# Specification For Approval

Date: 2014 / 04/ 09

File No.: 140409002

Version: 1.0

**Customer：** 盛達電業股份有限公司

**Customer P/N：** **AAZANDHS2AN0727600**

**INVAX P/N：** **AN0727-64DP5BSM**

**Description：** **Antenna**

| | |
|---|---|
| **Cortec Checked By:** | R@D Dept 2014.04.09 Jack; 海達電子有限公司 工程課 承認章 |
| **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

**Index:**

## 3. Revision History

| Revision | Date | Change Notification | Description |
|---|---|---|---|
| 1.0 | | | |
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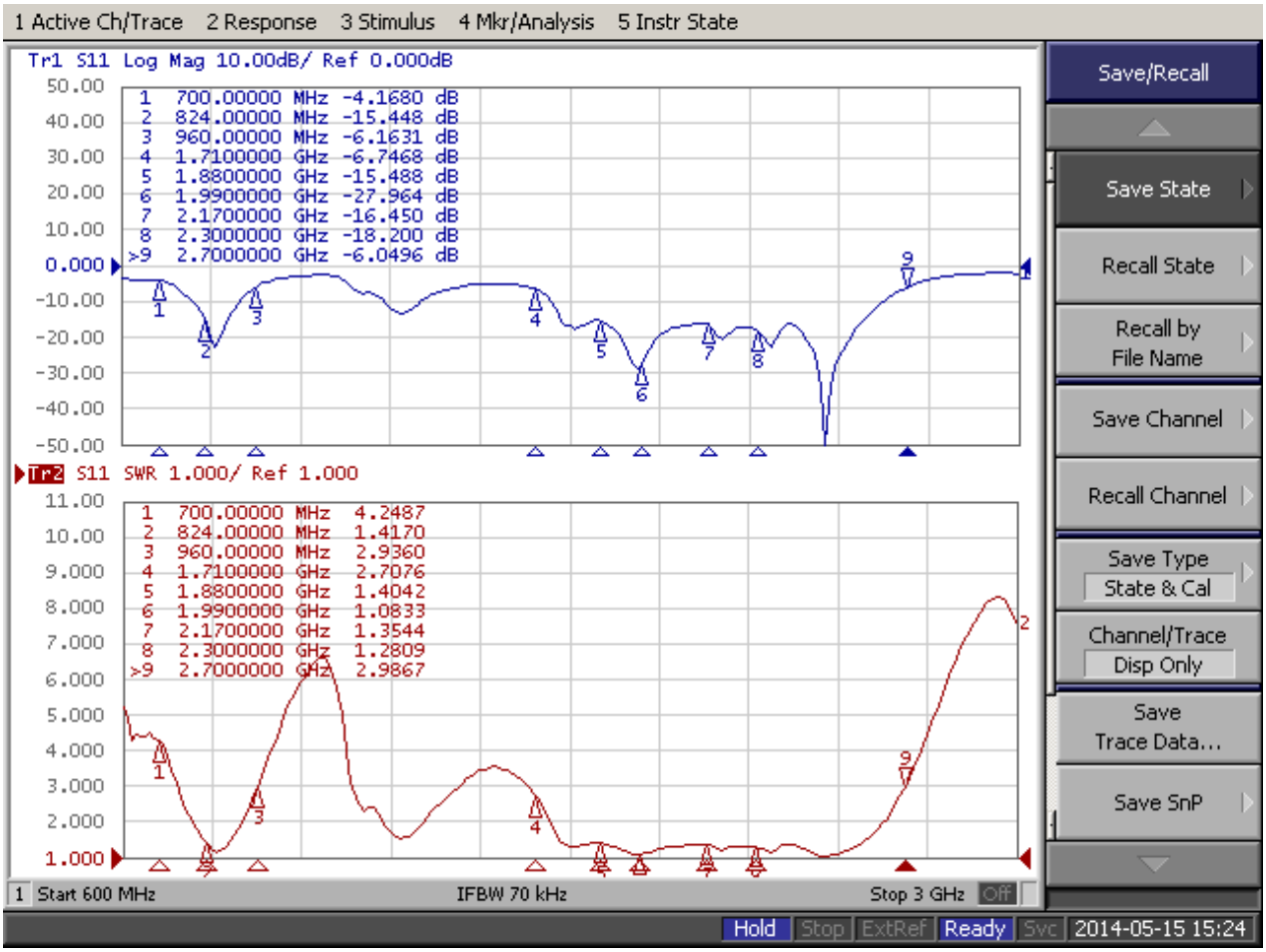
## 4. S pecification

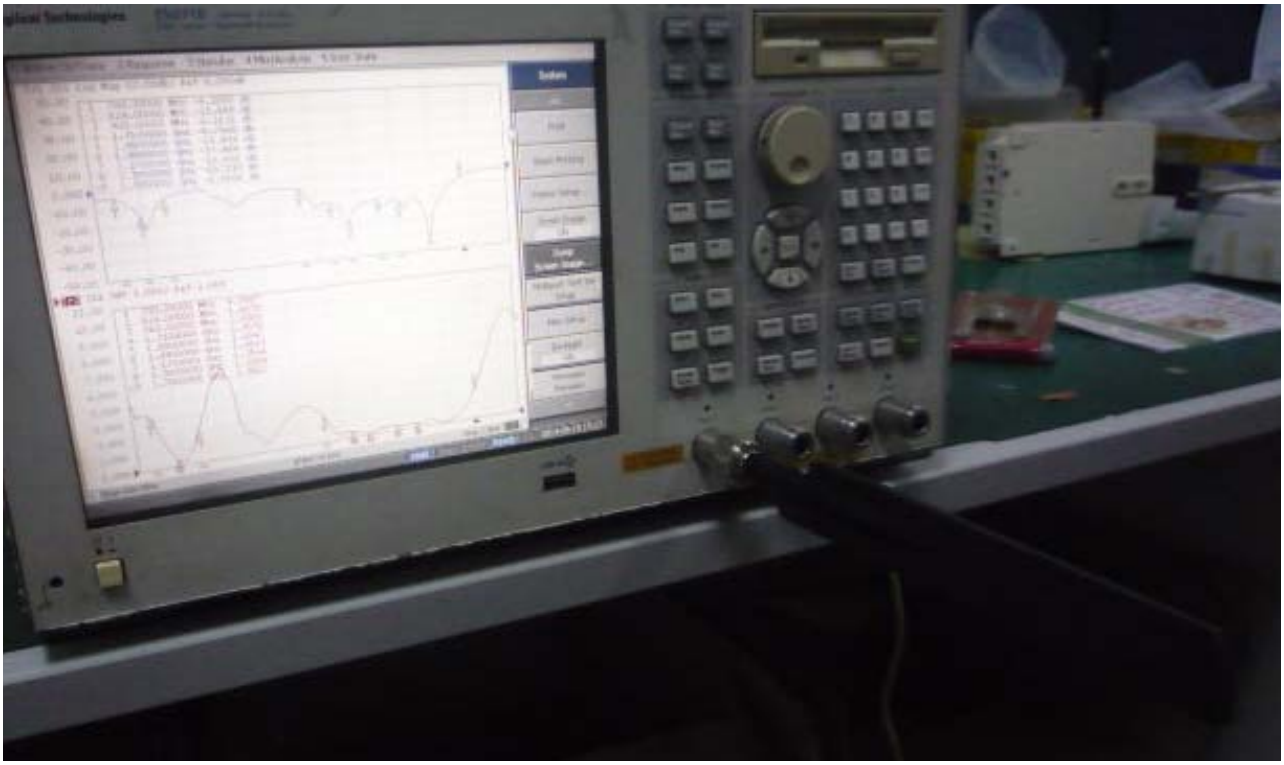
| Sample Photo | |
|---|---|
|  | |
| **A. Electrical Characteristics** | |
| Frequency | 700 ~ 960 MHz<br>1710 ~ 2700 MHz |
| S.W.R. | <= 2.0 @ 824 MHz<br><= 2.0 @ 1880 ~ 2300 MHz |
| Antenna Gain | 0.5 ± 0.5dBi @ 700 ~ 960 MHz<br>2.0 ± 0.7dBi @ 1710 ~ 2700 MHz |
| Efficiency (%) | 40 % @ 700 ~ 960 MHz<br>76% @ 1710 ~ 2700 MHz |
| Polarization Linear | |
| Impedance | 50 Ohm |
| **B. Material & Mechanical Characteristics** | |
| Material of Radiator | Cu |
| Material of Plastic | BODY: ABS<br>HINGE:ABS |
| Cable Type | RG-178U-03 |
| Connecter Type | SMA Male |
| **C. Environmental** | |
| Operation Temperature | - 40 ℃ ~ + 65 ℃ |
| Storage Temperature | - 40 ℃ ~ + 80 ℃ |
| Antenna Color Storage life | < 2 year |

## 5. Characteristics and Reliability Test

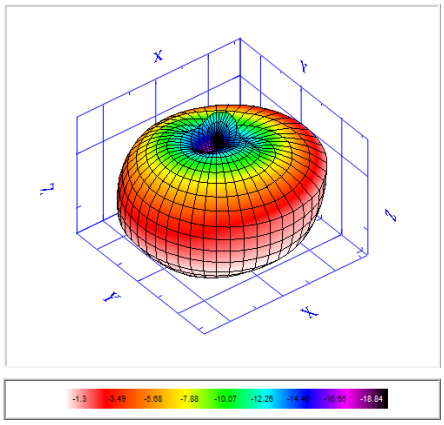
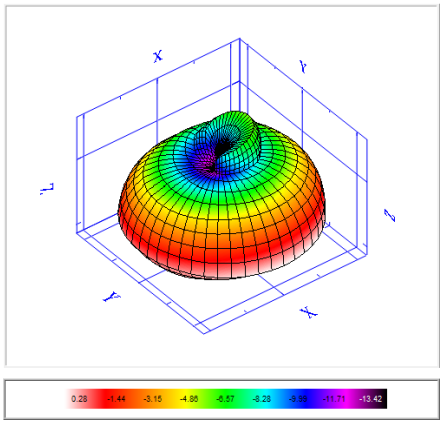
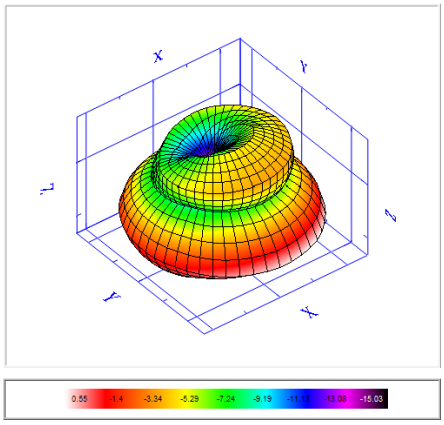
| Test Items | | Test Condition and Procedure | Requirements |
|---|---|---|---|
| C1 | S.W.R. | Set DUT on Network Analyzer; make individual calibration to test | Directive DUT specification |
| C2 | Antenna Gain | Set DUT on Antenna Chamber; make individual calibration to test | Directive DUT specification |
| M1 | Vibration | GB / T2423 . 48-1997<br>Amplitude: 0.03 inch (1.5mm); Freq: 20 to 80 to 20 Hz<br>3 directions; 2 hours for each direction | 1. No Visual Damage<br>2. Frequency Tol.<= 5% |
| M2 | Random Drop | GB / T2423.8-1995<br>Height: 1.0 Meter;<br>3 directions; 1 time for each direction | 1. No parts separated<br>2. Frequency Tol.<= 5% |
| M3 | Solderability | GB 2423 . 28- 82<br>Solder iron: 260±5°C; Duration: 5 seconds | 1. Mounted on PCB<br>2. No Visual Damage |
| M4 | Terminal-Pull Test | Holding with individual specification; force applied to axis of terminal | 1. Directive DUT specification<br>2. Frequency Tol.<= 5% |
| M5 | Terminal-Torque Test | Holding with individual specification; applied clockwise and counterclockwise to the axis of terminal | 1. Directive DUT specification<br>2. Frequency Tol.<= 5% |
| M6 | Dimension | Inspection of dimension, color, material, package, surface process | Directive DUT specification |
| E1 | Salt Spray | GB / T 2423 . 17- 93<br>Temp: 35°C; RH: >= 95%; NaCl solution: >= 5%;<br>Time: 24 hours | After 2 Hours Recovery<br>1. No Visual Damage<br>2. Frequency Tol.<= 5% |
| E2 | Humidity | GB / T 2423 . 4 - 93<br>Temp: 80°C / 12 H; -40°C / 12H RH: >= 90%;<br>Time: 24 hours | After 2 Hours Recovery<br>1. No Visual Damage<br>2. Frequency Tol.<= 5% |
| E3 | Thermal Shock | GB / T 2423 . 22 - 87<br>1 Cycle: - 40°C (30 minutes) to + 80°C (30 minutes)<br>Cycles: 24 | After 2 Hours Recovery<br>1. No Visual Damage<br>2. Frequency Tol.<= 5% |
| E4 | Life (High Temp.) | GB /T 2423 . 2 - 89<br>Temp: 80°C; Time: 24 hours | After 2 Hours Recovery<br>1. No Visual Damage<br>2. Frequency Tol.<= 5% |
| R1 | RoHS | With Reference to IEC 62321:2008 with flow chart | Directive RoHS 2011/65/EU |
| 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 |

## 6. Antenna - S Parameter Test Data

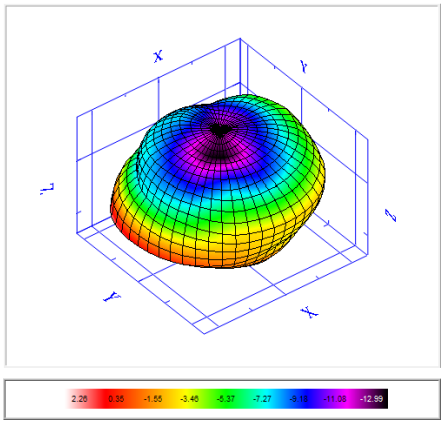
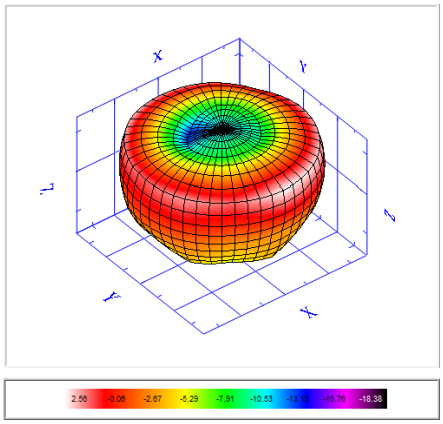
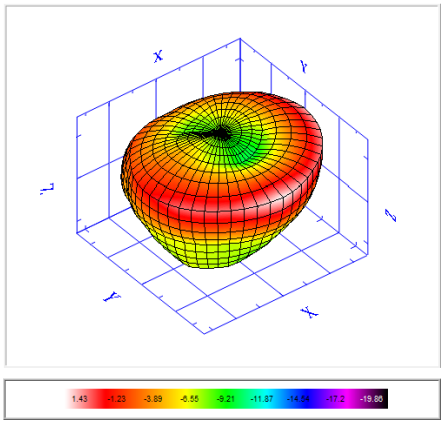


## 7. Antenna - Radiation Pattern Test Data

| 704 MHZ | 824 MHZ | 960 MHZ |
|---|---|---|
|  |  |  |

| Frequency | 704 | 824 | 880 | 960 |
|---|---|---|---|---|
| TRP (dBm) | -4.86 | -3.74 | -3.45 | -3.65 |
| Peak EIRP (dBm) | -1.3 | 0.28 | 0.71 | 0.55 |
| NHPRP +/- 45 (degree) | -4.57 | -3.5 | -3.23 | -3.41 |
| NHPRP +/- 30 (degree) | -5.58 | -4.79 | -4.53 | -4.97 |
| E-Theta Peak Gain (dBi) | -7.42 | -6.32 | -5.78 | -5.7 |
| E-Phi Peak Gain (dBi) | -1.73 | 0.01 | 0.51 | 0.34 |
| E-Total Peak Gain (dBi) | -1.3 | 0.28 | 0.71 | 0.55 |
| Directivity (dBi) | 3.56 | 4.02 | 4.16 | 4.2 |
| Efficiency (%) | 32.69 | 42.28 | 45.19 | 43.14 |

| 1710 MHZ | 2200 MHZ | 2700 MHZ |
|---|---|---|
|  |  |  |

| Frequency | 1710 | 1880 | 1990 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TRP (dBm) | -1.35 | -1.09 | -0.64 | -0.63 | -0.55 | -0.63 | -1.49 | -1.76 | -0.79 | -1.33 | -3.33 |
| Peak EIRP (dBm) | 2.26 | 0.64 | 1.38 | 1.52 | 2.32 | 2.56 | 1.22 | 2.38 | 3.7 | 3 | 1.43 |
| NHPRP +/- 45 (degree) | -1.22 | -1.36 | -1 | -1 | -0.93 | -1.08 | -1.81 | -2.06 | -1.07 | -1.73 | -4.09 |
| NHPRP +/- 30 (degree) | -2.77 | -1.87 | -1.22 | -1.21 | -1.08 | -1.2 | -2.48 | -2.37 | -1.13 | -1.68 | -3.98 |
| E-Theta Peak Gain (dBi) | -7.6 | -11.2 | -13.9 | -14.1 | -12.8 | -10.3 | -9.71 | -8.94 | -8.18 | -11.3 | -13.4 |
| E-Phi Peak Gain (dBi) | 2.25 | 0.62 | 1.36 | 1.51 | 2.29 | 2.55 | 1.17 | 2.34 | 3.68 | 3 | 1.42 |
| E-Total Peak Gain (dBi) | 2.26 | 0.64 | 1.38 | 1.52 | 2.32 | 2.56 | 1.22 | 2.38 | 3.7 | 3 | 1.43 |
| Directivity (dBi) | 3.61 | 1.73 | 2.02 | 2.16 | 2.88 | 3.19 | 2.7 | 4.14 | 4.49 | 4.33 | 4.77 |
| Efficiency (%) | 73.24 | 77.8 | 86.31 | 86.43 | 88.07 | 86.49 | 71.01 | 66.74 | 83.37 | 73.7 | 46.43 |

## 8. Mechanical Drawing

**See attached files**

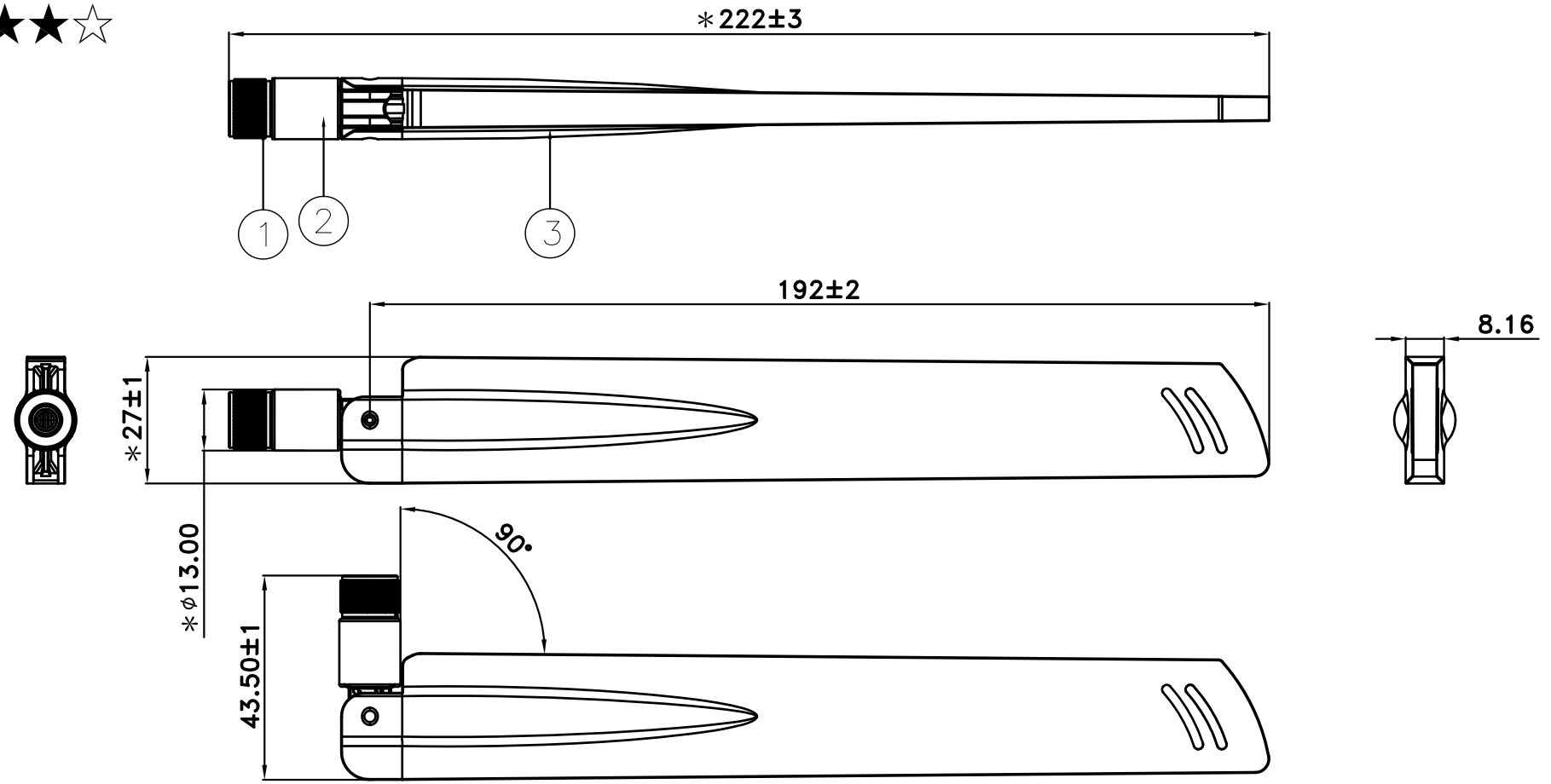
## 9. Material Description and RoHS Test Report

**See attached files**

RoHS Compatible

★★★★☆

| SIGN | DATE | DESCRIPTION | APPROVER |
|---|---|---|---|
| A | | | |
| B | | | |
| C | | | |




Note:
1.Take" ＊ "is the important dimension.
2.Tolerance:Unmarked tolerance refer to the standard tolerance please.

| No. | Part Number | Name | Material | Finish | Q'ty |
|---|---|---|---|---|---|
| 3 | AN64D-P5-01B | Body | ABS | Black | 1 |
| 2 | Hinge-AN67-01B | Hinge | ABS | Black | 1 |
| 1 | SMA207-CCT5AN19-A | SMA公頭公針 | Cu | Black | 1 |

Invax System Group.
Cortec
Cortec Technology Inc.
Http://www.invaxsystem.com Tel:886-2-27885218
E-mail:info@invax.com.tw Fax:886-2-27831658

TITLE: AN64D Type LTE Antenna

PART NO.: AN0727-64DP5BSM | CUSTOMER P/N: /

| APP BY | CHK BY | RF BY | DES BY | |
|---|---|---|---|---|
| Grant 2013/12/03 | Jack 2013/12/03 | SiFei 2013/12/03 | LJHUA 2013/12/03 | UNITS: mm<br>SCALE: /<br>REVISION: A |

Tolerance
X.X ±0.5
X.XX ±0.2
X° ±1

Invax System Group.

Cortec

# 產品包裝規範
# PACKING CRITERION

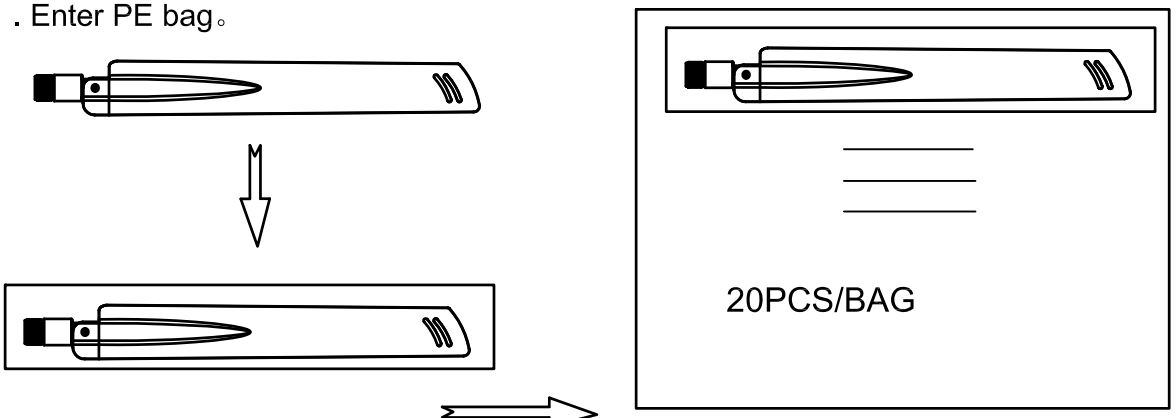
★★★★☆

Date: 2014.04.09



| Part Number : AN0727-67DP5BSM | Revision : A |
|---|---|
| Name: 700~960MHZ/1710~2700MHz Antenna | Customer : |

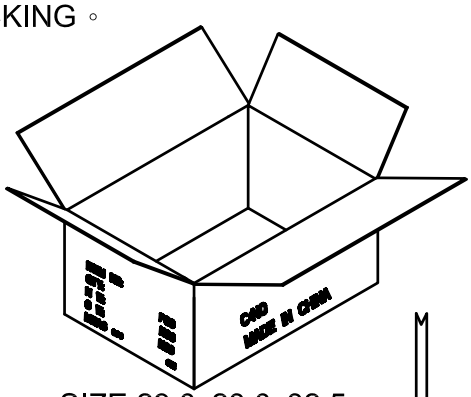
1 . Enter PE bag。




R-STI-BAG-25040

R-PE-BAG-310290

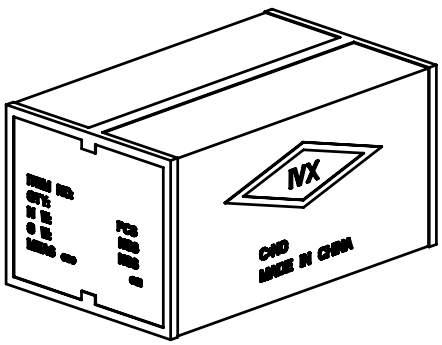
2.PACKING。

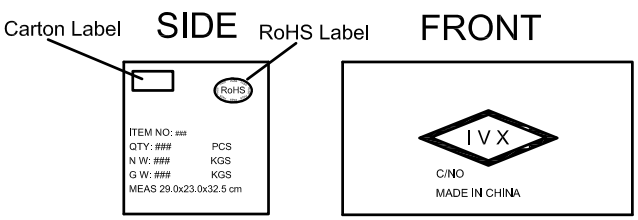



SIZE:29.0x23.0x32.5cm
300PCS/BOX

Cardboard :2pcs/BOX

3 . SEALING。




APPROVED BY： Grant　CHECKED BY： Jack　DESIGNED BY： LJHUA

SGS 台灣網站 → http://twap.sgs.com/sgsrsts/chn/cheres_tw.asp
SGS 大陸網站 → http://rsts.cn.sgs.com/chn/cheres_cn.asp
SGS 韓國網站 → 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)

COR/F-G-47a

| 康捷電子有限公司 | |
|---|---|
| 填表： | 時麗 |
| 部門： | 研發部 |
| 職務： | 文員 |

# 物料中HSF對象物質含量調查表

物料名稱： AN0727-64DP5BSM

| 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 | Hinge-AN67-01B | Hinge | ABS | N.D. | N.D. | N.D. | N.D. | N.D. | N.D. | 10044908 034 | 2014.01.02 | ABS-757 | TuvRheinland |
| 2 | AN64D-P5-01B | Body | ABS | N.D. | N.D. | N.D. | N.D. | N.D. | N.D. | 10044908 034 | 2014.01.02 | ABS-757 | TuvRheinland |
| 3 | SMA207-CCT5AN19-A | SMA Male | 銅 | 60 | 31000 | N.D. | Negative | | | CE/2013/73960 | 2013.07.25 | REECUTTINGBRASSBA | 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，鎘的允許濃度爲5ppm

歐盟ROHS指令豁免條款2009/95/BC、钢中合金元素中的铅含量达0.35%、铝含量达0.4%、铜合金中的铅含量达4%

# Prüfbericht - Nr.: 10044908 034

*Test Report No.:*



| | |
|---|---|
| **Auftraggeber:** *Client:* | Chi Mei Corporation<br>59-1, San Chia, Jen Te, Tainan City 71702, Taiwan, R.O.C. |
| **Gegenstand der Prüfung:** *Test Item:* | ACRYLONITRILE-BUTADIENE-STYRENE COPOLYMER |
| **Bezeichnung:** *Identification:* | POLYLAC® PA-757 / Nature |
| **Anlieferungszustand:** *Delivery condition:* | apparent good |
| **Eingangsdatum:** *Date of Receipt:* | 2013-12-16 |
| **Prüfort:** *Testing location:* | TÜV Rheinland Hong Kong Ltd. |
| **Prüfgrundlage:** *Test specification:* | According to RoHS (recast): Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment, 2011/65/EU: Total Content of Lead, Cadmium, Mercury, Chromium VI, Polybrominated Biphenyls, Polybrominated Diphenyl Ethers |
| **Prüfergebnis:** *Test result:* | According to the kind and extend of tests performed the above mentioned test item passed the test specification. |

**geprüft:** *tested by:*

| Datum *Date* | Name/Stellung *Name/Position* | Unterschrift *Signature* |
|---|---|---|
| 2014-01-02 | Anne Chen /Coordinator | |

**kontrolliert:** *checked by:*

| Datum *Date* | Name/Stellung *Name/Position* | Unterschrift *Signature* |
|---|---|---|
| 2014-01-02 | Carl Chang /Department Manager | |

**Sonstiges/** *Other Aspects:*

Test period: 2013-12-16 – 2014-01-02

| *Abkürzungen:* | | | | *Abbreviations:* | | | |
|---|---|---|---|---|---|---|---|
| | *ok / P* | = | *entspricht Prüfgrundlage* | | *ok / P* | = | *passed* |
| | *fail / F* | = | *entspricht nicht Prüfgrundlage* | | *fail / F* | = | *failed* |
| | *n.a. / N* | = | *nicht anwendbar* | | *n.a. / N* | = | *not applicable* |



TÜV Rheinland Taiwan Ltd. Softlines
4F., No.758, Sec. 4, Bade Rd., Songshan Dist., Taipei 105, Taiwan, R.O.C.
Tel.:+886 2 2172-7000 Fax: +886 2 2528-0018
Mail: service-gc@tuv.com · Web: www.twn.tuv.com

TÜV Rheinland Taiwan Ltd. Chemical Laboratory

Test Report No. : 10044908 034 2014-01-02
Customer : Chi Mei Corporation
Test Method : Cd, Pb, Hg, Cr VI, PBB/PBDE – determination with reference to EN 62321:2009

| Sample<br>Material<br>Lab.-No. | | LoD | POLYLAC® PA-757 / Nature<br>plastic / light yellow<br>TCL131216-39 |
|---|---|---|---|
| Cadmium (Cd) | mg/kg | 2 | n.d. |
| Lead (Pb) | mg/kg | 2 | n.d. |
| Mercury (Hg) | mg/kg | 2 | n.d. |
| Chromium VI (Cr VI) | mg/kg | 2 | n.d. |
| PBBs | mg/kg | 10 | n.d. |
| PBDEs | mg/kg | 10 | n.d. |

Notes:
- n.d. - not detected
- n.a. - not applicable
- LoD - Limit of Detection
- mg/kg is equal to ppm (parts per million)

| | Cd | Cr(VI) | Pb | Hg | PBBs | PBDEs |
|---|---|---|---|---|---|---|
| **Maximum permissible Limit acc. to 2011/65/EU (mg/kg)** | 100 | 1000 | 1000 | 1000 | 1000 | 1000 |

**Test Sample**

--- End of Test-Report ---

TÜV Rheinland Taiwan Ltd. Chemical Laboratory TÜVRheinland®

# 測試報告
# Test Report

號碼(No.) : CE/2013/73960　　日期(Date) : 2013/07/25　　頁數(Page): 1 of 4

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, GUISHAN SHIANG, TAOYUAN COUNTY 333, TAIWAN (R. O. C.)

**以下測試樣品係由申請廠商所提供及確認 (The following sample(s) was/were submitted and identified by/on behalf of the applicant as):**

| | | |
|---|---|---|
| 送樣廠商(Sample Submitted By) | : | 宮前五金股份有限公司 (KUON CHEN HARDWARE CO., LTD.) |
| 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) | : | 2013/07/19 |
| 測試期間(Testing Period) | : | 2013/07/19 TO 2013/07/25 |

==========

**測試需求(Test Requested) :** 依據客戶要求, 參考RoHS 2011/65/EU Annex II 指令進行鎘, 鉛, 汞, 六價鉻測試. (As specified by client, with reference to RoHS Directive 2011/65/EU Annex II to determine Cadmium, Lead, Mercury, Cr(VI) contents in the submitted sample.)

**測試方法(Test Method) :** 參考IEC 62321: 2008方法 / With reference to IEC 62321: 2008.

**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

# 測試報告
# Test Report

號碼(No.) : CE/2013/73960　　日期(Date) : 2013/07/25　　頁數(Page): 2 of 4

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, GUISHAN SHIANG, TAOYUAN COUNTY 333, TAIWAN (R. O. C.)

**測試結果(Test Results)**

測試部位(PART NAME)No.1　：　銅色金屬 (COPPER COLORED METAL)

| 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 | 60 |
| 鉛 / Lead (Pb) | mg/kg | | 2 | 31000 |
| 汞 / Mercury (Hg) | mg/kg | | 2 | n.d. |
| 六價鉻 / Hexavalent Chromium Cr(VI) | ** | 參考IEC 62321: 2008方法, 以沸水萃取法檢測. / With reference to IEC 62321: 2008 and performed by Boiling water extraction Method.# | # | Negative |

**備註(Note):**

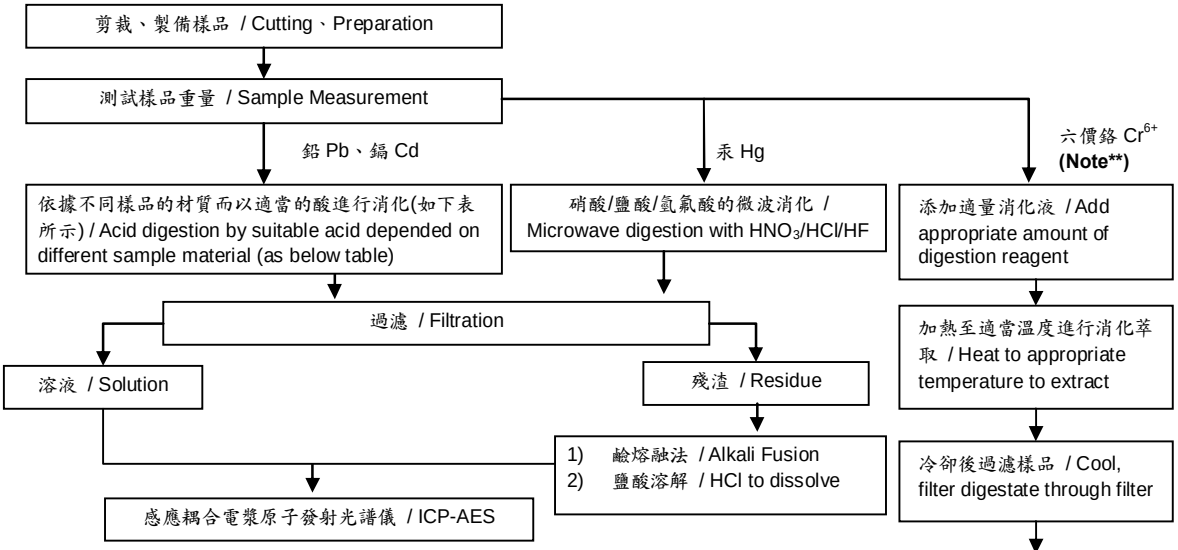
1. mg/kg = ppm；0.1wt% = 1000ppm
2. n.d. = Not Detected (未檢出)
3. MDL = Method Detection Limit (方法偵測極限值)
4. **= Qualitative analysis (No Unit) 定性分析(無單位)
5. # = a. Positive means the presence of CrVI on the tested areas
   (Positive表示測試區域偵測到六價鉻)
   b. Negative means the absence of CrVI on the tested areas
   (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 $cm^2$ tested areas. / 該溶液濃度≧0.02 mg/kg with 50 $cm^2$ (tested areas)

# 測試報告
# Test Report



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, GUISHAN SHIANG, TAOYUAN COUNTY 333, 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.（$Cr^{6+}$ 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




| 樣品材質 / Sample Material | 消化酸液種類 / Digestion Acid |
|---|---|
| 鋼，銅，鋁，焊錫 / Steel, copper, aluminum, solder | 王水，硝酸，鹽酸，氫氟酸，雙氧水 / Aqua regia, $HNO_3$, HCl, HF, $H_2O_2$ |
| 玻璃 / Glass | 硝酸,氫氟酸 / $HNO_3$/HF |
| 金，鉑，鈀，陶瓷 / Gold, platinum, palladium, ceramic | 王水 / Aqua regia |
| 銀 / Silver | 硝酸 / $HNO_3$ |
| 塑膠 / Plastic | 硫酸，雙氧水，硝酸，鹽酸 / $H_2SO_4$, $H_2O_2$, $HNO_3$, HCl |
| 其他 / Others | 加入適當的試劑至完全溶解 / Added appropriate reagent to total digestion |

**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.

# 測試報告
# Test Report

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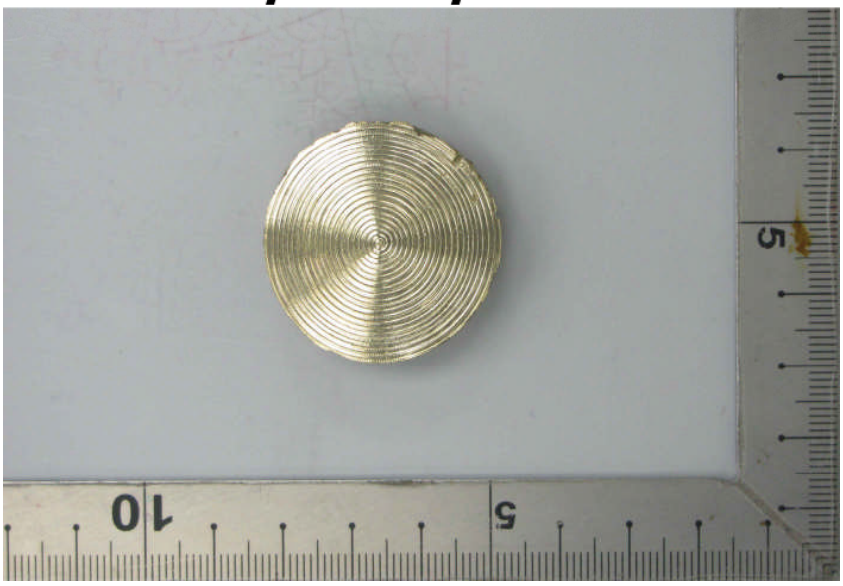
*** 照片中如有箭頭標示，則表示爲實際檢測之樣品/部位. ***
**(The tested sample / part is marked by an arrow if it's shown on the photo.)**

**CE/2013/73960**




** 報告結尾 (End of Report) **