



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:** 永洋科技股份有限公司

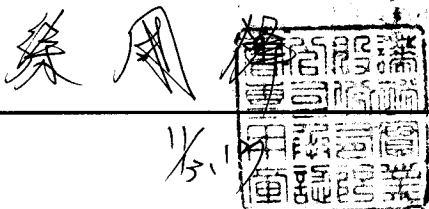
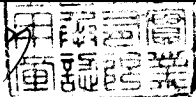
**PART NAME:** PIFA Antenna Assembly

**PART NO.:** 11320Y11145A1

**REVISION:**

**W. Y. P/NO.:** C381-510208-A(SRF2013364)

**REV.:** X2

|                  | MANUFACTURER<br>SIGNATURE                                                                     | CUSTOMER |
|------------------|-----------------------------------------------------------------------------------------------|----------|
| APPROVED<br>BY : |             |          |
| DATE :           | 1/5/17<br> |          |

### WHA YU GROUP

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# PIFA Antenna Assembly

## Specification (With housing)

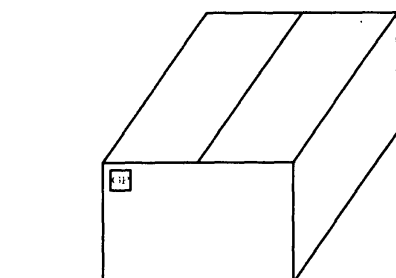
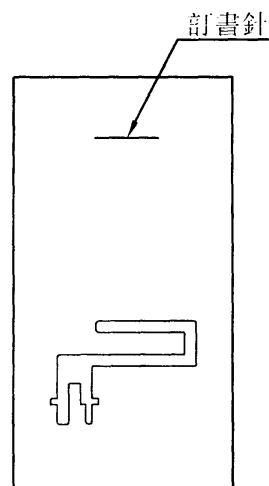
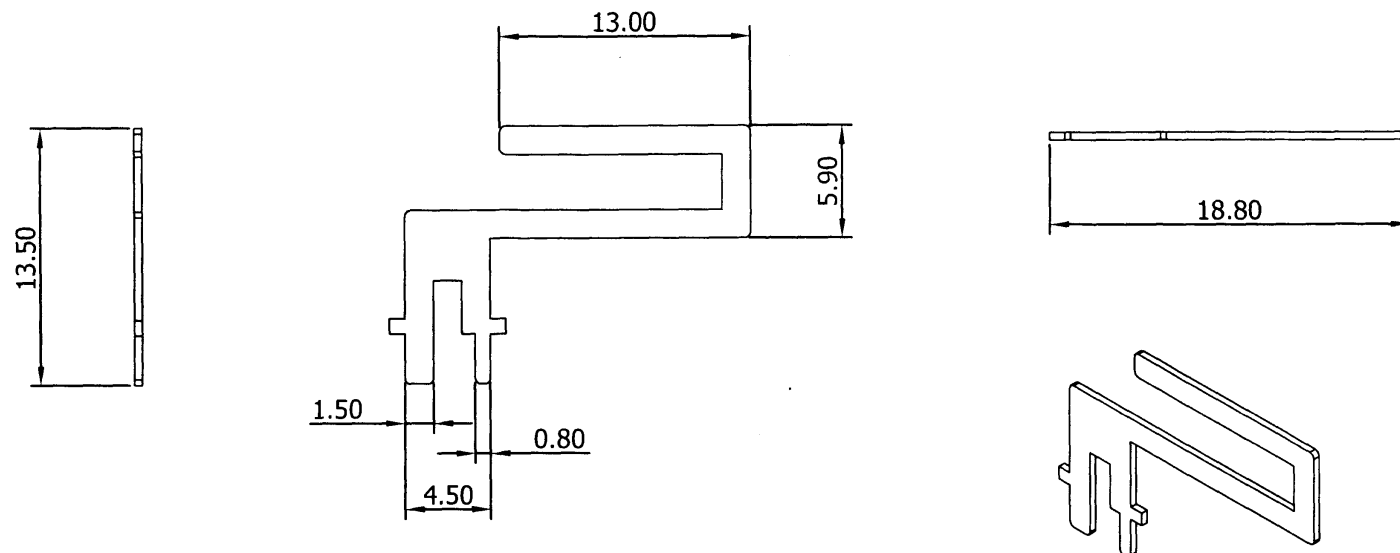
### 1. Electrical Properties :

- 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).....2.97dBi (With cable loss )
- 1.7 Cable Loss..... NONE
- 1.8 Polarization.....Linear ; Vertical
- 1.9 Admitted Power.....1W
- 1.10 Cable..... NONE
- 1.11 Connector.....NONE

### 2. Physical Properties :

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

| REV | DATE       | DESCRIPTION |
|-----|------------|-------------|
| X1  | 11/13-2012 | New Issue   |
| X2  | 11/13-2013 | 增加客戶料號      |



GP標籤貼於外箱兩邊側麥左上角

|    |             |                   |   |     |
|----|-------------|-------------------|---|-----|
| 1  | PIFA        | SUS430 Ni-Plating | 1 |     |
| NO | DESCRIPTION |                   |   | QTY |

Packing: 1pcs/bag  
(每10袋用訂書機訂起來)

CUSTOMER'S SINGATURE

|      |      |          |
|------|------|----------|
| XX.  | ±5.0 | APPROVED |
| X.   | ±3.0 | CHECKED  |
| .X   | ±1.0 |          |
| .XX  | ±0.5 |          |
| .XXX | ±0.1 | DRAWING  |

|              |                       |             |
|--------------|-----------------------|-------------|
| CUSTOMER: 永洋 |                       |             |
| PART NO :    | 11320Y11145A1         |             |
| PART NAME:   | PIFA Antenna Assembly |             |
| W.Y P/NO :   | C381-510208-A         |             |
| REV          | UNIT                  | FILE :      |
| X2           | mm                    | SHEET : 1/1 |

**M.gear** Wha Yu Group

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# Antenna Design For NE3-12112

**V1.1**

|                                     |                    |
|-------------------------------------|--------------------|
| <b>Document Number</b>              | <b>NE3-12112</b>   |
| <b>1<sup>st</sup> Released Date</b> | <b>08/22/12</b>    |
| <b>Last Released Date</b>           | <b>10/05/12</b>    |
| <b>Author</b>                       | <b>Kevin Lin</b>   |
| <b>Review by</b>                    | <b>Byron Chang</b> |

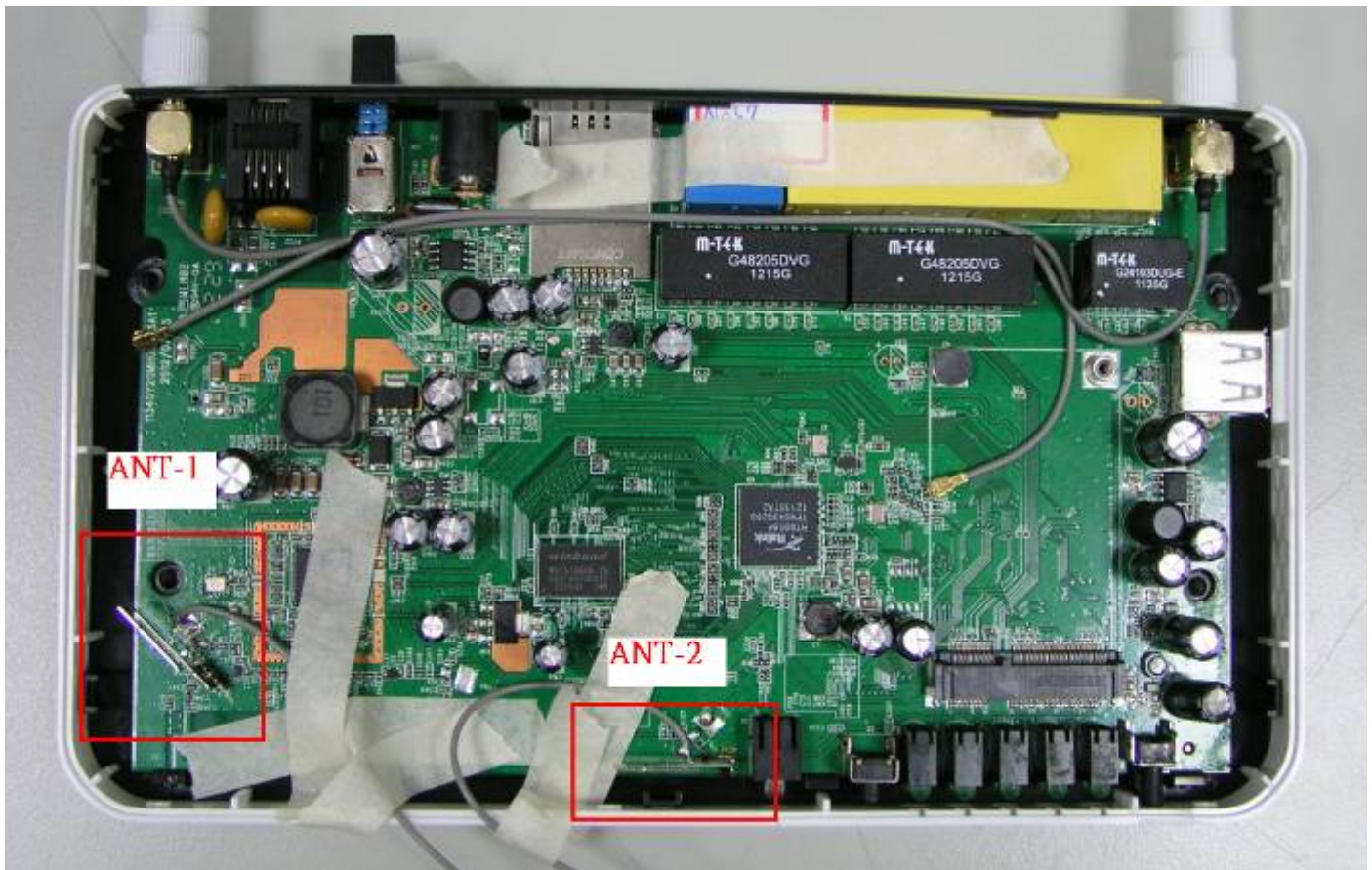
## Revised History

[illegible]

## Specification

| Rough description |                                 |                     |
|-------------------|---------------------------------|---------------------|
| Item              | Initial Specification           | Final Specification |
| Dimensions        | (L)18X(W)0.3X(H)13.5<br>T=0.4mm |                     |
| Impedance         | 50Ω                             |                     |
| Test environment  | With Housing                    |                     |
| Application       | None                            |                     |
| Freq. Range       | 2.4GHz~2.5GHz                   |                     |
| Antenna type      | PIFA                            |                     |
| Gain              | 2.97                            |                     |
| VSWR              | 1.92:1                          |                     |
| Radiation         | None                            |                     |
| Polarization      | Linear                          |                     |
| HPBW / H          | None                            |                     |
| HPBW / E          | None                            |                     |
| Rad. efficiency   | >50%                            |                     |
| Connector type    | NO Connector                    |                     |
| Cable type        | None                            |                     |

## 1 Antenna Introduction



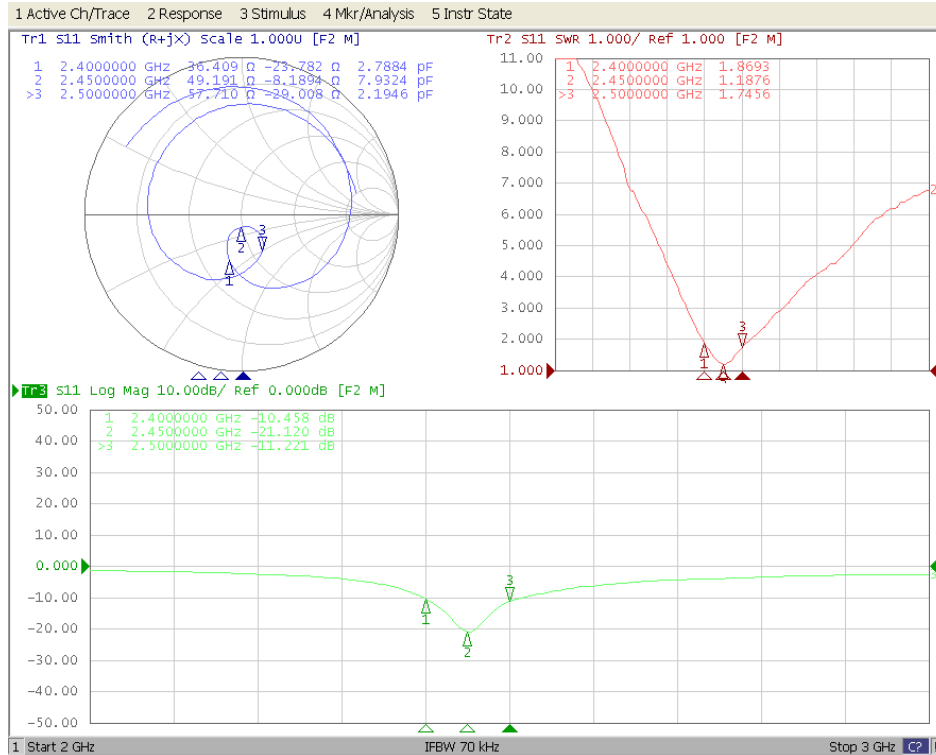
(ANT-1)



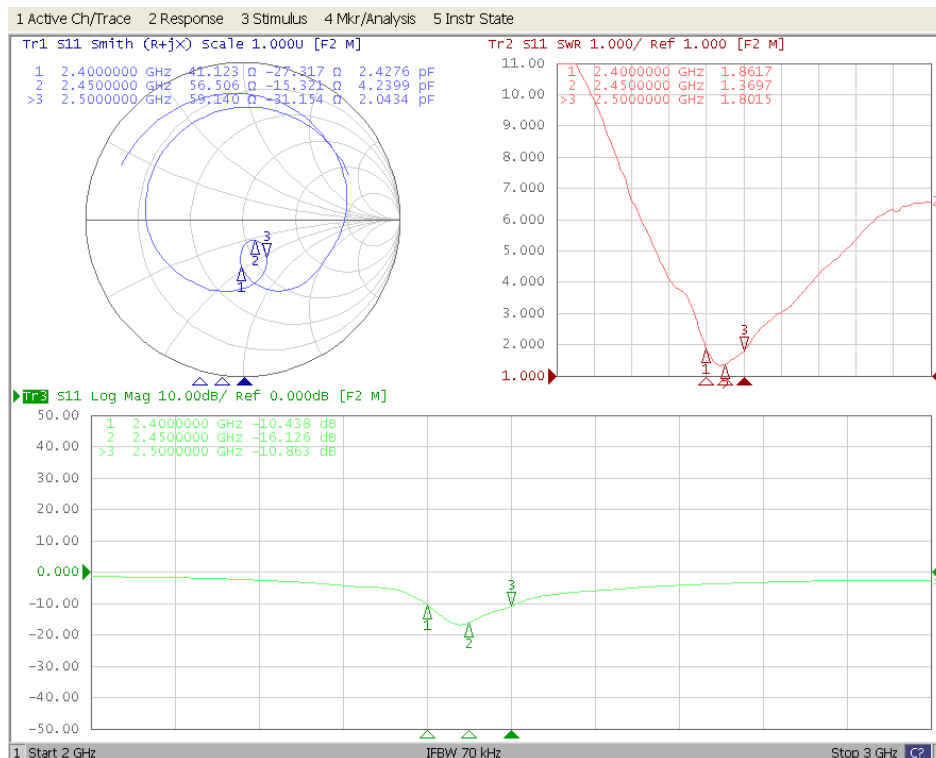
(ANT-2)

## 2 S11 test results

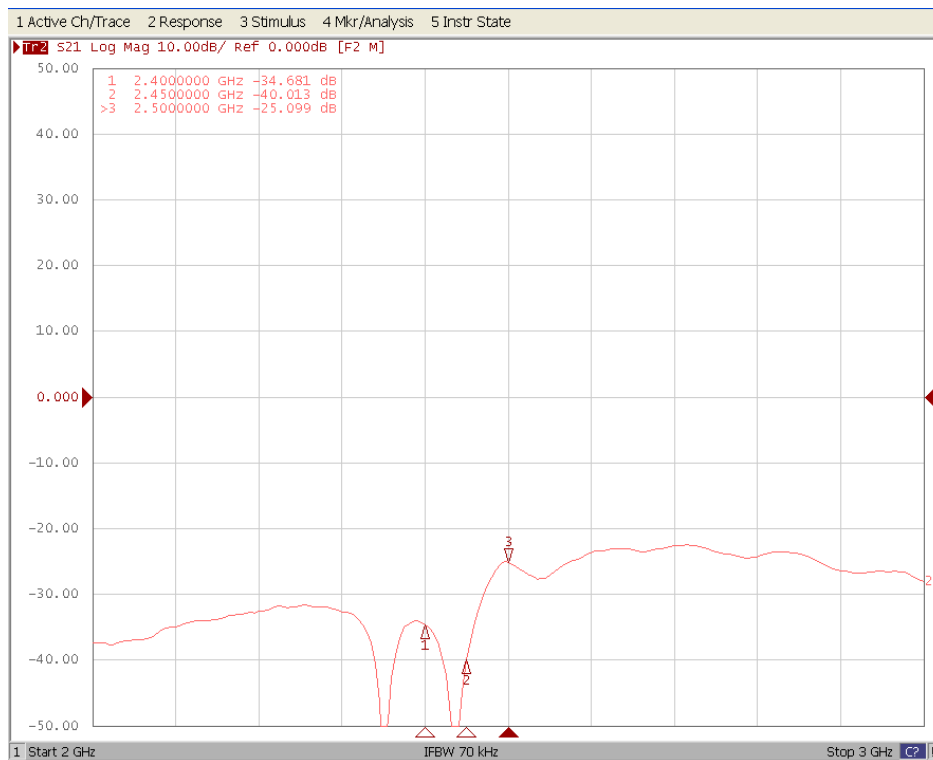
### 2.1 ANT1



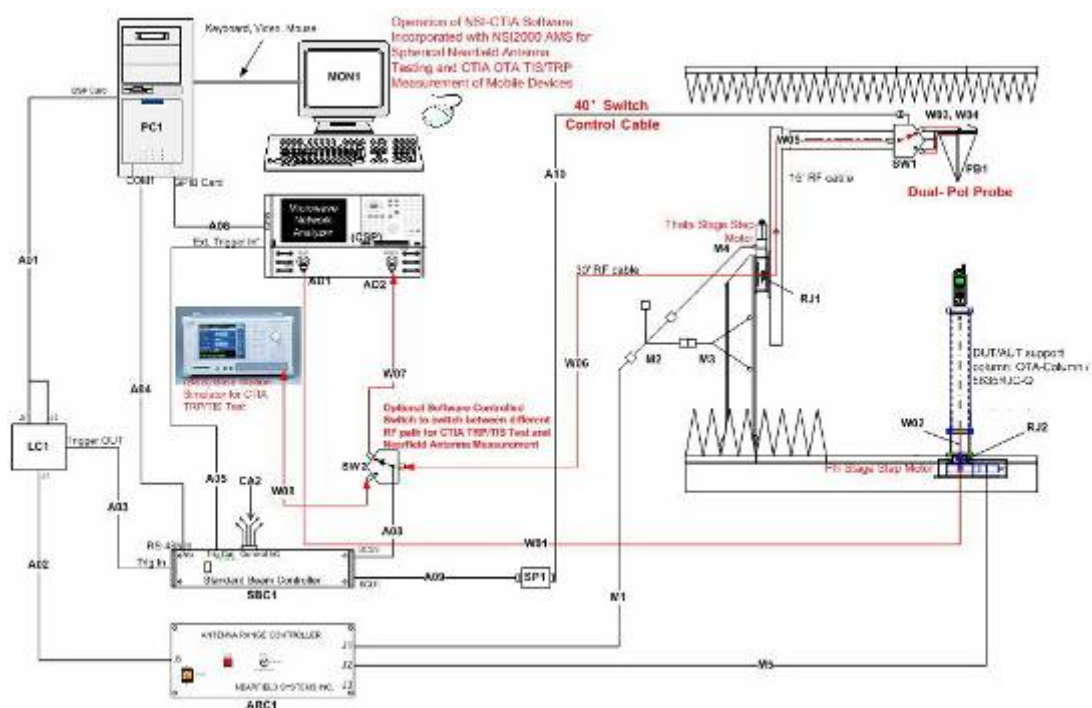
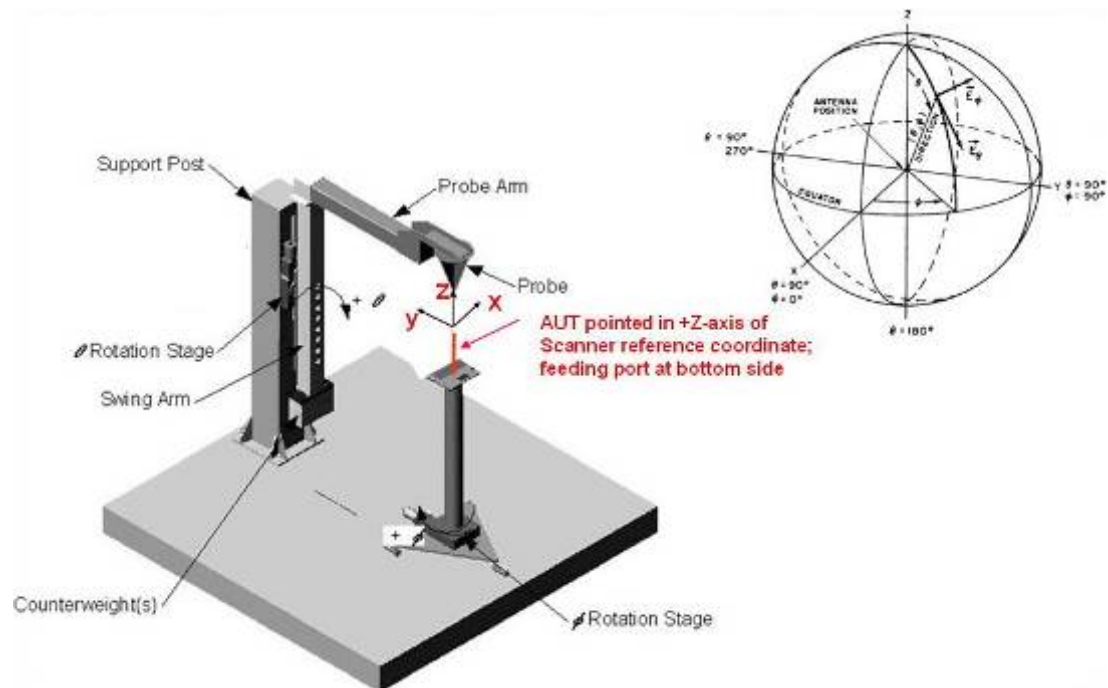
### ANT2

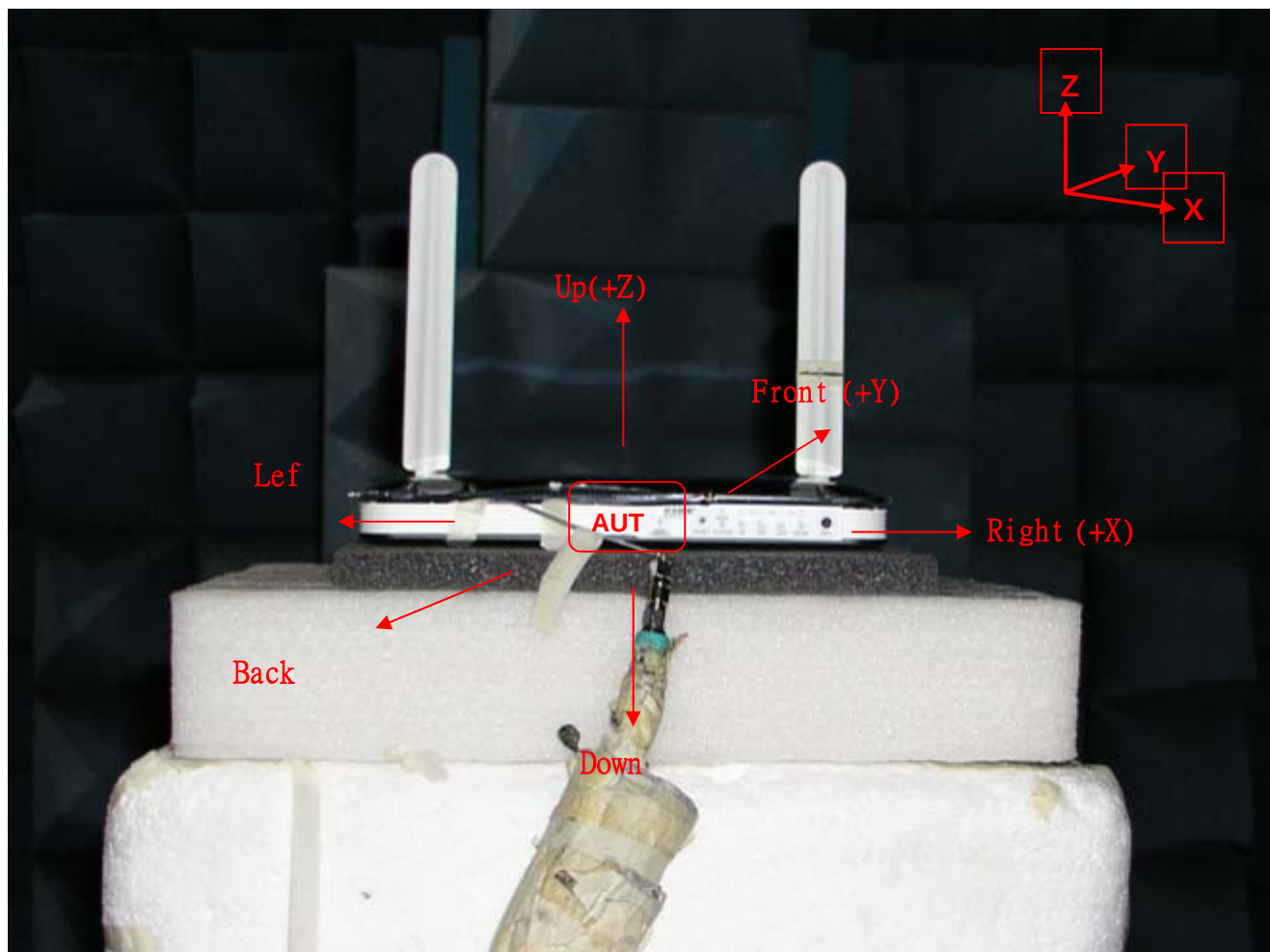


## 2.2 Isolation test results



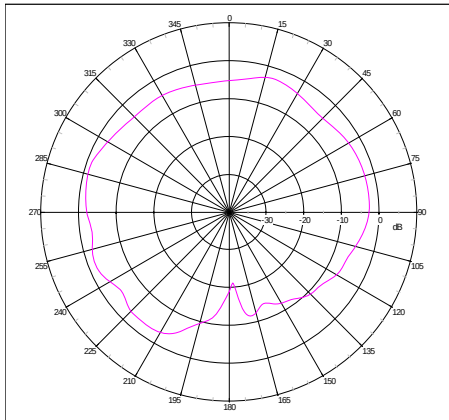
### 3.1 Measurement setting



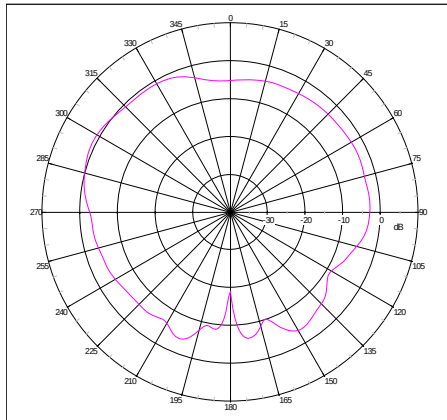


|      | XY    | YZ    | XZ    |
|------|-------|-------|-------|
| 0°   | Right | Up    | Up    |
| 90°  | Back  | Back  | Right |
| 180° | Left  | Down  | Down  |
| 270° | Front | Front | Left  |

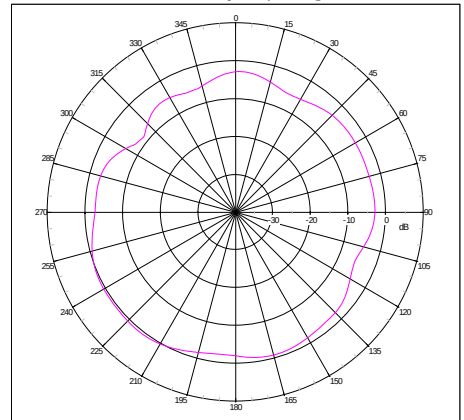
### 3.2 2D pattern 2400MHz (ANT-1)



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

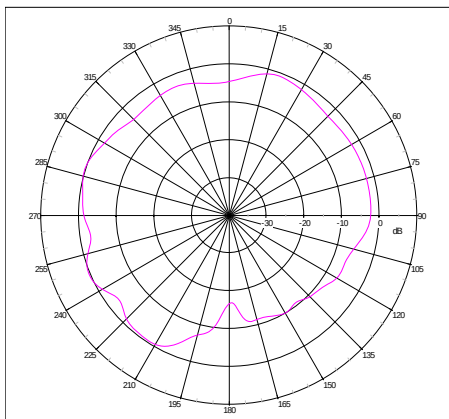


**Y-Z Plane (E-total)**

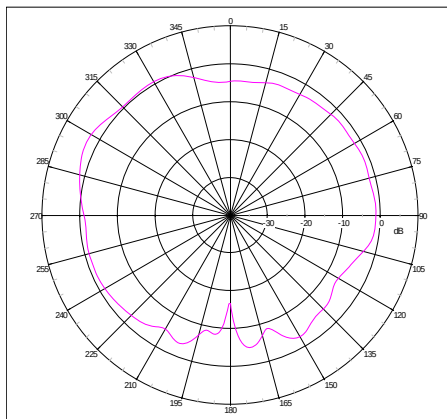


**X-Y Plane (E-total)**

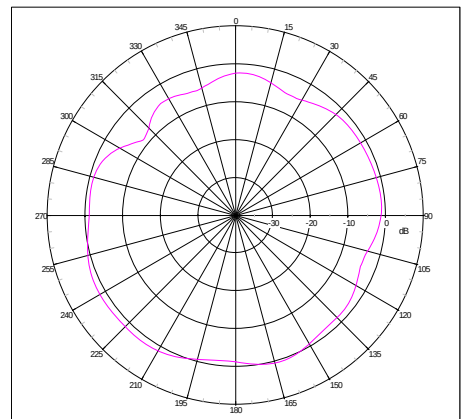
### 2450MHz



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

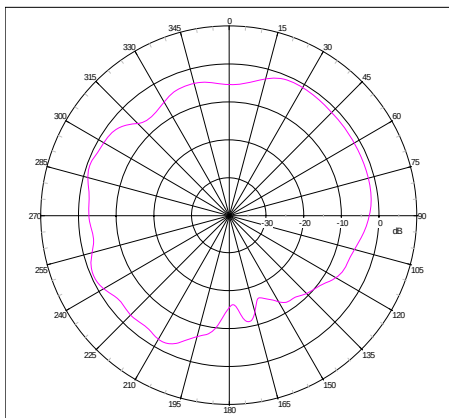


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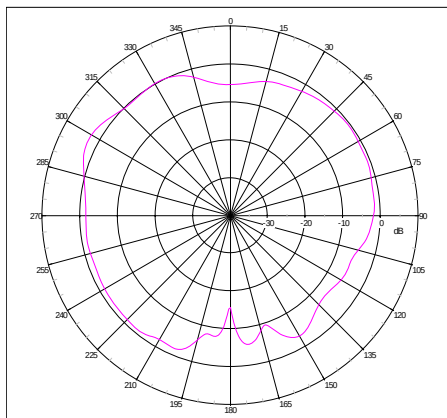


**X-Y Plane (E-total)**

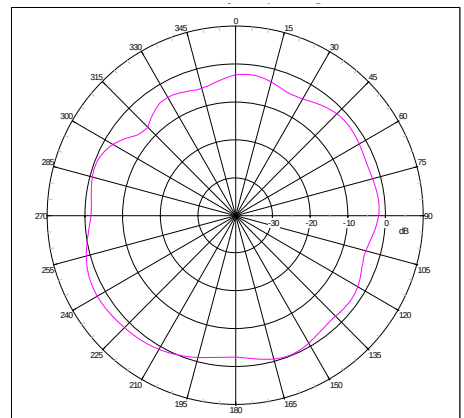
### 2500MHz



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

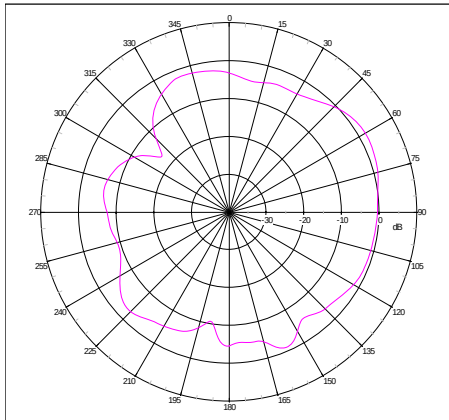


**Y-Z Plane (E-total)**

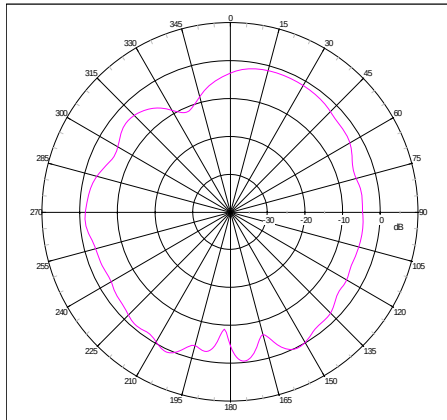


**X-Y Plane (E-total)**

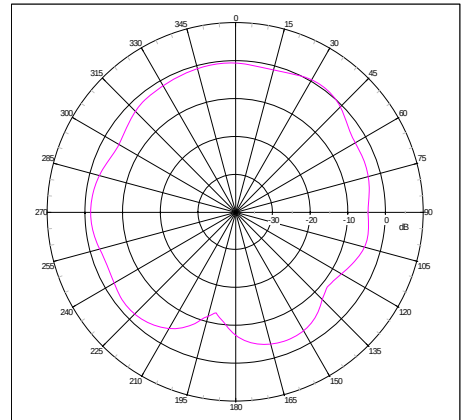
### 3.3 2D pattern 2400MHz (ANT-2)



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

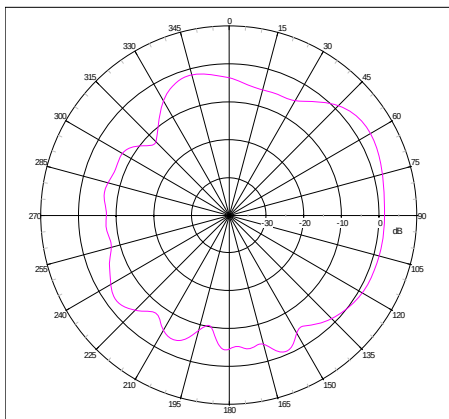


**Y-Z Plane (E-total)**

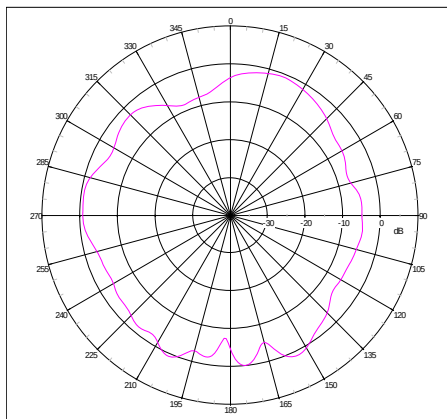


**X-Y Plane (E-total)**

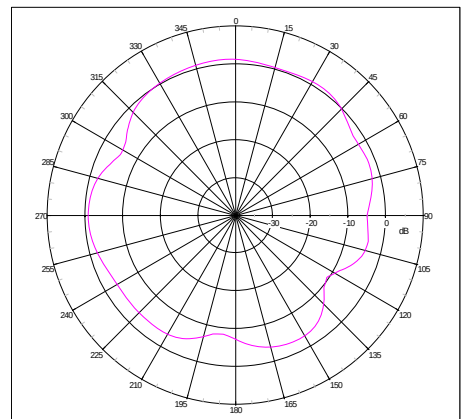
### 2450MHz



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

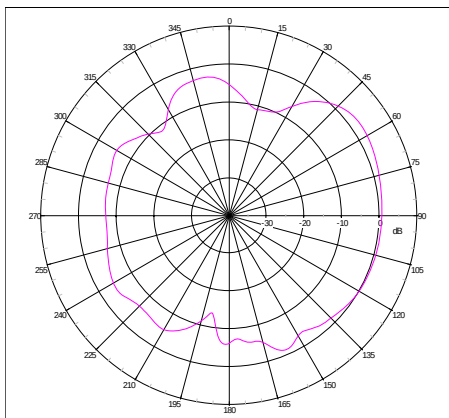


**Y-Z Plane (E-total)**

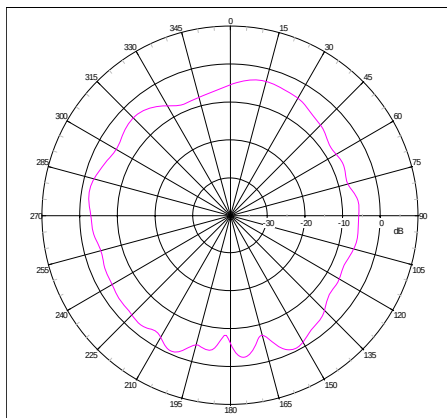


**X-Y Plane (E-total)**

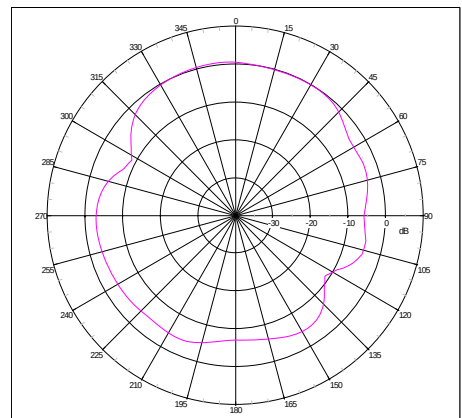
### 2500MHz



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



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



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

## 4 Summary

### 4.1 Return Loss

| Frequency | Ant 1  | Ant 2  |
|-----------|--------|--------|
| 2400MHz   | -10.45 | -10.43 |
| 2450MHz   | -21.12 | -16.12 |
| 2500MHz   | -11.22 | -10.86 |

### 4.2 Isolation

| Frequency | Ant 1 to<br>Ant 2(dB) |
|-----------|-----------------------|
| 2400 MHz  | -34.68                |
| 2450 MHz  | -40.01                |
| 2500 MHz  | -25.09                |

### 4.3 3D total Peak Gain & Efficiency

| Frequency | Ant 1                 |                   | Ant 2                 |                   |
|-----------|-----------------------|-------------------|-----------------------|-------------------|
|           | Peak<br>Gain<br>(dBi) | Efficiency<br>(%) | Peak<br>Gain<br>(dBi) | Efficiency<br>(%) |
| 2400MHz   | 1.57                  | 54.96             | 2.74                  | 61.49             |
| 2450MHz   | 2.51                  | 61.70             | 2.97                  | 62.49             |
| 2500MHz   | 2.56                  | 60.48             | 2.69                  | 61.22             |

# SGS Test Report

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**Product : PIFA Antenna Assembly**

## Content

| No | Description |              | Report No.                      | Page    |
|----|-------------|--------------|---------------------------------|---------|
| 1  | PIFA        | SUS430<br>鍍鎳 | KA/2012/C1135<br>HX201301338-3E | P.15~32 |

**Result for RoHS : PASS**

# 測試報告

## Test Report

號碼(No.) : KA/2012/C1135 日期(Date) : 2013/01/02 頁數(Page) : 1 of 14

嘉發實業工廠股份有限公司

CHIA FAR INDUSTRIAL FACTORY CO., LTD.

台北市太原路83號2樓

2F, NO. 83, TAIYUAN RD., TAIPEI, TAIWAN

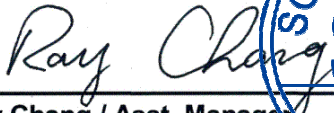
以下測試樣品係由客戶送樣，且由客戶聲稱並經客戶確認如下

(The following samples was/were submitted and identified by/on behalf of the client as) :

|                             |                                                        |
|-----------------------------|--------------------------------------------------------|
| 樣品名稱(Sample Description)    | : 冷軋不銹鋼材                                               |
| 樣品型號(Style/Item No.)        | : SUS 430                                              |
| 收件日期(Sample Receiving Date) | : 2012/12/17                                           |
| 測試期間(Testing Period)        | : 2012/12/17 TO 2013/01/02                             |
| 送樣廠商(Sample Submitted By)   | : 嘉發實業工廠股份有限公司 (CHIA FAR INDUSTRIAL FACTORY CO., LTD.) |

測試結果(Test Results)

: 請見下一頁 (Please refer to next pages).

  
 Ray Chang / Asst. Manager  
 Signed for and on behalf of  
 SGS Taiwan Limited



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Member of the SGS Group

# 測試報告

## Test Report

號碼(No.) : KA/2012/C1135 日期(Date) : 2013/01/02 頁數(Page) : 2 of 14

嘉發實業工廠股份有限公司

CHIA FAR INDUSTRIAL FACTORY CO., LTD.

台北市太原路83號2樓

2F, NO. 83, TAIYUAN RD., TAIPEI, TAIWAN

### 測試結果(Test Results)

測試部位(PART NAME) NO.1 : 銀色 冷軋不銹鋼材 (SILVER 冷軋不銹鋼材)

| 測試項目<br>(Test Items)                                          | 單位<br>(Unit) | 測試方法<br>(Method)                                                                                                                              | 方法偵測<br>極限值<br>(MDL)                           | 結果<br>(Result)<br>NO.1 |
|---------------------------------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|------------------------|
| 鎘 / Cadmium (Cd)                                              | mg/kg        | 參考 IEC 62321: 2008 方法, 用感應耦合電漿原子發射光譜儀檢測. / With reference to IEC 62321: 2008 and performed by ICP-AES.                                        | 2                                              | n.d.                   |
| 鉛 / Lead (Pb)                                                 | mg/kg        | 參考 IEC 62321: 2008 方法, 用感應耦合電漿原子發射光譜儀檢測. / With reference to IEC 62321: 2008 and performed by ICP-AES.                                        | 2                                              | n.d.                   |
| 汞 / Mercury (Hg)                                              | mg/kg        | 參考 IEC 62321: 2008 方法, 用感應耦合電漿原子發射光譜儀檢測. / With reference to IEC 62321: 2008 and performed by ICP-AES.                                        | 2                                              | n.d.                   |
| 六價鉻 / Hexavalent Chromium Cr(VI) by boiling water extraction# | **           | 參考 IEC 62321: 2008 方法, 用 Boiling water extraction 方法檢測. / With reference to IEC 62321: 2008 and performed by boiling water extraction Method. | 0.02mg/kg with 50 cm <sup>2</sup> surface area | Negative               |
| 多溴聯苯總和 / Sum of PBBs                                          | mg/kg        | 參考 IEC 62321: 2008 方法, 以氣相層析儀/質譜儀檢測. / With reference to IEC 62321: 2008 and performed by GC/MS.                                              | -                                              | n.d.                   |
| 一溴聯苯 / Monobromobiphenyl                                      |              |                                                                                                                                               | 5                                              | n.d.                   |
| 二溴聯苯 / Dibromobiphenyl                                        |              |                                                                                                                                               | 5                                              | n.d.                   |
| 三溴聯苯 / Tribromobiphenyl                                       |              |                                                                                                                                               | 5                                              | n.d.                   |
| 四溴聯苯 / Tetrabromobiphenyl                                     |              |                                                                                                                                               | 5                                              | n.d.                   |
| 五溴聯苯 / Pentabromobiphenyl                                     |              |                                                                                                                                               | 5                                              | n.d.                   |
| 六溴聯苯 / Hexabromobiphenyl                                      |              |                                                                                                                                               | 5                                              | n.d.                   |
| 七溴聯苯 / Heptabromobiphenyl                                     |              |                                                                                                                                               | 5                                              | n.d.                   |
| 八溴聯苯 / Octabromobiphenyl                                      |              |                                                                                                                                               | 5                                              | n.d.                   |
| 九溴聯苯 / Nonabromobiphenyl                                      |              |                                                                                                                                               | 5                                              | n.d.                   |
| 十溴聯苯 / Decabromobiphenyl                                      |              |                                                                                                                                               | 5                                              | n.d.                   |

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高雄市楠梓加工出口區開發路61號  
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# 測試報告

## Test Report

號碼(No.) : KA/2012/C1135 日期(Date) : 2013/01/02 頁數(Page) : 3 of 14

嘉發實業工廠股份有限公司

CHIA FAR INDUSTRIAL FACTORY CO., LTD.

台北市太原路83號2樓

2F, NO. 83, TAIYUAN RD., TAIPEI, TAIWAN

| 測試項目<br>(Test Items)                                                                           | 單位<br>(Unit)      | 測試方法<br>(Method)                                                                                                                              | 方法偵測<br>極限值<br>(MDL) | 結果<br>(Result)<br>NO.1 |
|------------------------------------------------------------------------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------------|
| 多溴聯苯醚總和 / Sum of PBDEs                                                                         | mg/kg             | 參考IEC 62321: 2008方法, 以氣相層析儀/質譜儀檢測. / With reference to IEC 62321: 2008 and performed by GC/MS.                                                | -                    | n.d.                   |
| 一溴聯苯醚 / Monobromodiphenyl ether                                                                |                   |                                                                                                                                               | 5                    | n.d.                   |
| 二溴聯苯醚 / Dibromodiphenyl ether                                                                  |                   |                                                                                                                                               | 5                    | n.d.                   |
| 三溴聯苯醚 / Tribromodiphenyl ether                                                                 |                   |                                                                                                                                               | 5                    | n.d.                   |
| 四溴聯苯醚 / Tetrabromodiphenyl ether                                                               |                   |                                                                                                                                               | 5                    | n.d.                   |
| 五溴聯苯醚 / Pentabromodiphenyl ether                                                               |                   |                                                                                                                                               | 5                    | n.d.                   |
| 六溴聯苯醚 / Hexabromodiphenyl ether                                                                |                   |                                                                                                                                               | 5                    | n.d.                   |
| 七溴聯苯醚 / Heptabromodiphenyl ether                                                               |                   |                                                                                                                                               | 5                    | n.d.                   |
| 八溴聯苯醚 / Octabromodiphenyl ether                                                                |                   |                                                                                                                                               | 5                    | n.d.                   |
| 九溴聯苯醚 / Nonabromodiphenyl ether                                                                |                   |                                                                                                                                               | 5                    | n.d.                   |
| 十溴聯苯醚 / Decabromodiphenyl ether                                                                |                   |                                                                                                                                               | 5                    | n.d.                   |
| 四溴雙酚-A /<br>Tetrabromobisphenol A (TBBP-A)<br>(CAS No.: 79-94-7)                               | mg/kg             | 參考DIN 53313方法, 以氣相層析儀/質譜儀檢測. / With reference to DIN 53313 method. Analysis was performed by GC/MS.                                           | 10                   | n.d.                   |
| 全氟辛酸(鉍) / PFOA<br>(CAS No.: 000335-67-1)                                                       | μg/m <sup>2</sup> | 參考US EPA 3550C: 2007方法, 以液相層析質譜儀檢測全氟辛烷磺酸含量. / With reference to US EPA 3550C: 2007 method for PFOS Content. Analysis was performed by LC/MS.  | 1                    | n.d.                   |
| 全氟辛酸(鉍) / PFOA<br>(CAS No.: 335-67-1)                                                          | mg/kg             | 參考US EPA 3540C: 1996方法, 以液相層析質譜儀檢測全氟辛酸(鉍)含量. / With reference to US EPA 3540C: 1996 method for PFOA Content. Analysis was performed by LC/MS. | 10                   | n.d.                   |
| 全氟辛烷磺酸 / Perfluorooctane sulfonates (PFOS)<br>PFOS — Acid<br>PFOS — Metal Salt<br>PFOS — Amide | μg/m <sup>2</sup> | 參考US EPA 3550C: 2007方法, 以液相層析質譜儀檢測全氟辛烷磺酸含量. / With reference to US EPA 3550C: 2007 method for PFOS Content. Analysis was performed by LC/MS.  | 1                    | n.d.                   |

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# 測試報告

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台北市太原路83號2樓

2F, NO. 83, TAIYUAN RD., TAIPEI, TAIWAN

| 測試項目<br>(Test Items)                                                                    | 單位<br>(Unit) | 測試方法<br>(Method)                                                                                                                                | 方法偵測<br>極限值<br>(MDL) | 結果<br>(Result) |
|-----------------------------------------------------------------------------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------|
|                                                                                         |              |                                                                                                                                                 |                      | NO.1           |
| 銻 / Antimony (Sb)                                                                       | mg/kg        | 參考US EPA 3052方法, 用感應耦合電漿原子發射光譜儀檢測銻含量. / With reference to US EPA Method 3052 for Antimony Content. Analysis was performed by ICP-AES.           | 2                    | n.d.           |
| 三氧化二銻 /<br>Antimony trioxide (Sb <sub>2</sub> O <sub>3</sub> )*<br>(CAS No.: 1309-64-4) | mg/kg        | 參考US EPA 3052方法, 用感應耦合電漿原子發射光譜儀檢測銻含量. / With reference to US EPA Method 3052 for Antimony Content. Analysis was performed by ICP-AES.           | -                    | n.d.           |
| 砷 / Arsenic (As)                                                                        | mg/kg        | 參考US EPA 3052方法, 用感應耦合電漿原子發射光譜儀 (ICP-AES) 檢測砷含量. / With reference to US EPA Method 3052 for Arsenic Content. Analysis was performed by ICP-AES. | 2                    | n.d.           |
| 鋇 / Barium (Ba)                                                                         | mg/kg        | 參考US EPA 3052方法, 用感應耦合電漿原子發射光譜儀檢測鋇含量. / With reference to US EPA Method 3052 for Barium Content. Analysis was performed by ICP-AES.             | 2                    | n.d.           |
| 硒 / Selenium (Se)                                                                       | mg/kg        | 參考US EPA 3052方法, 用感應耦合電漿原子發射光譜儀檢測硒含量. / With reference to US EPA Method 3052 for Selenium Content. Analysis was performed by ICP-AES.           | 2                    | n.d.           |
| 鎳 / Nickel (Ni)                                                                         | mg/kg        | 參考US EPA 3052方法, 用感應耦合電漿原子發射光譜儀檢測鎳含量. / With reference to US EPA Method 3052 for Nickel Content. Analysis was performed by ICP-AES.             | 2                    | 2040           |

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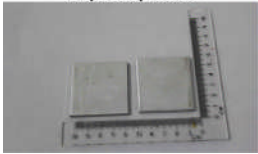
嘉發實業工廠股份有限公司

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2F, NO. 83, TAIYUAN RD., TAIPEI, TAIWAN

| 測試項目<br>(Test Items)                                    | 單位<br>(Unit) | 測試方法<br>(Method)                                                                                        | 方法偵測<br>極限值<br>(MDL) | 結果<br>(Result)<br>NO.1 |
|---------------------------------------------------------|--------------|---------------------------------------------------------------------------------------------------------|----------------------|------------------------|
| <b>鹵素 / Halogen</b>                                     |              |                                                                                                         |                      |                        |
| 鹵素 (氟) / Halogen-Fluorine (F)<br>(CAS No.: 14762-94-8)  | mg/kg        | 參考BS EN 14582:2007, 以離子層析儀分析. /<br>With reference to BS EN 14582:2007.<br>Analysis was performed by IC. | 50                   | n.d.                   |
| 鹵素 (氯) / Halogen-Chlorine (Cl)<br>(CAS No.: 22537-15-1) | mg/kg        | 參考BS EN 14582:2007, 以離子層析儀分析. /<br>With reference to BS EN 14582:2007.<br>Analysis was performed by IC. | 50                   | n.d.                   |
| 鹵素 (溴) / Halogen-Bromine (Br)<br>(CAS No.: 10097-32-2)  | mg/kg        | 參考BS EN 14582:2007, 以離子層析儀分析. /<br>With reference to BS EN 14582:2007.<br>Analysis was performed by IC. | 50                   | n.d.                   |
| 鹵素 (碘) / Halogen-Iodine (I)<br>(CAS No.: 14362-44-8)    | mg/kg        | 參考BS EN 14582:2007, 以離子層析儀分析. /<br>With reference to BS EN 14582:2007.<br>Analysis was performed by IC. | 50                   | n.d.                   |

| EDXRF       |                                                                                     |                            |                 |              |
|-------------|-------------------------------------------------------------------------------------|----------------------------|-----------------|--------------|
| 序號<br>(No.) | 樣品照片 (Picture)                                                                      | 方法偵測極限類別<br>(MDL Category) | 元素<br>(Element) | 數據<br>(Data) |
| 1           |  | 金屬 (Metals)                | 溴(Br)           | n.d.         |
|             |                                                                                     |                            | 鎘(Cd)           | n.d.         |
|             |                                                                                     |                            | 鉻(Cr)           | 161000       |
|             |                                                                                     |                            | 汞(Hg)           | n.d.         |
|             |                                                                                     |                            | 鉛(Pb)           | n.d.         |

| 測試項目<br>(Test Item)                         | 方法偵測極限值(MDL)<br>(mg/kg) |                   |                                 |                | 測試方法<br>(Test method)                                        |
|---------------------------------------------|-------------------------|-------------------|---------------------------------|----------------|--------------------------------------------------------------|
| XRF<br>(X光螢光光譜儀<br>/ X-ray<br>fluorescence) | 類別(Category)            | 高分子<br>(Polymers) | 複合材料<br>(Composite<br>Material) | 金屬<br>(Metals) | 參考 IEC 62321: 2008<br>(With reference to IEC 62321:<br>2008) |
|                                             | 元素(Element)             |                   |                                 |                |                                                              |
|                                             | 鉛(Pb)                   | 50                | 100                             | 100            |                                                              |
|                                             | 鎘(Cd)                   | 50                | 50                              | 50             |                                                              |
|                                             | 汞(Hg)                   | 50                | 100                             | 100            |                                                              |
|                                             | 鉻(Cr)                   | 50                | 100                             | 100            |                                                              |
|                                             | 溴(Br)                   | 50                | 100                             | n.a.           |                                                              |

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# 測試報告

## Test Report

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嘉發實業工廠股份有限公司

CHIA FAR INDUSTRIAL FACTORY CO., LTD.

台北市太原路83號2樓

2F, NO. 83, TAIYUAN RD., TAIPEI, TAIWAN

### 備註(Note) :

1. mg/kg = ppm ; 0.1wt% = 1000ppm
2. n.d. = Not Detected (未檢出)
3. MDL = Method Detection Limit (方法偵測極限值)
4. "-" = Not Regulated (無規格值)
5. # =
  - a. Positive means the presence of CrVI on the tested areas  
(Positive表示測試區域偵測到六價鉻)
  - b. Negative means the absence of CrVI on the tested areas  
(Negative表示測試區域未偵測到六價鉻)

The detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm<sup>2</sup> tested areas . / 該溶液濃度 $\geq$ 0.02 mg/kg with 50 cm<sup>2</sup> (tested areas)

6. \*\* = Qualitative analysis (No Unit) 定性分析(無單位)
7. \*\*\*: 該物質是由"三丁基錫", "三苯基錫"或各別元素(例如: 銻、鉍、矽、鋅或磷)之測試結果計算得知. 其MDL是針對"三丁基錫", "三苯基錫"或元素(例如: 銻、鉍、矽、鋅或磷)之評估. (The substance was calculated by the test results of Tributyl Tin, Triphenyl Tin or element (Ex. Antimony, Beryllium, Silicon, Zinc or Phosphorus respectively). The MDL is evaluated for Tributyl Tin, Triphenyl Tin or element (Ex. Antimony, Beryllium, Silicon, Zinc or Phosphorus respectively).)
8. The XRF result of Br for metal sample is conducted from semi-quantitative method of polymer.  
(金屬樣品中溴元素的XRF分析結果是來自於塑膠半定量分析方法。)

### PFOS參考資訊(Reference Information) : 持久性有機污染物 POPs - (EU) 757/2010

PFOS濃度在物質或製備中不得超過0.001%(10ppm), 在半成品、成品或零部件中不得超過0.1%(1000ppm), 在紡織品或塗層材料中不得超過1 $\mu$ g/m<sup>2</sup>。(Outlawing PFOS as substances or preparations in concentrations above 0.001% (10ppm), in semi-finished products or articles or parts at a level above 0.1%(1000ppm), in textiles or other coated materials above 1 $\mu$ g/m<sup>2</sup>.)

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CHIA FAR INDUSTRIAL FACTORY CO., LTD.

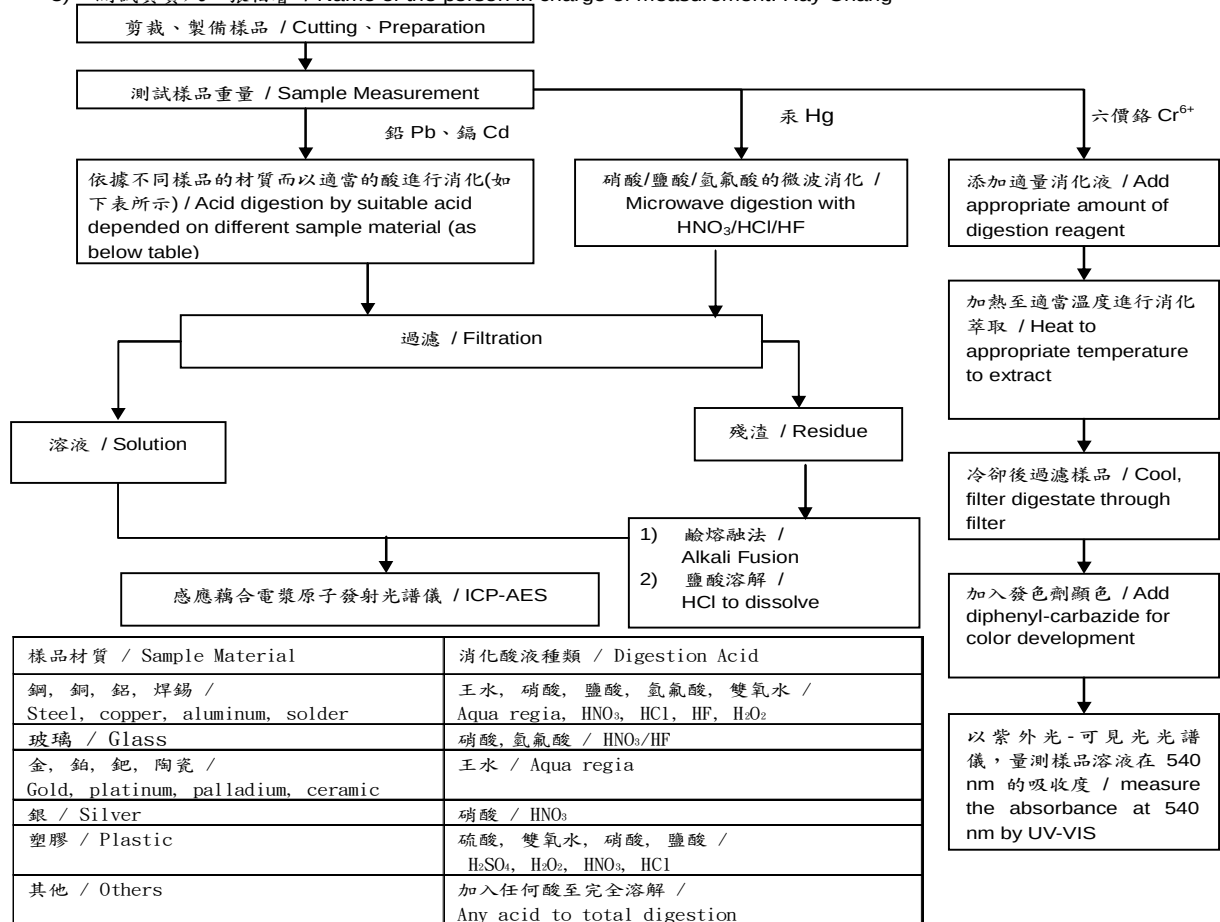
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2F, NO. 83, TAIYUAN RD., TAIPEI, TAIWAN

1) 根據以下的流程圖之條件，樣品已完全溶解。(六價鉻測試方法除外) / These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr<sup>6+</sup> test method excluded)

2) 測試人員：張俊雄 / Name of the person who made measurement: Alex Chang

3) 測試負責人：張伯睿 / Name of the person in charge of measurement: Ray Chang



**Note\*\* :** (1) 針對非金屬材料加入鹼性消化液，加熱至 90~95℃ 萃取。 / For non-metallic material, add alkaline digestion reagent and heat to 90~95℃.

(2) 針對金屬材料加入純水，加熱至沸騰萃取。 / For metallic material, add pure water and heat to boiling.

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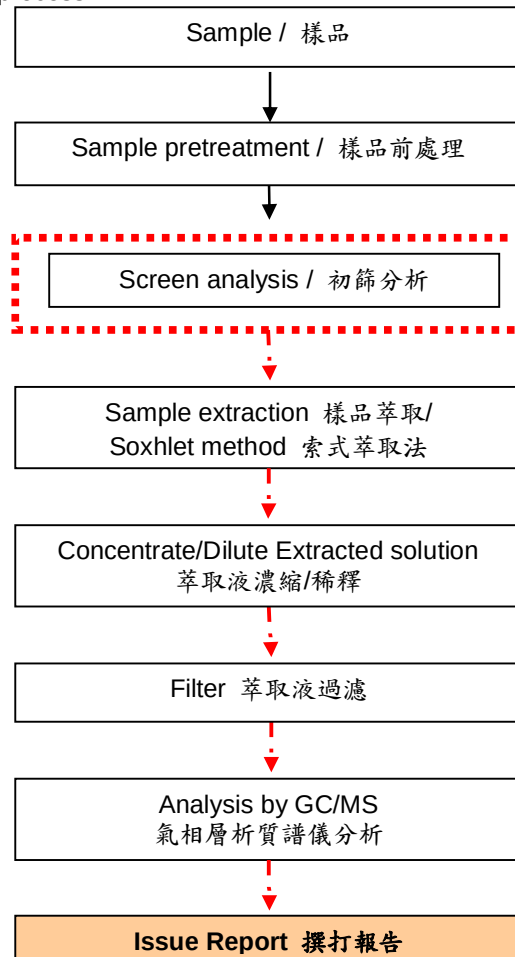
### 多溴聯苯/多溴聯苯醚 分析流程圖 / PBB/PBDE analytical FLOW CHART

- 1) 測試人員：曹嘉琪 / Name of the person who made measurement: Anson Tsao  
2) 測試負責人：張伯睿 / Name of the person in charge of measurement: Ray Chang

初次測試程序 / First testing process —————>

選擇性篩檢程序 / Optional screen process .....

確認程序 / Confirmation process - - - ->



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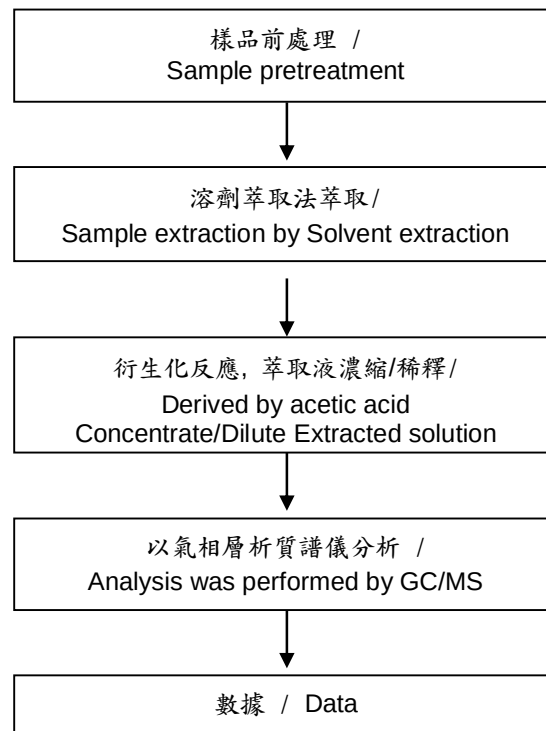
CHIA FAR INDUSTRIAL FACTORY CO., LTD.

台北市太原路83號2樓

2F, NO. 83, TAIYUAN RD., TAIPEI, TAIWAN

### 四溴雙酚A 分析流程圖 / TBBP-A analytical flow chart

- 測試人員：曹嘉琪 / Name of the person who made measurement: Anson Tsao
- 測試負責人：張博睿 / Name of the person in charge of measurement: Ray Chang



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# 測試報告

## Test Report

號碼(No.) : KA/2012/C1135 日期(Date) : 2013/01/02 頁數(Page) : 10 of 14

嘉發實業工廠股份有限公司

CHIA FAR INDUSTRIAL FACTORY CO., LTD.

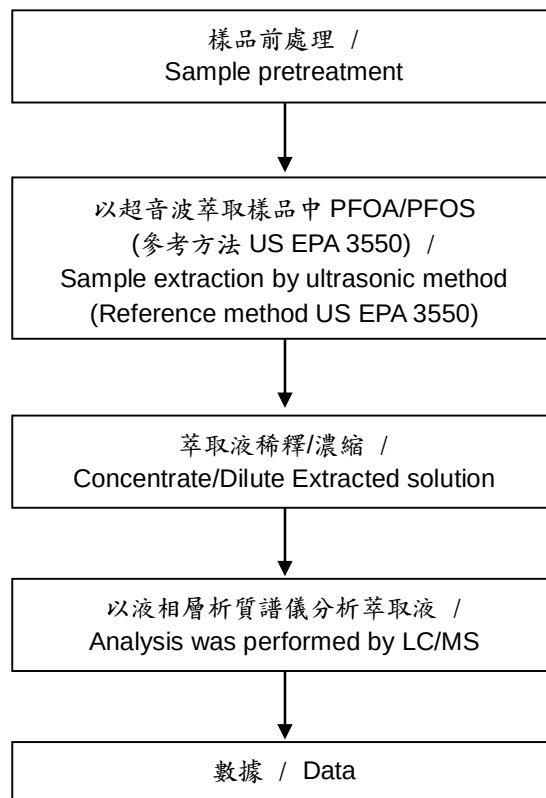
台北市太原路83號2樓

2F, NO. 83, TAIYUAN RD., TAIPEI, TAIWAN

### 全氟辛酸(銨)/ 全氟辛烷磺酸分析流程圖 / Analytical flow chart of PFOA/PFOS content

1)測試人員：曹嘉琪 / Name of the person who made measurement: Anson Tsao

2)測試負責人：張伯睿 / Name of the person in charge of measurement: Ray Chang



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# 測試報告

## Test Report

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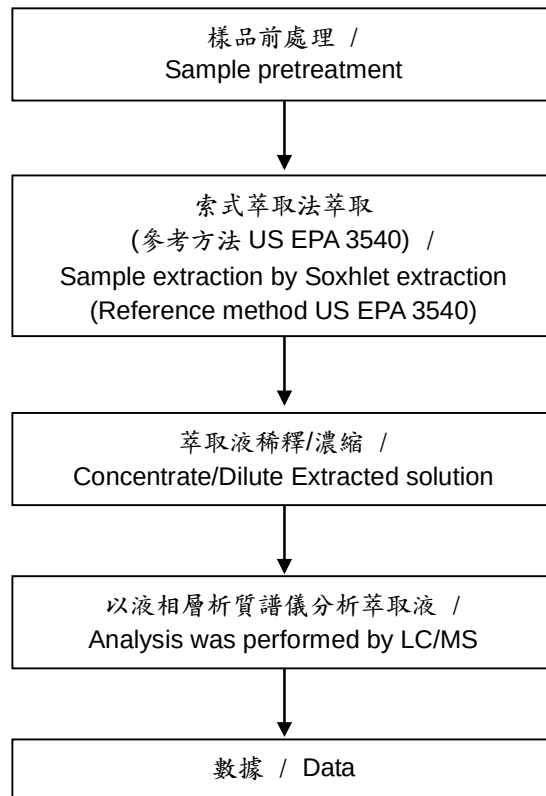
2F, NO. 83, TAIYUAN RD., TAIPEI, TAIWAN

### 全氟辛酸(銨)/ 全氟辛烷磺酸分析流程圖 /

#### Analytical flow chart of PFOA/PFOS content

1)測試人員：曹嘉琪 / Name of the person who made measurement: Anson Tsao

2)測試負責人：張伯睿 / Name of the person in charge of measurement: Ray Chang



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## 測試報告 Test Report

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嘉發實業工廠股份有限公司

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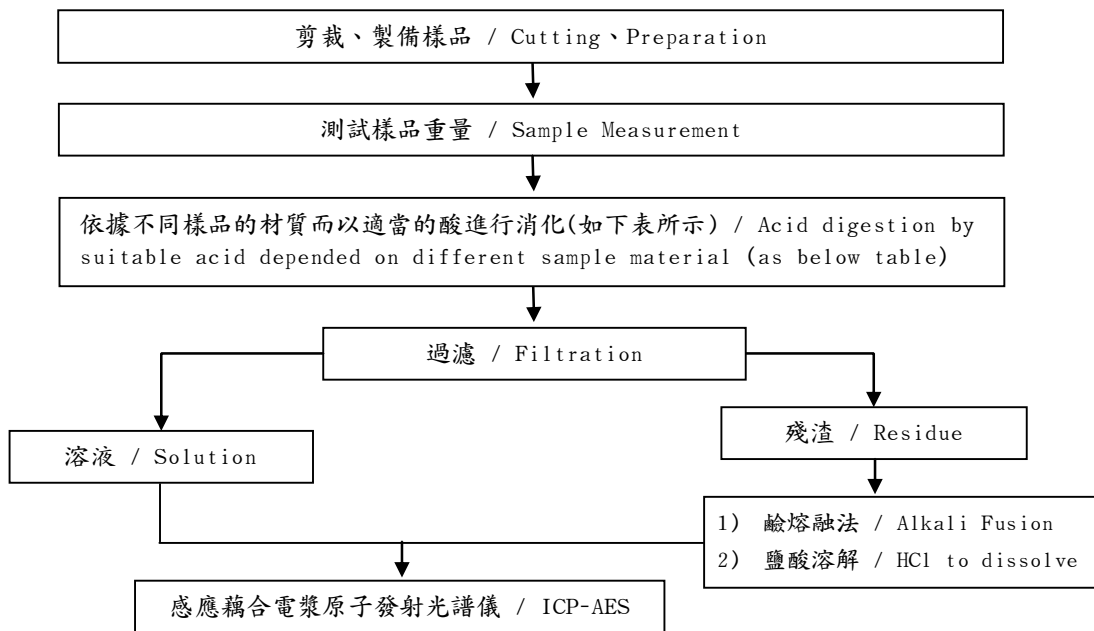
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- 1) 根據以下的流程圖之條件，樣品已完全溶解。 / These samples were dissolved totally by pre-conditioning method according to below flow chart.
- 2) 測試人員：張俊雄 / Name of the person who made measurement: Alex Chang
- 3) 測試負責人：張伯睿 / Name of the person in charge of measurement: Ray Chang

### 元素以 ICP-AES 分析的消化流程圖

(Flow Chart of digestion for the elements analysis performed by ICP-AES)



|                                               |                                                                                                        |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 鋼,銅,鋁,焊錫 / Steel, copper, aluminum, solder    | 王水,硝酸,鹽酸,氫氟酸,雙氧水 / Aqua regia, HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub>               |
| 玻璃 / Glass                                    | 硝酸,氫氟酸 / HNO <sub>3</sub> /HF                                                                          |
| 金,鉑,鈱,陶瓷 / Gold, platinum, palladium, ceramic | 王水 / Aqua regia                                                                                        |
| 銀 / Silver                                    | 硝酸 / HNO <sub>3</sub>                                                                                  |
| 塑膠 / Plastic                                  | 硫酸,雙氧水,硝酸,鹽酸 / H <sub>2</sub> SO <sub>4</sub> , H <sub>2</sub> O <sub>2</sub> , HNO <sub>3</sub> , HCl |
| 其他 / Others                                   | 加入任何酸至完全溶解 / Any acid to total digestion                                                               |

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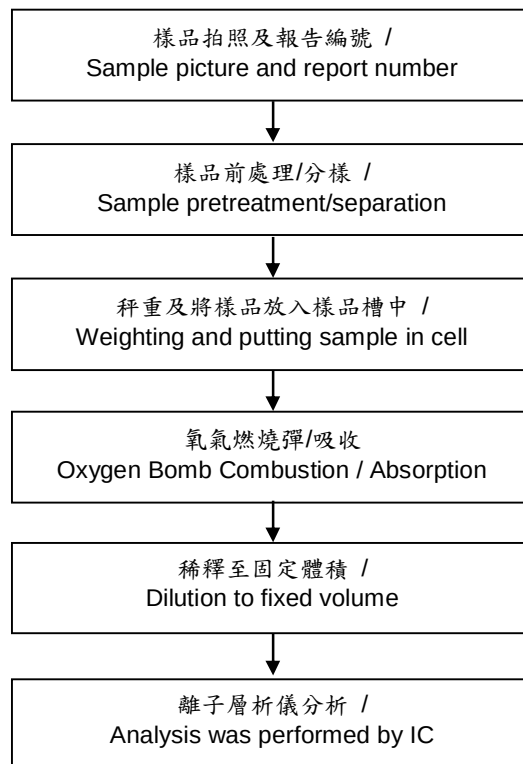
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### 鹵素分析流程圖 / Analytical flow chart of halogen content

- 1) 測試人員：洪秀真 / Name of the person who made measurement: Jean Hung
- 2) 測試負責人：張伯睿 / Name of the person in charge of measurement: Ray Chang



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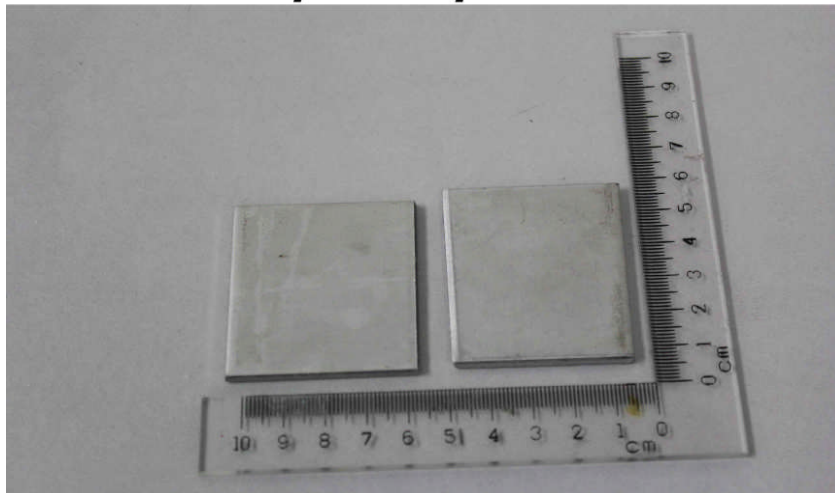
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\* 照片中如有箭頭標示，則表示為實際檢測之樣品/部位。 \*

(The tested sample / part is marked by an arrow if it's shown on the photo.)

### KA/2012/C1135



\*\* 報告結尾(End of Report) \*\*

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# TEST REPORT

Report No.: HX201301338-3E

**Applicant:** Hui Zhou City Chuang Long Precision Assembly Co., Ltd.  
**Address:** Building 18, Da Tian Industrial Park, San Xin Industrial District, Jiang Bei, Hui Zhou City

**Report on the submitted sample(s) said to be:**

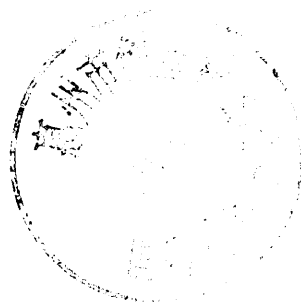
**Name:** Nickel-plated  
**Type/Model:** -----  
**Buyer:** -----  
**Supplier:** -----

**Date of Receipt:** Feb.27, 2013      **Test period:** Feb.27, 2013 – Mar.5, 2013

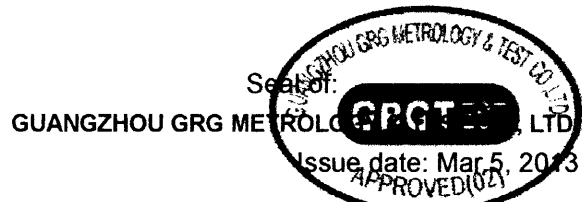
**Test Request:** In accordance with RoHS Directive 2011/65/EU and its amendment directives

**Test Result:** Please refer to following page(s).

**Conclusion:** Based on the performed test on submitted sample, the result(s) comply with the RoHS Directive 2011/65/EU and its amendment directives.



Tested by Zoe Tang Reviewed by Kevin Ren Approved by Hailan Wang



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**GUANGZHOU GRG METROLOGY & TEST CO., LTD.**

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Tel: +86-020-38699572 FAX: +86-020-38698685 <http://www.grgtest.com>

# TEST REPORT

Report No.: HX201301338-3E

**Sample description**

1. Silver-grey plated metal

**Test method:**

| Test Item(s)                 | Test method              | Measuring instrument | MDL    |
|------------------------------|--------------------------|----------------------|--------|
| Lead (Pb)                    | IEC 62321:2008,section 9 | ICP-OES              | 2mg/kg |
| Cadmium (Cd)                 | IEC 62321:2008,section 9 | ICP-OES              | 2mg/kg |
| Mercury (Hg)                 | IEC 62321:2008,section 7 | ICP-OES              | 2mg/kg |
| Hexavalent Chromium [Cr(VI)] | IEC 62321:2008,Annex B   | UV-VIS               | ---    |

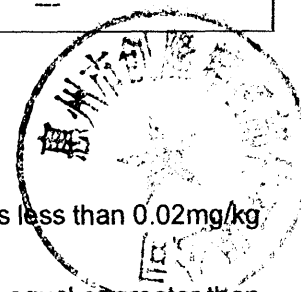
**Test result:**

| Test Item                    | Result (mg/kg) | RoHS Limit<br>(mg/kg) |
|------------------------------|----------------|-----------------------|
|                              | 1              |                       |
| Lead (Pb)                    | N.D.           | 1000                  |
| Cadmium (Cd)                 | N.D.           | 100                   |
| Mercury (Hg)                 | N.D.           | 1000                  |
| Hexavalent Chromium [Cr(VI)] | Negative       | ---                   |

Remark: 1) mg/kg = ppm

2) MDL = Method Detection Limit

3) "N.D." = Not Detected (Below Method Detection Limit)

4) Negative = The detected Cr(VI) concentration in boiling solution is less than 0.02mg/kg with 50 cm<sup>2</sup> sample surface area.Positive = The detected Cr(VI) concentration in boiling solution is equal or greater than 0.02mg/kg with 50 cm<sup>2</sup> sample surface area.**GUANGZHOU GRG METROLOGY & TEST CO., LTD.**

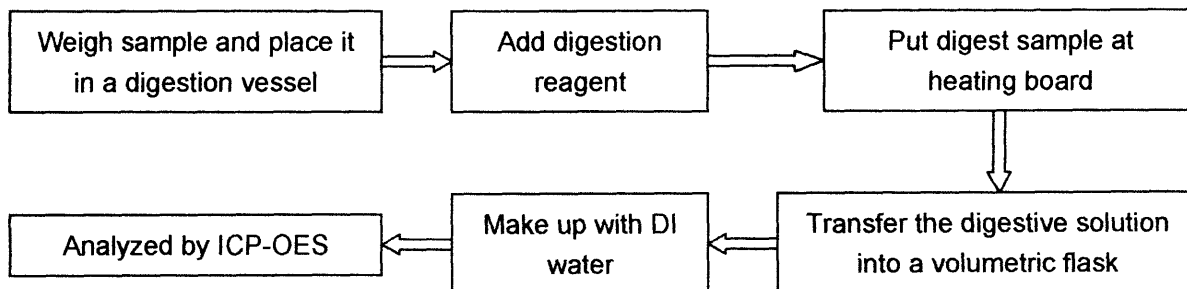
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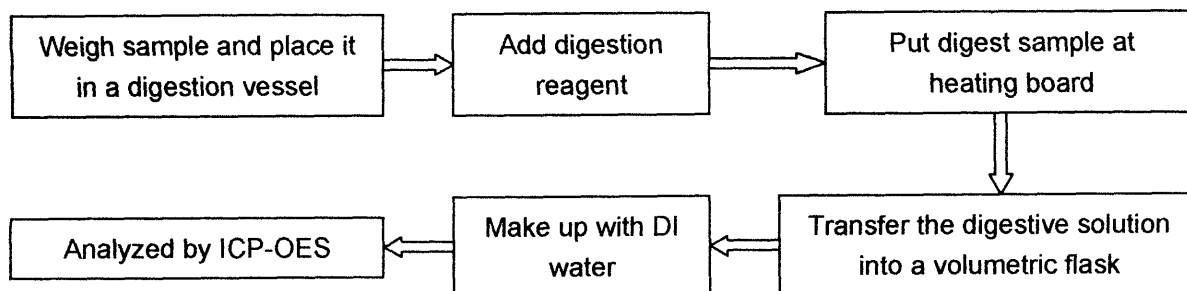
# TEST REPORT

Report No.: HX201301338-3E

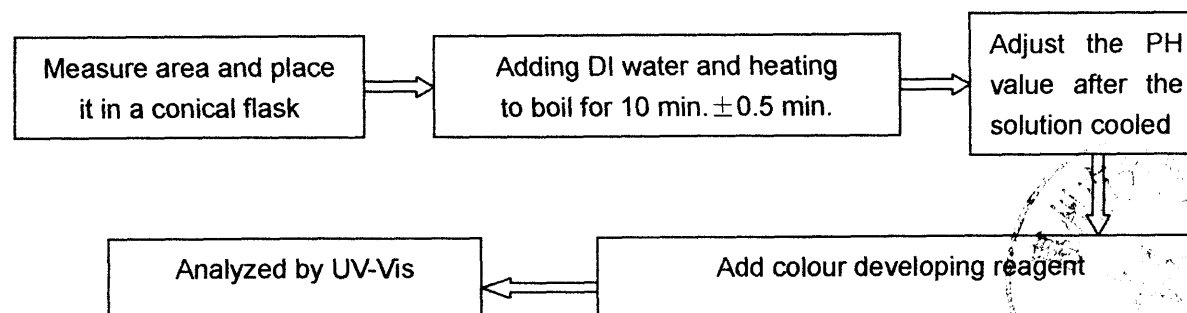
## Test Process for Pb / Cd



## Test Process for Hg



## Test Process for Cr (VI)



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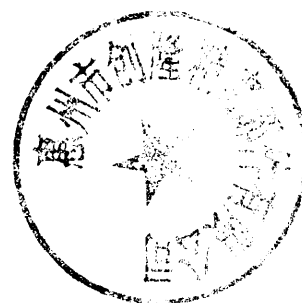
## TEST REPORT

Report No.: HX201301338-3E

Photo of Sample



-----End of Report-----

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**華裕實業股份有限公司**  
WHA YU INDUSTRIAL CO., LTD

## RoHS 排外條款說明 RoHS Exclusive item Hazardous Substance

本公司保證，本產品均屬環保產品，皆符合 RoHS 法規要求，並適用於 RoHS 規定之排除條款。

We hereby confirm and assure that all parts and sub-materials delivered to your company comply with RoHS Standard and apply to RoHS Exclusive item.

**RoHS 合金類排除條款要求如下：**

**RoHS Exclusive item：**

| 合金種類<br>alloys item     | 鉛允許含量(ppm)<br>Lead acceptance concentration |
|-------------------------|---------------------------------------------|
| 鋼材<br>steel             | <3,500ppm                                   |
| 鋁合金<br>aluminium alloys | <4,000ppm                                   |
| 銅合金<br>copper alloys    | <40,000ppm                                  |
| 焊錫<br>solder            | <1,000ppm                                   |

立承諾書人

公司名稱：華裕實業股份有限公司  
company name: WHA YU INDUSTRIAL CO., LTD

公司地址：新竹市公道五路二段 326 號  
company address: No.326. Sec 2. Kung Tao 5 Road. Hsin Chu City, Taiwan

聯絡電話：03-5714225  
TEL: +886-3-5714225

負責人：\_\_\_\_\_ 林祺生 \_\_\_\_\_ 董事長  
sign by

立約日期：西元 2006 年 9 月 05 日  
Date: 2006. 09. 05



Product Hazardous Substance Report

Model Name: PIFA Antenna Assembly  
 Part Number: 11320Y11145A1

Date: 2013/11/12

RoHS Directive 2011/65/EC & PFOS D

| Item<br>項目 | Part Number<br>料號 | Description<br>品名 | Component Suppliers<br>(First & 2nd Source)<br>原廠名稱 | Component Model Number<br>原廠型號 | Q'ty<br>零件數量 | Location<br>零件位置 | Weight (mg)<br>零件重量 | Sub-Item<br>分離材質<br>項目 | Sub-parts<br>Homogeneous Material<br>分離之均勻材質名稱 | 原材料顏色<br>(塑膠、油墨及漆料必填)<br>The color of raw material<br>(Required for plastic, ink and paint) | 鍍層存在與否/鍍層材質說明<br>If the plating layer exist or<br>not?(Y/N)/If yes, please describe the<br>material of the plating layer | 分離之<br>均勻材質<br>重量(mg) | Effective date<br>報告生效日 |         |         |         |
|------------|-------------------|-------------------|-----------------------------------------------------|--------------------------------|--------------|------------------|---------------------|------------------------|------------------------------------------------|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------------|---------|---------|---------|
|            |                   |                   |                                                     |                                |              |                  |                     |                        |                                                |                                                                                             |                                                                                                                          |                       |                         | 800     | 80      | 800     |
|            |                   |                   |                                                     |                                |              |                  |                     |                        |                                                |                                                                                             |                                                                                                                          |                       |                         | Pb<br>鉛 | Cd<br>鎘 | Hg<br>汞 |
| 1          | 11320Y11145A1     | PIFA              | CHUANG LONG                                         | 100-4012601-AZ                 | 1            | PIFA-SUS 430     | 230                 |                        | SUS 430                                        | NA                                                                                          | N                                                                                                                        | 230                   | 2013/1/2                | N.D     | N.D     | N.D     |
|            |                   |                   |                                                     |                                |              | PIFA-Ni Plated   |                     |                        | Ni                                             | NA                                                                                          |                                                                                                                          |                       | 2013/2/27               | N.D     | N.D     | N.D     |

| Directive 2006/122/EC        |     |      |           |      |     |     |      |      |                     | REACH Regulation (EC) No 1907/2006 |                                                           |                                                                               |              | Halogen Free IEC 61249-2-21 |                                   |                                     |                                       |           |                                                                                                              |                                                           |                                                 |              |         |
|------------------------------|-----|------|-----------|------|-----|-----|------|------|---------------------|------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------|--------------|-----------------------------|-----------------------------------|-------------------------------------|---------------------------------------|-----------|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------|--------------|---------|
| Control Substance; mg/kg=ppm |     |      |           |      |     |     |      |      | Laboratory<br>實驗室名稱 | Analysis report No.<br>實驗室分析報告號碼   | Laboratory Test<br>Report (Hyperlink)<br>第三公證單位化學<br>分析報告 | Material Declaration/<br>Exception Declaration<br>物質宣告書或排外宣<br>告證明(Hyperlink) | 物質成份元素表      |                             | Contanted<br>Substance<br>of SVHC | Candidate List<br>Update Date<br>by | SVHC<br>Contanted List<br>(Hyperlink) | 1500ppm   |                                                                                                              | Laboratory Test<br>Report (Hyperlink)<br>第三公證單位化學<br>分析報告 | Material<br>Declaration<br>(Hyperlink)<br>物質宣告書 | 備註<br>Remark |         |
| 800                          | 800 | 800  | Concerned |      |     |     |      |      |                     |                                    |                                                           |                                                                               | 元素/化合物<br>名稱 | 元素/化合物<br>比重 (%)            |                                   |                                     |                                       | Concerned | Cl<br>氯                                                                                                      |                                                           |                                                 |              | Br<br>溴 |
| Cr+6<br>六價鉻                  | PBB | PBDE | HBCDD     | DEHP | BBP | DBP | PFOA | PFOS |                     |                                    |                                                           |                                                                               |              |                             |                                   |                                     |                                       |           |                                                                                                              |                                                           |                                                 |              |         |
| Negative                     | N.D | N.D  | -         | -    | -   | -   | N.D  | N.D  | SGS                 | KA/2012/C1135                      | SGSPIFA-<br>KA_2012_C1135.pdf                             |                                                                               | Fe           | 79.36                       | No                                | N.D                                 | N.D                                   |           | <br>SUS430不銹鋼材料<br>證書.pdf |                                                           |                                                 |              |         |
|                              |     |      |           |      |     |     |      |      |                     |                                    | Cr                                                        |                                                                               | 18           | No                          |                                   |                                     |                                       |           |                                                                                                              |                                                           |                                                 |              |         |
|                              |     |      |           |      |     |     |      |      |                     |                                    | Mn                                                        |                                                                               | 1.7          | No                          |                                   |                                     |                                       |           |                                                                                                              |                                                           |                                                 |              |         |
|                              |     |      |           |      |     |     |      |      |                     |                                    | Si                                                        |                                                                               | 0.75         | No                          |                                   |                                     |                                       |           |                                                                                                              |                                                           |                                                 |              |         |
|                              |     |      |           |      |     |     |      |      |                     |                                    | C                                                         |                                                                               | 0.12         | No                          |                                   |                                     |                                       |           |                                                                                                              |                                                           |                                                 |              |         |
|                              |     |      |           |      |     |     |      |      |                     |                                    | P                                                         |                                                                               | 0.04         | No                          |                                   |                                     |                                       |           |                                                                                                              |                                                           |                                                 |              |         |
|                              |     |      |           |      |     |     |      |      |                     |                                    | S                                                         |                                                                               | 0.03         | No                          |                                   |                                     |                                       |           |                                                                                                              |                                                           |                                                 |              |         |
| Negative                     | -   | -    | -         | -    | -   | -   | -    | -    | GRG                 | HX201301338-3E                     | SGSPIFA-<br>HX201301338-3E.pdf                            | Ni                                                                            | 100          | No                          | -                                 | -                                   |                                       |           |                                                                                                              |                                                           |                                                 |              |         |