

Product Number: R-AN2400-5701RS-Z  
Product Name: Antenna



# Specification For Approval

Date: 2010 / 09 / 13

File No.: 100913001

Version: 1.0

Customer : 泰 鉅 科技 股份 有限 公司

Customer P/N : \_\_\_\_\_

INVAX P/N : R-AN2400-5701RS-Z

Description : Antenna

Cortec Checked By:

R&D Dept  
2010.09.13  
Jack

Customer Approved By:



**INVAX System Technology Corp.**

4F. No. 815.Chung Hsiao East Rd.,Sec.5  
Taipei, TAIWAN

TEL:886-2-2788-5218 FAX:886-2-2783-1658  
<http://www.invaxsystem.com>



**Cortec Technology Inc.**

Xian-Xi Industrial, Sha-Tou Administration Zone,  
Chang-An Town, Dong-Guan City, Guangdong  
Province, China

TEL:86-769-85388261 FAX:86-769-85317869  
<http://www.cortec.com.cn>

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Product Number: R-AN2400-5701RS-Z

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## 1. Specification

Sample Photo	
	
Type:Dipole	
A. Electrical Characteristics	
Frequency	2400 ~ 2500 MHz
S.W.R.	$\leq 2.0$
Antenna Gain	$2.0 \pm 0.7$ dBi
Polarization	Linear
Impedance	50 Ohm
B. Material & Mechanical Characteristics	
Material of Radiator	Cu
Material of Plastic	Body: TPE Hinge: PA+ABS Holder: PA+ABS
Cable Type	RG-178
Connector Type	SMA Male Reverse
Connector Pull Test	$\geq 3$ Kg
Connector Torque Test	150~600g.cm
C. Environmental	
Operation Temperature	- 40 °C ~ + 65 °C
Storage Temperature	- 40 °C ~ + 80 °C

Product Number: R-AN2400-5701RS-Z

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## 2. Characteristics and Reliability Test

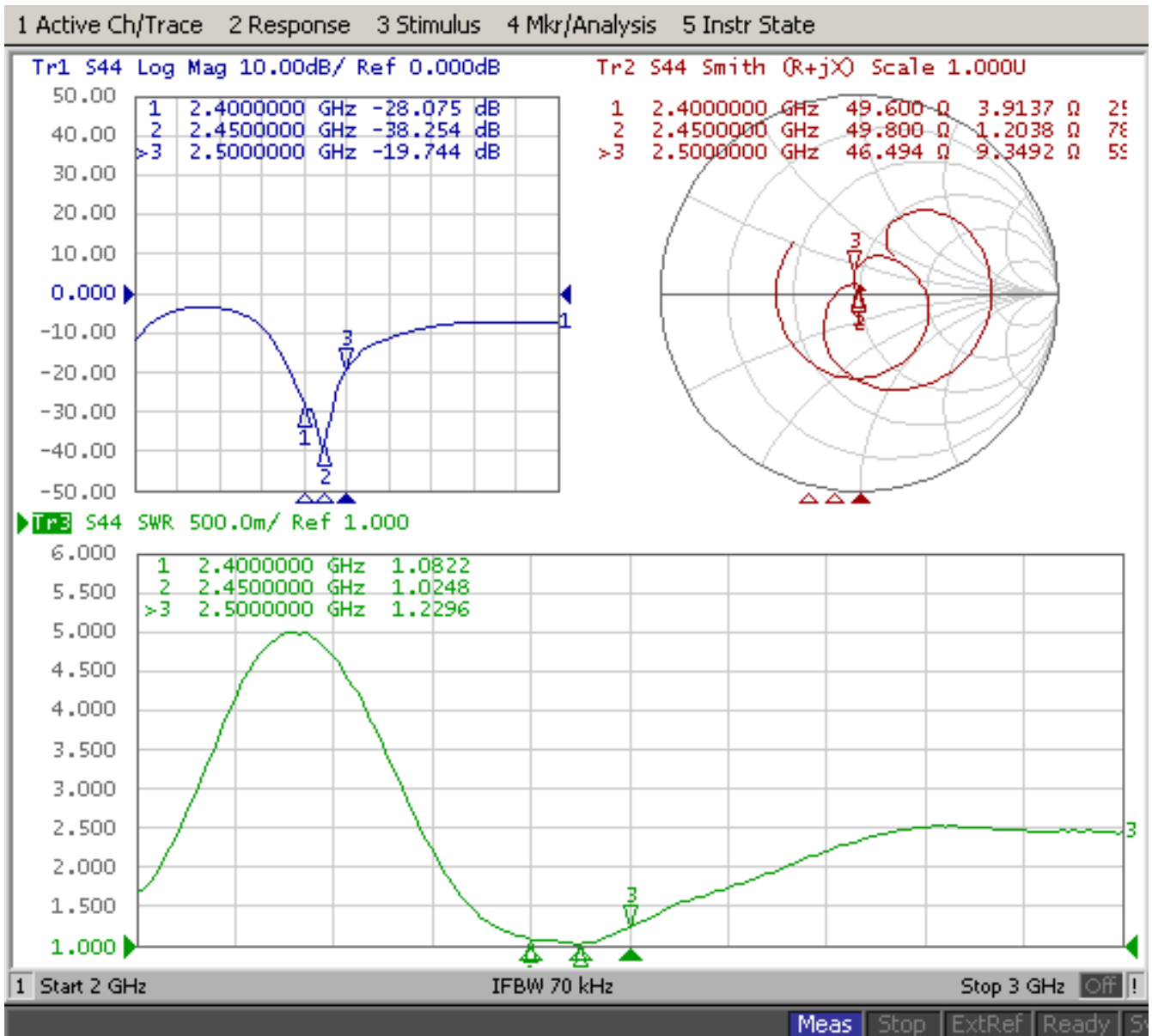
Test Items		Test Condition and Procedure	Requirements
C1	S.W.R.	Set DUT on Network Analyzer; make individual calibration to test	Directive DUT specification
C2	Antenna Gain	Set DUT on Antenna Chamber; make individual calibration to test	Directive DUT specification
M1	Vibration	MIL-STD-202G, 201A Amplitude: 0.03 inch (0.76mm); Freq: 10 to 55 Hz 3 directions; 2 hours for each direction	1. No Visual Damage 2. Frequency Tol.<= 5%
M2	Random Drop	Height: 1.5 Meter; 3 directions; 1 time for each direction	1. No parts separated 2. Frequency Tol.<= 5%
M3	Solderability	MIL-STD-202G, 210F, cond. A Solder iron: 350±10°C; Duration: 5 seconds	1. Mounted on PCB 2. No Visual Damage
M4	Terminal-Pull Test	MIL-STD-202G, 211A, cond. A Holding with individual specification; force applied to axis of terminal	1. Directive DUT specification 2. Frequency Tol.<= 5%
M5	Terminal-Torque Test	MIL-STD-202G, 211A, cond. E Holding with individual specification; applied clockwise and counterclockwise to the axis of terminal	1. Directive DUT specification 2. Frequency Tol.<= 5%
M6	Dimension	Inspection of dimension, color, material, package, surface process	Directive DUT specification
E1	Salt Spray	MIL-STD-202G, 101E, cond. B Temp: 35°C; RH: >= 95%; NaCl solution: >= 5%; Time: 48 hours	After 2 Hours Recovery 1. No Visual Damage 2. Frequency Tol.<= 5%
E2	Humidity	MIL-STD-202G, 103B, cond. B Temp: 40°C; RH: >= 95%; Time: 48 hours	After 2 Hours Recovery 1. No Visual Damage 2. Frequency Tol.<= 5%
E3	Thermal Shock	1 Cycle: - 40°C (30 minutes) to + 80°C (30 minutes) Cycles: 24	After 2 Hours Recovery 1. No Visual Damage 2. Frequency Tol.<= 5%
E4	Life (High Temp.)	MIL-STD-202G, 108A, cond. A Temp: 85°C; Time: 96 hours	After 2 Hours Recovery 1. No Visual Damage 2. Frequency Tol.<= 5%
R1	RoHS	With Reference to IEC 62321:2008 with flow chart	Directive RoHS 2002/95/EC
R2	PFOS	With Reference to USA EPA 3540C:1996 by LC/MS	Directive RoHS 2006/122/EC
R3	PFOA	With Reference to USA EPA 3540C:1996 by LC/MS	Directive RoHS 2006/122/EC

Product Number: R-AN2400-5701RS-Z

Product Name: Antenna



### 3. Antenna - S Parameter Test Data



Product Number: R-AN2400-5701RS-Z

Product Name: Antenna



#### 4. Antenna - Radiation Pattern Test Data

##### Testing Equipment Specification:

Antenna Anechoic Chamber Dimension: 8 x 4 x 4 m

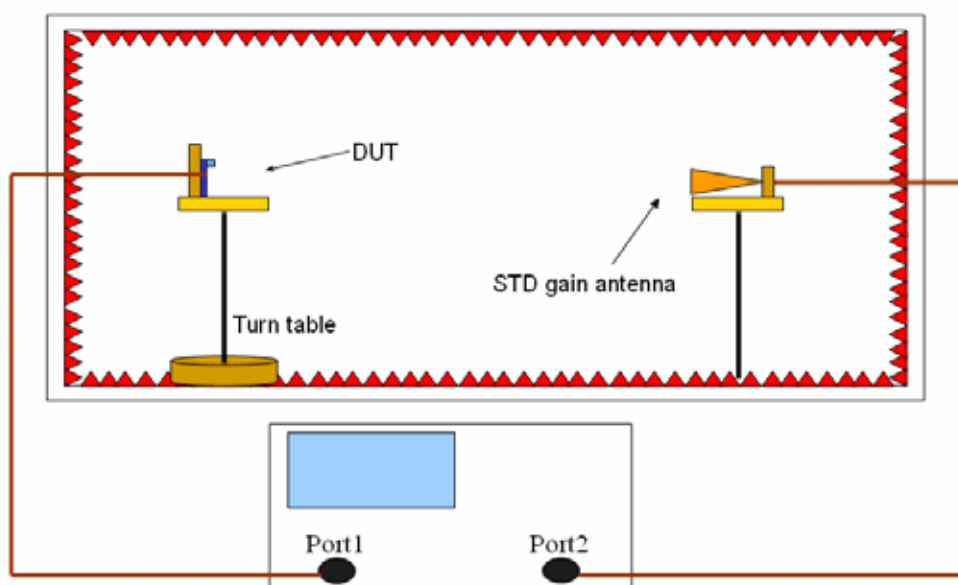
Quiet Zone: 600mm @1 GHz

Isolation: >100dB @ 1 MHz ~ 10 GHz

Testing Equipment: Agilent 5071B

Received Antenna: 0.7 ~ 6.0 GHz for Gain Calibration

Double Ridged Horn Antenna



#### 5. Mechanical Drawing

See attached files

#### 6. Material Description and RoHS Test Report

See attached files



Model : R-AN2400-5701RS-Z // 1  
Remark : H-Plane // Vertical Polarization  
Tested by : Antenna 3D Lab // Zhao Yao Rong

Location: **Chamber**

Date: **2009/4/1**

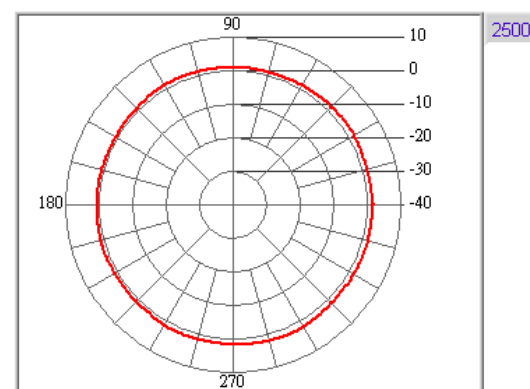
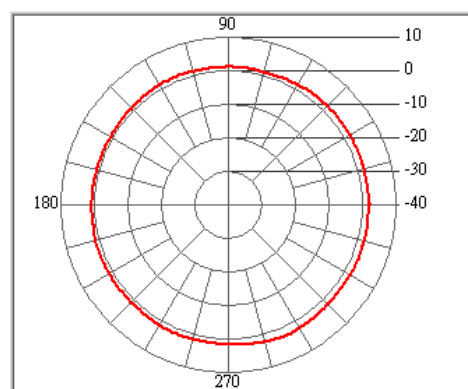
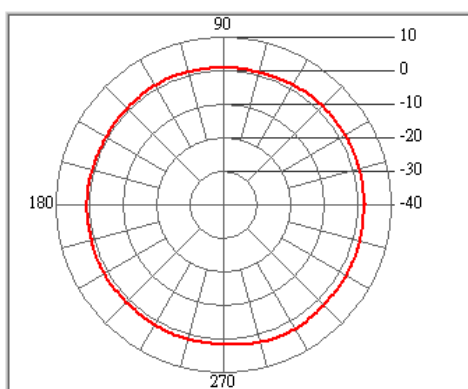
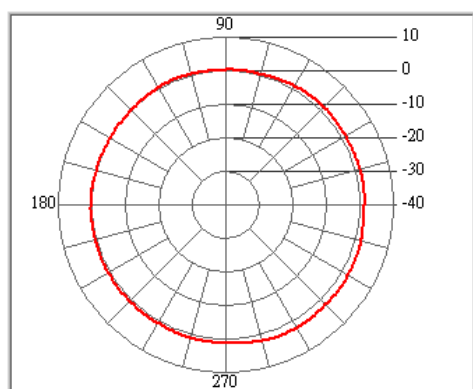
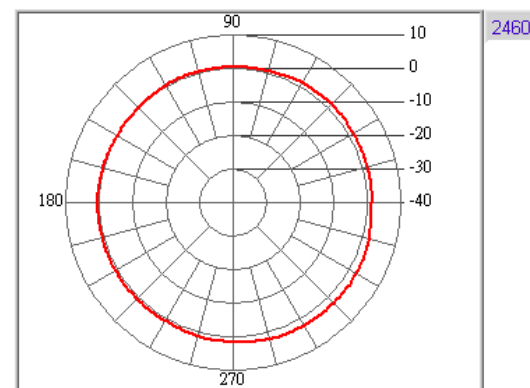
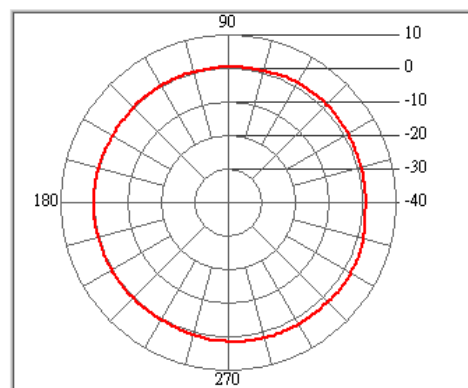
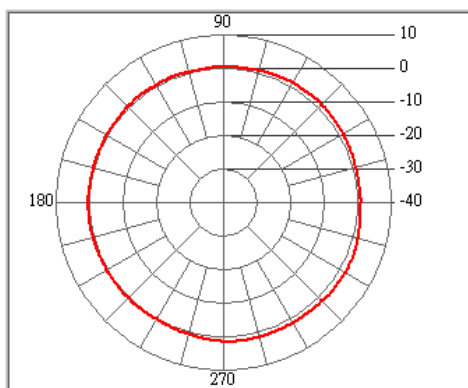
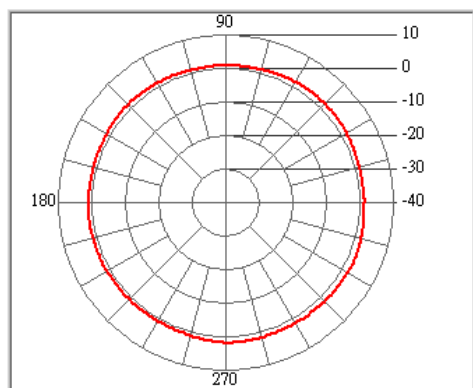
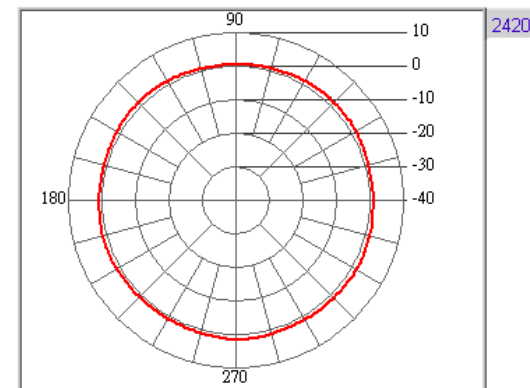
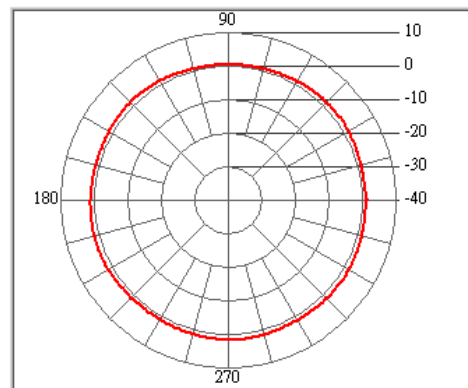
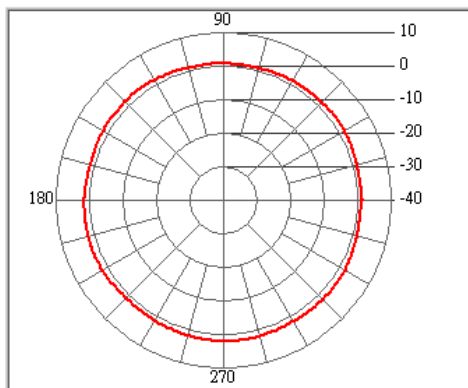
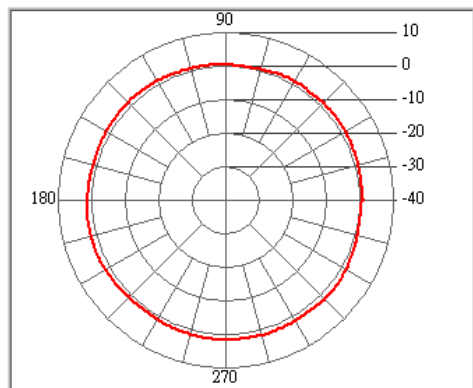
Time: **下午 07:30:21**

Temperature (°C): **22.00**

Humidity (%): **55.00**

Approved by:

Freq. (MHz)	2390	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500
Peak Gain (dBi)	1.73	2.08	1.77	1.64	2.12	1.91	2.16	2.51	2.3	2.71	2.58	2.06
Peak Degree	270	276	270	270	332	332	337	325	295	295	294	294
AV Gain (dBi)	1.13	1.43	1.16	1.04	1.3	0.86	0.92	1.15	1	1.47	1.47	1.24



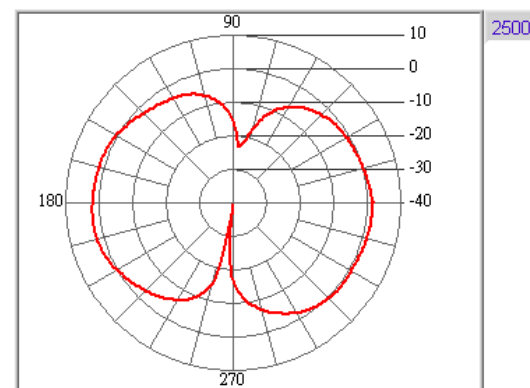
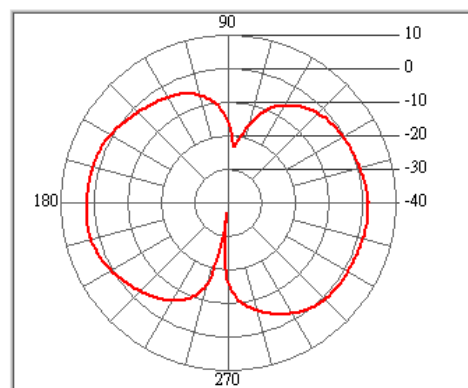
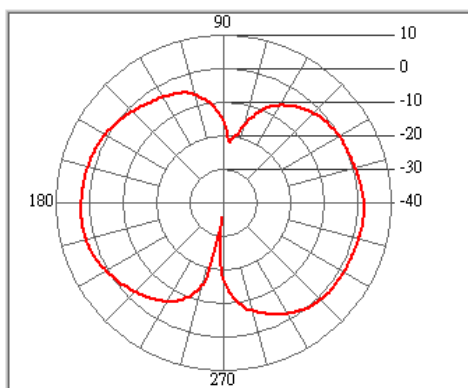
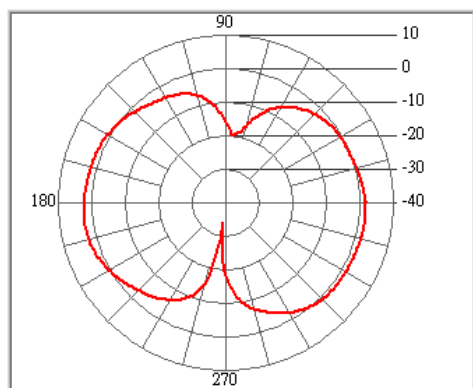
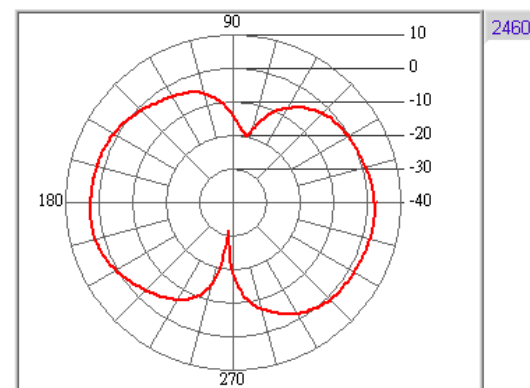
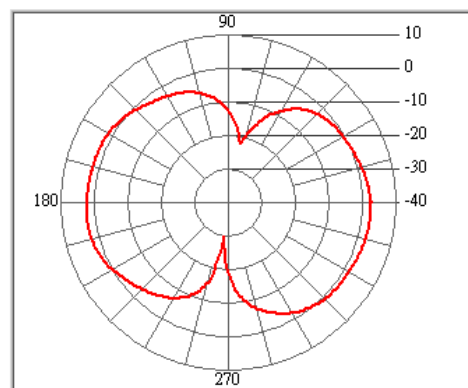
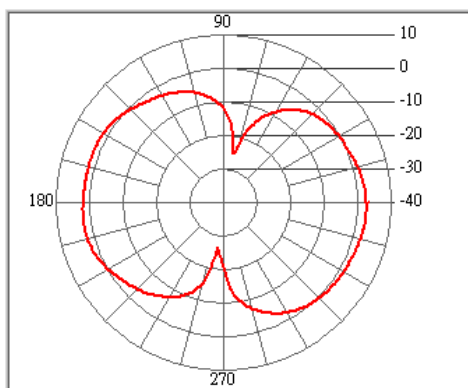
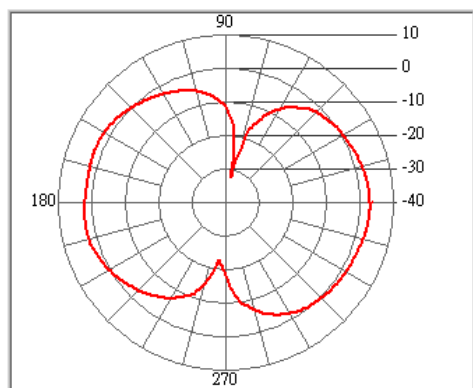
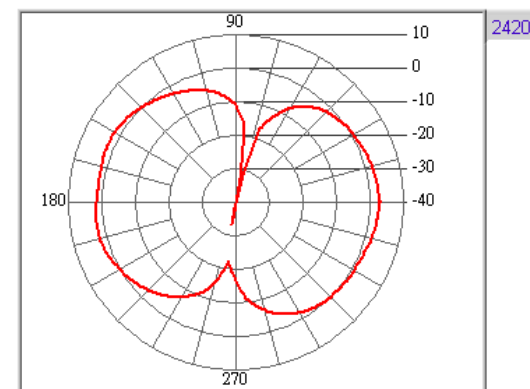
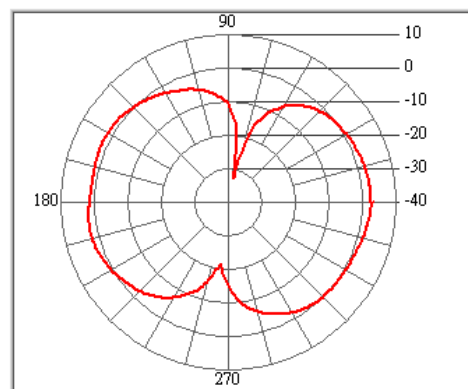
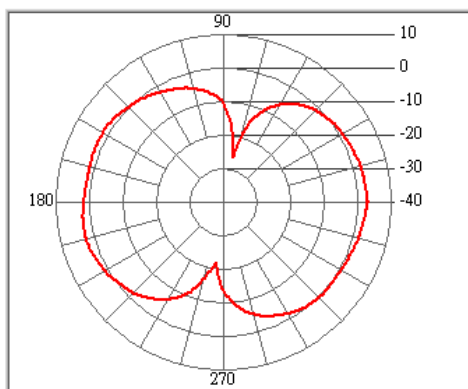
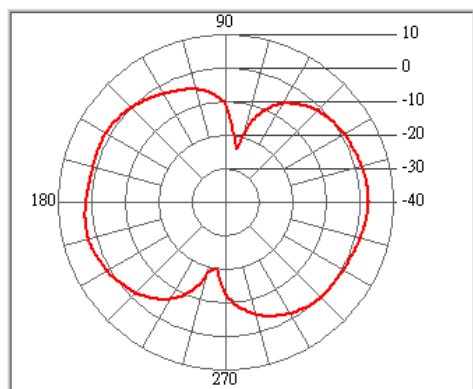
Model : R-AN2400-5701RS-Z // 1  
 Remark : E-Plane // Horizontal Polarization  
 Tested by : Antenna 3D Lab // Zhao Yao Rong

Location: **Chamber**  
 Temperatur (°C): **22.00**

Date: **2009/4/1**  
 Humidity (%): **55.00**

Time: **下午 07:30:21**  
 Approved by:

Freq. (MHz)	2390	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500
Peak Gain (dBi)	2.59	2.89	2.8	2.92	3.22	2.81	2.71	2.7	2.44	2.62	2.49	2.12
Peak Degree	2	360	360	360	359	358	356	189	189	189	189	189
AV Gain (dBi)	-0.8	-0.63	-0.92	-0.88	-0.65	-1	-0.94	-0.85	-1.2	-0.97	-1.13	-1.47

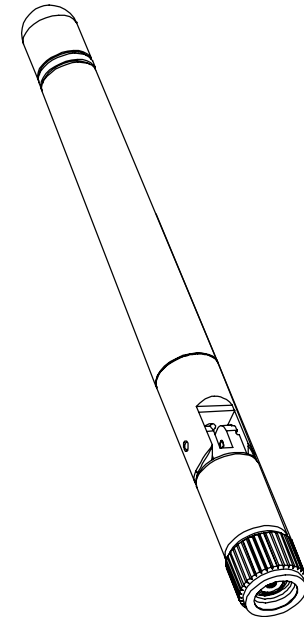
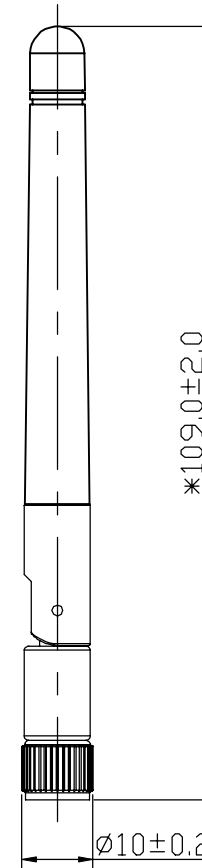
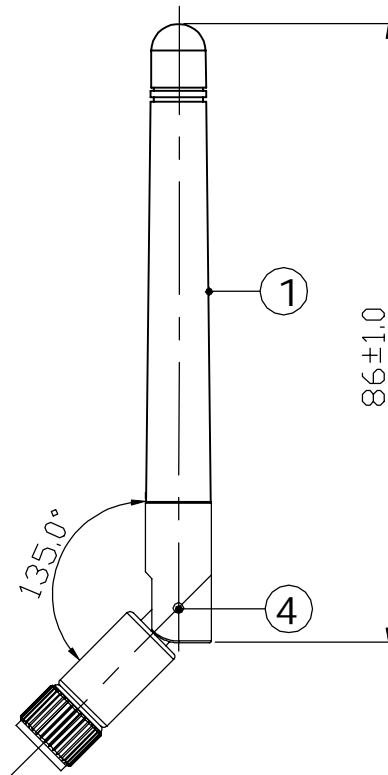
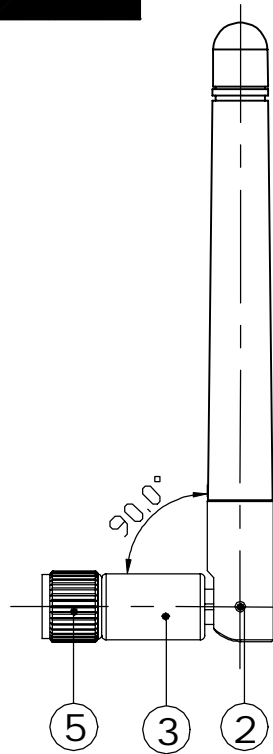




# RoHS

## Compatible

SIGN	DATE	DESCRIPTION	APPROVER
△			
△			
△			



Note:

- 1.Dimension: Take \* is the important dimension
- 2.Tolerance:Unmarked tolerance refer to the standard tolerance please.

5	SMA201-CCR5AN56	SMA Male Reverse	Cu	Eletrodeposition	1
4	R-AN01-1213Z	Pin	Cu	Zn Black plated	2
3	AN57-10B	Body-2	PA+ABS	Black	1
2	R-AN57-02	Body-3	PA+ABS	Black	1
1	R-AN57-03	Body-1	TPE	Black	1
NO.	Part Number	Description	Material	Finish	Q'ty

Invax System Group.

# Cortec

## Cortec Technology Inc.


Http://www.invaxsystem.com  
E-mail: info@invax.com.tw

Tel:886-2-27885218  
Fax:886-2-27831658

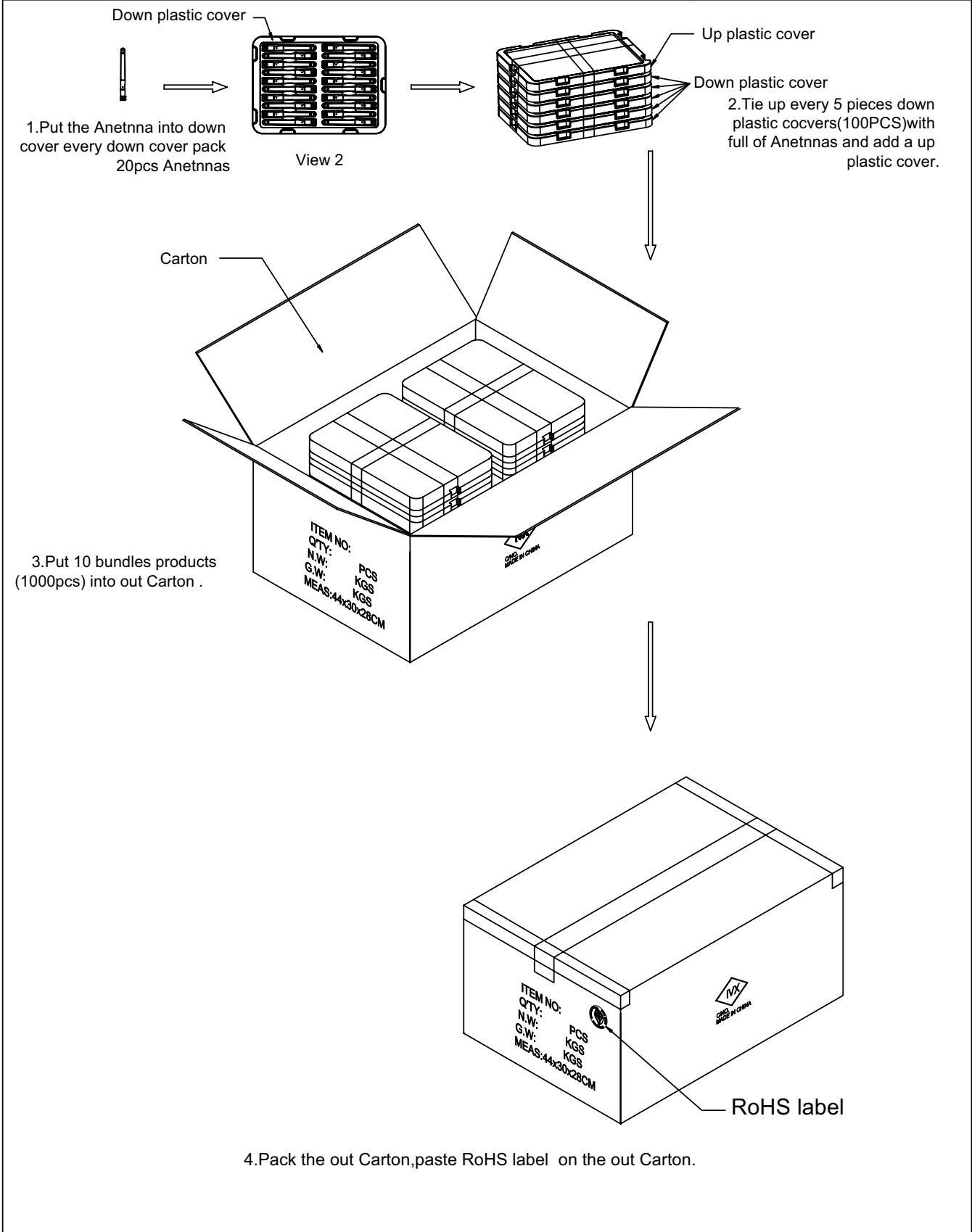
TITLE: 2.4GHz Antenna

PART NO.: R-AN2400-5701RS-Z

DWG NAME: R-AN2400-5701RS-Z.dwg

APPROVED BY	CHECKED BY	DESIDNED BY	 UNITS: mm SCALE: 1:1 REVISION: A	Tolerance
Grant 2010.02.05	liukui 2010.02.05	HU CHUNJIN 2010.02.05		X.X ±0.3 X.XX ±0.1 X° ±1°

Part Number : R-AN2400-5701RS-Z	Revision : A
Part Name :AP Antenna	Customer :



Approve : Grant Check : Liukui Design : Tangshaowu

SGS 台灣網站 → [http://twap.sgs.com/sgsrsts/chn/cheres\\_tw.asp](http://twap.sgs.com/sgsrsts/chn/cheres_tw.asp)

SGS 大陸網站 → [http://rsts.cn.sgs.com/chn/cheres\\_cn.asp](http://rsts.cn.sgs.com/chn/cheres_cn.asp)

SGS 韓國網站 → [http://rohs.kr.sgs.com/sgsrsts/en/cheres\\_en.asp](http://rohs.kr.sgs.com/sgsrsts/en/cheres_en.asp)

請輸入以下報告正確資料及檢查碼以便查核

1. 報告編號
2. 報告日期 (YYYY/MM/DD)
3. 產品名稱 (輸入前 10 個字不含空白)
4. 圖示檢查碼 (依指示畫面)



## 物料中HSF對象物質含量調查表

康捷電子有限公司	
填表：	時麗
部門：	研發部
職務：	文員

物料名稱：R-AN2400-5701RS-Z

序號	物料型號	物料各構成名稱	各構成物 料的材質	測試報告裡RoHS對應物質測試結果						檢測報告編號	測試日期	測試名稱	測試機構 名稱
				Cd	Pb	Hg	Cr(VI)	PBBs	PBDEs				
1	R-AN57-03	Body	TPE	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	CE/2009/C4753	2009.12.25	THERMOPLASTIC	臺北SGS
2	R-AN57-02 R-AN57-10B	Body1 Body2	PA+ABS	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	CE/2009/C0706	2009.12.09	PA+ABS	臺北SGS
3	R-AN01-1213Z	PIN	銅	45	29700	N.D.	Negative			CE/2010/20213	2010.02.06	FREE CUTTING	臺北SGS
4	SMA201-CCR5AN56	SMA Male Reverse	銅	45	29700	N.D.	Negative			CE/2010/20213	2010.02.06	FREE CUTTING	臺北SGS
5	R-AN4424517S	Tube	銅	45	29700	N.D.	Negative			CE/2010/20213	2010.02.06	FREE CUTTING	臺北SGS
6	R-RG-178U	Cable (RG178)	外皮 (FEP)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	SHAEC1011131901	2010.08.06	氟塑料电线电缆	大陸SGS
7			PTFE	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	SHAEC1011131901	2010.08.06	氟塑料电线电缆	大陸SGS
8			鍍銀銅	N.D.	N.D.	N.D.	Negative	N.D.	N.D.	SHAEC1011131901	2010.08.06	氟塑料电线电缆	大陸SGS

根據測試報告如實填寫鉛、鎘、汞、六價鉻、PBBs和PBDEs六項禁用物質的含量  
包裝材料中鉛、鎘、汞、六價鉻總含量不超過100ppm，鎘的允許濃度為5ppm

## TPE Datasheet

物性項目 Property	單位 Unit	ASTM 試驗法 Test Method	TPE
比重 Specific Gravity	---	D792	0.88
模具收縮率 Shrinkage	%	D955	0.8-2.5
斷裂拉伸強度 Tensile Strength	Kg/ cm <sup>3</sup>	D638	3.1
扭曲強度 Flexural Strength	Kg/ cm <sup>3</sup>	D790	---
衝擊強度缺口 23°C Impact Strength	Kg om/om	D256	---
硬度 Hardness	A Shore	---	13
熱變形溫度 0.45 MPa Heat Deflection Temp.	°C	D648	80
熔融指數 Melt Flow Index	G/ min <sup>2</sup>	D1238	10
燃燒性 Flammability	---	UL94	HB
<p><b>Testing Data from</b></p> <p>東莞市合春塑料有限公司 Tel:86-0769-2774772</p> <p>台灣大雅國際股份有限公司 Tel:886-02-27775232</p>			

## 測試報告

號碼(No.): CE/2009/C4753

日期(Date): 2009/12/25

頁數(Page): 1 of 6

## Test Report

長春人造樹脂廠股份有限公司

CHANG CHUN PLASTICS CO., LTD.

(CHANG CHUN CHEMICAL (ZHANGZHOU) CO., LTD.)

台北市中山區松江路301號7樓

NO. 301, 7TH FL., SONG KIANG ROAD, 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) : THERMOPLASTIC POLYESTER ELASTOMER, TPEE  
 樣品型號(Style/Item No.) : TPEE (1140, 1143, 1148, 1155, 1163, 1172)  
 收件日期(Sample Receiving Date) : 2009/12/21  
 測試期間(Testing Period) : 2009/12/21 TO 2009/12/25

=====  
 測試需求(Test Requested) : 參照 RoHS 2002/95/EC 及其修定指令要求. (In accordance with the RoHS Directive 2002/95/EC, and its amendment directives).

測試方法(Test Method) : 參考 IEC 62321: 2008 方法檢測. (With reference to IEC 62321: 2008. Procedures for the Determination of Levels of Regulated Substances in Electrotechnical Products).  
 (1) 以感應耦合電漿原子發射光譜儀檢測鎘含量. / Determination of Cadmium by ICP-AES.  
 (2) 以感應耦合電漿原子發射光譜儀檢測鉛含量. / Determination of Lead by ICP-AES.  
 (3) 以感應耦合電漿原子發射光譜儀檢測汞含量. / Determination of Mercury by ICP-AES.  
 (4) 以 UV-VIS 檢測六價鉻含量. / Determination of Hexavalent Chromium by UV/Vis Spectrometry.  
 (5) 以氣相層析儀/質譜儀檢測多溴聯苯和多溴聯苯醚含量. / Determination of PBB and PBDE by GC/MS.

測試結果(Test Results) : 請見下一頁 (Please refer to next pages).

結論(Conclusion) : 根據客戶所提供樣品的測試結果，符合 RoHS(2002/95/EC) 及其修定指令之要求 (Based upon the performed tests by submitted samples, the test results comply with the limits of RoHS Directive 2002/95/EC and its subsequent amendments).

Chenyu Kung / Operation Manager  
 Signed for and on behalf of  
 SGS TAIWAN LTD.  
 Chemical Laboratory – Taipei

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested. This test report cannot be reproduced, except in full, without prior written permission of the Company. 除非另有說明，此報告結果僅對測試之樣品負責。本報告未經本公司書面許可，不可部分複製。

This Test Report is issued by the Company under its General Conditions of Service printed overleaf or available on request and accessible at [http://www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm). Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this Test Report is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

## 測試報告

## Test Report

號碼(No.): CE/2009/C4753

日期(Date): 2009/12/25

頁數(Page): 2 of 6

長春人造樹脂廠股份有限公司

CHANG CHUN PLASTICS CO., LTD.

(CHANG CHUN CHEMICAL (ZHANGZHOU) CO., LTD.)

台北市中山區松江路301號7樓

NO. 301, 7TH FL., SONG KIANG ROAD, TAIPEI, TAIWAN



### 測試結果(Test Results) 單位(Unit): mg/kg

測試項目 (Test Items)	測試方法 Method (Refer to)	結果 (Result)	方法偵測 極限值 (MDL)	RoHS 限值 (Limit)
		No.1		
鎘 / Cadmium (Cd)	(1)	n.d.	2	100
鉛 / Lead (Pb)	(2)	n.d.	2	1000
汞 / Mercury (Hg)	(3)	n.d.	2	1000
六價鉻 / Hexavalent Chromium Cr(VI) by alkaline extraction	(4)	n.d.	2	1000
<b>多溴聯苯總和 / Sum of PBBs</b>	(5)	n.d.	-	1000
一溴聯苯 / Monobromobiphenyl		n.d.	5	-
二溴聯苯 / Dibromobiphenyl		n.d.	5	-
三溴聯苯 / Tribromobiphenyl		n.d.	5	-
四溴聯苯 / Tetrabromobiphenyl		n.d.	5	-
五溴聯苯 / Pentabromobiphenyl		n.d.	5	-
六溴聯苯 / Hexabromobiphenyl		n.d.	5	-
七溴聯苯 / Heptabromobiphenyl		n.d.	5	-
八溴聯苯 / Octabromobiphenyl		n.d.	5	-
九溴聯苯 / Nonabromobiphenyl		n.d.	5	-
十溴聯苯 / Decabromobiphenyl		n.d.	5	-
<b>多溴聯苯醚總和 / Sum of PBDEs</b>		n.d.	-	1000
一溴聯苯醚 / Monobromodiphenyl ether		n.d.	5	-
二溴聯苯醚 / Dibromodiphenyl ether		n.d.	5	-
三溴聯苯醚 / Tribromodiphenyl ether		n.d.	5	-
四溴聯苯醚 / Tetrabromodiphenyl ether		n.d.	5	-
五溴聯苯醚 / Pentabromodiphenyl ether		n.d.	5	-
六溴聯苯醚 / Hexabromodiphenyl ether		n.d.	5	-
七溴聯苯醚 / Heptabromodiphenyl ether		n.d.	5	-
八溴聯苯醚 / Octabromodiphenyl ether		n.d.	5	-
九溴聯苯醚 / Nonabromodiphenyl ether	n.d.	5	-	
十溴聯苯醚 / Decabromodiphenyl ether	n.d.	5	-	

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## 測試報告

## Test Report

號碼(No.): CE/2009/C4753

日期(Date): 2009/12/25

頁數(Page): 3 of 6

長春人造樹脂廠股份有限公司

CHANG CHUN PLASTICS CO., LTD.

(CHANG CHUN CHEMICAL (ZHANGZHOU) CO., LTD.)

台北市中山區松江路301號7樓

NO. 301, 7TH FL., SONG KIANG ROAD, TAIPEI, TAIWAN



### 測試部位描述 (TEST PART DESCRIPTION):

NO.1 : 白色塑膠粒 (WHITE PLASTIC PELLETS)

### 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)

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## 測試報告 Test Report

號碼(No.): CE/2009/C4753

日期(Date): 2009/12/25

頁數(Page): 4 of 6

長春人造樹脂廠股份有限公司

CHANG CHUN PLASTICS CO., LTD.

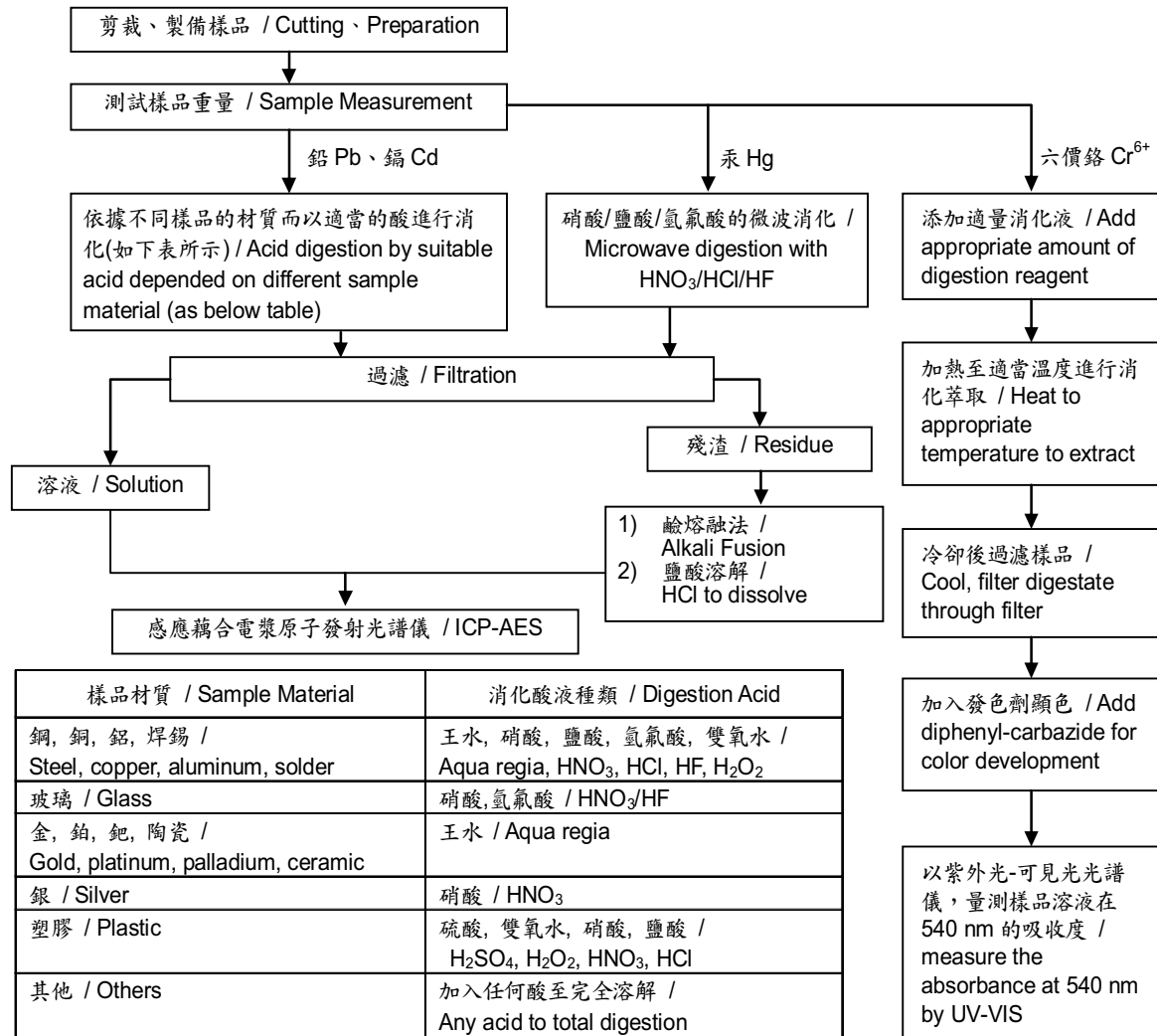
(CHANG CHUN CHEMICAL (ZHANGZHOU) CO., LTD.)

台北市中山區松江路301號7樓

NO. 301, 7TH FL., SONG KIANG ROAD, 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：楊登偉 / Name of the person who made measurement: Climbgreat Yang
- 3) 測試負責人：張啓興 / Name of the person in charge of measurement: Troy Chang



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NO. 301, 7TH FL., SONG KIANG ROAD, TAIPEI, TAIWAN



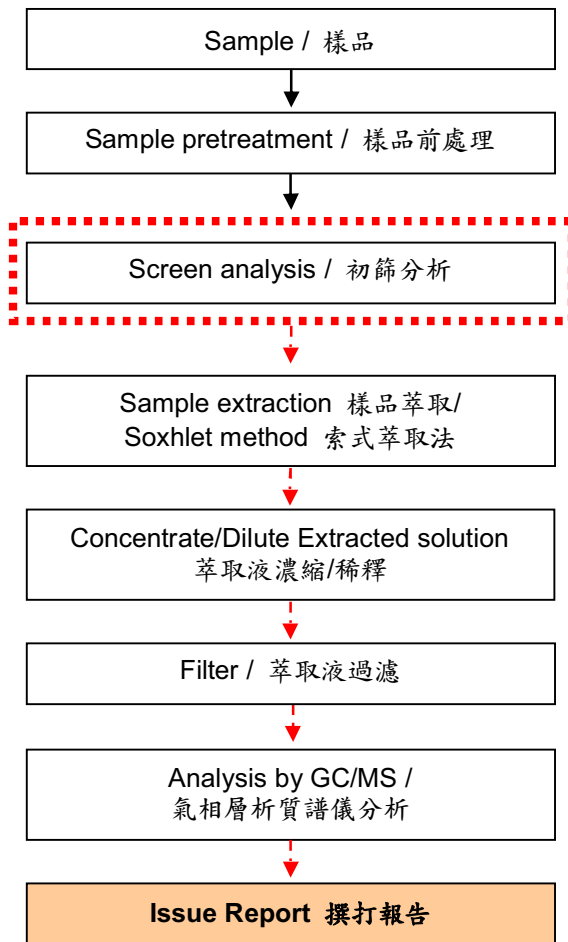
### 多溴聯苯/多溴聯苯醚分析流程圖 / PBB/PBDE analytical FLOW CHART

- 1) 測試人員：翁賜彬 / Name of the person who made measurement: Roman Wong
- 2) 測試負責人：陳新智 / Name of the person in charge of measurement: Shinjyh Chen

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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NO. 301, 7TH FL., SONG KIANG ROAD, TAIPEI, TAIWAN



\*\* 報告結尾(End of Report) \*\*

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Rhodia Polyamide Co., Ltd.

RHODIA POLYAMIDE CO., LTD.  
3 FL. KANGNAM BLDG. 1321-1  
SEOCHO-DONG SEOCHO-KU  
SEOUL 137-070  
KOREA

TAIWAN YOSON CO., LTD  
10F-1 NO.68 , INDUSTRIAL DIST.1RD  
HSI TUN DIST. TAICHUNG TAIWAN ROC  
411 TAICHUNG  
TAIWAN

Manufacturing Plant  
RHODIA POLYAMIDE ONSAN PLANT  
WONSAN-RI, ONSAN-EUP, ULJU-KUN  
689-892, ULSAN-SI  
SOUTH KOREA

**Certificate of analysis**

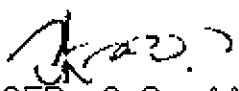
Date  
15.04.2008  
L/C order n /Date  
  
Delivery item/Date  
80950449 900001 / 14.04.2008  
Order item/Date  
623022 000010  
Customer  
75102  
Contract number

Material: Our / Your reference  
77474 TECHNYL ALLOY KC 226 NATURAL 25 KG BAG(S) /

The dispatched material conforms to agreed requirements

Batch 0810307 / Quantity 4,300 KG

Characteristic	Unit	Value	Limit Lower	Limit upper
Moisture content ISO 15512	%	0.036	0.000	0.200
Melt flow index ISO 1133 (235 C; 2,16 kg)	g/10mn	3.1	1.0	15.0

CHECKED BY:   
QUALITY MANAGER – OnSan AA/EP/POLY  
(AA) Tel (82.52) 231-0800 / Fax 238-0015  
(EP) Tel (82.52) 231-0900 / Fax 231-0993  
(Poly) Tel (82. 52) 240-0700 / Fax 237-6525

## 測試報告 Test Report

號碼(No.) : CE/2009/C0706 日期(Date) : 2009/12/09 頁數(Page) : 1 of 9

英碩科技股份有限公司 / INVAX SYSTEM TECHNOLOGY CORP.

(康捷電子有限公司 / CORTEC TECHNOLOGY INC.)

台北市南港區忠孝東路五段815號4樓

4F, NO. 815, CHUNG HSIAO EAST RD., SEC. 5, TAIPEI, TAIWAN

(XIANXI INDUSTRIAL, SHATOU ADMINISTRATION ZONE, CHANGAN TOWN, DONGGUAN,  
GUANGDONG PROVINCE, CHINA)



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) : PA + ABS  
收件日期(Sample Receiving Date) : 2009/12/02  
測試期間(Testing Period) : 2009/12/02 TO 2009/12/09

=====  
測試結果(Test Results) : 請見下一頁 (Please refer to next pages).

Chenyu Kung / Operation Manager  
Signed for and on behalf of  
SGS TAIWAN LTD.  
Chemical Laboratory – Taipei

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# 測試報告

## Test Report

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英碩科技股份有限公司 / INVAX SYSTEM TECHNOLOGY CORP.

(康捷電子有限公司 / CORTEC TECHNOLOGY INC.)

台北市南港區忠孝東路五段815號4樓

4F, NO. 815, CHUNG HSIAO EAST RD., SEC. 5, TAIPEI, TAIWAN

(XIANXI INDUSTRIAL, SHATOU ADMINISTRATION ZONE, CHANGAN TOWN, DONGGUAN, GUANGDONG PROVINCE, CHINA)

### 測試結果(Test Results)

測試部位(PART NAME) NO.1 : 黑色塑膠 (BLACK PLASTIC)

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限值 (MDL)	結果 (Result)
				NO.1
鎘 / Cadmium (Cd)	mg/kg	參考IEC 62321: 2008方法, 以感應藕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, 以感應藕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, 以感應藕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 alkaline extraction	mg/kg	參考IEC 62321: 2008方法, 以UV-VIS 檢測. / With reference to IEC 62321: 2008 and performed by UV- VIS.	2	n.d.
全氟辛烷磺酸 / Perfluorooctane sulfonates (PFOS) PFOS - Acid PFOS - Metal Salt PFOS - Amide	mg/kg	參考US EPA 3540C: 1996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 3540C: 1996 method for PFOS Content. Analysis was performed by LC/MS.	10	n.d.
全氟辛酸(銨) / PFOA (CAS No.: 000335- 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(銨)含量. / With reference to US EPA 3540C: 1996 method for PFOA Content. Analysis was performed by LC/MS.	10	n.d.

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英碩科技股份有限公司 / INVAX SYSTEM TECHNOLOGY CORP.

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(XIANXI INDUSTRIAL, SHATOU ADMINISTRATION ZONE, CHANGAN TOWN, DONGGUAN, GUANGDONG PROVINCE, CHINA)

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限值 (MDL)	結果 (Result)		
				NO.1		
<b>多溴聯苯總和 / Sum of PBBs</b>	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.		
<b>多溴聯苯醚總和 / Sum of PBDEs</b>					-	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.		

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(XIANXI INDUSTRIAL, SHATOU ADMINISTRATION ZONE, CHANGAN TOWN, DONGGUAN, GUANGDONG PROVINCE, CHINA)

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限值 (MDL)	結果 (Result)
				NO.1
<b>鹵素 / Halogen</b>				
鹵素 (氟) / Halogen-Fluorine (F) (CAS No.: 014762-94-8)	mg/kg	參考BS EN 14582:2007, 以離子層析儀分析. / With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.
鹵素 (氯) / Halogen-Chlorine (Cl) (CAS No.: 022537-15-1)			50	n.d.
鹵素 (溴) / Halogen-Bromine (Br) (CAS No.: 010097-32-2)			50	n.d.
鹵素 (碘) / Halogen-Iodine (I) (CAS No.: 014362-44-8)			50	n.d.

### 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)

### PFOS參考資訊(Reference Information) : 指令 2006/122/EC (Directive 2006/122/EC)

- (1) 該物質不可置於市場上或使用於特殊物質或配置成分重量濃度等於或大於0.005%。  
(May not be placed on the market or used as a substance or constituent of preparations in a concentration equal to or higher than 0.005 % by mass.)
- (2) 該物質不可置於市場上的半成品或商品或其物件；假若零件上明顯地具有PFOS並參照結構上及微細構造上計算PFOS重量濃度等於或大於0.1%，而紡織品或其他覆蓋物質，如果PFOS在覆蓋物質中含量等於或大於1µg/m<sup>2</sup>。  
(May not be placed on the market in semi-finished products or articles, or parts thereof, if the concentration of PFOS is equal to or higher than 0.1 % by mass calculated with reference to the mass of structurally or microstructurally distinct parts that contain PFOS or, for textiles or other coated materials, if the amount of PFOS is equal to or higher than 1µg/m<sup>2</sup> of the coated material.)

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## 測試報告 Test Report

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英碩科技股份有限公司 / INVAX SYSTEM TECHNOLOGY CORP.

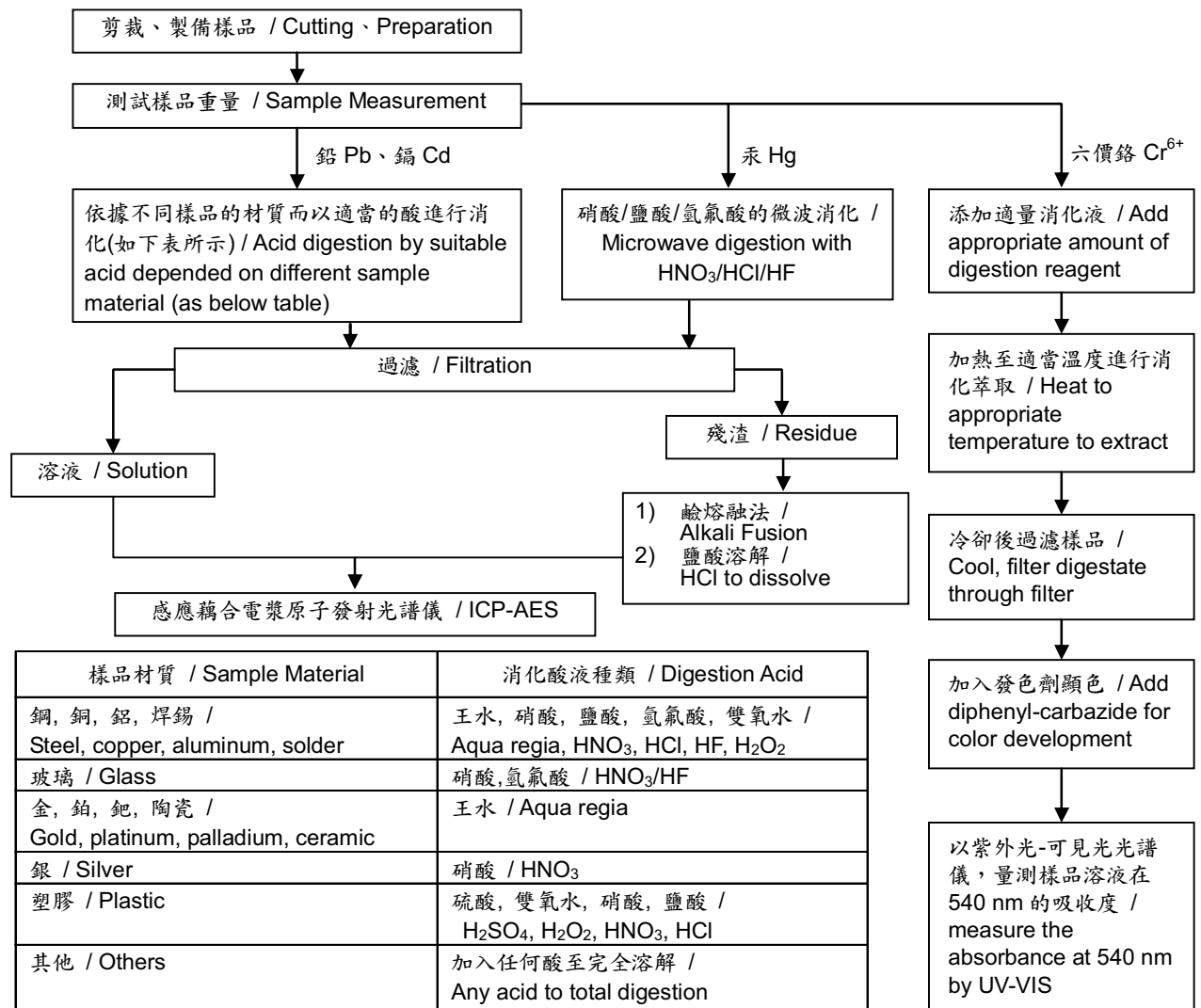
(康捷電子有限公司 / CORTEC TECHNOLOGY INC.)

台北市南港區忠孝東路五段815號4樓

4F, NO. 815, CHUNG HSIAO EAST RD., SEC. 5, TAIPEI, TAIWAN

(XIANXI INDUSTRIAL, SHATOU ADMINISTRATION ZONE, CHANGAN TOWN, DONGGUAN, GUANGDONG PROVINCE, CHINA)

- 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：楊登偉 / Name of the person who made measurement: Climbgreat Yang
- 3) 測試負責人：張啓興 / Name of the person in charge of measurement: Troy Chang



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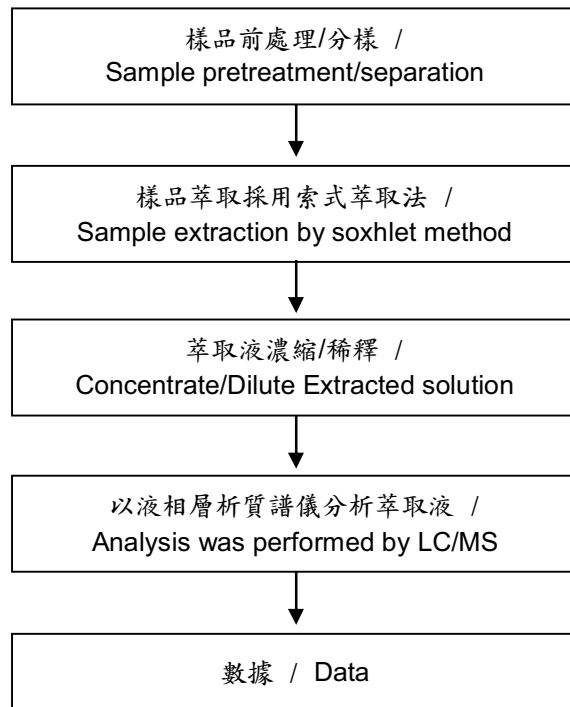
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### 索式萃取(LC/MS)分析流程圖 /

### Analytical flow chart of Soxhlet extraction (LC/MS) procedure

- 1) 測試人員：傅莉雅 / Name of the person who made measurement: Lydia Fu
  - 2) 測試負責人：陳新智 / Name of the person in charge of measurement: Shinjyh Chen
- 測試項目(Test Items): 全氟辛烷磺酸/全氟辛酸(銨)、苯並三唑類化合物 / PFOS/PFOA、Benzotriazole



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

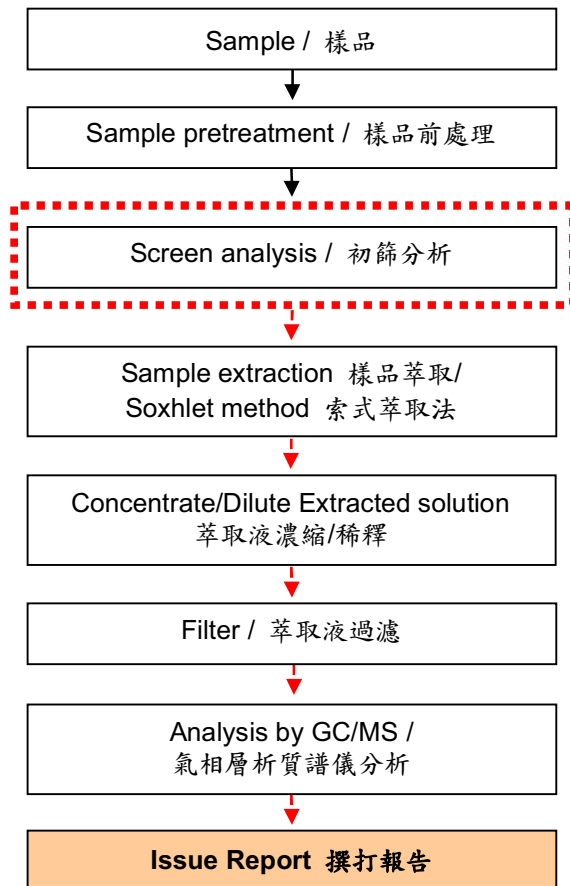
1) 測試人員：翁賜彬 / Name of the person who made measurement: Roman Wong

2) 測試負責人：陳新智 / Name of the person in charge of measurement: Shinjyh Chen

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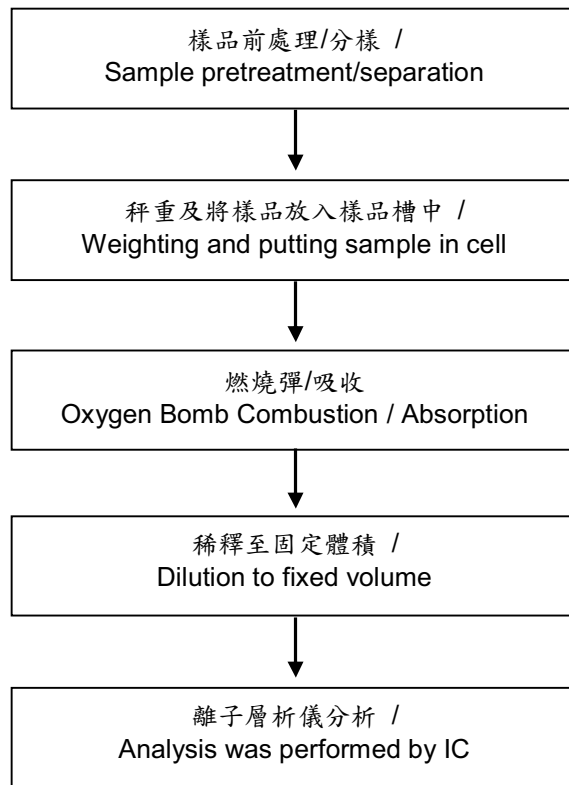
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### 鹵素分析流程圖 / Analytical flow chart of halogen content

- 1) 測試人員：陳立倫 / Name of the person who made measurement: Alan Chen
- 2) 測試負責人：張啓興 / Name of the person in charge of measurement: Troy Chang



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# Copper Datasheet

合金編號 Copper Alloy CN & JIS No.	化學成分 Composition (%)									
	銅 Cu	鉛 Pb	鐵 Fe	錫 Sn	鋅 Zn	鋁 Al	錳 Mn	鎳 Ni	磷 P	銅+鋁+鐵+錳+鎳 Cu+Al+Fe+Mn+Ni
C3501	60.0~64.0	0.7~1.7	0.2 以下 0.2max	Fe+Sn 0.4 以下 0.4max	殘余 Rem					
C3601	59.0~63.0	1.8~3.7	0.3 以下 0.3max	Fe+Sn 0.5 以下 0.5max	殘余 Rem					
C3602	59.0~63.0	1.8~3.7	0.5 以下 0.5max	Fe+Sn 1.2 以下 1.2max	殘余 Rem					
C3603	57.0~61.0	1.8~3.7	0.35 以下 0.35max	Fe+Sn 0.6 以下 0.6max	殘余 Rem					
C3604	57.0~61.0	1.8~3.7	0.5 以下 0.5max	Fe+Sn 1.2 以下 1.2max	殘余 Rem					
C3605	57.0~60.0	3.5~4.5	0.5 以下 0.5max	Fe+Sn 1.2 以下 1.2max	殘余 Rem					
C3712	58.0~62.0	0.26~1.2	Fe+Sn 0.8 以下 0.8max		殘余 Rem					
C3771	57.0~61.0	1.0~2.5	Fe+Sn 1.0 以下 1.0max		殘余 Rem					
合金種類 Alloy CN & JIS No.	符號 Symbol	別類 Name	特性用途 Speciality and Utilities							
C3501	線(B)	Nipple 用黃銅 Nipple Using Brass	切削性、冷間鍛造性良好 機車、腳踏車、腳踏車用接頭螺帽 Excellent Cold Forging and Good Machine-ability Use Motorcycle and Bicycle Join Nut...							
C3601	(B)	快削黃銅 Free Cutting Brass	切削性良好，C3601,C3602 延展性也良好，電腦、電子、釣具、筆、燈飾、螺絲、小螺帽、齒輪、凡而、照相機各種五金零件 Excellent Machine-ability and C3601, C3602 Good Excellent to Use Computer, Electronic, Clock, Pen, Light and Fishing, Nut, Gear, Valve Camera Parts, Hardware Parts...							
C3602	(A)									
C3602	(B)									
C3603	(B)									
C3604	(A)									
C3604	(B)									
C3605	(A)	Forging Brass	熱間性良好，精密鍛造亦適合機械零組件。 熱間鍛造性和切削性均佳，凡而，表殼，機械零件等 Excellent Hot Forging Uses Precision Forging, Machine Parts, Excellent Hot Forging and Good Machine-ability . Using Value, Watch, Machine Parts...							
C3712	(B)									
C3771	(A)									
C3771	(B)									

## 測試報告 Test Report

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日期(Date): 2010/02/06

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宮前五金股份有限公司

KUON CHEN HARDWARE CO., LTD.

桃園縣龜山鄉頂湖一街24號

NO. 24, DINGHU 1ST ST., GUIZHAN SHIANG, TAOYUAN COUNTY 333,  
TAIWAN (R. O. C.)



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) : FREE CUTTING BRASS BAR  
樣品型號(Style/Item No.) : C3604  
收件日期(Sample Receiving Date) : 2010/02/01  
測試期間(Testing Period) : 2010/02/01 TO 2010/02/06

=====  
測試需求(Test Requested) : 參照 RoHS 2002/95/EC 及其修定指令要求. (In accordance with the RoHS Directive 2002/95/EC, and its amendment directives).

測試方法(Test Method) : 參考IEC 62321: 2008方法檢測. (With reference to IEC 62321: 2008. Procedures for the Determination of Levels of Regulated Substances in Electrotechnical Products).

- (1) 以感應耦合電漿原子發射光譜儀檢測鎘含量. / Determination of Cadmium by ICP-AES.
- (2) 以感應耦合電漿原子發射光譜儀檢測鉛含量. / Determination of Lead by ICP-AES.
- (3) 以感應耦合電漿原子發射光譜儀檢測汞含量. / Determination of Mercury by ICP-AES.
- (4) 以Spot test / boiling water extraction方法檢測六價鉻含量. / Determination of Hexavalent Chromium by Spot test / boiling water extraction Method.

測試結果(Test Results) : 請見下一頁 (Please refer to next pages).

Nicole Chien / Supervisor  
Signed for and on behalf of  
SGS TAIWAN LTD.  
Chemical Laboratory - Taipei

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# 測試報告

## Test Report

號碼(No.): CE/2010/20213

日期(Date): 2010/02/06

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宮前五金股份有限公司

KUON CHEN HARDWARE CO., LTD.

桃園縣龜山鄉頂湖一街24號

NO. 24, DINGHU 1ST ST., GUIZHAN SHIANG, TAOYUAN COUNTY 333,  
TAIWAN (R. O. C.)

測試結果(Test Results) 單位(Unit): mg/kg

測試項目 (Test Items)	測試方法 Method (Refer to)	結果 (Result)	方法偵測 極限值 (MDL)
		No.1	
鎘 / Cadmium (Cd)	(1)	45	2
鉛 / Lead (Pb)	(2)	29700	2
汞 / Mercury (Hg)	(3)	n.d.	2
六價鉻 / Hexavalent Chromium Cr(VI) by Spot test / boiling water extraction	(4)	Negative	See Note 4

**測試部位描述 (TEST PART DESCRIPTION):**

NO.1 : 銅色金屬 (COPPER COLORED METAL)

**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. Spot-test:

Negative = Absence of Cr(VI) coating / surface layer(鍍層中偵測不到六價鉻),

Positive = Presence of Cr(VI) coating / surface layer(鍍層中偵測到六價鉻);

The tested sample should be further verified by boiling-water-extraction method if the spot test result cannot be confirmed.

(當該測項無法確認時, 測試樣品可藉由boiling-water-extraction測試方法進一步確認)

**Boiling-water-extraction:**

Negative = Absence of Cr(VI) coating / surface layer(鍍層中偵測不到六價鉻),

Positive = Presence of Cr(VI) coating / surface layer(鍍層中偵測到六價鉻);

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

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號碼(No.): CE/2010/20213

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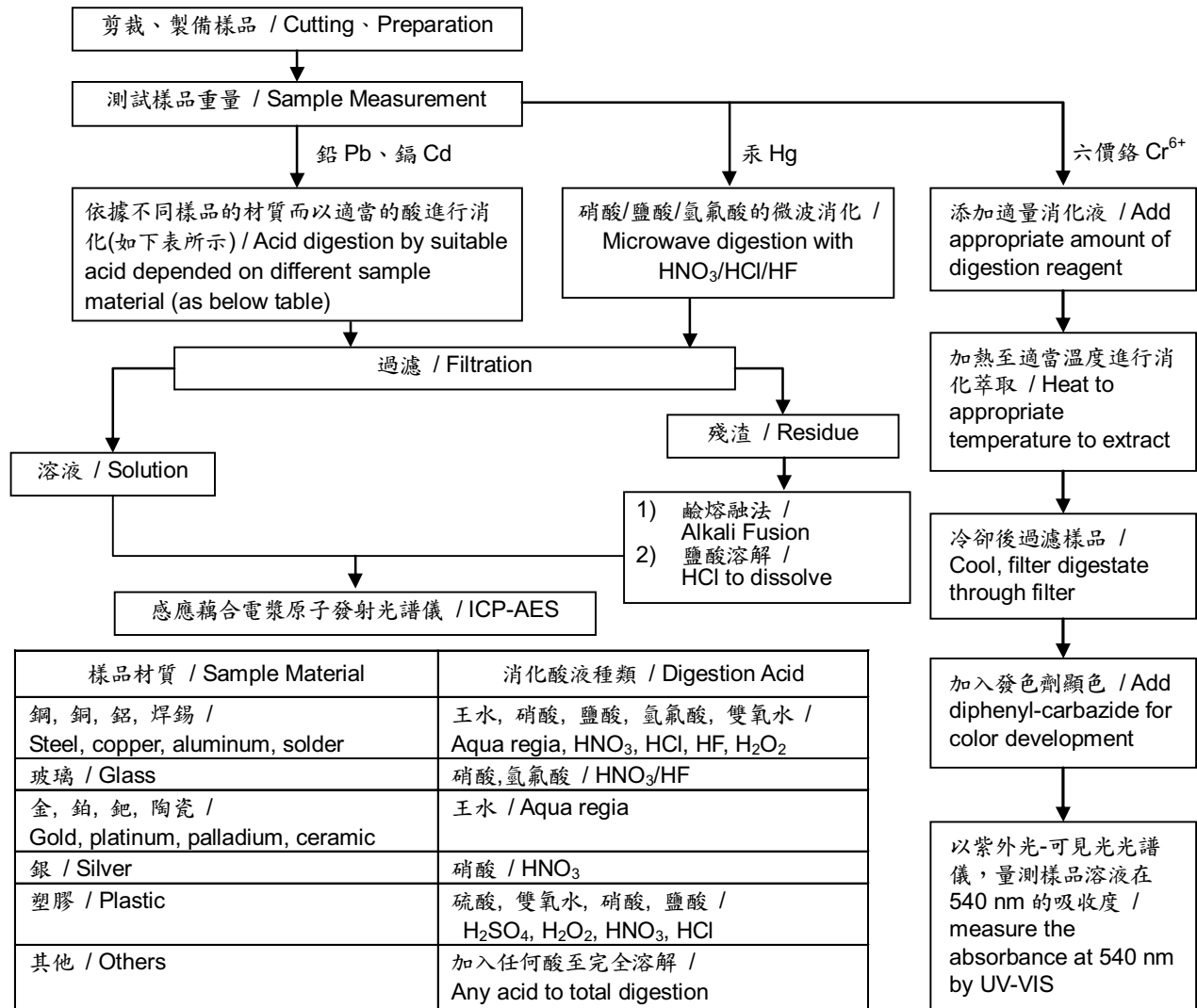
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TAIWAN (R. O. C.)



- 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：楊登偉 / Name of the person who made measurement: Climbgreat Yang
- 3) 測試負責人：張啓興 / Name of the person in charge of measurement: Troy Chang



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苏州市华诺线缆科技有限公司  
苏州相城区太平镇太平大街

以下测试之样品是由申请者所提供及确认: 氟塑料电线电缆

SGS工作编号: SP10-027003 - SUZ  
成分: FEP  
成分: 镀银铜丝  
成分: PTFE  
样品接收日期: 2010年08月04日  
测试周期: 2010年08月04日 - 2010年08月06日  
测试要求: 根据客户要求测试  
测试方法: 请参见下一页  
测试结果: 请参见下一页  
结论: 基于所送样品进行的测试, 测试结果与欧盟RoHS指令2002/95/EC以及后续修正指令的要求相符

通标标准技术服务有限公司  
授权签名



Liu Haipeng, Helen 刘海鹏  
批准签署人

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测试结果:

样品部件外观描述:

1	SHA10-111319.001	白色颗粒
2	SHA10-111319.002	银色金属线
3	SHA10-111319.003	白色粉末

备注:

- (1) 1 mg/kg = 1 ppm = 0.0001%
- (2) MDL = 检测极限值
- (3) ND = 未检出 (< MDL)
- (4) "-" = 未规定

测试方法: 参照IEC 62321:2008:

- (1) 用ICP-OES测定镉的含量.
- (2) 用ICP-OES测定铅的含量.
- (3) 用ICP-OES测定汞的含量.
- (4) 用紫外-可见分光光度计比色法测定六价铬的含量.
- (5) 用GC-MS测定PBBs(多溴联苯)和PBDEs(多溴二苯醚)的含量.

测试项目	限值	单位	MDL	001	003
镉(Cd)	100	mg/kg	2	ND	ND
铅(Pb)	1,000	mg/kg	2	ND	ND
汞(Hg)	1,000	mg/kg	2	ND	ND
六价铬(CrVI)	1,000	mg/kg	2	ND	ND
多溴联苯之和(PBBs)	1,000	mg/kg	-	ND	ND
一溴联苯	-	mg/kg	5	ND	ND
二溴联苯	-	mg/kg	5	ND	ND
三溴联苯	-	mg/kg	5	ND	ND
四溴联苯	-	mg/kg	5	ND	ND
五溴联苯	-	mg/kg	5	ND	ND
六溴联苯	-	mg/kg	5	ND	ND
七溴联苯	-	mg/kg	5	ND	ND
八溴联苯	-	mg/kg	5	ND	ND
九溴联苯	-	mg/kg	5	ND	ND
十溴联苯	-	mg/kg	5	ND	ND

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测试项目	限值	单位	MDL	001	003
十溴联苯	-	mg/kg	5	ND	ND
多溴二苯醚之和(PBDEs)	1,000	mg/kg	-	ND	ND
一溴二苯醚	-	mg/kg	5	ND	ND
二溴二苯醚	-	mg/kg	5	ND	ND
三溴二苯醚	-	mg/kg	5	ND	ND
四溴二苯醚	-	mg/kg	5	ND	ND
五溴二苯醚	-	mg/kg	5	ND	ND
六溴二苯醚	-	mg/kg	5	ND	ND
七溴二苯醚	-	mg/kg	5	ND	ND
八溴二苯醚	-	mg/kg	5	ND	ND
九溴二苯醚	-	mg/kg	5	ND	ND
十溴二苯醚	-	mg/kg	5	ND	ND

备注:

(1)最大允许极限值引用自2002/95/EC RoHS指令和后续修正指令2005/618/EC.

测试方法: 参照IEC 62321:2008:

- (1) 用ICP-OES测定镉的含量.
- (2) 用ICP-OES测定铅的含量.
- (3) 用ICP-OES测定汞的含量.
- (4) 用点测试法/紫外-可见分光光度计比色法测定六价铬的含量.
- (5) 用GC-MS测定PBBs(多溴联苯)和PBDEs(多溴二苯醚)的含量.

测试项目	限值	单位	MDL	002
镉 (Cd)	100	mg/kg	2	ND
铅(Pb)	1,000	mg/kg	2	ND
汞 (Hg)	1,000	mg/kg	2	ND
六价铬(CrVI)	-	-	◇	Negative
多溴联苯之和(PBBs)	1,000	mg/kg	-	ND
一溴联苯	-	mg/kg	5	ND
二溴联苯	-	mg/kg	5	ND
三溴联苯	-	mg/kg	5	ND
四溴联苯	-	mg/kg	5	ND
五溴联苯	-	mg/kg	5	ND
六溴联苯	-	mg/kg	5	ND
七溴联苯	-	mg/kg	5	ND
八溴联苯	-	mg/kg	5	ND

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测试项目	限值	单位	MDL	002
九溴联苯	-	mg/kg	5	ND
十溴联苯	-	mg/kg	5	ND
多溴二苯醚之和(PBDEs)	1,000	mg/kg	-	ND
一溴二苯醚	-	mg/kg	5	ND
二溴二苯醚	-	mg/kg	5	ND
三溴二苯醚	-	mg/kg	5	ND
四溴二苯醚	-	mg/kg	5	ND
五溴二苯醚	-	mg/kg	5	ND
六溴二苯醚	-	mg/kg	5	ND
七溴二苯醚	-	mg/kg	5	ND
八溴二苯醚	-	mg/kg	5	ND
九溴二苯醚	-	mg/kg	5	ND
十溴二苯醚	-	mg/kg	5	ND

## 备注:

(1)最大允许极限值引用自2002/95/EC RoHS指令和后续修正指令2005/618/EC.

(2)◇点测试法:

**Negative**= 镀层中未检测到六价铬, **Positive** = 镀层中检测到六价铬;

(当点测试结果为**Negative**或无法确定时,将采用沸水萃取法作进一步的结果验证.)

◇沸水萃取法:

**Negative** = 镀层中未检测到六价铬

**Positive** = 镀层中检测到六价铬;表明50 cm<sup>2</sup>表面积的被测试样品的沸水萃取液中六价铬的浓度等于或大于0.02 mg/kg.

针对金属表面的防腐涂层:由于未获知样品的存储条件和生产日期,样品的六价铬测试结果仅代表测试时样品的状态.

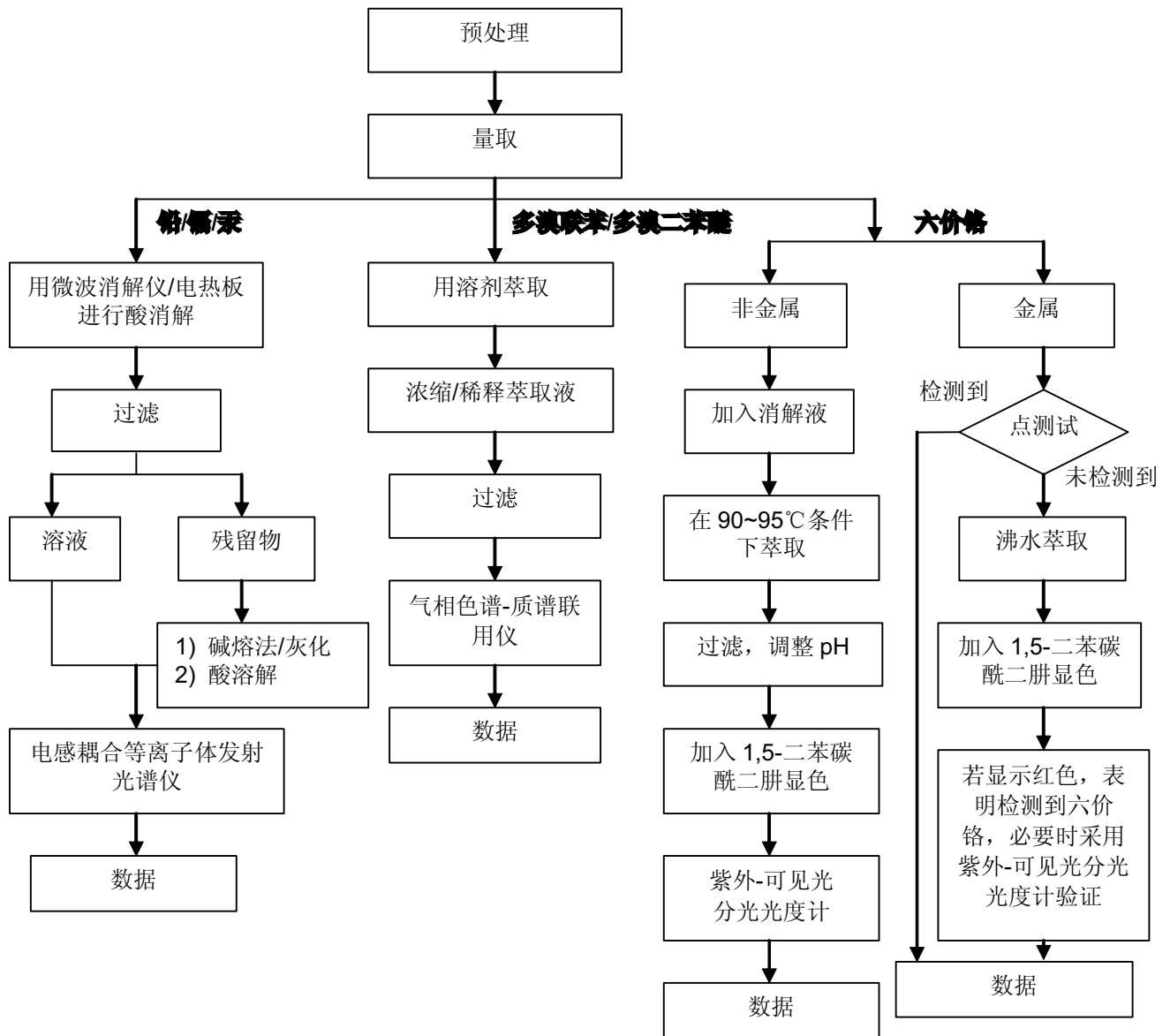
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**附件**

**RoHS 测试流程图**

- 1) 分析人员: 肖飞/左克春/赵旭东/林以琳
- 2) 项目负责人: 张春华/徐亮/岳林禾
- 3) 样品按照下述流程被完全消解(六价铬和多溴联苯/多溴二苯醚测试除外)。



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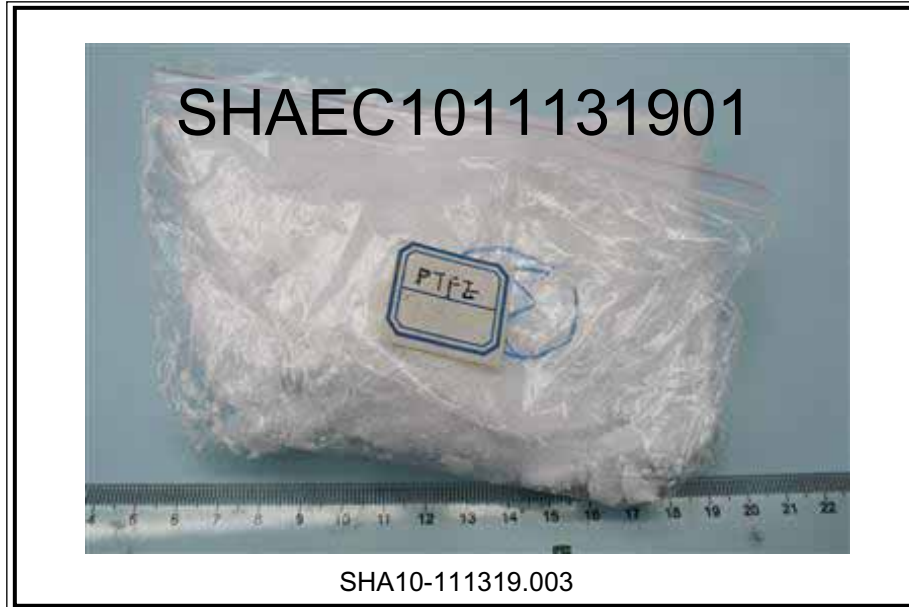


样品照片:



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SHA10-111319.003

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