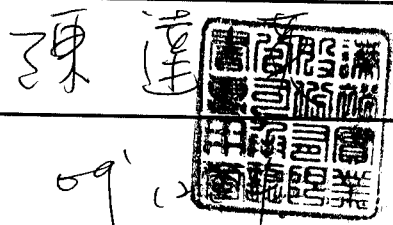




WHA YU INDUSTRIAL CO., LTD.(HEAD OFFICE)  
 DONGGUAN AEON TECH CO.,LTD.(CHINA)  
 SUZHOU AEON TECH CO.,LTD.(CHINA)  
 AEON TECH (SHANGHAI) CO.,LTD(CHINA)  
 DONGGUAN PARNER TECH CO.,LTD.(CHINA)

## SPECIFICATION FOR APPROVAL

**CUSTOMER:** 明泰科技股份有限公司 **產地:** 大陸吳江市。東莞市  
**PART NAME:** RF PCB Antenna Assembly **產品單重:** 1800mg  
**PART NO.:** **REVISION:**  
**W. Y. P/NO.:** C037-511041-A (SSR-209274) **REV.:** X1

|                  | MANUFACTURER<br>SIGNATURE                                                           | CUSTOMER<br>SIGNATURE |
|------------------|-------------------------------------------------------------------------------------|-----------------------|
| APPROVED<br>BY : |   |                       |
| DATE :           |  |                       |

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# RF PCB Antenna Assembly

## Specification

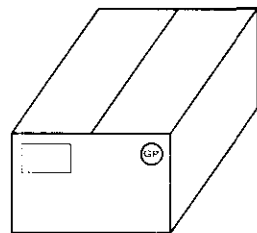
### 1. Electrical Properties :(With Housing)

|                          |                                |
|--------------------------|--------------------------------|
| 1.1 Frequency Range..... | 2.4GHz ~ 2.5GHz                |
| 1.2 Impedance .....      | 50Ω Nominal                    |
| 1.3 VSWR .....           | 1.92:1 Max.                    |
| 1.4 Return Loss.....     | -10 dB Max.                    |
| 1.5 Radiation .....      | Omni-directional               |
| 1.6 Gain(peak).....      | 1.9dBi (excluding cable loss ) |
| 1.7 Cable Loss.....      | 0.3dB Max.                     |
| 1.8 Polarization.....    | Linear ; Vertical              |
| 1.9 Admitted Power.....  | 1W                             |
| 1.10 Cable.....          | RG-178 Cable                   |
| 1.11 Connector.....      | I-PEX MHF                      |

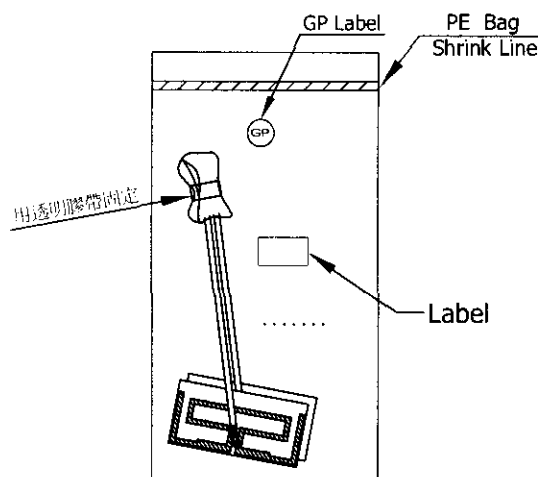
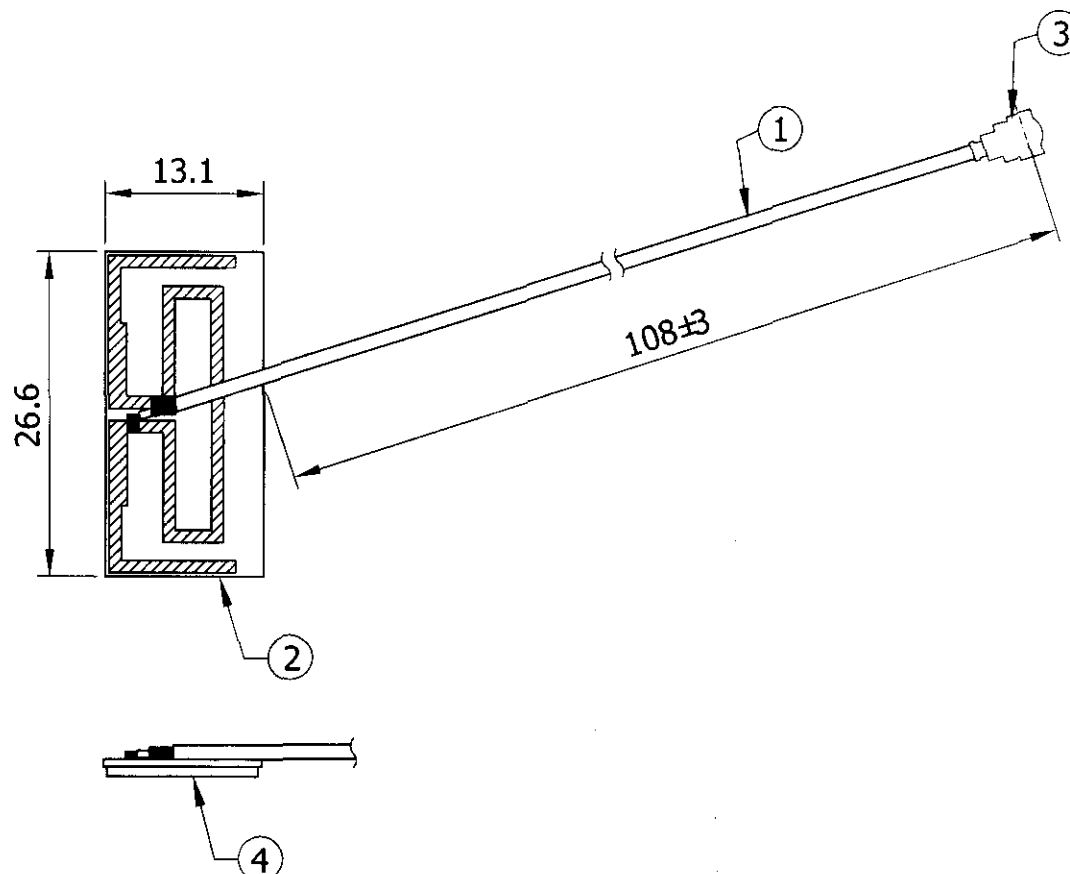
### 2. Physical Properties :

|                          |               |
|--------------------------|---------------|
| 2.1 Operating Temp. .... | -10°C ~ +60°C |
| 2.2 Storage Temp. ....   | -10°C ~ +70°C |

| REV | DATE       | DESCRIPTION |
|-----|------------|-------------|
| X1  | 11/24-2009 | New Issue   |



GP標籤貼於紙箱兩側右上角(共2PCS)  
外箱標籤貼於左上角1PCS  
成品淨重: 1800±5%mg



Packing : 25 pcs/bag

| 4  | 雙面背膠        | EVA, 雙面Sony G4000背膠, L=26*W=12.5*T=0.8 | 1    |        |
|----|-------------|----------------------------------------|------|--------|
| 3  | Connector   | MHF Connector                          | 1    |        |
| 2  | PCB         | FR4(L)26.6*(W)13.1*(T)0.6mm            | 1    |        |
| 1  | Cable       | RG178 Cable; 透明棕                       | 1    |        |
| NO | DESCRIPTION |                                        | Q'TY | REMARK |

|                      |  |      |      |             |                                    |      |
|----------------------|--|------|------|-------------|------------------------------------|------|
| CUSTOMER'S SIGNATURE |  | XX.  | ±5.0 | APPROVED    | CUSTOMER: 明泰                       |      |
|                      |  | X.   | ±3.0 | CHECKED     | PART NO :                          |      |
|                      |  | .X   | ±1.0 |             | PART NAME: RF PCB Antenna Assembly |      |
|                      |  | .XX  | ±0.5 |             | W.Y P/NO : C037-511041-A           |      |
|                      |  | .XXX | ±0.1 | DRAWING     | REV                                | UNIT |
|                      |  | ⊙    | ⊙    | 3/12/09     | X1                                 | mm   |
|                      |  |      |      | SHEET : 1/1 |                                    |      |

**M.gear** Wha Yu Group

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華裕實業股份有限公司

WHA YU INDUSTRIAL CO., LTD

BILL OF MATERIAL

CUSTOMER P/N: 明泰科技股份有限公司

DATE:2009.12.03

W.Y.P/N:C037-511041-A

PART NO:SSR-209274

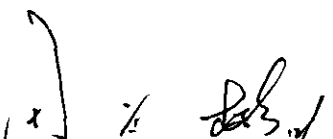
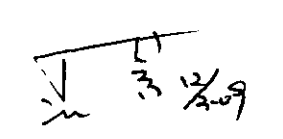
PART NAME:RF PCB Antenna Assembly

REV:X1

| 序號 | 零件名稱      | 供應商       | 規格描述                                             | UL 防火等級  |
|----|-----------|-----------|--------------------------------------------------|----------|
| 1  | Cable     | WONDERFUL | Cable:RG-178 Cable,透明棕,50Ω.                      | 105 C.MV |
| 2  | Connector | I-PEX     | Connector:MHF -I Plug for RG-178 (20278-112R-18) | V-0      |
| 3  | PCB       | NANYA     | PCB:南亞 FR4,(L)26.6*(W)13.1*(T)0.6                | V-0      |
| 4  | 泡棉雙面背膠    | SONY      | 雙面背膠:EVA,Sony G4000,L=26*W=12.5*T=0.8            | —        |

變更履歷:

| 序號 | 變更依據 | 變更內容 | 變更日期 | 版本 |
|----|------|------|------|----|
| 1  |      |      |      |    |
|    |      |      |      |    |
|    |      |      |      |    |

|        |                                                                                     |        |                                                                                     |        |                                                                                       |
|--------|-------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------------------------|--------|---------------------------------------------------------------------------------------|
| 核<br>準 |  | 審<br>核 |  | 制<br>作 |  |
|--------|-------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------------------------|--------|---------------------------------------------------------------------------------------|

工程部的未經許可"不得複印"

# Antenna Design For Wireless Camera

V3.2

|                                     |                   |
|-------------------------------------|-------------------|
| <b>Document Number</b>              |                   |
| <b>1<sup>st</sup> Released Date</b> | <b>06/30/09</b>   |
| <b>Last Released Date</b>           | <b>01/21/10</b>   |
| <b>Author</b>                       | <b>Andy Chen</b>  |
| <b>Review by</b>                    | <b>Romeo Chou</b> |

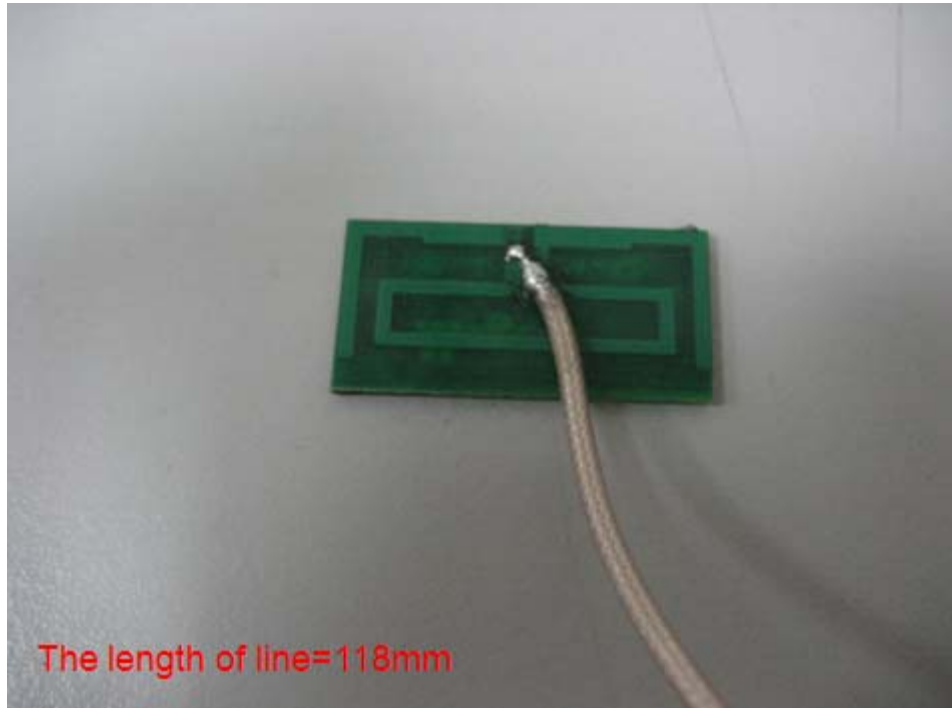
## Revised History

| Date     | Version | Revised Record                |
|----------|---------|-------------------------------|
| 06/30/09 | 1.00    | ● Passive test                |
| 07/21/09 | 2.0     | ● Passive test(old edition)   |
| 07/21/09 | 2.1     | ● Passive test(new edition)   |
| 07/23/09 | 2.2     | ● Passive test(new edition)   |
| 11/05/09 | 3.0     | ● Passive test(final edition) |
| 12/15/09 | 3.1     | ● Add cable length 10mm       |
| 01/21/10 | 3.2     | ● Antenna free space test     |
|          |         | ●                             |
|          |         | ●                             |
|          |         | ●                             |
|          |         | ●                             |
|          |         | ●                             |
|          |         | ●                             |
|          |         | ●                             |
|          |         |                               |
|          |         |                               |
|          |         |                               |
|          |         |                               |
|          |         |                               |
|          |         |                               |

## Specification

|                          |                                                                                        |                            |
|--------------------------|----------------------------------------------------------------------------------------|----------------------------|
| <b>Rough description</b> | 2 antennas for a Wireless Camera. Isolation between antennas must be under 20dB minus. |                            |
| <b>Item</b>              | <b>Initial Specification</b>                                                           | <b>Final Specification</b> |
| <b>Dimensions</b>        | ANT1 27.2(L)*13.7(W)*0.6(H)mm<br>ANT2 27.2(L)*13.7(W)*0.6(H)mm                         |                            |
| <b>Impedance</b>         | 50Ω                                                                                    |                            |
| <b>Test environment</b>  | With housing                                                                           |                            |
| <b>Spectrum</b>          | 802.11n                                                                                |                            |
| <b>Freq. Range</b>       | 2.4~2.5GHz                                                                             |                            |
| <b>Antenna type</b>      | PCB                                                                                    |                            |
| <b>Gain</b>              | 1.9dBi                                                                                 |                            |
| <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>   | >60%                                                                                   |                            |
| <b>Connector type</b>    | I-PEX                                                                                  |                            |
| <b>Cable type</b>        | RG-178                                                                                 |                            |
| <b>Cable length</b>      | None                                                                                   |                            |
| <b>Isolation</b>         | 20dB                                                                                   |                            |

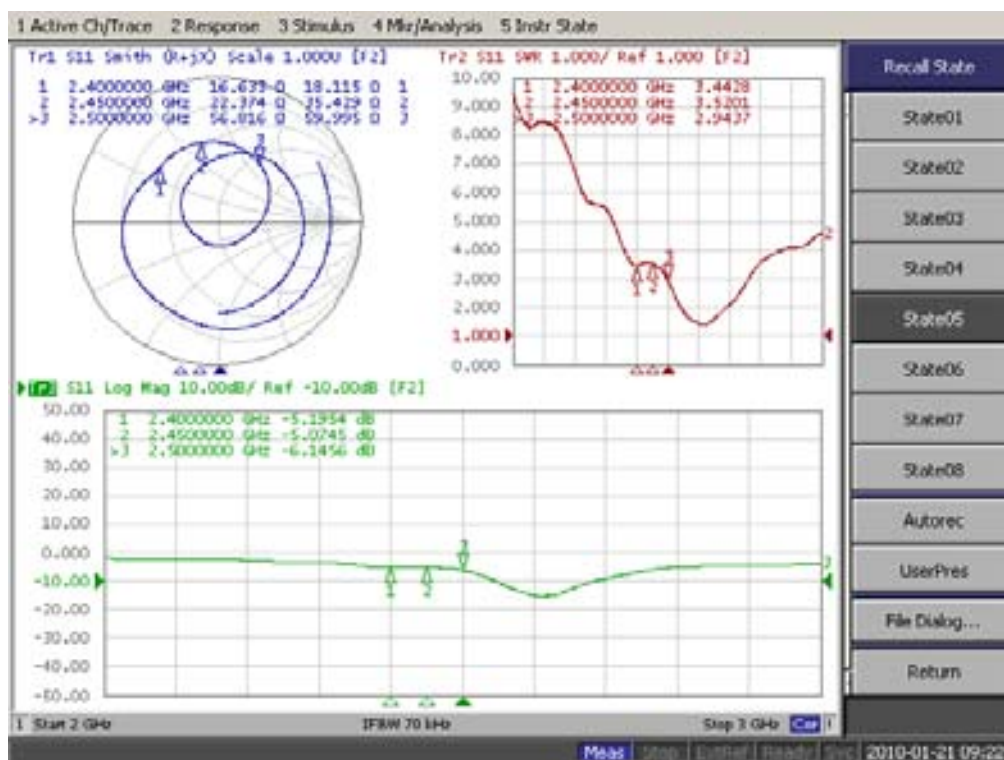
## 1 Antenna Introduction



## 2 S-parameter test results

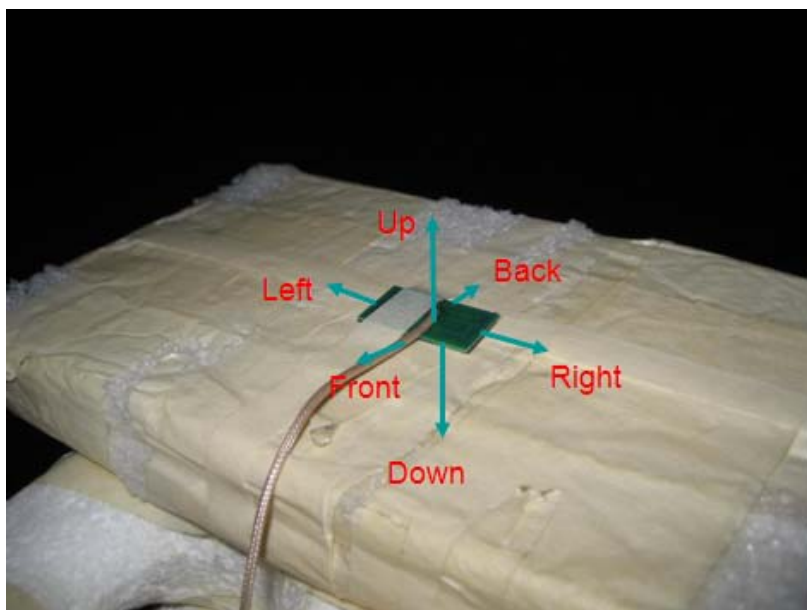
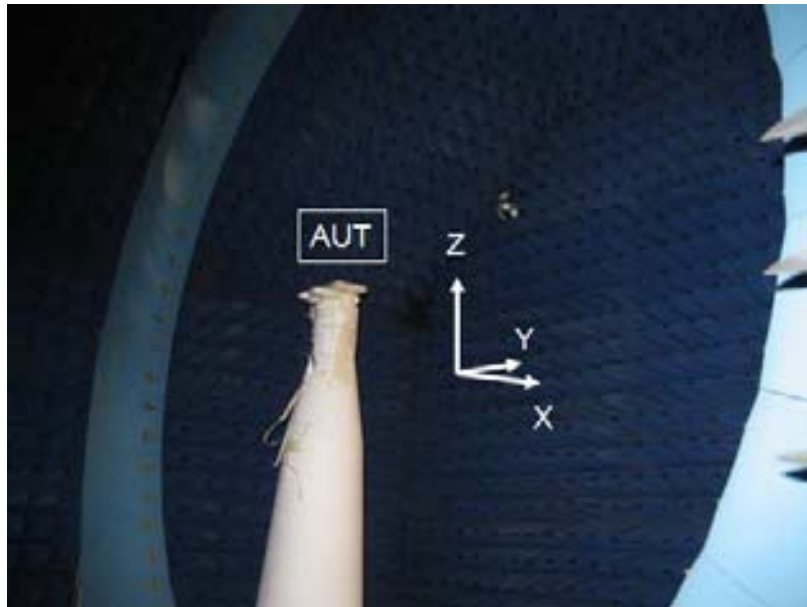
### 2.1 S11 test results

#### 2.1.1 ANT

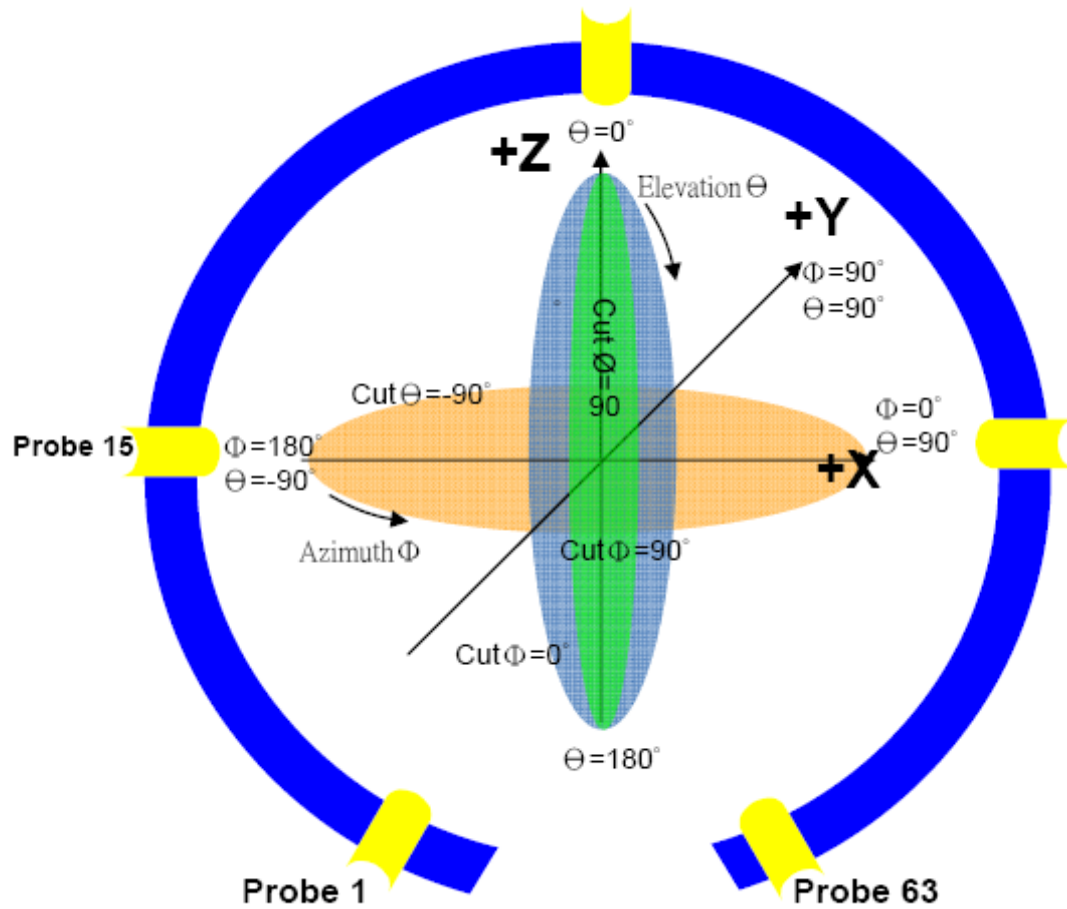


### 3 Gain & Patterns test results

#### 3.1 Measurement setting



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

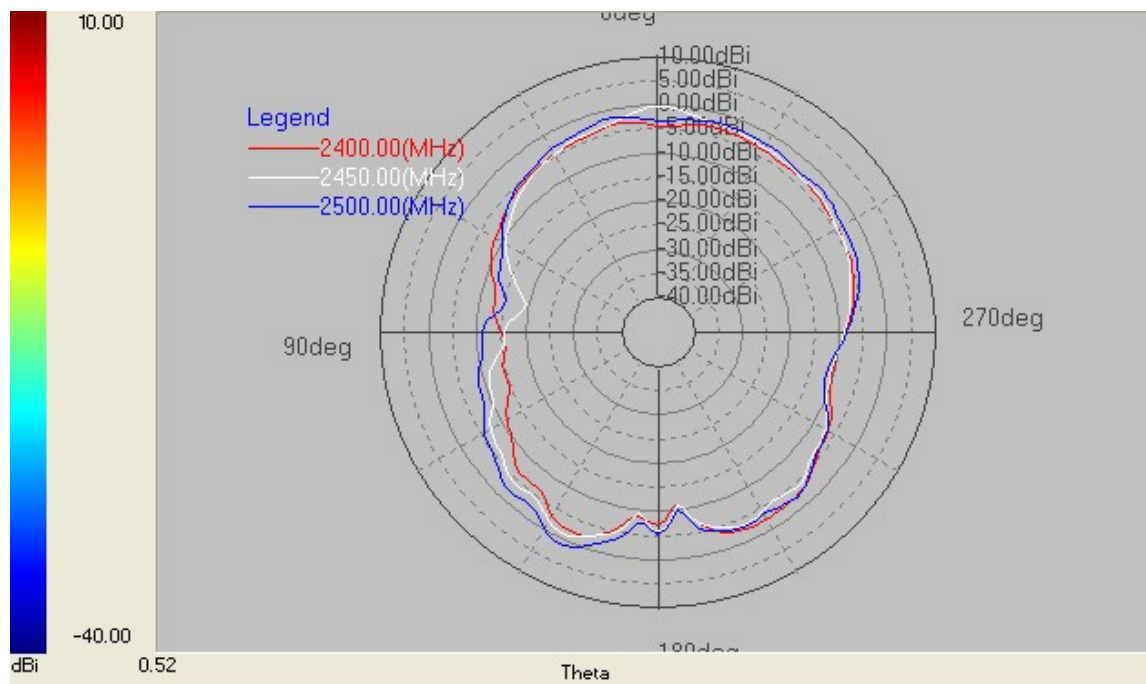


|                               | $\theta$    | $\varphi$   |
|-------------------------------|-------------|-------------|
| Total angle                   | $175^\circ$ | $360^\circ$ |
| How many angle scan one point | $5^\circ$   | $5^\circ$   |
| Total scan point              | 36          | 73          |

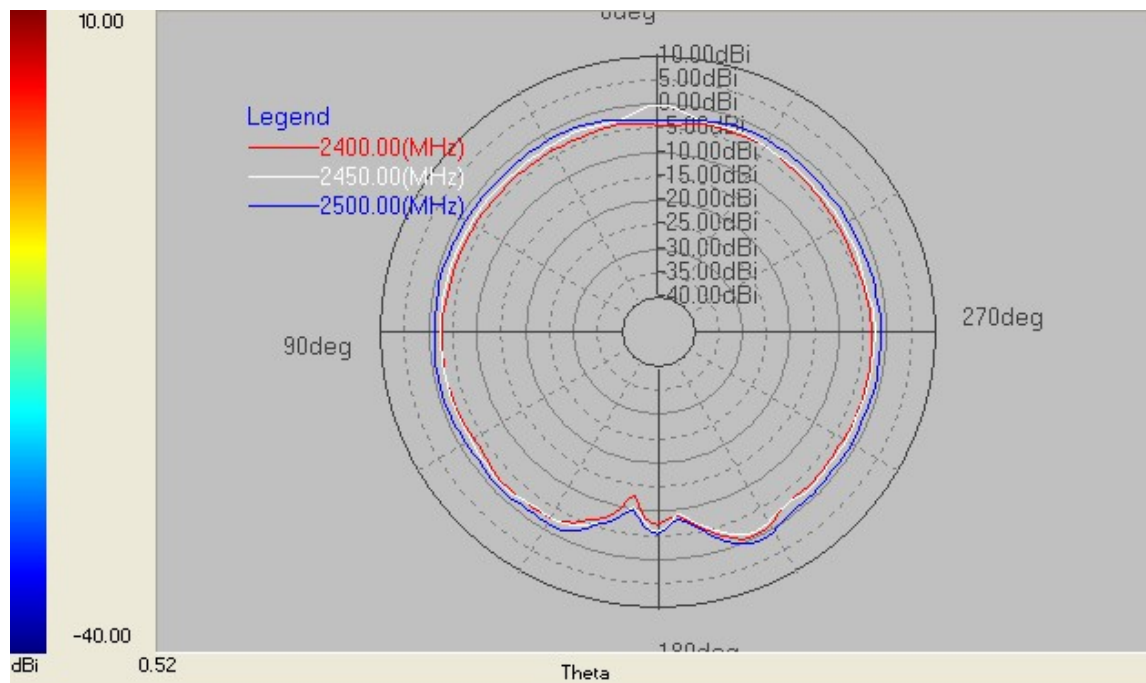
## 3.2 2D patterns

### 3.2.1 ANT

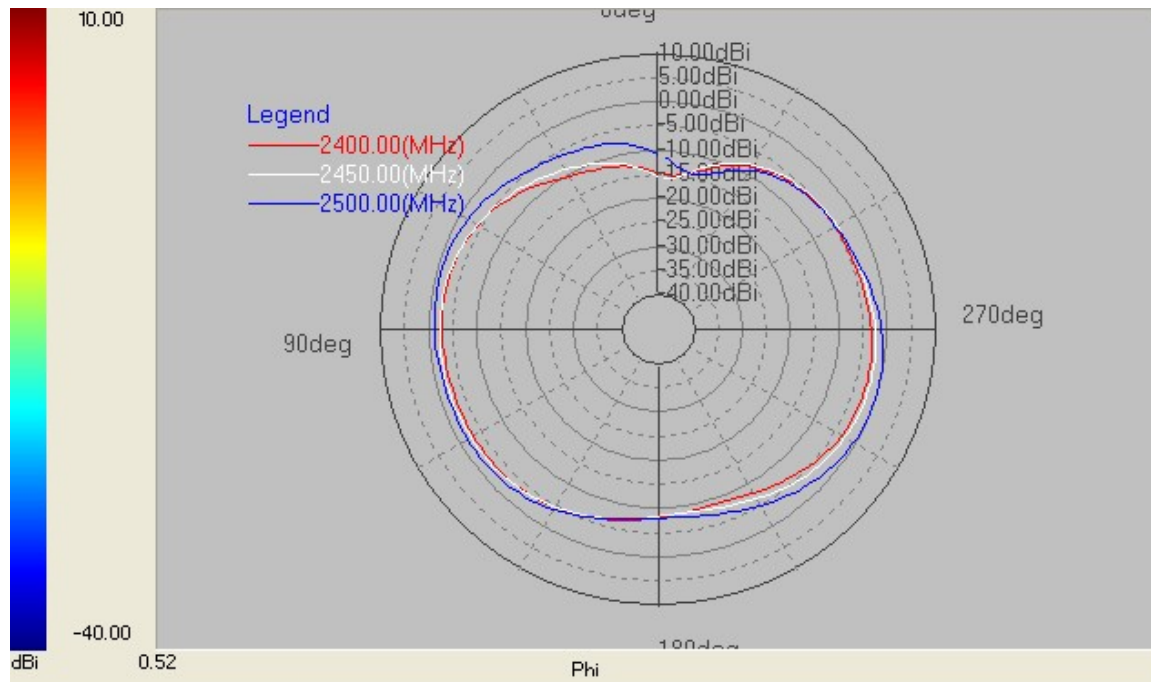
**2.4~2.5GHz**



X-Z Plane (E-total)



Y-Z Plane (E-total)



X-Y Plane (E-total)

## 4 Summary

### 4.1 Return Loss

|         | ANT(dB) |
|---------|---------|
| 2.4GHz  | -5.2    |
| 2.45GHz | -5.1    |
| 2.5GHz  | -6.1    |

### 1.1 3D total Peak Gain & Efficiency

| Frequency | ANT             |                |
|-----------|-----------------|----------------|
|           | Peak Gain (dBi) | Efficiency (%) |
| 2.4GHz    | 0.5             | 36             |
| 2.45GHz   | -0.2            | 38             |
| 2.5GHz    | 1.9             | 51             |