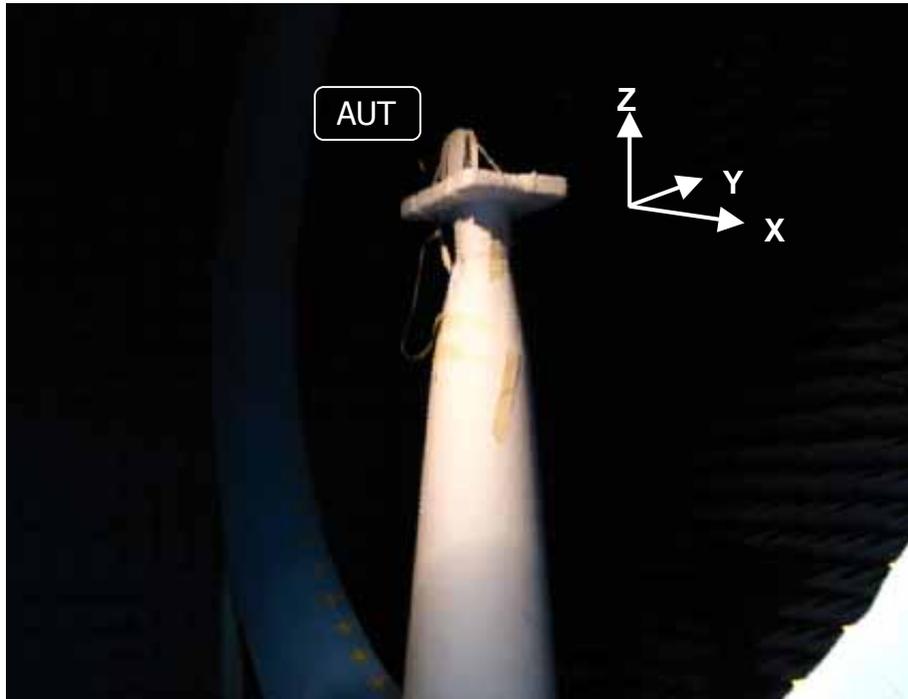
### 2.2.1 S11



### 2.2.2 S12



### 3.1 Measurement setting for Ant1



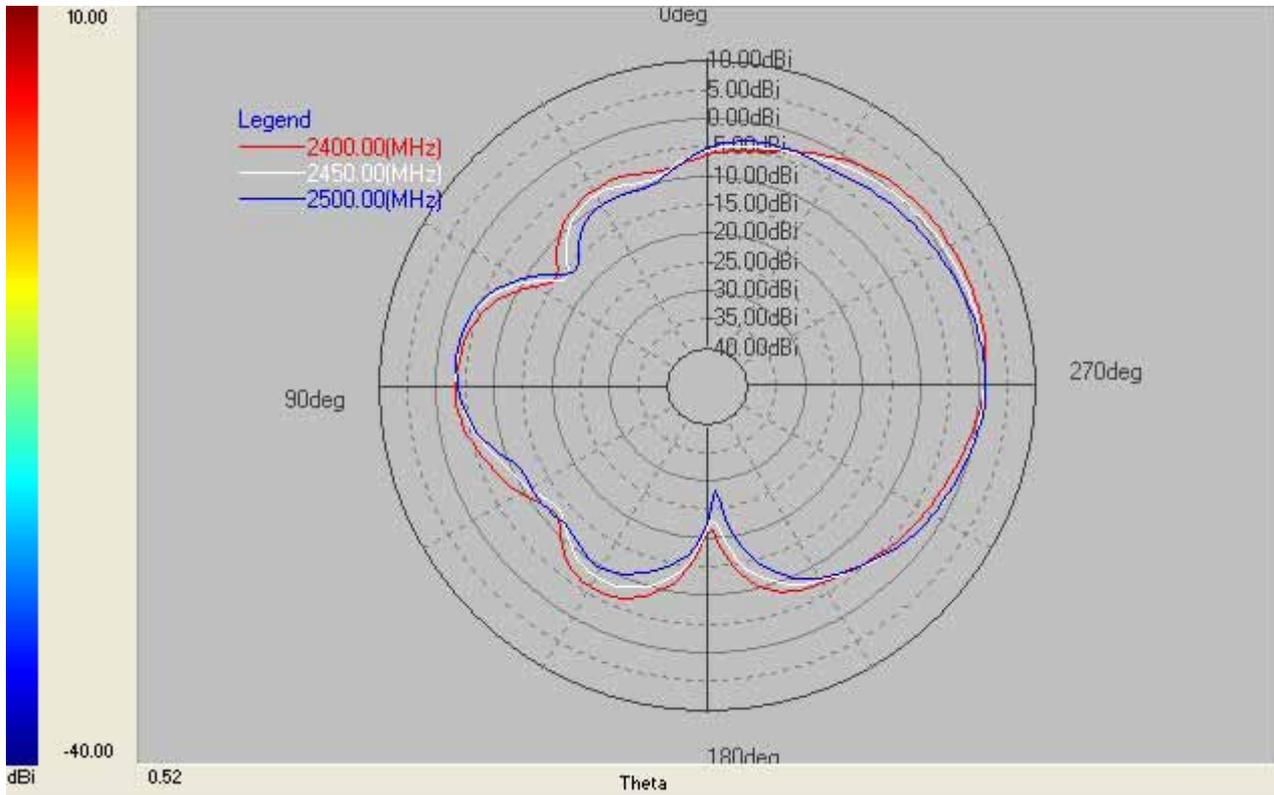
	XY	YZ	XZ
0°	Right	Up	Up
90°	Back	Back	Right
180°	Left	Down	Down
270°	Front	Front	Left



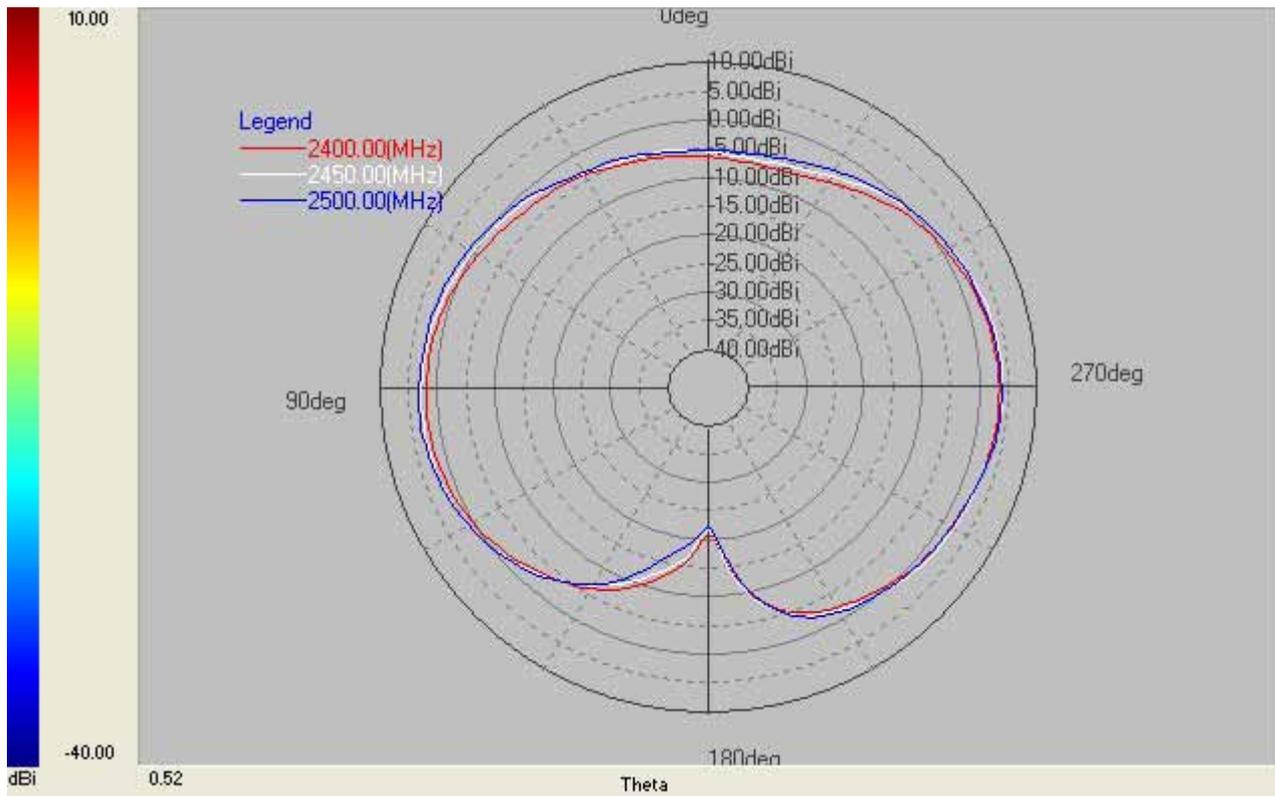
3 2D patterns

3.1 ANT 1

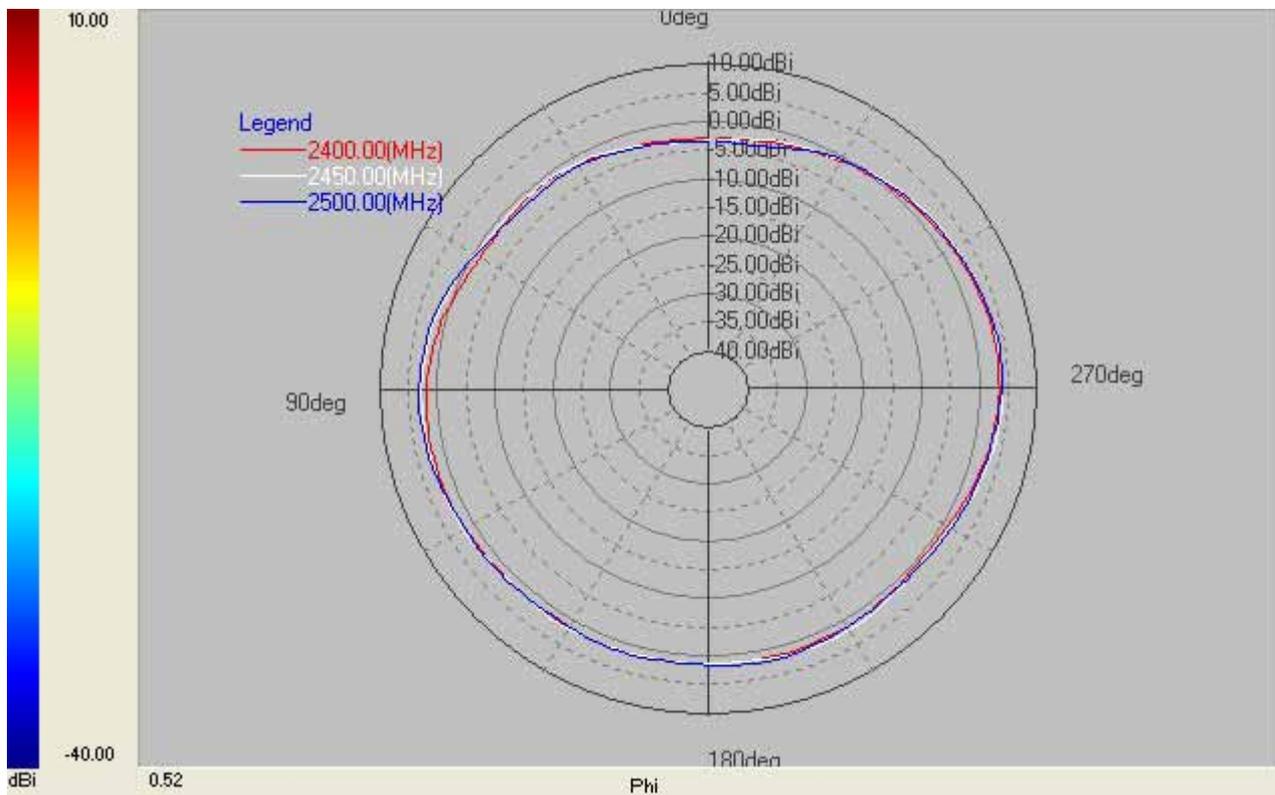
**2.4~2.5GHz**



**X-Z Plane (E-total)**



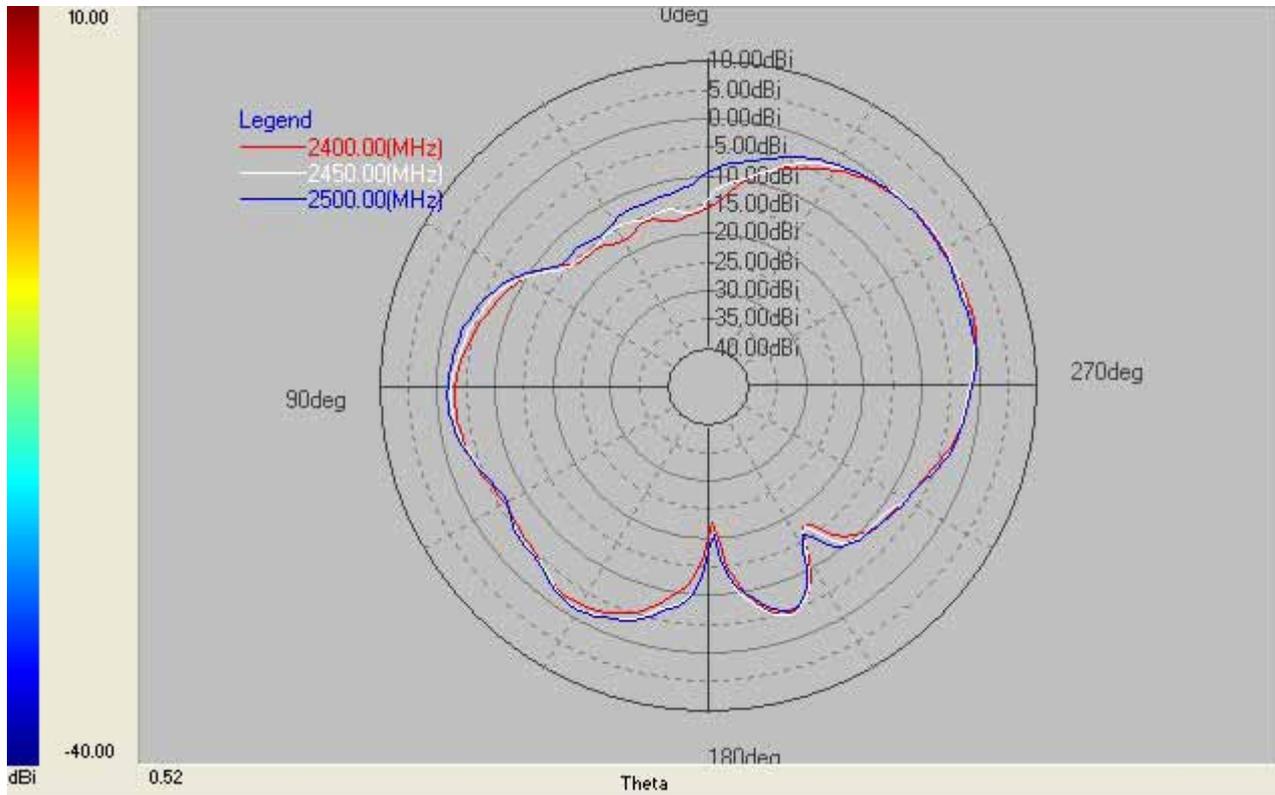
**Y-Z Plane (E-total)**



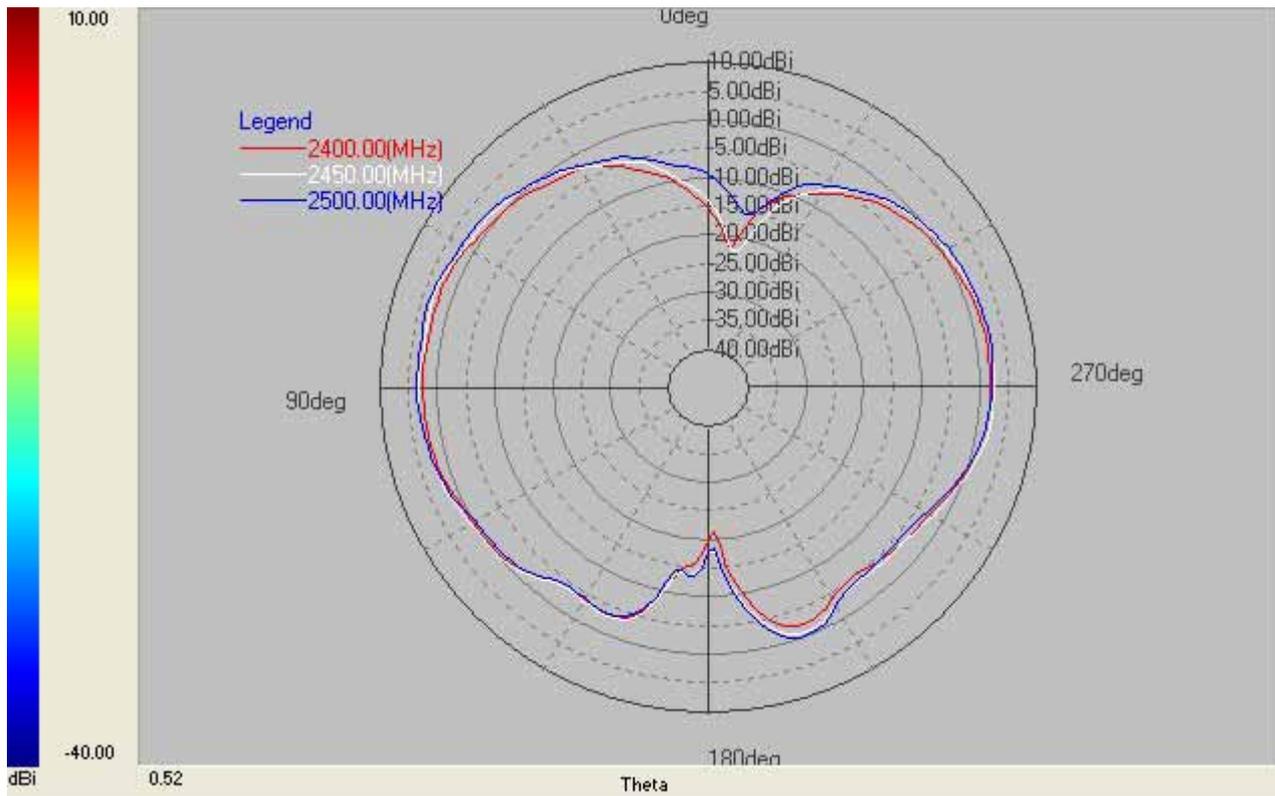
**X-Y Plane (E-total)**

3.2 Ant 2

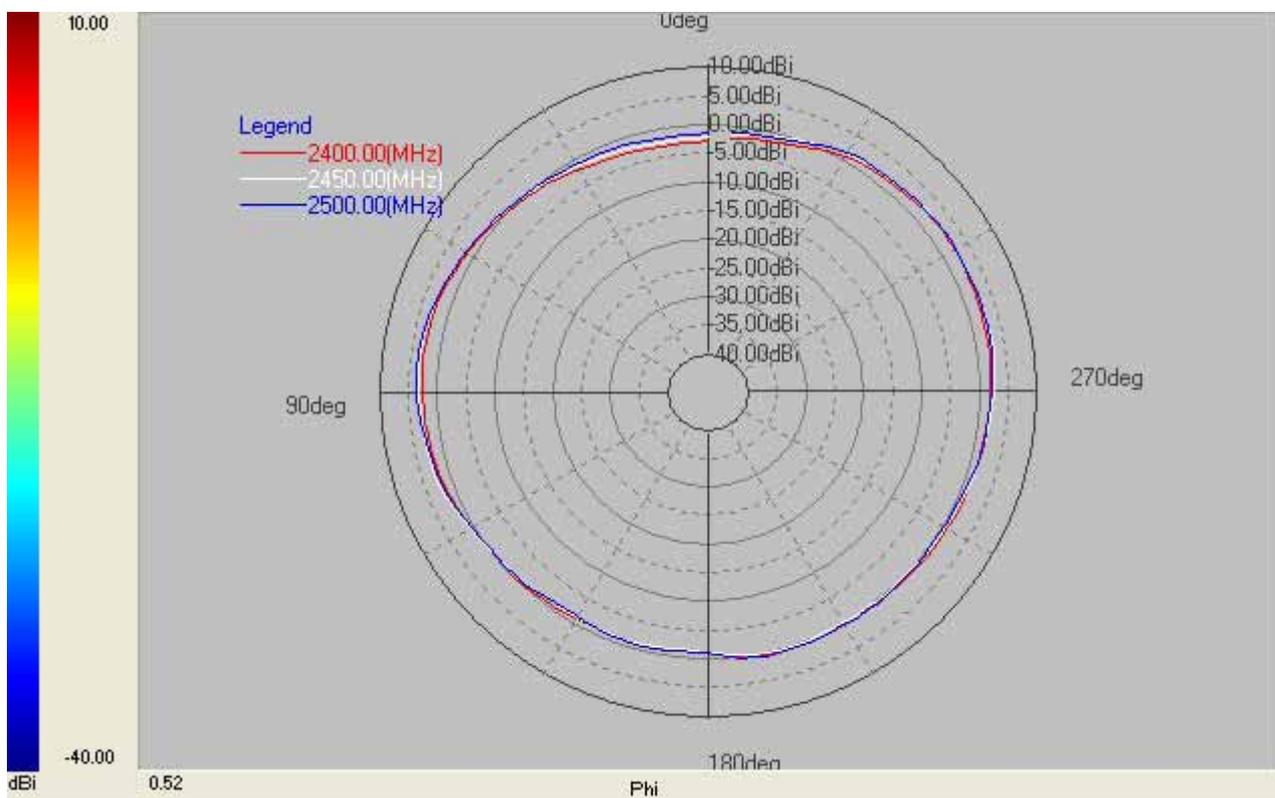
**2.4~2.5GHz**



**X-Z Plane (E-total)**



**Y-Z Plane (E-total)**



**X-Y Plane (E-total)**

## 4. Summary

### 4.1 Return Loss

Frequency	Ant1(dB)	Ant2 (dB)
2400MHz	-14.8	-11.6
2450MHz	-26.3	-13.8
2500MHz	-20.9	-16.5

### 4.2 Isolation

Frequency	ANT1 (dB)	ANT2 (dB)
2400MHz	-31.3	-33.7
2450MHz	-29.4	-30.7
2500MHz	-29.7	-30.8

### 4.3 3D total Peak Gain & Efficiency

Frequency	Ant1		Ant2	
	Peak Gain (dBi)	Efficiency (%)	Peak Gain (dBi)	Efficiency (%)
2400MHz	3.7	81	2.8	73
2450MHz	4.1	87	3.5	80
2500MHz	4.2	82	3.7	80