

產品規格承認書

Specification For Approval

日期： 2007 / 06 / 16

Date

編號： 070616004

File No.

版本： 1.0

Revision

承認廠商： 偉 德

Customer

製造廠商： 康捷電子有限公司

Manufacturer

型號品名： 2.4GHz External Antenna

Part Number

Description

R-AN2400-1901RS

廠商審核：

Approved By

Invax

英碩科技股份有限公司
台北市忠孝東路五段 815 號 4 樓
Tel: 886-2-2788-5218 Fax: 886-2-2783-1658

Cortec

東莞康捷電子有限公司
廣東省東莞市長安鎮振安路
沙頭段咸西工業區
Tel: 86-769-85388261 Fax: 86-769-85397133

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- 2. Specification**
- 3. S Parameter Test Data**
- 4. Antenna Radiation Pattern**
- 5. Mechanical Drawing**
- 6. MSDS & SGS Report**

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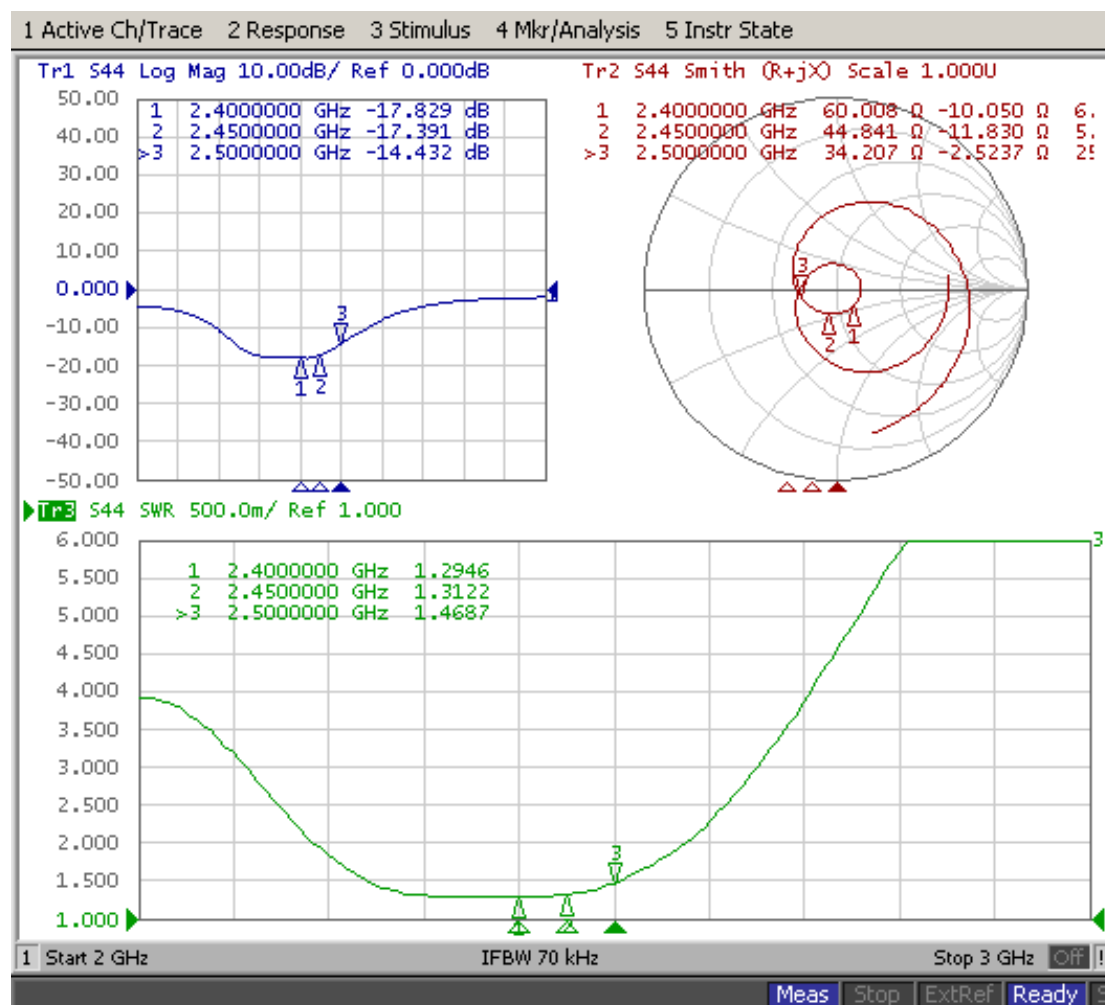
1. Reliability Testing

| Test Item | Procedure | Requirement |
|---|---|--|
| 1. Visual inspection and Dimension Check | Applicable methods using x5 magnification | follow specification |
| 2. Rapid Changing of Temperature | -40°C (30minutes) to 90°C (30minutes); 24 cycles | After 2 hours recovery: 1. no visible damage 2. Freq. Tol.: < ±5% |
| 3. Damp Heat | 24 hours at 60°C; 90 ~ 95% RH | After 2 hours recovery: 1. no visible damage 2. Freq. Tol. : < ±5% |
| 4. Endurance | 24 hours at 90°C | After 2 hours recovery: 1. no visible damage 2. Freq Tol.: < ±5% |

2. Specification

| A. Electrical Characteristics | |
|-------------------------------|---|
| S.W.R. | ≤ 2.0 @ 2400 ~ 2500 MHz |
| Antenna Gain | 5.0 ± 0.7 dBi (*Depends on Product Mechanical Environment*) |
| Impedance | 50 Ohm |
| B. Material | |
| Material of Radiator | Cu (Plated) |
| Connector Type | 50 Ohm SMA Male Reverse |
| C. Environmental | |
| Operation Temperature | - 30 °C ~ + 85 °C |
| Storage Temperature | - 30 °C ~ + 85 °C |

3. S Parameter Test data



4. Antenna Radiation Pattern

Testing Equipment Specification:

Antenna Anechoic Chamber Dimension: 8 x 4 x 4 m

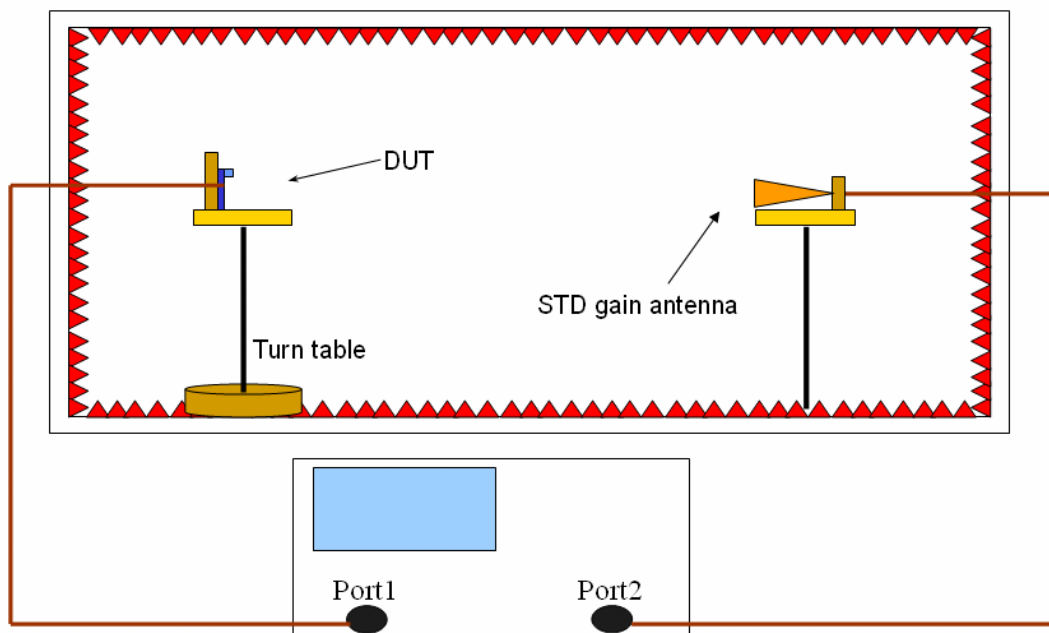
Quiet Zone: 600mm @1 GHz

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

6. MSDS & SGS Report



Cortec Technology Inc.

广东省东莞市长安镇振安路沙头段咸西工业区

Model : 2.4GHz-5dBi Antenna // 03
Remark : H-Plane // Vertical Polarization
Tested by : CORTEC Antenna 3D Lab // Zhao Yao Rong

Location: Chamber

Date: 2007/5/12

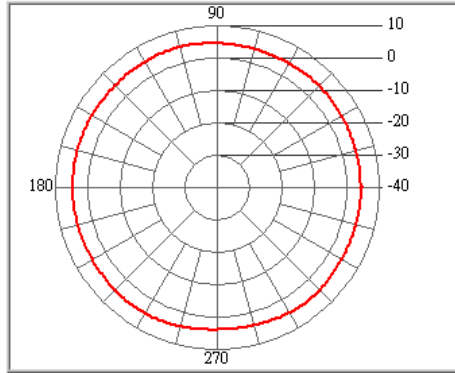
Time: 上午 09:43:22

Temperatur (°C): 22.00

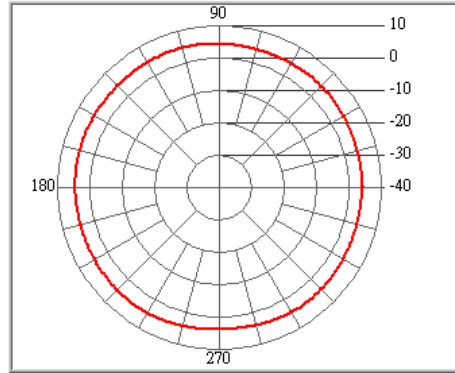
Humidity (%): 55.00

Approved by:

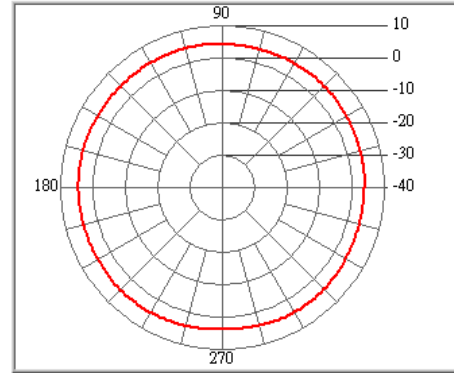
| Freq. (MHz) | 2390 | 2400 | 2410 | 2420 | 2430 | 2440 | 2450 | 2460 | 2470 | 2480 | 2490 | 2500 |
|-----------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Peak Gain (dBi) | 5 | 4.76 | 4.61 | 4.74 | 4.92 | 4.83 | 4.73 | 4.78 | 5.02 | 4.94 | 4.78 | 4.85 |
| Peak Degree | 117 | 228 | 228 | 228 | 295 | 295 | 203 | 105 | 105 | 105 | 99 | 99 |
| AV Gain (dBi) | 4.52 | 4.37 | 4.3 | 4.45 | 4.65 | 4.56 | 4.46 | 4.47 | 4.72 | 4.57 | 4.36 | 4.38 |



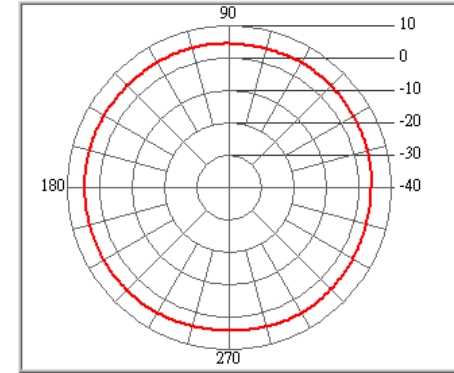
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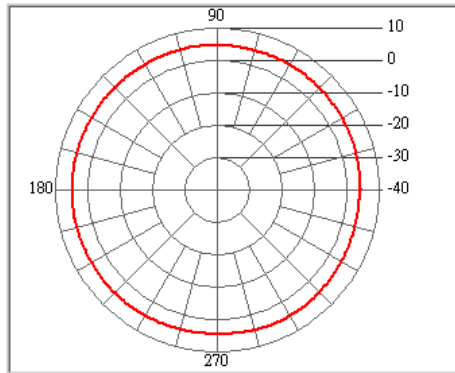
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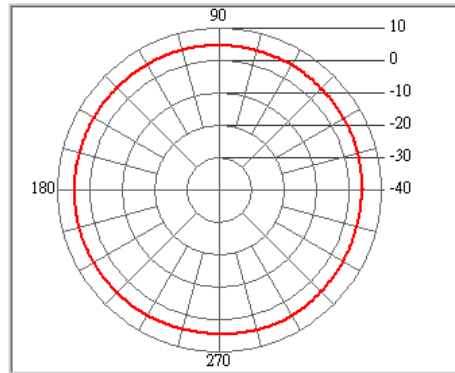
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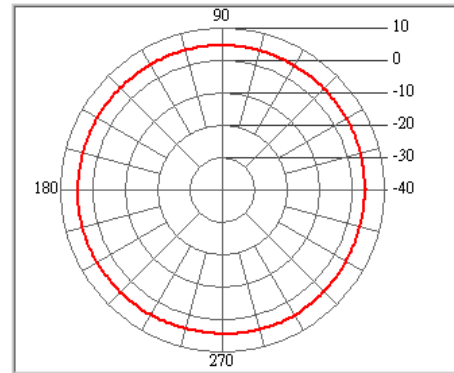
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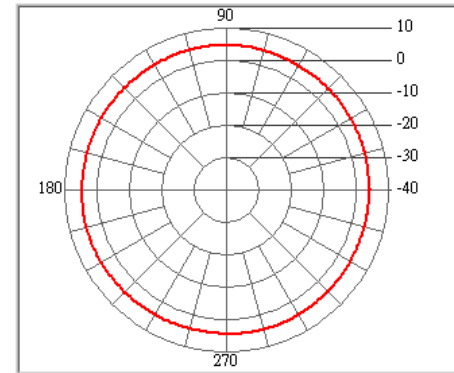
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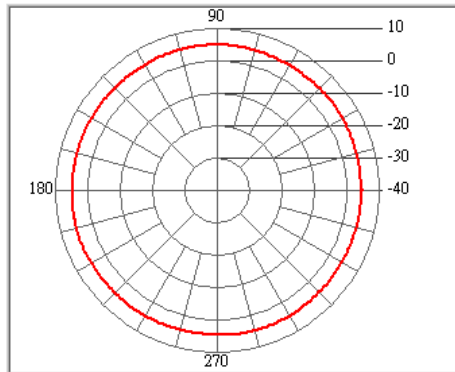
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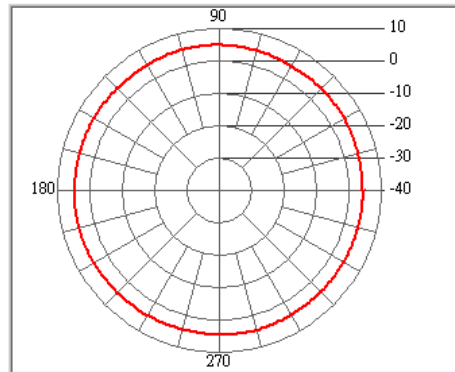
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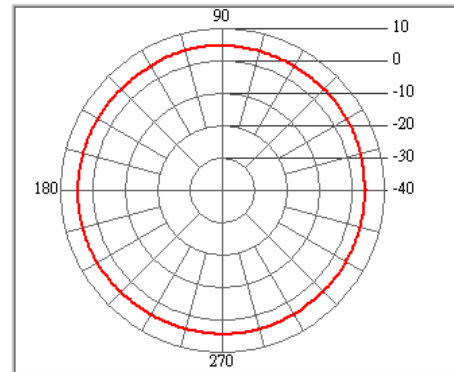
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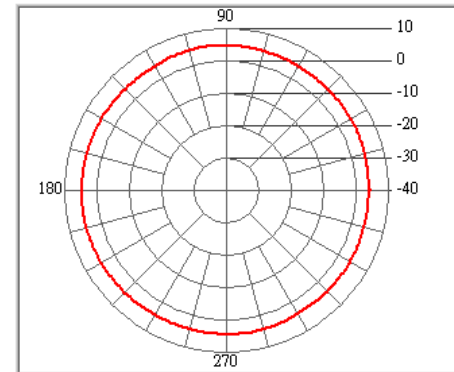
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2480



2490

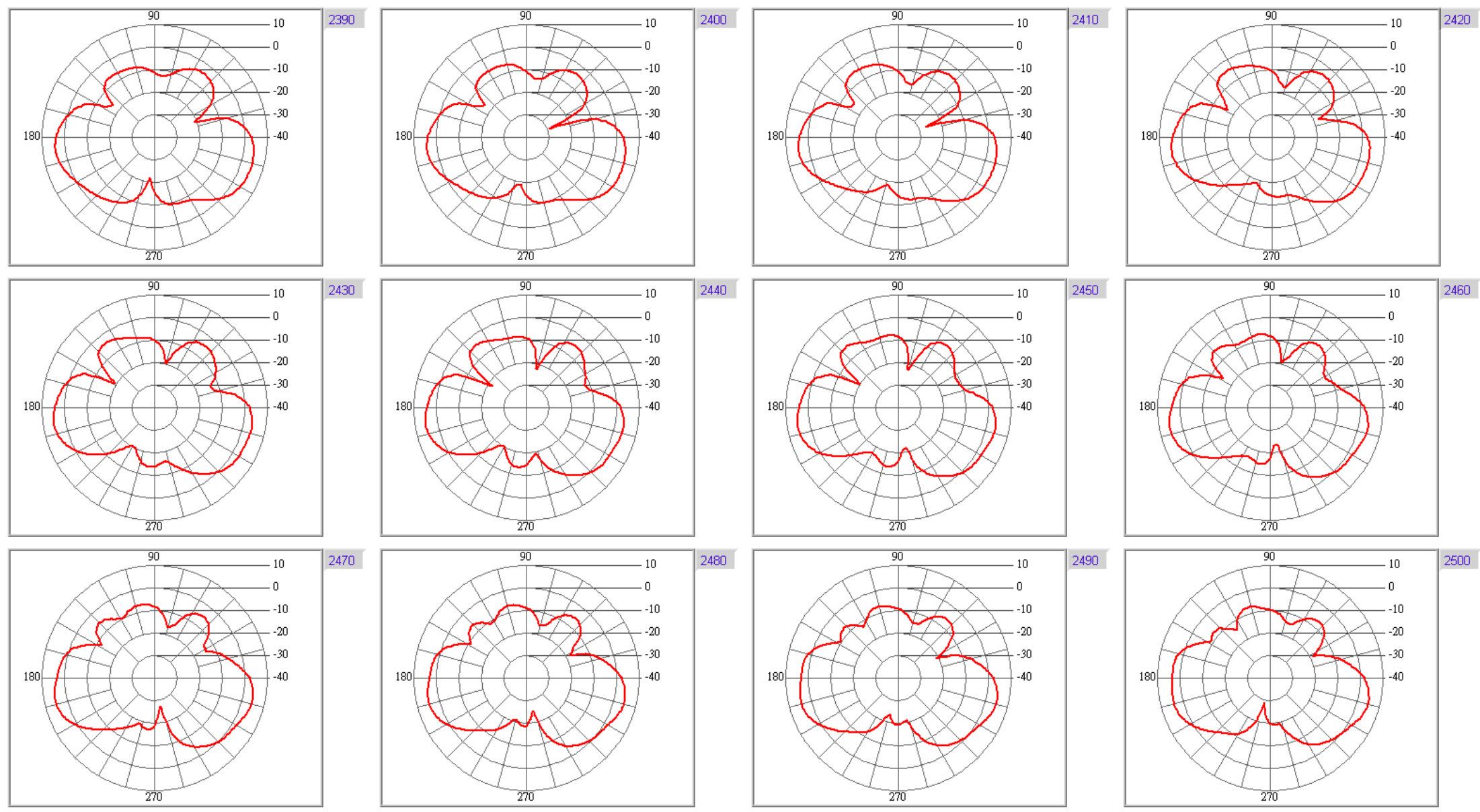


2500

Model : R-AN2400-1901RS
 Remark : E-Plane // Horizontal Polarization
 Tested by : Cortec Antenna 3D Chamber // Zhao Yao Rong

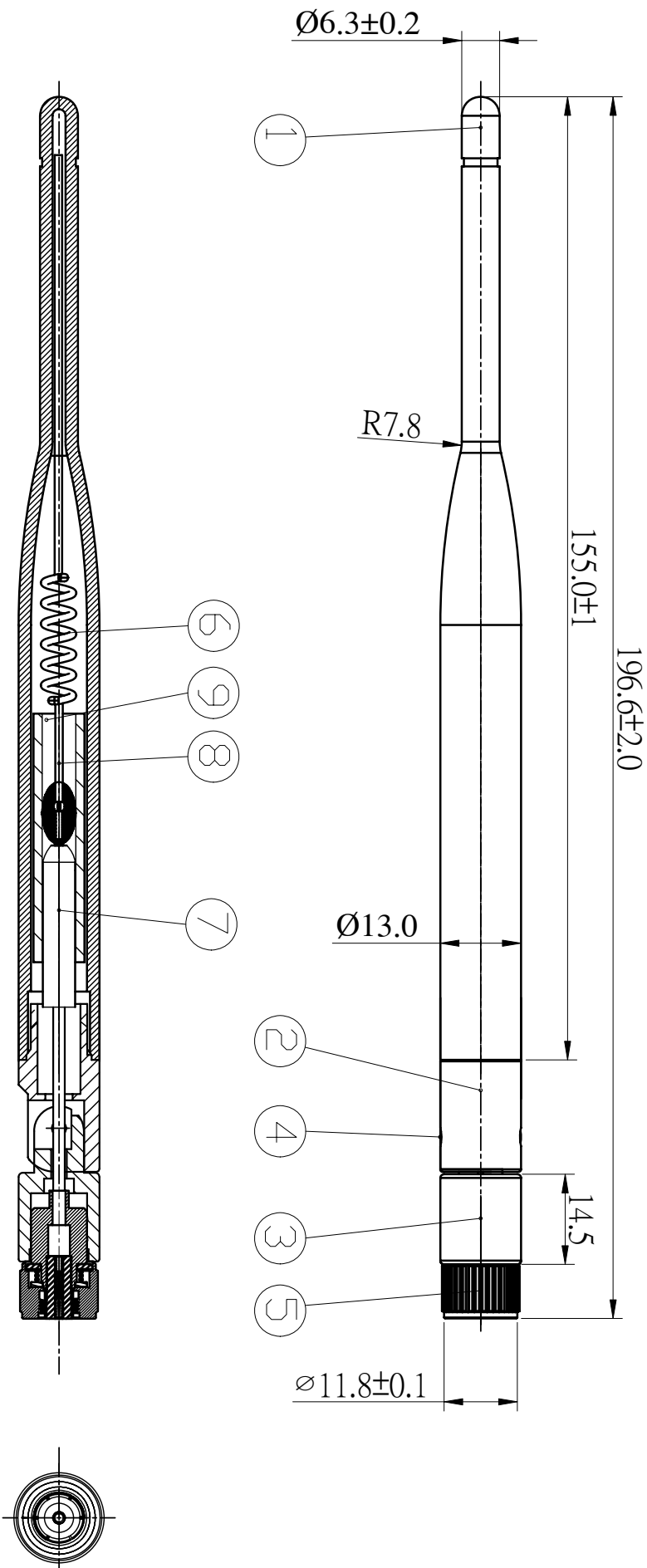
Location: **Chamber** Date: **2007/7/12** Time: **上午 09:07:09**
 Temperatur (°C): **22.00** Humidity (%): **55.00** Approved by:

| Freq. (MHz) | 2390 | 2400 | 2410 | 2420 | 2430 | 2440 | 2450 | 2460 | 2470 | 2480 | 2490 | 2500 |
|-----------------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|
| Peak Gain (dBi) | 4.92 | 4.83 | 4.51 | 4.84 | 5.18 | 5.27 | 5.37 | 5.3 | 4.96 | 4.87 | 5.04 | 4.96 |
| Peak Degree | 342 | 343 | 348 | 190 | 191 | 191 | 191 | 191 | 191 | 348 | 348 | 348 |
| AV Gain (dBi) | -1.43 | -1.48 | -1.57 | -1.58 | -1.52 | -1.59 | -1.53 | -1.5 | -1.53 | -1.72 | -1.71 | -1.75 |



ROHS

Compatible



| No. | Part Number | Description | Material | Finished | Qty |
|-----|-------------------|-----------------|----------|------------------|-----|
| 9 | R-AN1901-04A | Sleeve | ABS | Ø8.20/ L=30.0 mm | 1 |
| 8 | R-RG-178U | Cable | RG178 | L=70.0mm | 1 |
| 7 | R-AN94-02S | Tube | Cu | Ø5.20/L=26.0 mm | 1 |
| 6 | R-AN1901-06 | Spring | Cu | L=94.0mm | 1 |
| 5 | R-SMA324-CC8MRANT | SMA Male Revers | Cu | Eletrodeposition | 1 |
| 4 | R-AN03-514CZ | Rivet | Cu | Eletrodeposition | 2 |
| 3 | R-AN03-101 | Body1 | PA-6 | Black | 1 |
| 2 | R-AN03-102 | Body2 | PA-6 | Black | 1 |
| 1 | R-AN1901-01 | Body | TPE | Black | 1 |

| SIGN | DATE | DESCRIPTION | APPROVER |
|------|------|-------------|----------|
| △ | | | |
| △ | | | |
| △ | | | |

Cortec® Cortec Technology Inc.

PART NAME: Antenna 2.4GHz 5dbi TITLE: Antenna 2.4GHz 5dbi

PART NO.: R-AN2400-1901RS DWG NAME: R-AN2400-1901RS.dwg

| APPROVED BY | CHECKED BY | DESIGNED BY | UNITS: mm | Tolerance |
|---------------------|-----------------------|-----------------------------|------------|-----------------------------------|
| Grant 2007/04/06 | Liu kui 2007/04/06 | Zhang yue xin 2007/04/06 | SCALE: 1/1 | X.X ±0.10 X.XX ±0.05 X° ±1° |

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 ³ | D638 | 3.1 |
| 扭曲強度 Flexural Strength | Kg/ cm ³ | 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 ² | D1238 | 10 |
| 燃燒性 Flammability | --- | UL94 | HB |
| <p>Testing Data from</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> | | | |

Coaxial Cable Datasheet

| RG-178 Coaxial Cable Specification | | |
|---|--------------------------|----------------------|
| 1. Cable Type | MIL – C – 17 / RG-178 | |
| 2. Impedance | 50 ± 3 ohm | |
| 3. Inner Conductor | Material | silver-coated copper |
| | Conductor Numbers | 7 |
| | Conductor Size | 0.102 mm |
| | Outer Diameter | 0.3 mm |
| 4. Dielectric Layer | Material | FEP |
| | Color | Clear |
| | Average Thickness | 0.28 mm |
| | Diameter | 0.86 mm |
| 5. Braid (Shielding) | Material | silver-coated copper |
| | Construction | 16-3-0.1 mm |
| | Coverage | 95 % |
| 6. Outer Cover | Material | FEP |
| | Color | Brown |
| | Average Thickness | 0.25 mm |
| | Diameter | 1.80 ± 0.05 mm |
| 7. V.S.W.R Testing | < 1.3 (DC ~ 6.0 GHz) | |
| 8. Attenuation (dB / 100 meter) | 100 MHz | 46 |
| | 900 MHz | 155 |
| | 1800 MHz | 295 |
| | 2400 MHz | 340 |
| | 5200 MHz | 505 |
| | 6000 MHz | 550 |
| 9. Capacitance | 97 ± 3 (pF / meter) | |
| 10. Maximum Power | 30 dBm | |
| 11. Spark Test | 2.0 KV | |
| 12. Rating Temp. and Volt. | 200°C / 30V | |
| 13. Conductor Resistance | 335 ohm / KM / 20°C max. | |
| 14. Dielectric Resistance | 3 G ohm / KM / 20°C min. | |

PA-6 Datasheet

納普工程塑料檢測報告單

QR-82401-04

A/1

NO : 06040401

| | | | | | |
|------------------------------|--------|---------------|-----------|---------------|----|
| 品名 | 增韌增強尼龍 | 檢驗標準 | QW-824-03 | 顏色 | 黑色 |
| 型號 | PA6-EA | 批號 | ---- | 數量 | 2T |
| 檢驗項目 | 單位 | 檢驗標準 | 標準要求 | 實測數據 | |
| 拉伸強度 | Mpa | GB/T1040-92 | ---- | 35.6 | |
| 拉伸模量 | Mpa | GB/T1040-92 | ---- | 1363 | |
| 斷裂伸長率 | % | GB/T1040-92 | ---- | 63.6 | |
| 簡支梁沖擊強度(缺口) | KJ/M2 | GB/T1043-93 | ---- | 20.0 | |
| 簡支梁沖擊強度(非缺口) | KJ/M2 | GB/T1043-93 | ---- | NB | |
| <p>結論:</p> <p>以上數據均為實測數據</p> | | | | | |
| 檢驗員：李興華 | | 日期：2006-05-07 | | 審核：汪文 | |
| | | | | 日期：2006-05-07 | |

產品規格承認書

Specification For Approval

日期： 2007 / 06 / 16

Date

編號： 070616005

File No.

版本： 1.0

Revision

承認廠商： 偉 德

Customer

製造廠商： 康捷電子有限公司

Manufacturer

型號品名： 2.4GHz External Antenna

Part Number

Description

R-AN2400-5801RS

廠商審核：

Approved By

Invax

英碩科技股份有限公司
台北市忠孝東路五段 815 號 4 樓
Tel: 886-2-2788-5218 Fax: 886-2-2783-1658

Cortec

東莞康捷電子有限公司
廣東省東莞市長安鎮振安路
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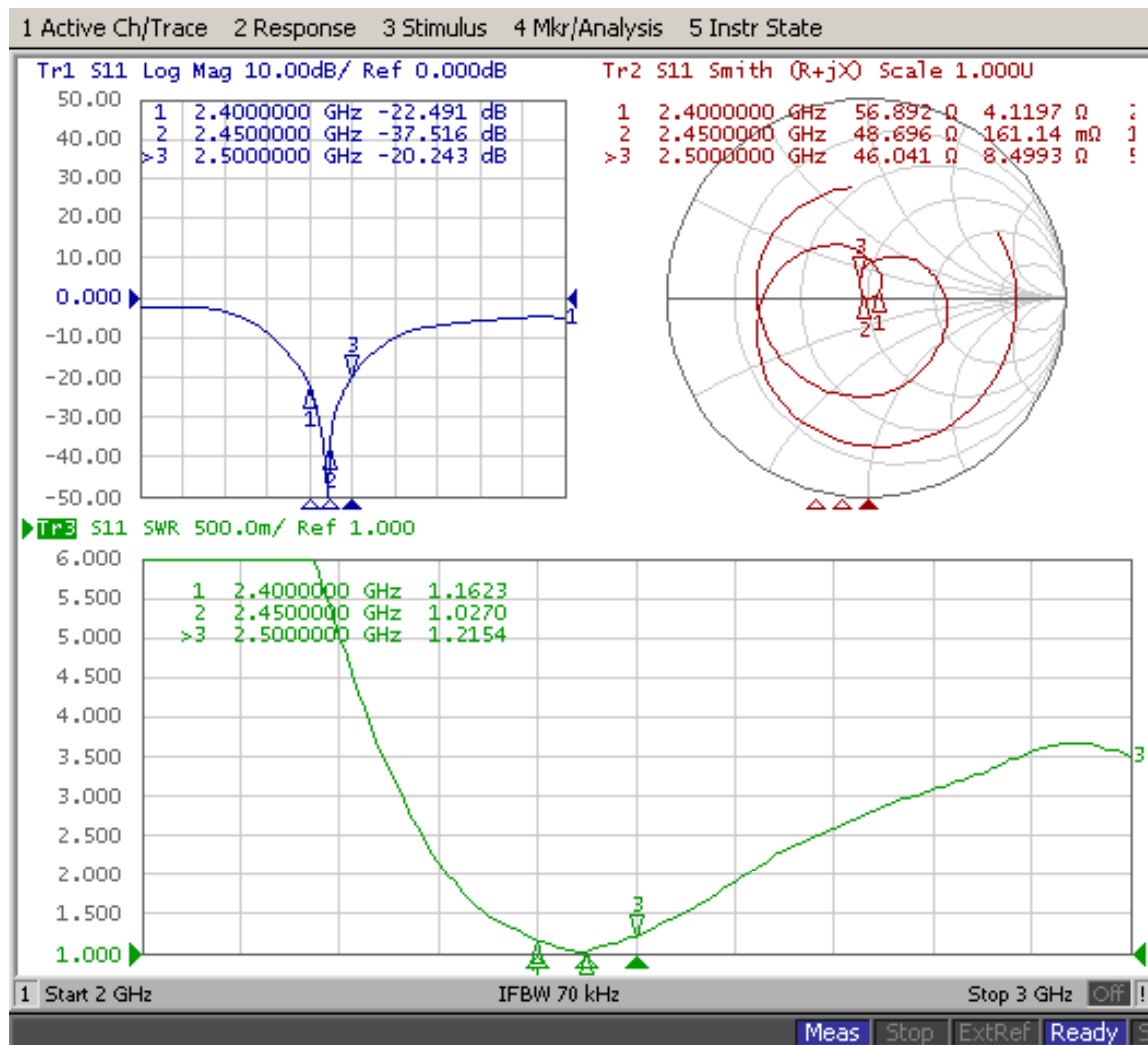
1. Reliability Testing

| Test Item | Procedure | Requirement |
|---|---|--|
| 1. Visual inspection and Dimension Check | Applicable methods using x5 magnification | follow specification |
| 2. Rapid Changing of Temperature | -40°C (30minutes) to 90°C (30minutes); 24 cycles | After 2 hours recovery: 1. no visible damage 2. Freq. Tol.: < ±5% |
| 3. Damp Heat | 24 hours at 60°C; 90 ~ 95% RH | After 2 hours recovery: 1. no visible damage 2. Freq. Tol. : < ±5% |
| 4. Endurance | 24 hours at 90°C | After 2 hours recovery: 1. no visible damage 2. Freq Tol.: < ±5% |

2. Specification

| A. Electrical Characteristics | |
|-------------------------------|---|
| S.W.R. | ≤ 2.0 @ 2400 ~ 2500 MHz |
| Antenna Gain | 2.0 ± 0.7 dBi (*Depends on Product Mechanical Environment*) |
| Impedance | 50 Ohm |
| B. Material | |
| Material of Radiator | Cu (Plated) |
| Connector Type | 50 Ohm SMA Male Reverse |
| C. Environmental | |
| Operation Temperature | - 30 °C ~ + 85 °C |
| Storage Temperature | - 30 °C ~ + 85 °C |

3. S Parameter Test data



4. Antenna Radiation Pattern

Testing Equipment Specification:

Antenna Anechoic Chamber Dimension: 8 x 4 x 4 m

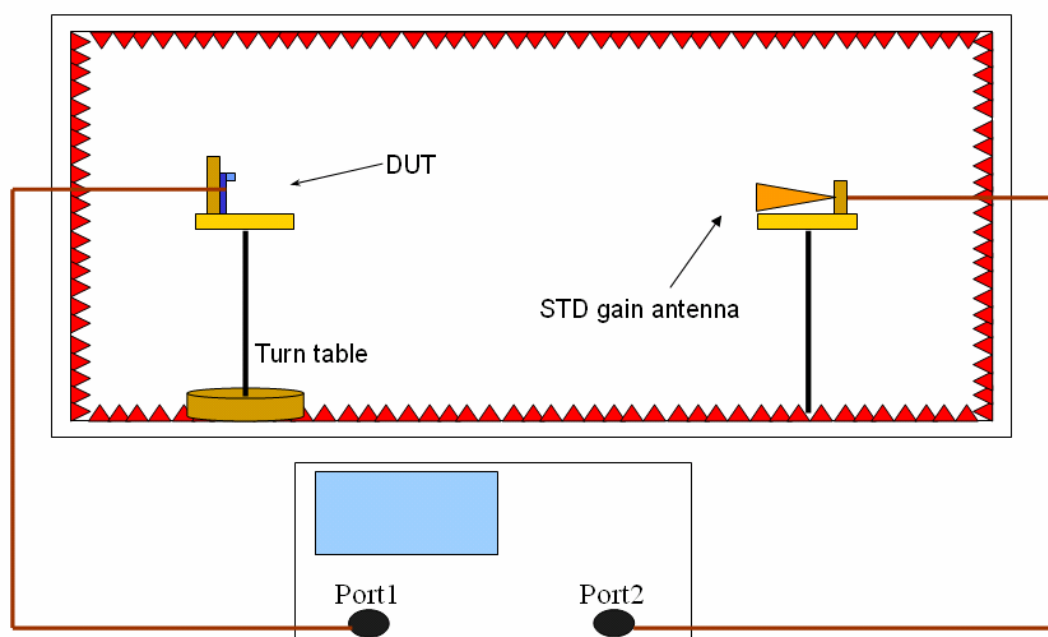
Quiet Zone: 600mm @1 GHz

Isolation: >100dB @ 1 MHz ~ 10 GHz

Testing Equipment: Agilent 5071B

Received Antenna: 0.7 ~ 6.0 GHz for Gain Calibration

Double Ridged Horn Antenna



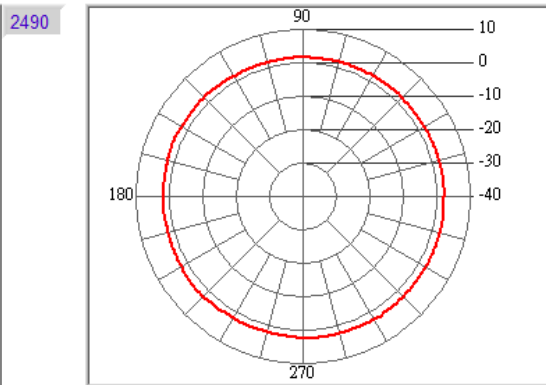
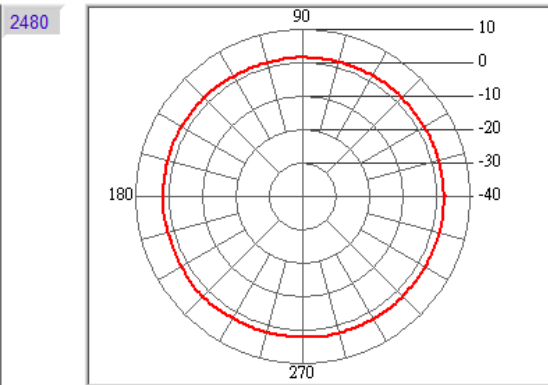
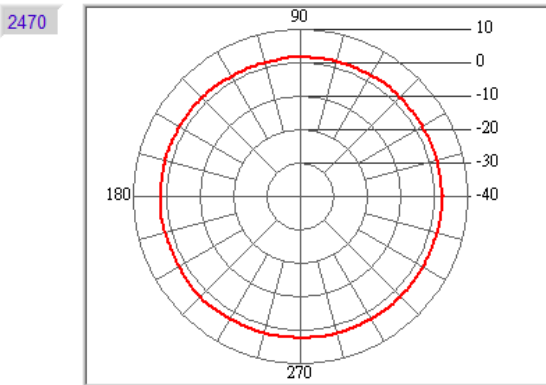
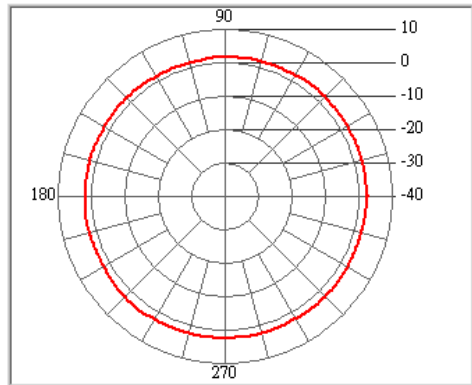
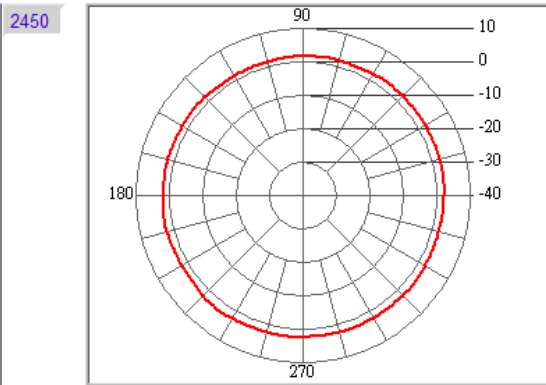
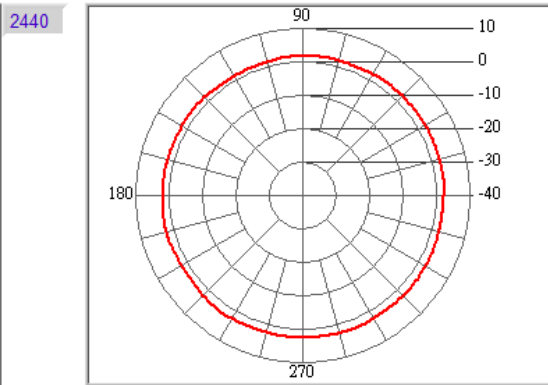
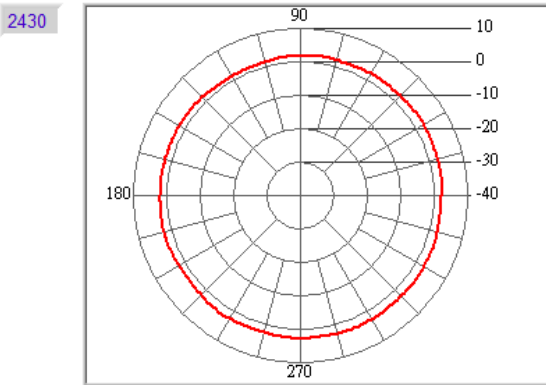
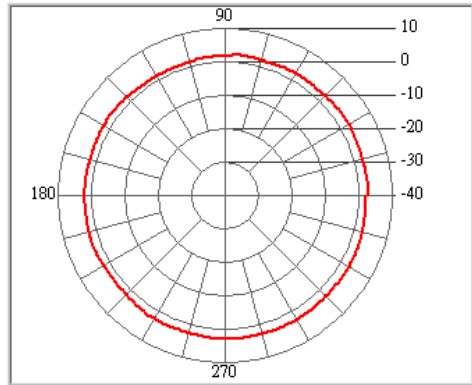
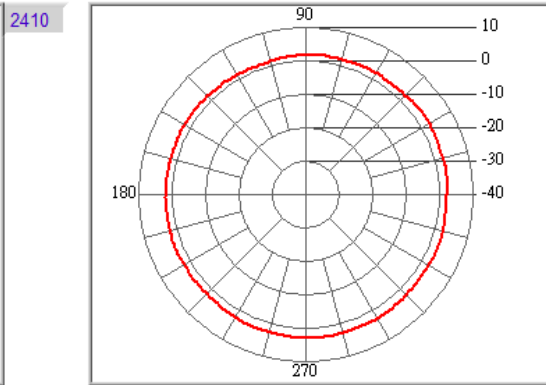
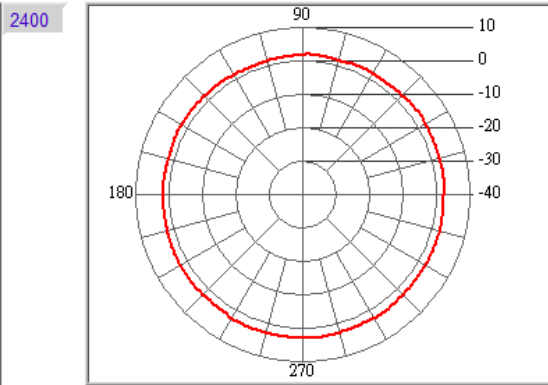
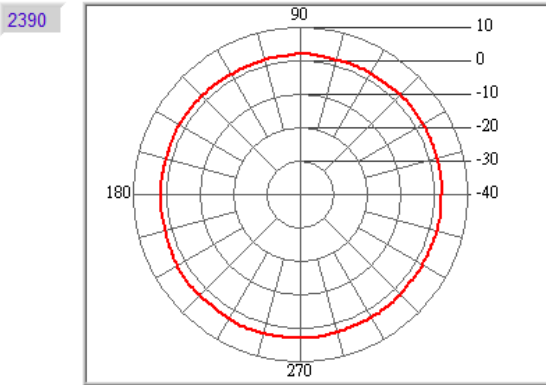
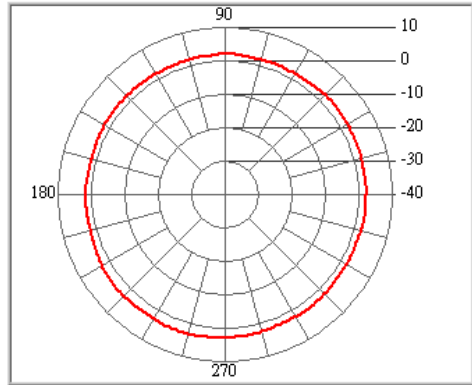
5. Mechanical Drawing

6. MSDS & SGS Report

Model : R-AN2400-5801RS // 2dBi Dipole Antenna
 Remark : H-Plane
 Tested by : CORTEC Antenna 3D Lab // Zhang Cong

Location: **Chamber** Date: 2006/9/21 Time: 下午 03:25:09
 Temperatur (°C): 22.00 Humidity (%): 55.00 Approved by:

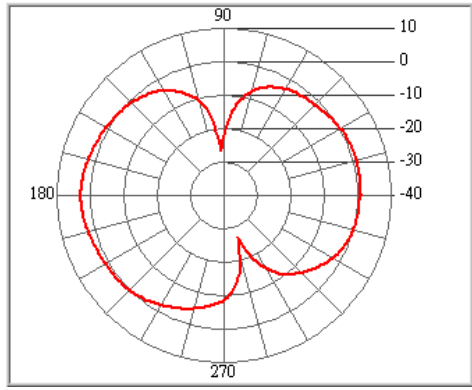
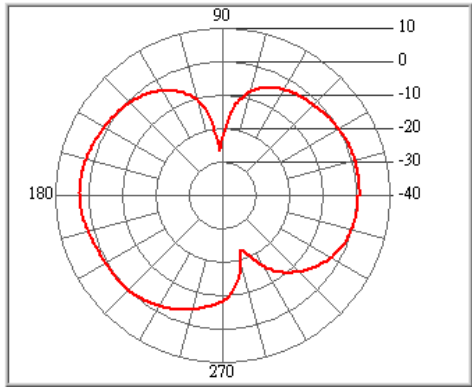
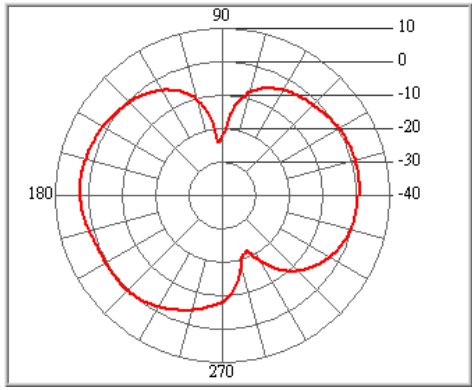
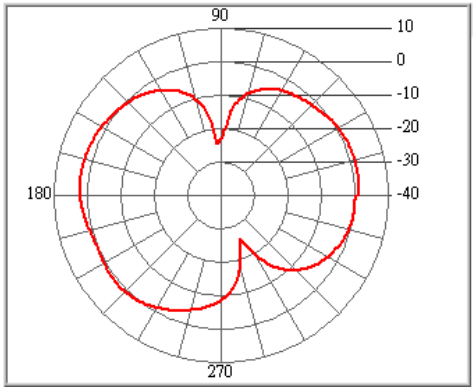
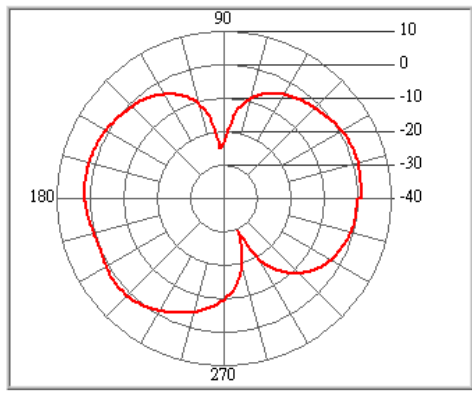
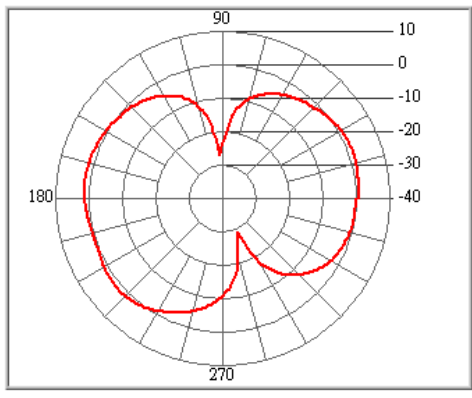
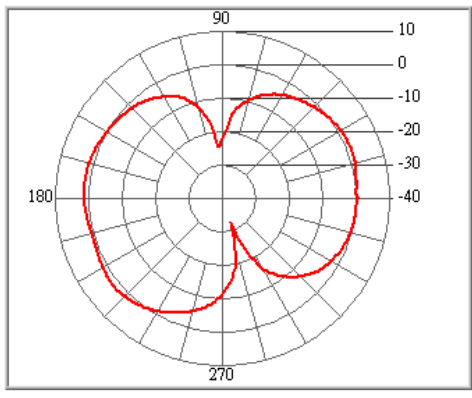
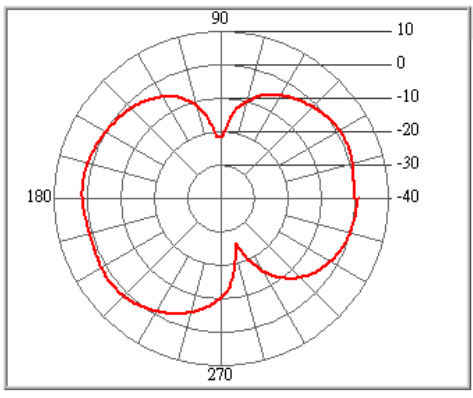
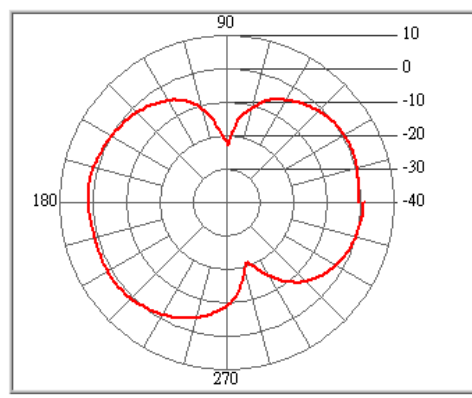
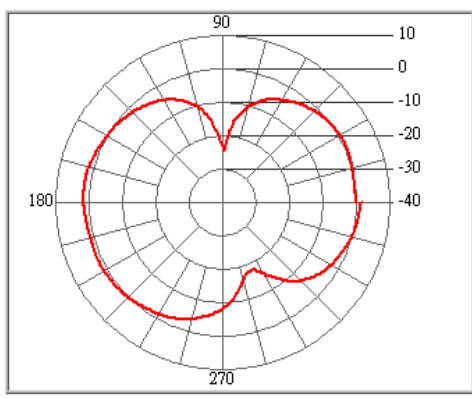
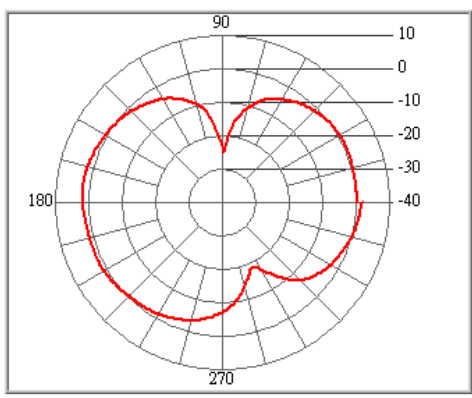
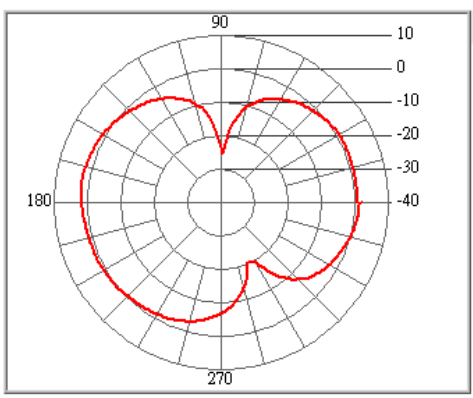
| Freq. (MHz) | 2390 | 2400 | 2410 | 2420 | 2430 | 2440 | 2450 | 2460 | 2470 | 2480 | 2490 | 2500 |
|-----------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Peak Gain (dBi) | 3.27 | 3.17 | 3.08 | 3.09 | 3.04 | 2.83 | 2.63 | 2.61 | 2.69 | 2.52 | 2.45 | 2.54 |
| Peak Degree | 254 | 248 | 272 | 272 | 272 | 290 | 290 | 230 | 230 | 230 | 351 | 278 |
| AV Gain (dBi) | 2.15 | 2.21 | 2.18 | 2.19 | 2.27 | 2.2 | 2.1 | 2.04 | 2.08 | 2.06 | 1.97 | 2.03 |



Model : R-AN2400-5801RS // 2dBi Dipole Antenna
 Remark : E-Plane
 Tested by : CORTEC Antenna 3D Lab // Zhang Cong

Location: **Chamber** Date: 2006/9/21 Time: 下午 03:25:09
 Temperatur (°C): 22.00 Humidity (%): 55.00 Approved by:

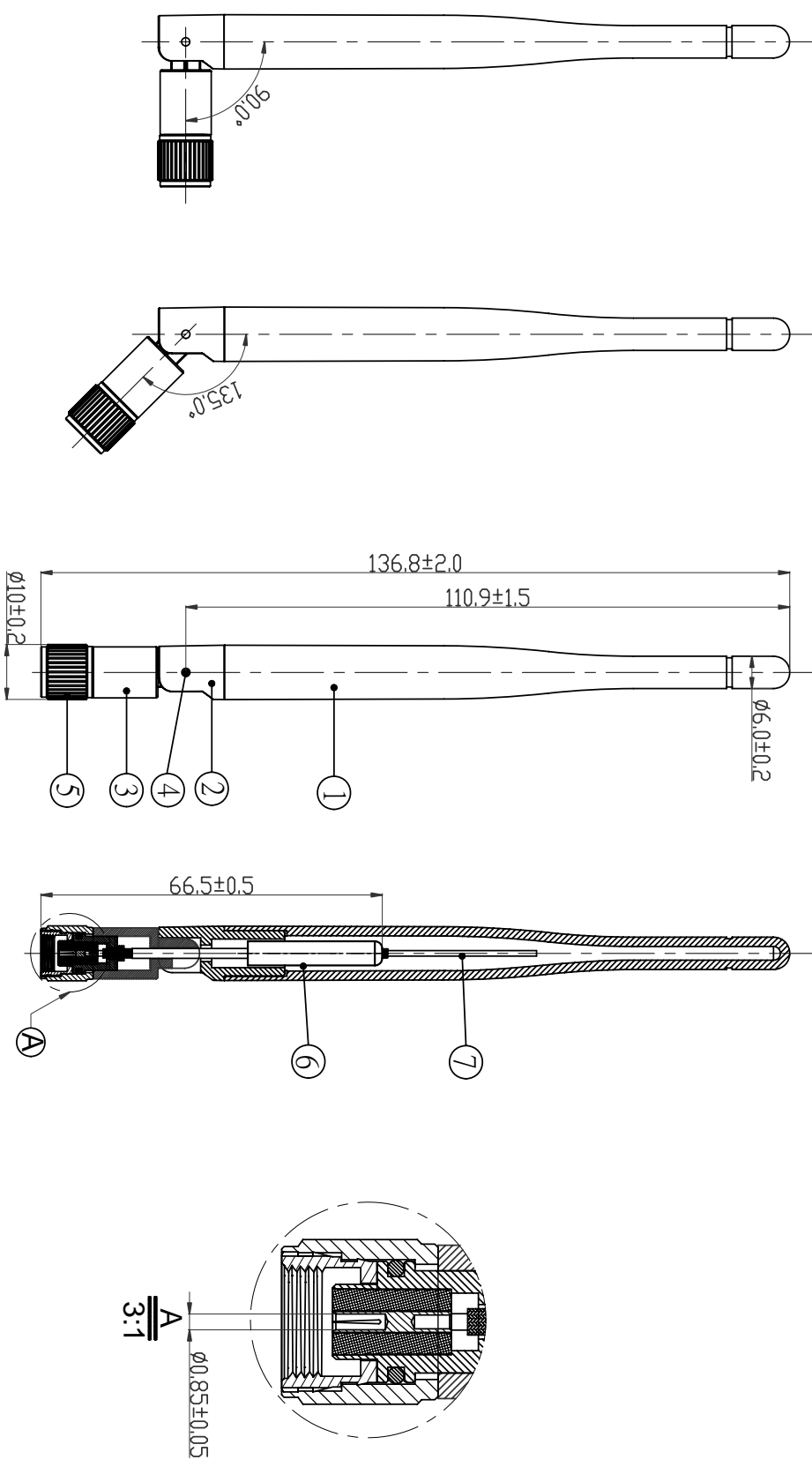
| Freq. (MHz) | 2390 | 2400 | 2410 | 2420 | 2430 | 2440 | 2450 | 2460 | 2470 | 2480 | 2490 | 2500 |
|-----------------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|
| Peak Gain (dBi) | 2.08 | 1.97 | 1.67 | 1.49 | 1.54 | 1.71 | 1.55 | 1.83 | 2.33 | 2.68 | 2.73 | 2.77 |
| Peak Degree | 173 | 173 | 173 | 173 | 221 | 221 | 221 | 173 | 173 | 173 | 178 | 179 |
| AV Gain (dBi) | -1.52 | -1.6 | -1.76 | -1.76 | -1.65 | -1.68 | -1.69 | -1.61 | -1.45 | -1.39 | -1.4 | -1.35 |



ROHS

Compatible

| SIGN | DATE | DESCRIPTION | APPROVER |
|------|------|-------------|----------|
| △ | | | |
| △ | | | |
| △ | | | |



| NO. | Part Number | Description | Material | Finished | Qty |
|-----|-------------------|------------------|----------|---------------------------|-----|
| 7 | R-RG-178U | Coaxial Cable | RG178 | L=85.0mm | 1 |
| 6 | R-AN4424517 | Copper Tube | Cu | $\phi 4.4 \times 24.5$ mm | 1 |
| 5 | R-SMA260-ZC8MRANT | SMA Male Reverse | Zn Alloy | Electrodeposition | 1 |
| 4 | R-AN01-1213Z | Hinge Pin | Cu | Black Zn Plated | 2 |
| 3 | R-ANS801-01B | Body3 | PA-6 | Black | 1 |
| 2 | R-ANS8-02B | Body2 | PA-6 | Black | 1 |
| 1 | R-ANS8-03B | Body1 | TPE | Black | 1 |

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Cortec Technology Inc.

| | | | |
|---------------------------|----------------------|-------------------------------|---------------------------------|
| PART NAME: 2.4GHz Antenna | | TITLE: 2.4GHz Antenna | |
| PART NO.: R-AN2400-5801RS | | DWG NAME: R-AN2400-5801RS.dwg | |
| APPROVED BY | CHECKED BY | DESIGNED BY | Tolerance |
| Grant 2007/05/08 | Liukui 2007/05/08 | 周松林 2007/05/08 | X.X ±0.5 X.XX ±0.1 X° ±1° |
| UNITS: mm | | SCALE: 1/1 | |
| REVISION: A | | | |

禧福工業股份有限公司材質分析報告

鋅合金

化學成份 Chemical Composition

| 元素 | Element | 國際標準 | ASTMB240 |
|----------------------------|---|------|-----------|
| 鋁 | (Al) | | 3.804% |
| 鎂 | (Mg) | | 0.0327% |
| 銅 | (Cu) | | 0.384% |
| 鐵 | (Fe) | | 0.0015% |
| 鉛 | (Pb) | | 0.0091% |
| 錫 | (Sn) | | 0.0017% |
| 鎘 | (Cd) | | 0.0010% |
| 錳 | (Mn) | | 0.00071% |
| 鎳 | (Ni) | | 0.0057% |
| 硒 | (Si) | | 0.0056% |
| 鉻 | (Cr) | | 0.0011% |
| 鉍 | (Bi) | | 0.00040% |
| 鋅 | (Zn) | | 95.8% |
| 物理性能 Physical Properties | | | |
| 密度 | Density(g/cm ³ @21°C) | | 6.60 |
| 溶點範圍 | Melting Range | | 381-387°C |
| 凝固收縮 | Solidification Shrinkage | | 1.17% |
| 熱膨脹率 | Thermal Expansion(m/mm/°C @20-100°C) | | 274 |
| 比熱 | Specific Heat Capacity(J/kg/°C @20-100°C) | | 418.7 |
| 導熱率 | Thermal Conductivity(W/m ² /br/m/°C @70-140°C) | | 1130 |
| 導電率 | Electrical Conductivity(%IACS) | | 2.0*E7 |
| 電阻率 | Electrical Resistivity (μohm-cm@20°C) | | 6.3694 |
| 機械性能 Mechanical Properties | | | |
| 極限抗拉強度 | Ultimate Tensile Strength | | 283MPa |
| 延伸率 | Elongation(% in 51mm) | | 10% |
| 硬度 | Hardness(Brinell 500 kg) | | 82 |
| 抗剪強度 | Sheet Strength | | 214 MPa |
| 抗壓屈服強度 | Compressive Yield Strength | | 414 MPa |
| 抗衝擊強度 | Impact Energy(Un-notched Bar 6.35*6.35mm) | | 58 |
| 疲勞強度 | Fatigue Strength(5*10 ⁸ Cycles) | | 48 MPa |

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 ³ | D638 | 3.1 |
| 扭曲強度 Flexural Strength | Kg/ cm ³ | 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 ² | D1238 | 10 |
| 燃燒性 Flammability | --- | UL94 | HB |
| <p>Testing Data from</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> | | | |

PA-6 Datasheet

納普工程塑料檢測報告單

QR-82401-04

A/1

NO : 06040401

| | | | | | |
|------------------------------|--------|---------------|-----------|---------------|----|
| 品名 | 增韌增強尼龍 | 檢驗標準 | QW-824-03 | 顏色 | 黑色 |
| 型號 | PA6-EA | 批號 | ---- | 數量 | 2T |
| 檢驗項目 | 單位 | 檢驗標準 | 標準要求 | 實測數據 | |
| 拉伸強度 | Mpa | GB/T1040-92 | ---- | 35.6 | |
| 拉伸模量 | Mpa | GB/T1040-92 | ---- | 1363 | |
| 斷裂伸長率 | % | GB/T1040-92 | ---- | 63.6 | |
| 簡支梁沖擊強度(缺口) | KJ/M2 | GB/T1043-93 | ---- | 20.0 | |
| 簡支梁沖擊強度(非缺口) | KJ/M2 | GB/T1043-93 | ---- | NB | |
| <p>結論:</p> <p>以上數據均為實測數據</p> | | | | | |
| 檢驗員：李興華 | | 日期：2006-05-07 | | 審核：汪文 | |
| | | | | 日期：2006-05-07 | |

Coaxial Cable Datasheet

| RG-178 Coaxial Cable Specification | | |
|---|--------------------------|----------------------|
| 1. Cable Type | MIL – C – 17 / RG-178 | |
| 2. Impedance | 50 ± 3 ohm | |
| 3. Inner Conductor | Material | silver-coated copper |
| | Conductor Numbers | 7 |
| | Conductor Size | 0.102 mm |
| | Outer Diameter | 0.3 mm |
| 4. Dielectric Layer | Material | FEP |
| | Color | Clear |
| | Average Thickness | 0.28 mm |
| | Diameter | 0.86 mm |
| 5. Braid (Shielding) | Material | silver-coated copper |
| | Construction | 16-3-0.1 mm |
| | Coverage | 95 % |
| 6. Outer Cover | Material | FEP |
| | Color | Brown |
| | Average Thickness | 0.25 mm |
| | Diameter | 1.80 ± 0.05 mm |
| 7. V.S.W.R Testing | < 1.3 (DC ~ 6.0 GHz) | |
| 8. Attenuation (dB / 100 meter) | 100 MHz | 46 |
| | 900 MHz | 155 |
| | 1800 MHz | 295 |
| | 2400 MHz | 340 |
| | 5200 MHz | 505 |
| | 6000 MHz | 550 |
| 9. Capacitance | 97 ± 3 (pF / meter) | |
| 10. Maximum Power | 30 dBm | |
| 11. Spark Test | 2.0 KV | |
| 12. Rating Temp. and Volt. | 200°C / 30V | |
| 13. Conductor Resistance | 335 ohm / KM / 20°C max. | |
| 14. Dielectric Resistance | 3 G ohm / KM / 20°C min. | |