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NP-9050

Antenna design For

Sercomm NETGEAR DGN3500

V1.02

Document Number	**NP-9050**
1st Released Date	**07/09/09**
Last Released Date	**07/17/09**
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Review by	**Romeo Chou**

Revised History

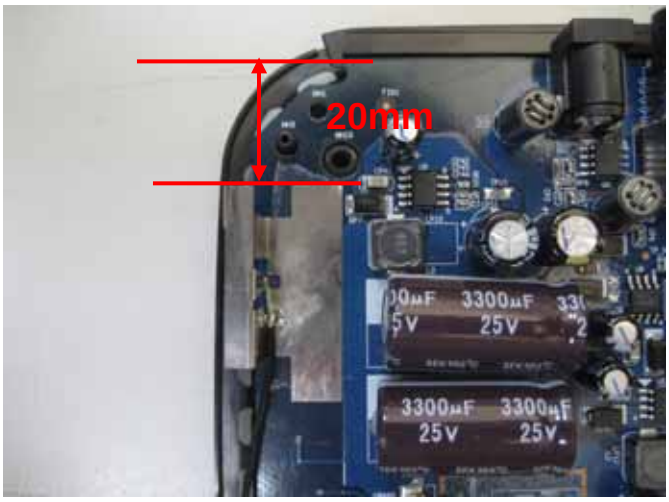
Date	Version	Revised Record
06/04/09	1.00	● 1st released
07/09/09	1.01	● PIFA & On board Antenna compare.
07/17/09	1.02	● PIFA & On board Antenna compare & Antenna position change.

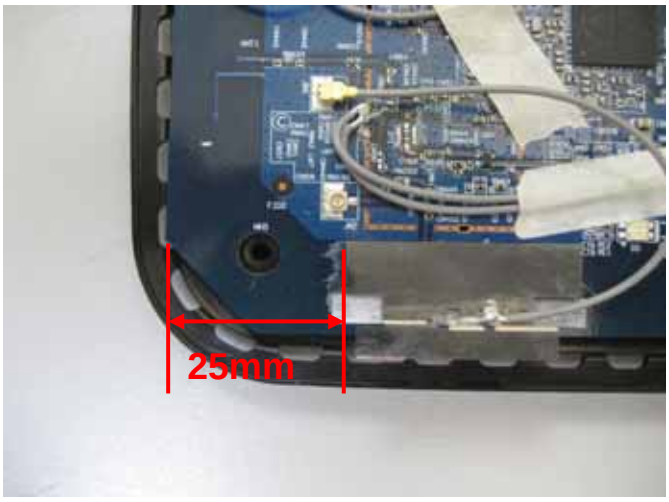
Specification

Rough description	2 embedded G band antenna for NETGEAR DGN3500
Dimensions	None
Impedance	50Ω
Test environment	None
Application	802.11n
Freq. Range	2.4～2.5GHz
Gain	Peak gain 2dBi@2.4～2.5GHz
VSWR	1.92：1
Radiation	Omni
Polarization	linear
HPBW / H	None
HPBW / E	None
Efficiency	None
Downtilt	None
Connector type	IPEX
Cable type	Φ1.13 Gray
Isolation	None
Special request	None

1. Antenna Introduction


B15

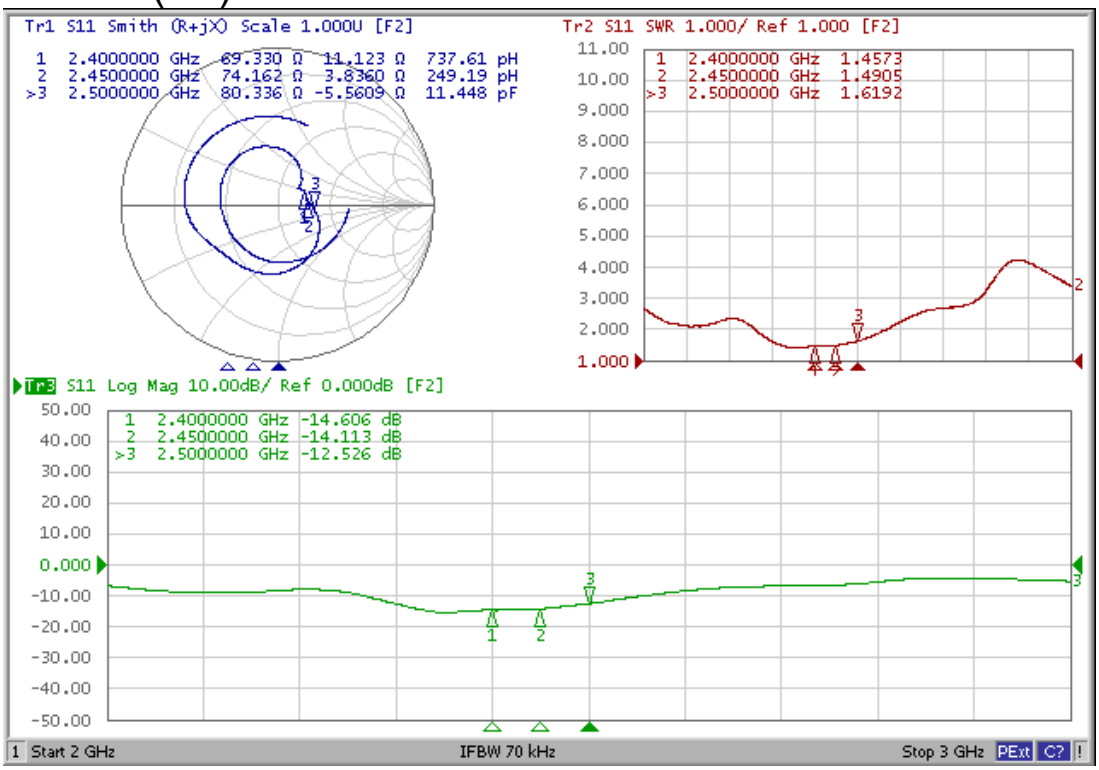

20mm
3300μF
25V
3300μF
25V


25mm

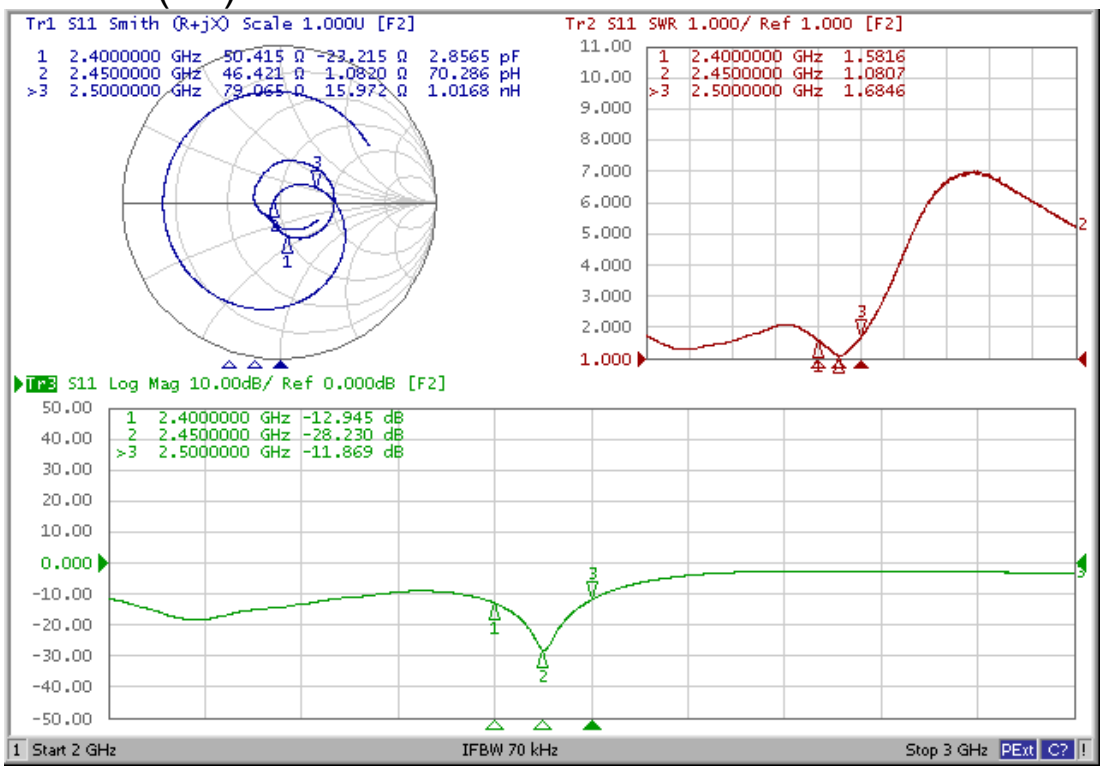
2 S-parameter test results

2.1 S11 test results

2.1.1 PIFA(A1)

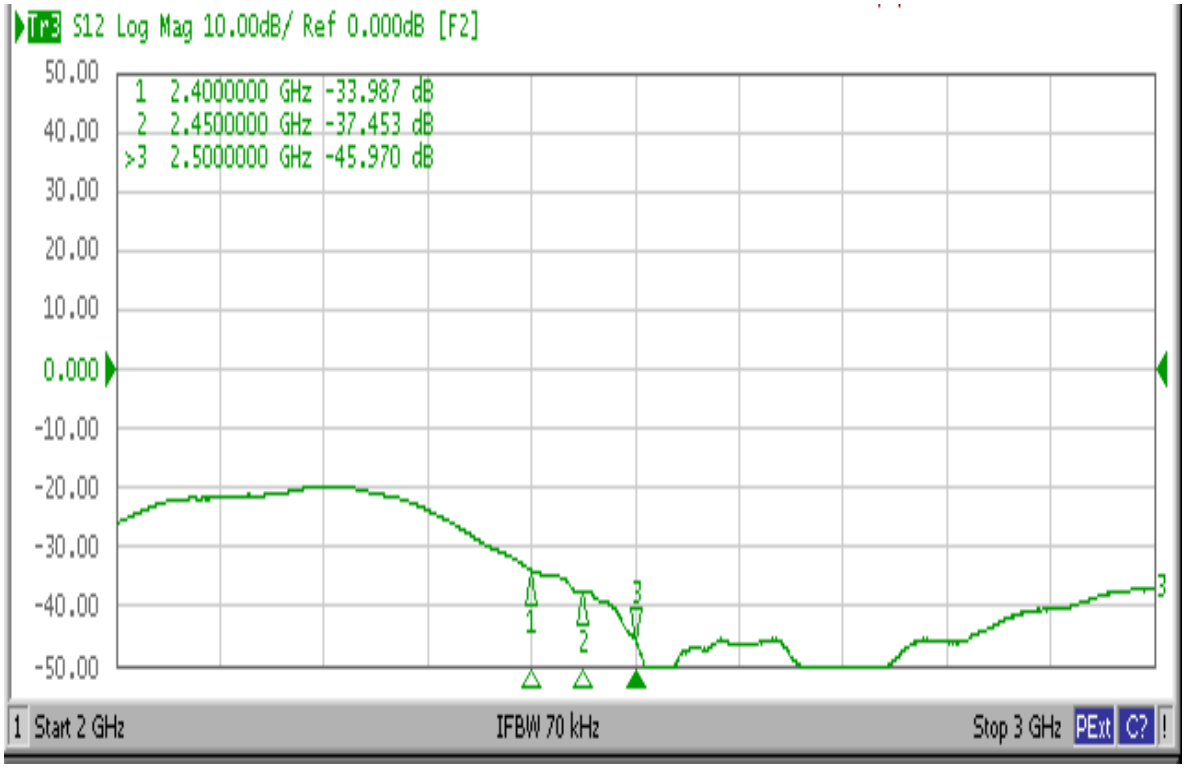


2.1.2 PIFA(A2)



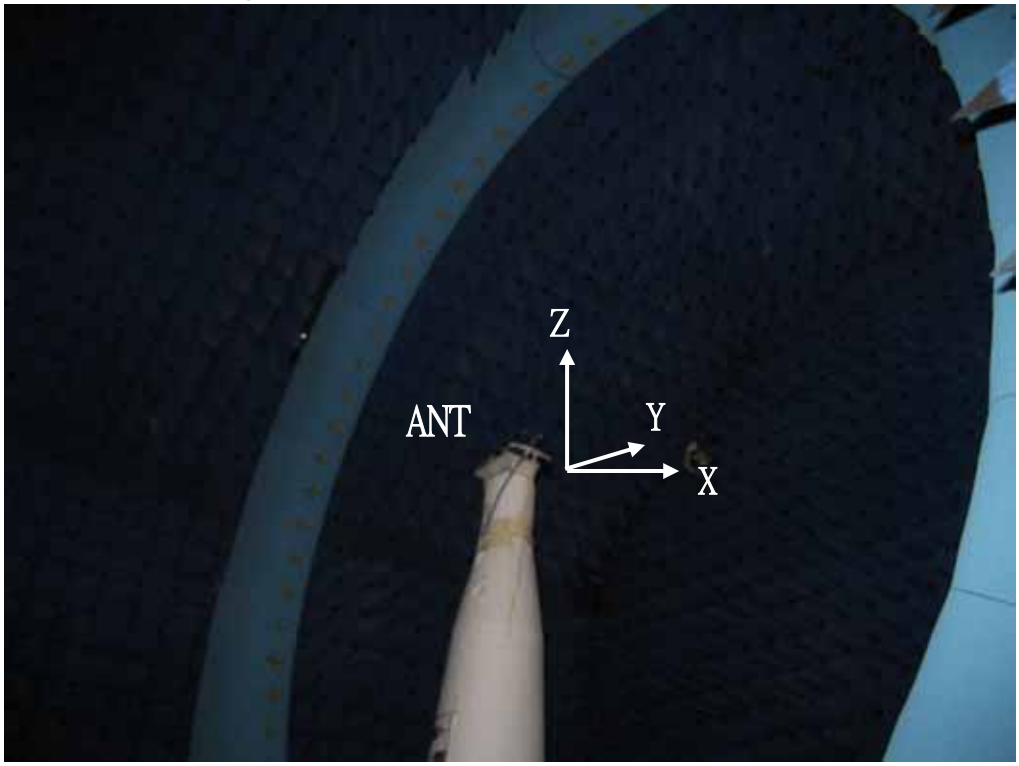
2.2 Isolation test results

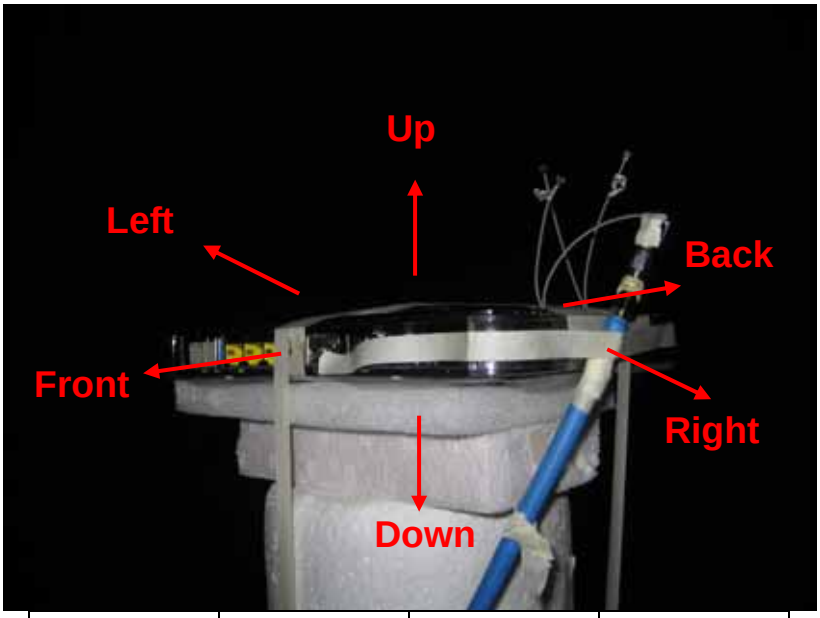
2.2.1 PIFA(A1)-PIFA(2)



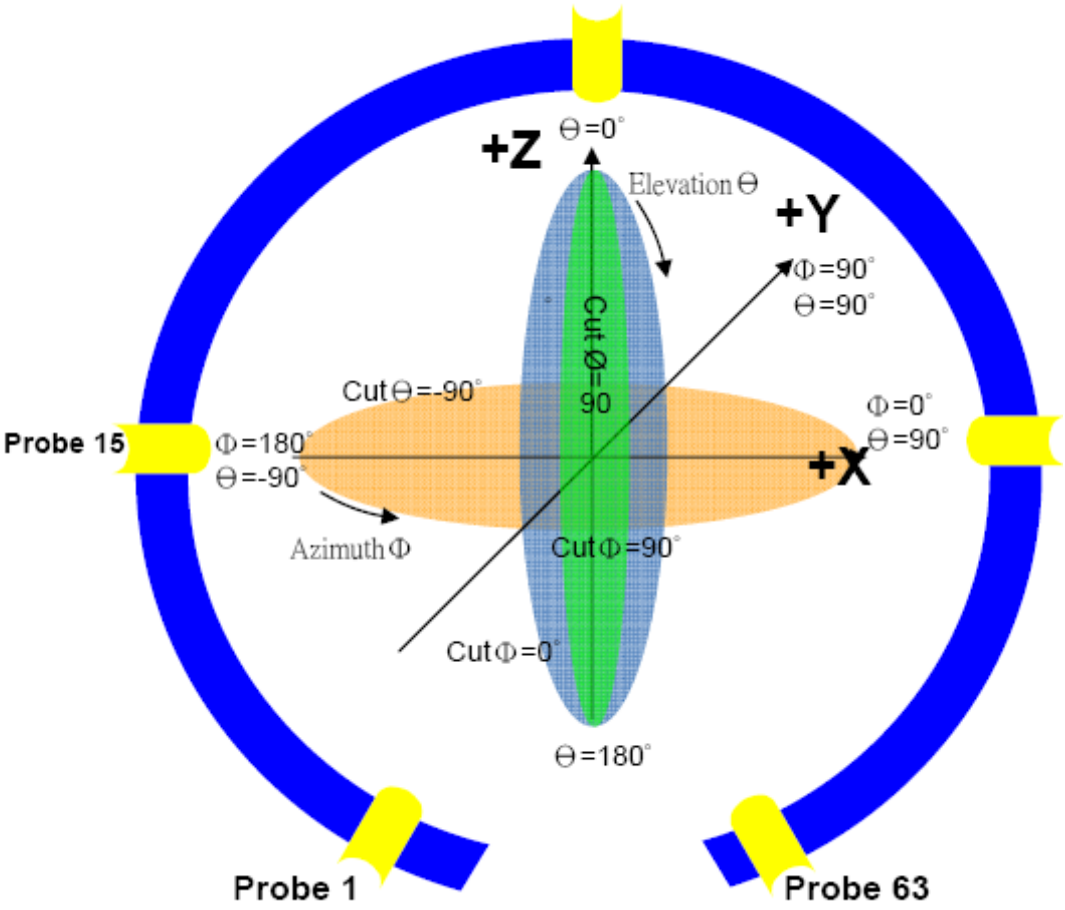
2. Gain & Patterns test results

2.1.Measurement setting(平躺式)



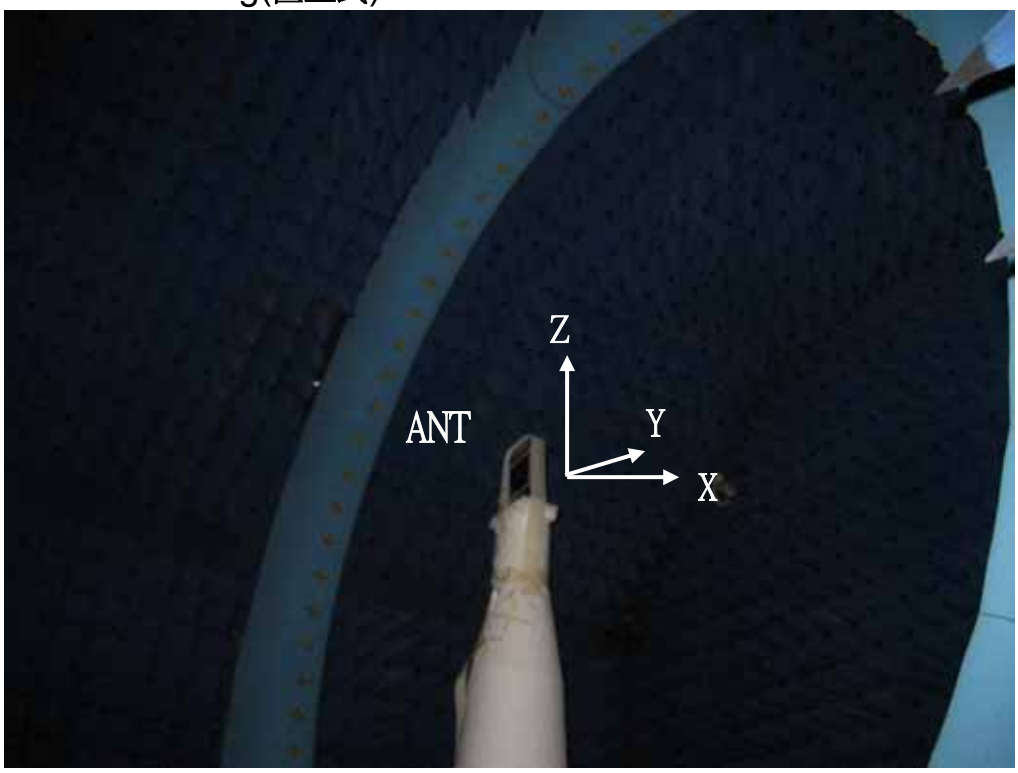


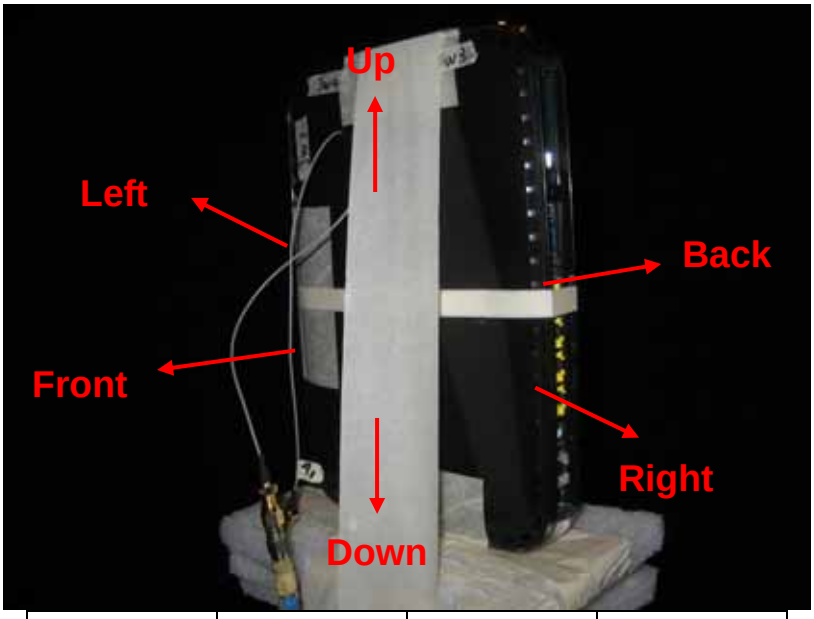
	XY	YZ	XZ
0°	Right	Up	Up
90°	Back	Back	Right
180°	Left	Down	Down
270°	Front	Front	Left



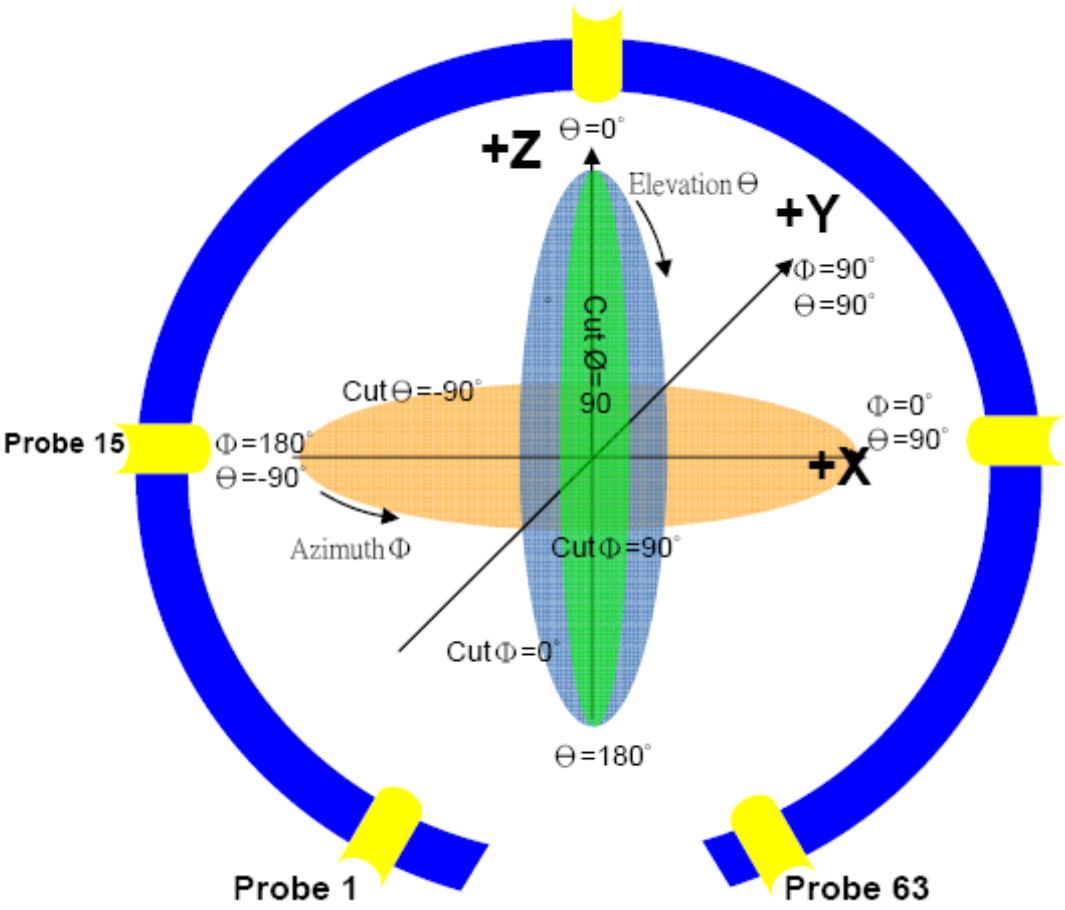
	θ	φ
Total angle	175°	360°
How many angle scan one point	5°	5°
Total scan point	36	73

2.2.Measurement setting(直立式)





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



	θ	φ
Total angle	175°	360°
How many angle scan one point	5°	5°
Total scan point	36	73

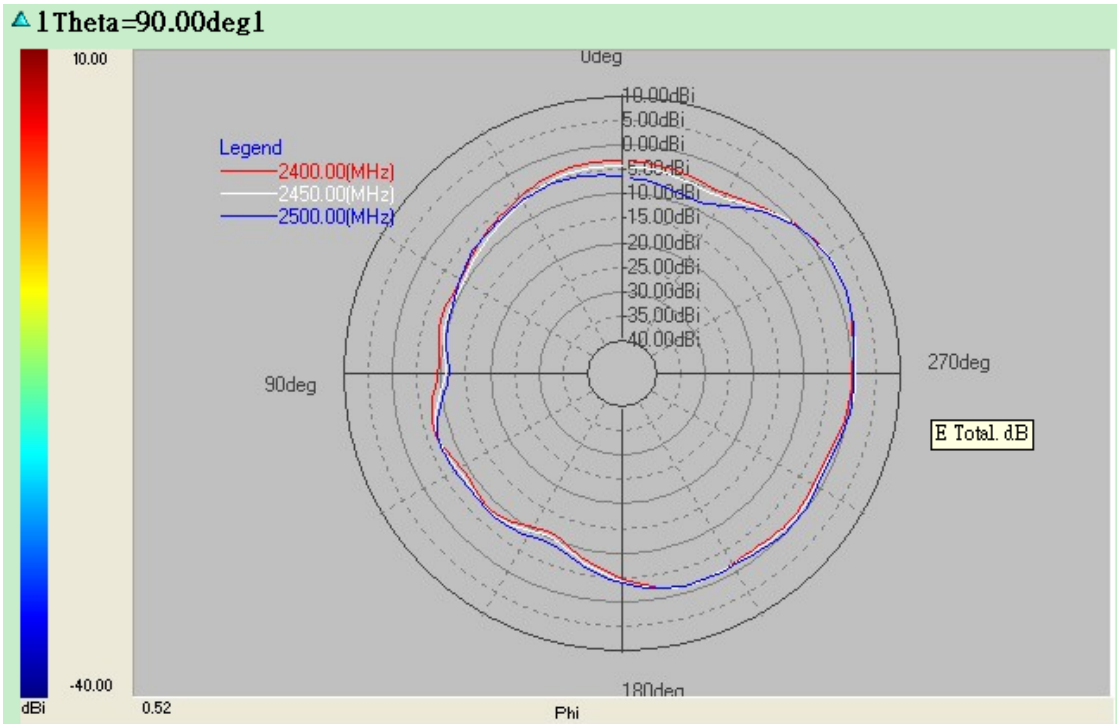
3. 2D patterns

3.1. PIFA Antenna solution

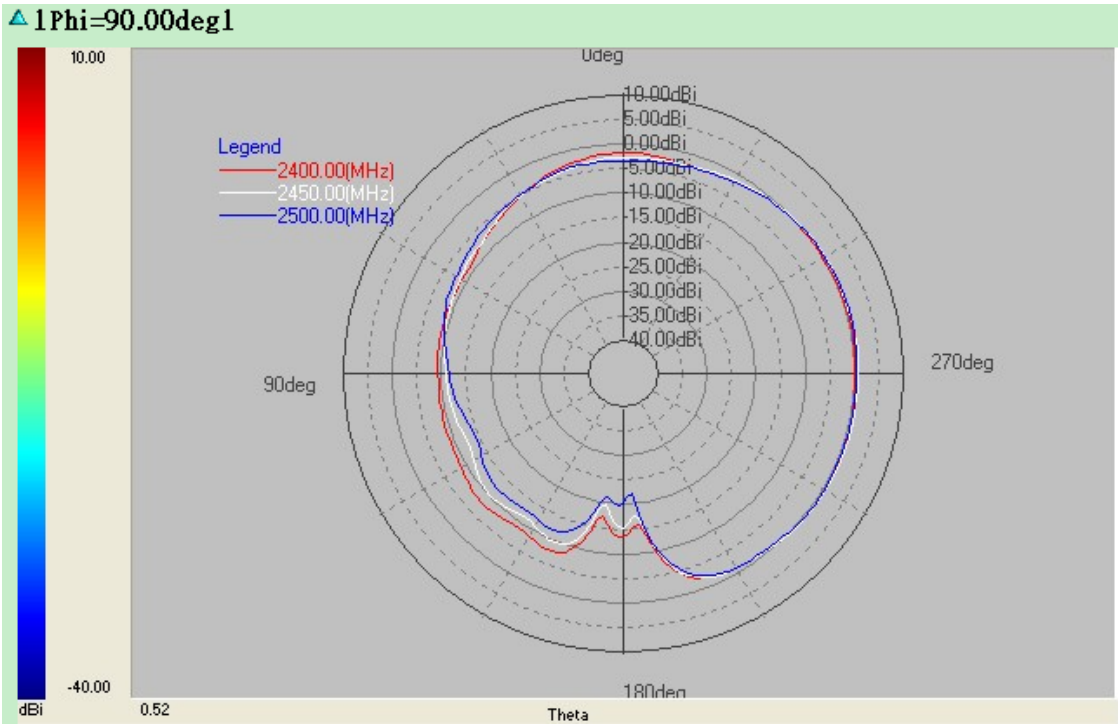
3.1.1. WY PIFA(A1)-平躺式

PIFA(A1)

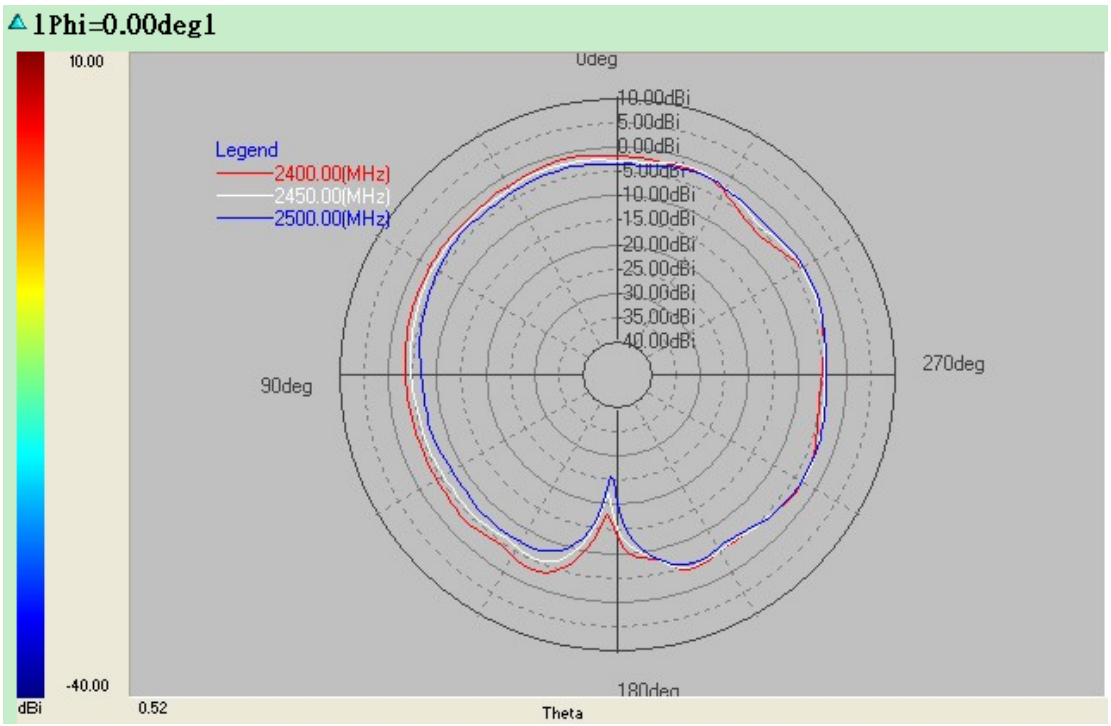
(X-Y Plane)



(Y-Z Plane)



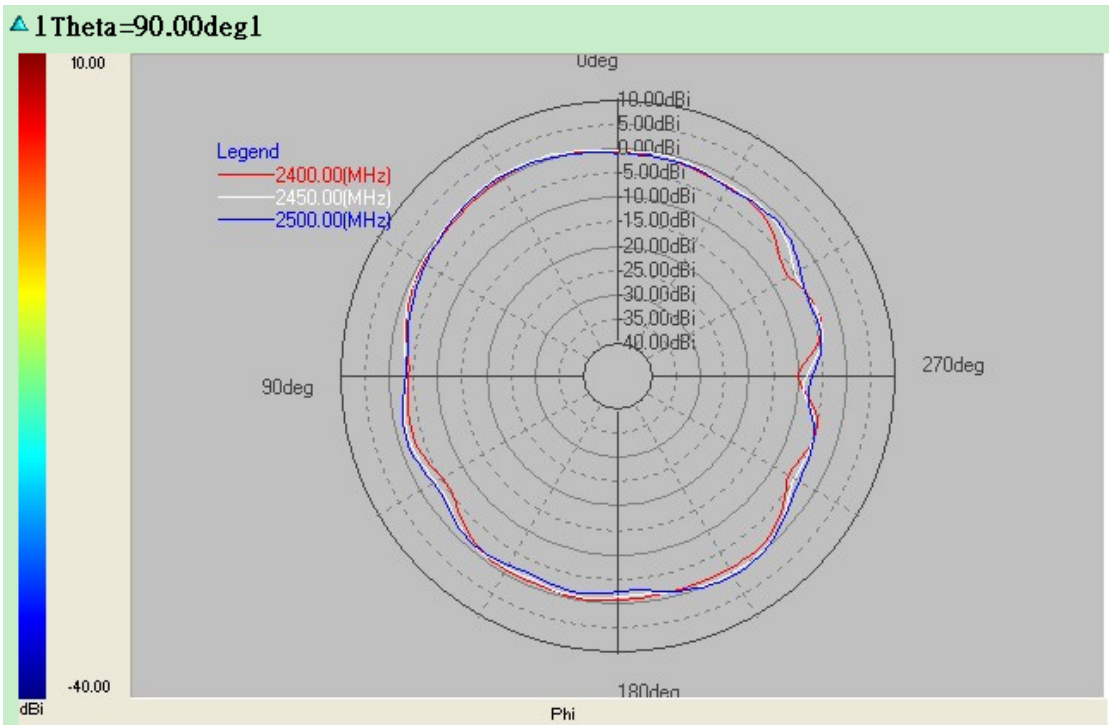
(X-Z Plane)


1Phi=0.00deg1
10.00
-40.00
dBi
0.52
Theta
0deg
90deg
270deg
180deg
Legend
2400.00(MHz)
2450.00(MHz)
2500.00(MHz)
10.00dBi
5.00dBi
0.00dBi
-5.00dBi
-10.00dBi
-15.00dBi
-20.00dBi
-25.00dBi
-30.00dBi
-35.00dBi
-40.00dBi

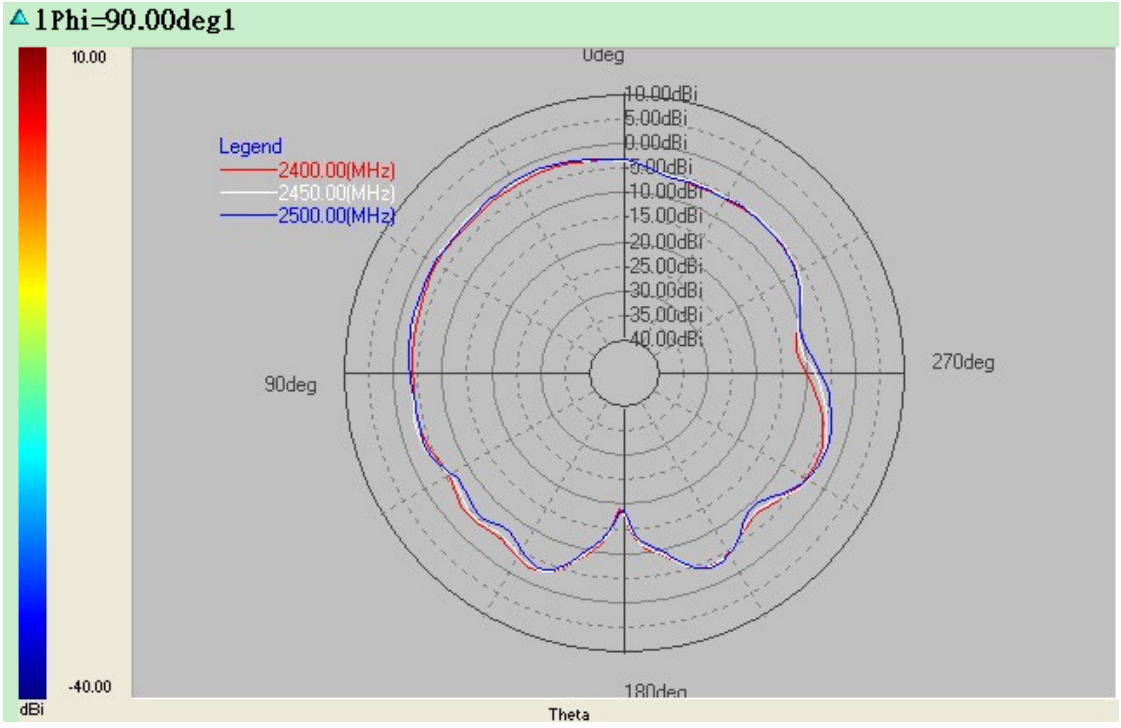
3.1.2. WY PIFA(A2)-平躺式

PIFA(A2)

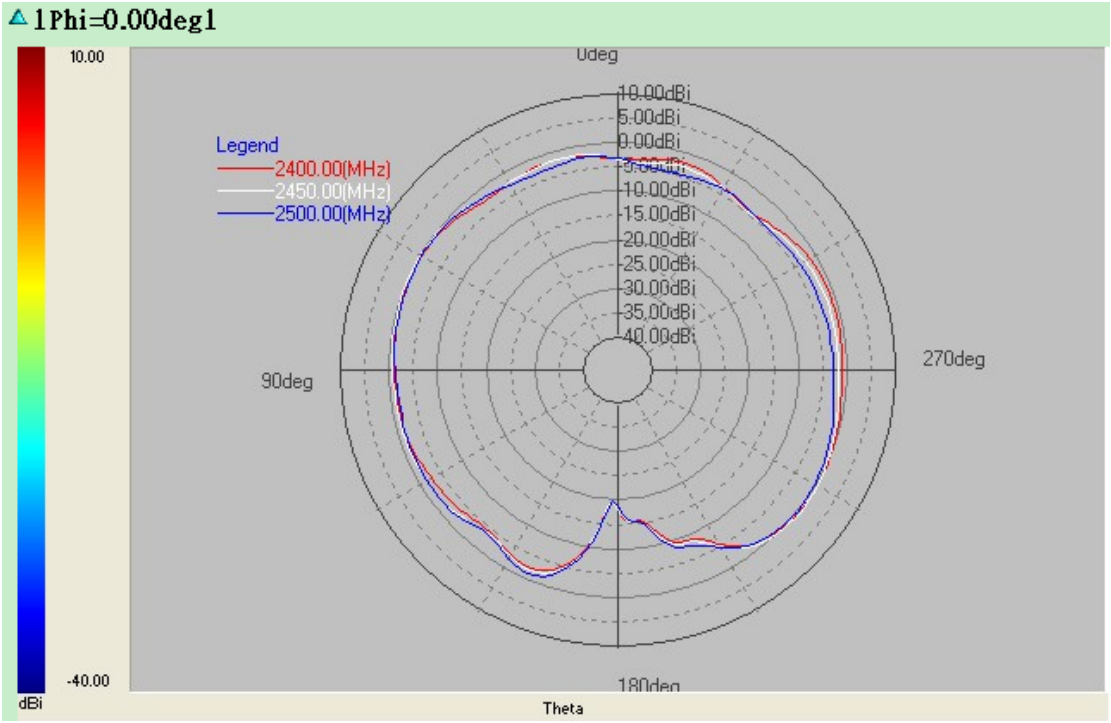
(X-Y Plane)



(Y-Z Plane)



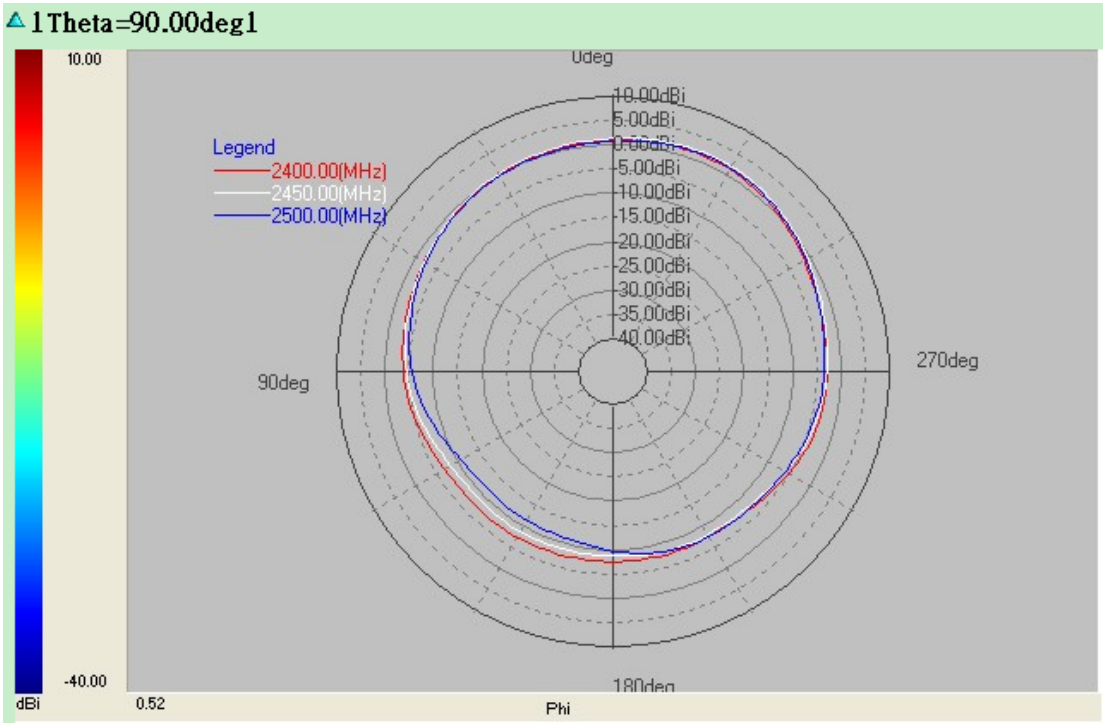
(X-Z Plane)


1Phi=0.00deg1
10.00
-40.00
dBi
0deg
90deg
270deg
180deg
Theta
Legend
2400.00(MHz)
2450.00(MHz)
2500.00(MHz)
10.00dBi
5.00dBi
0.00dBi
-5.00dBi
-10.00dBi
-15.00dBi
-20.00dBi
-25.00dBi
-30.00dBi
-35.00dBi
-40.00dBi

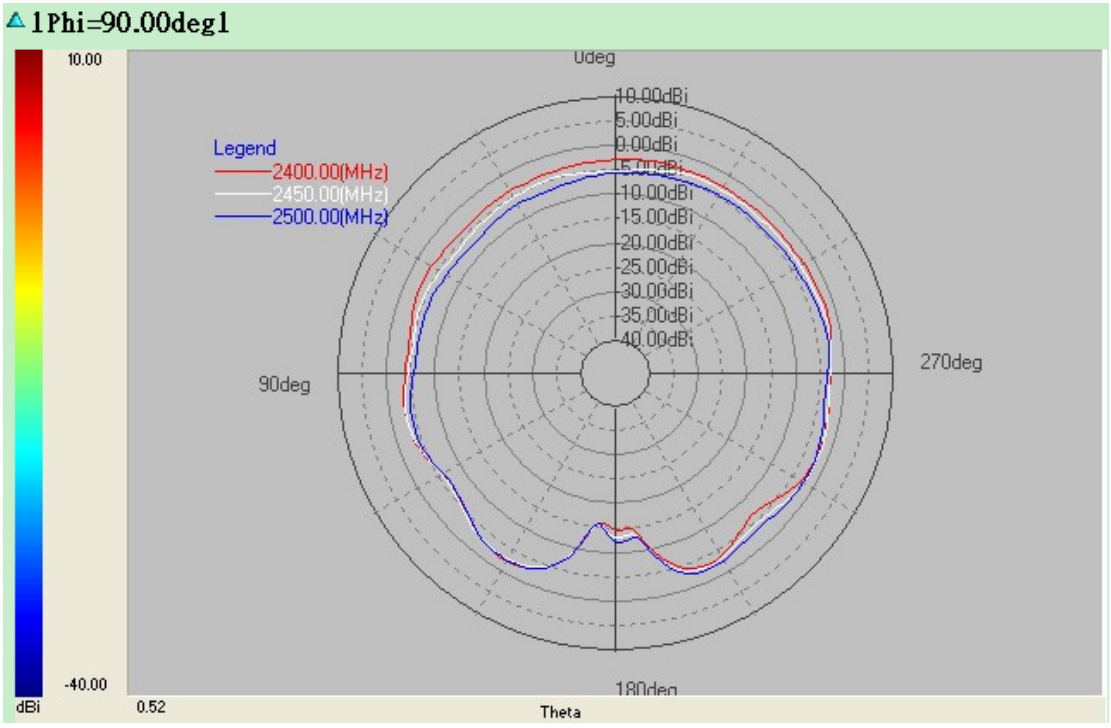
3.1.3. WY PIFA(A1)-直立式

PIFA(A1)

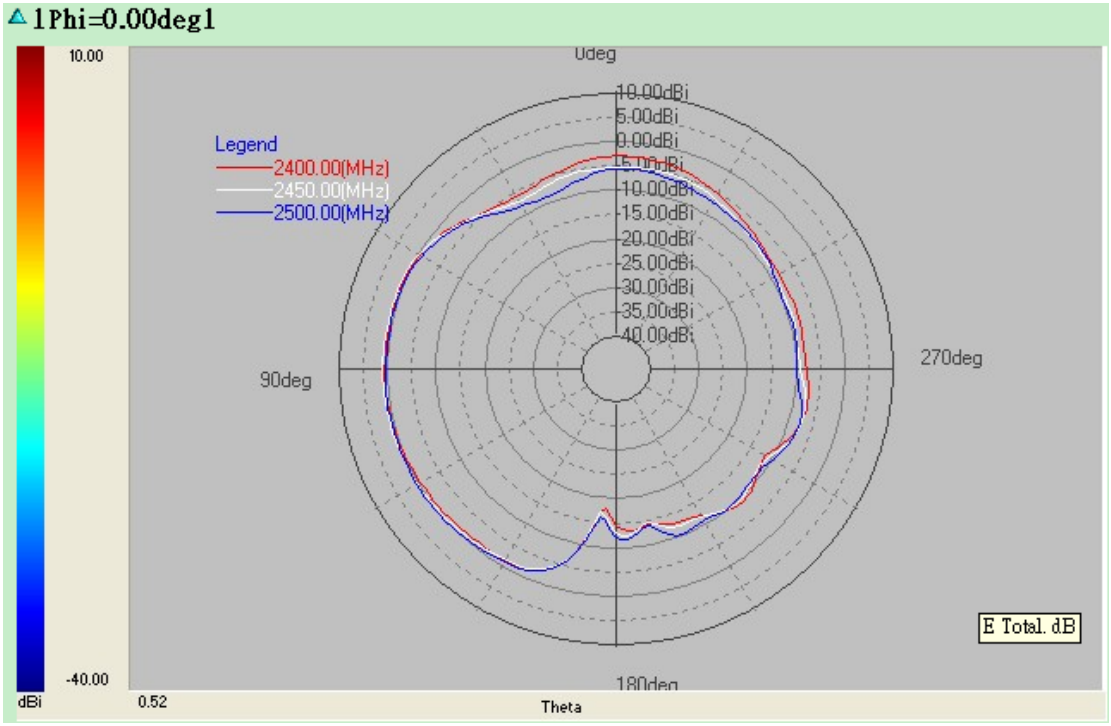
(X-Y Plane)



(Y-Z Plane)



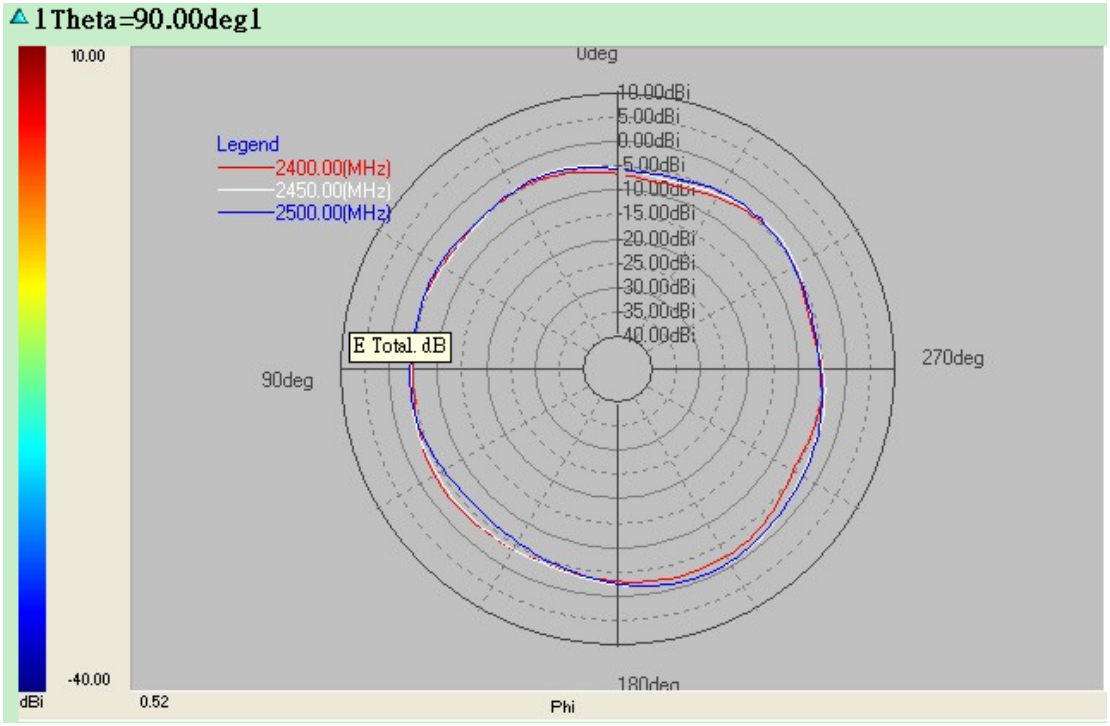
(X-Z Plane)


1Phi=0.00deg1
10.00
-40.00
dBi
0.52
Theta
0deg
90deg
180deg
270deg
Legend
2400.00(MHz)
2450.00(MHz)
2500.00(MHz)
10.00dBi
5.00dBi
0.00dBi
-5.00dBi
-10.00dBi
-15.00dBi
-20.00dBi
-25.00dBi
-30.00dBi
-35.00dBi
-40.00dBi
E Total. dB

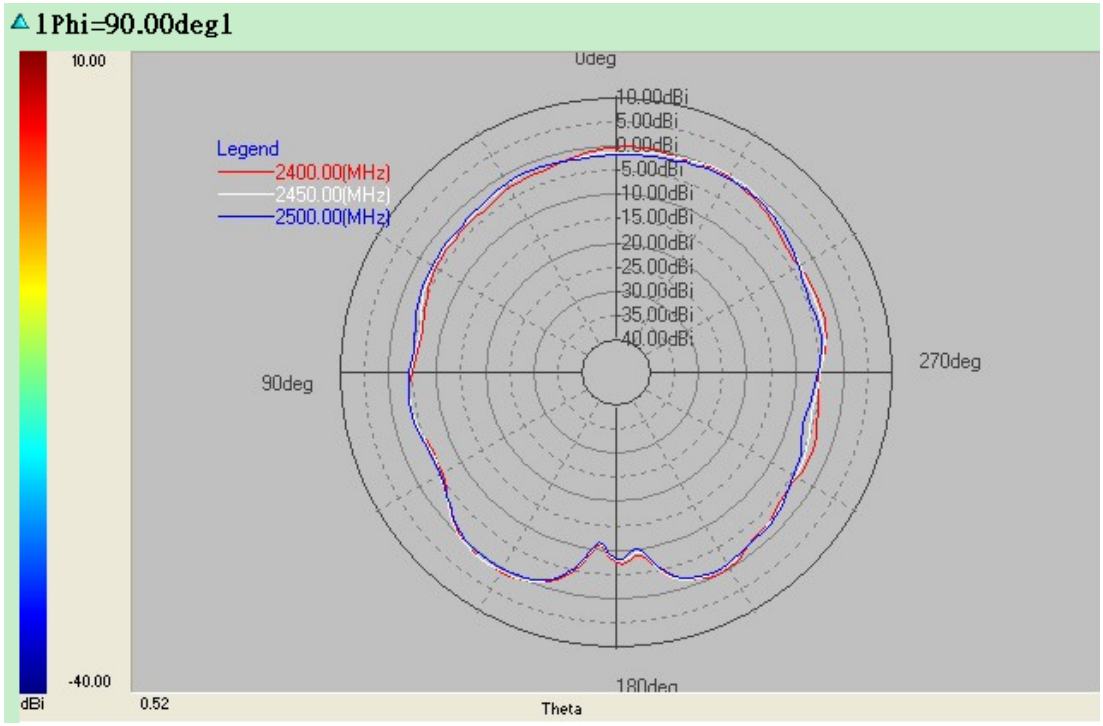
3.1.4. WY PIFA(A2)- 直立式

PIFA(A2)

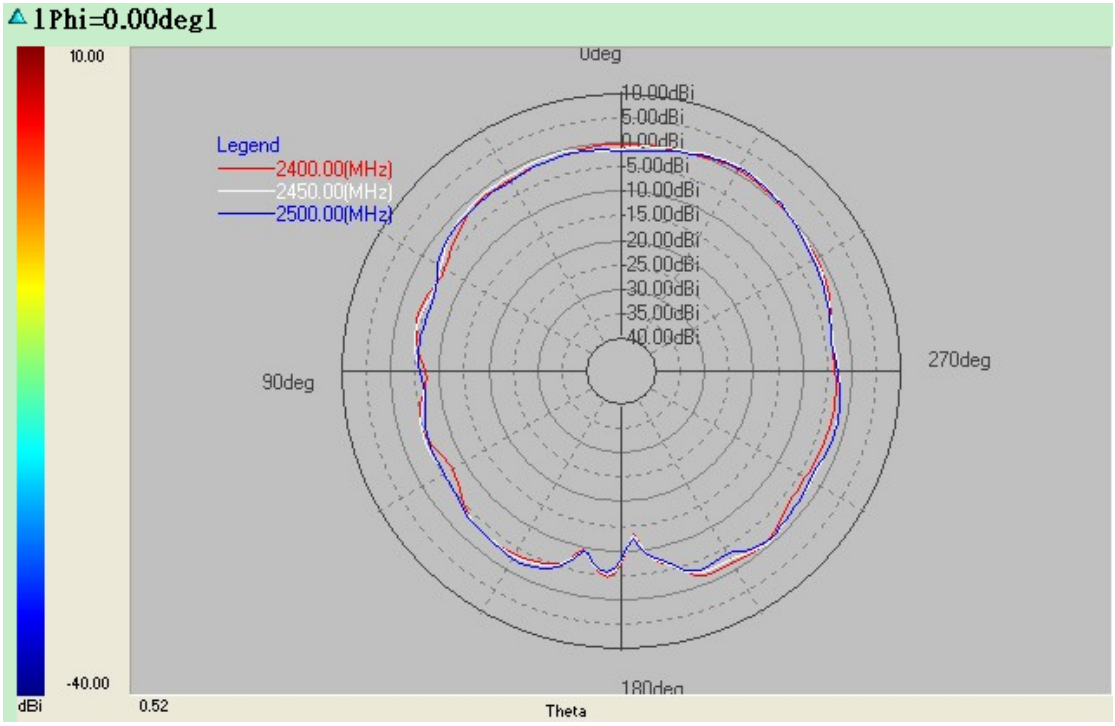
(X-Y Plane)



(Y-Z Plane)



(X-Z Plane)


1Phi=0.00deg1
10.00
-40.00
dBi
0.52
0deg
90deg
270deg
180deg
Theta
Legend
2400.00(MHz)
2450.00(MHz)
2500.00(MHz)
10.00dBi
5.00dBi
0.00dBi
-5.00dBi
-10.00dBi
-15.00dBi
-20.00dBi
-25.00dBi
-30.00dBi
-35.00dBi
-40.00dBi

4. Summary

4.1. Return Loss

	PIFA(A1)-(dB)	PIFA(A2)-(dB)
2.40 GHz	**-14.60**	**-12.94**
2.45 GHz	**-14.11**	**-28.23**
2.50 GHz	**-12.52**	**-11.86**

4.2. Isolation

	PIFA(A1)-J PIFA(A2) (dB)
2.40 GHz	**-33.98**
2.45 GHz	**-37.45**
2.50 GHz	**-45.97**

4.3. 3D total Peak Gain Performance Comparison(平躺式)

	PIFA(A1) **(dBi)**	PIFA(A2) **(dBi)**
2.40 GHz	**2.00**	**0.72**
2.45 GHz	**2.12**	**1.15**
2.50 GHz	**1.93**	**0.95**

4.4. 3D total Peak Gain Performance Comparison(直立式)

	PIFA(A1) **(dBi)**	PIFA(A2) **(dBi)**
2.40 GHz	**1.42**	**0.70**
2.45 GHz	**1.77**	**1.12**
2.50 GHz	**1.40**	**0.85**

4.5. 3D total Efficiency Performance Comparison(平躺式)

	PIFA(A1) (%)	PIFA(A2) (%)
2.40 GHz	48	54
2.45 GHz	50	60
2.50 GHz	43	58

4.6. 3D total Efficiency Performance Comparison(直立式)

	PIFA(A1) (%)	PIFA(A2) (%)
2.40 GHz	49	58
2.45 GHz	52	63
2.50 GHz	44	61