

# Specification For Approval

Date: 2010 / 09 / 20

File No.: 100920003

Version: 1.0

Customer : 合勤科技有限公司

Customer P/N : 65-031-066104B

INVAX P/N : AN2400-03A03RS

Description : Antenna

Cortec Checked By:

Customer Approved By:



**INVAX System Technology Corp.**  
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TEL:886-2-2788-5218 FAX:886-2-2783-1658  
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Province, China

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Product Number: AN2400-03A03RS

Product Name: Antenna



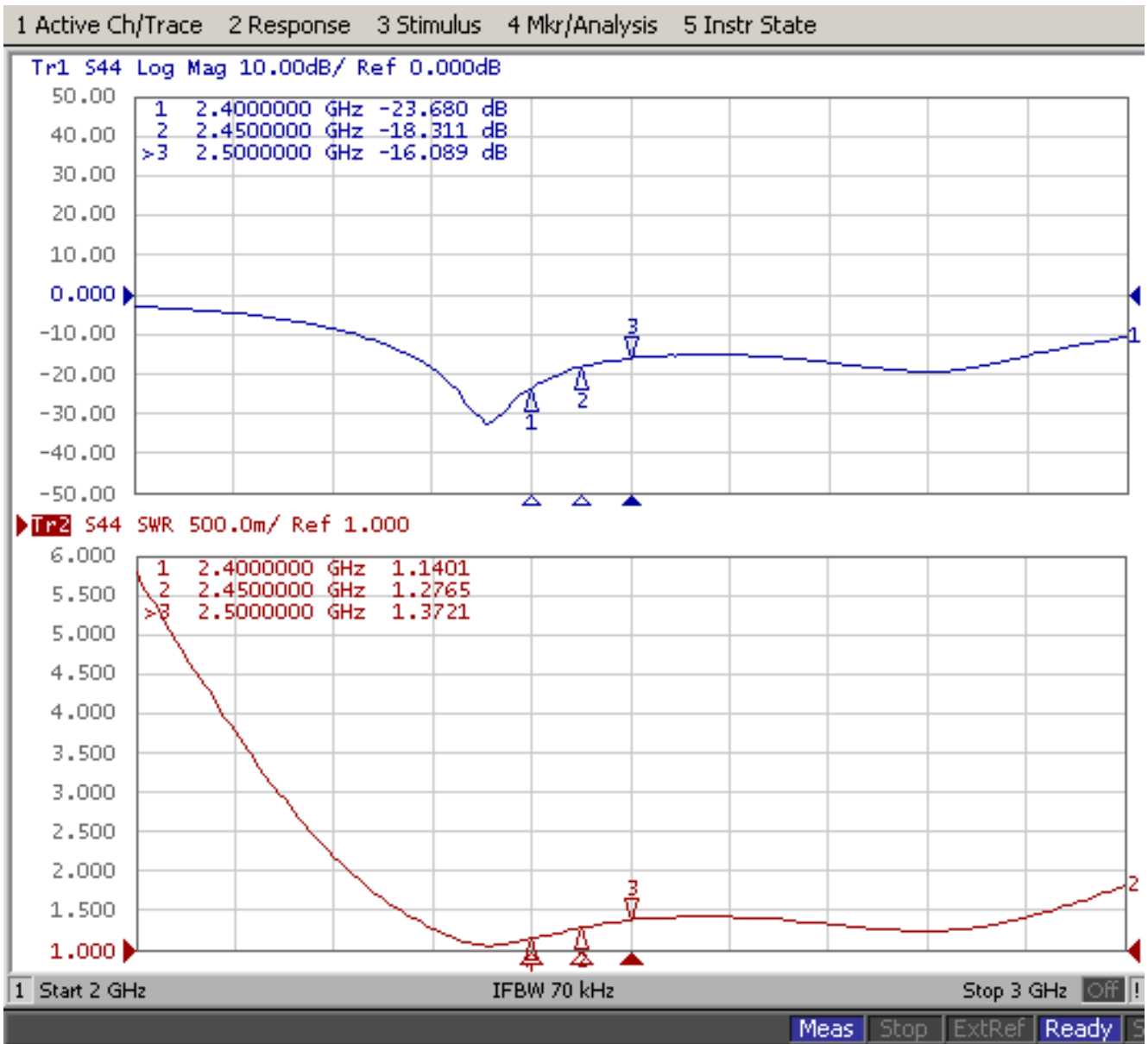
## 1. Specification

Sample Photo	
	
A. Electrical Characteristics	
Frequency	2400 ~ 2500 MHz
S.W.R.	$\leq 2.0$
Antenna Gain	2.0dBi
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	200 ~ 500 g.cm
C. Environmental	
Operation Temperature	- 40 °C ~ + 65 °C
Storage Temperature	- 40 °C ~ + 80 °C

## 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

### 3. Antenna - S Parameter Test Data



Product Number: AN2400-03A03RS

Product Name: Antenna



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

##### Testing Equipment Specification:

Antenna Anechoic Chamber Dimension: 8 x 4 x 4 m

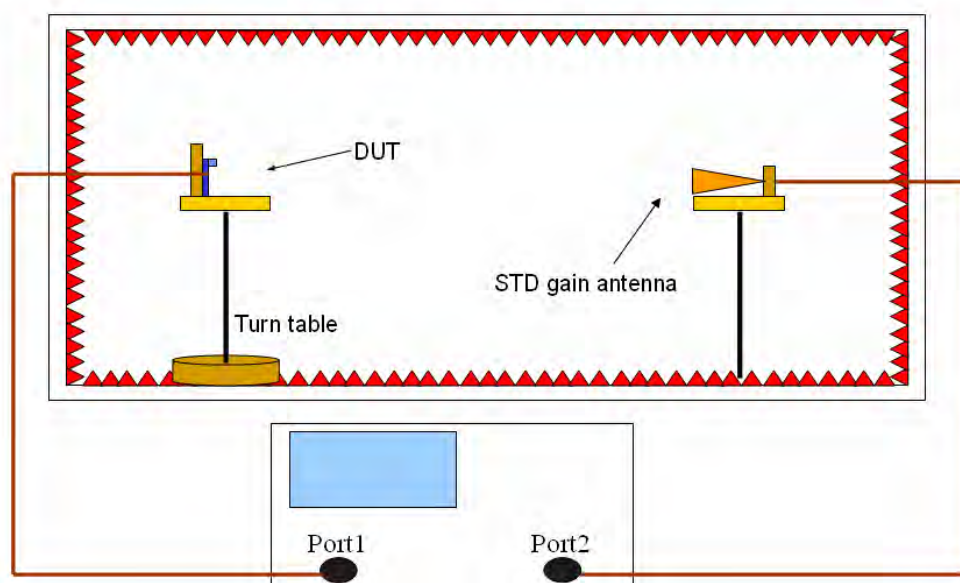
Quiet Zone: 600mm @1 GHz

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



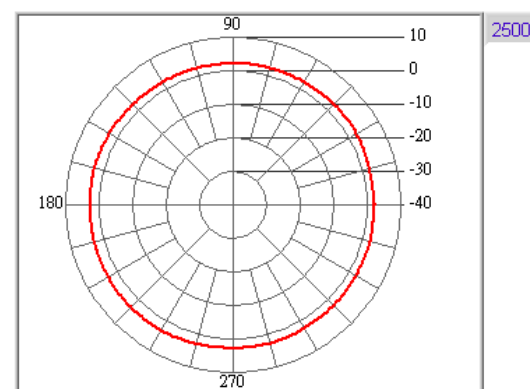
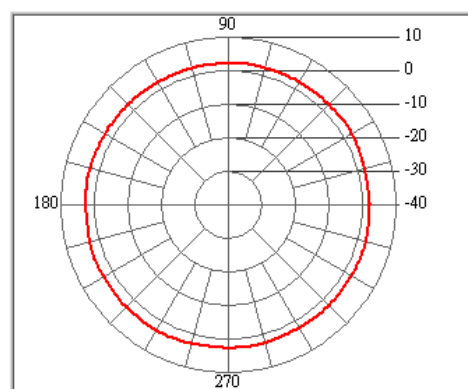
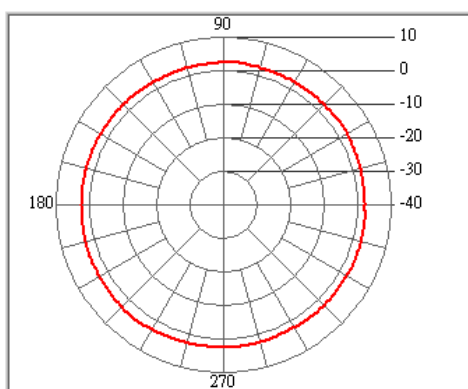
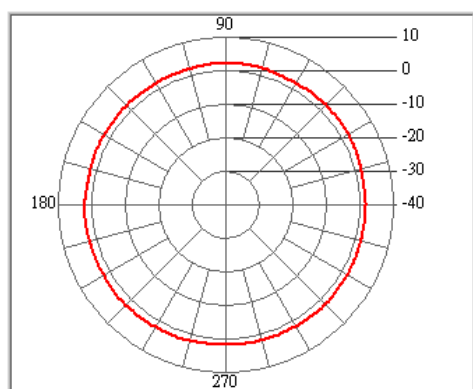
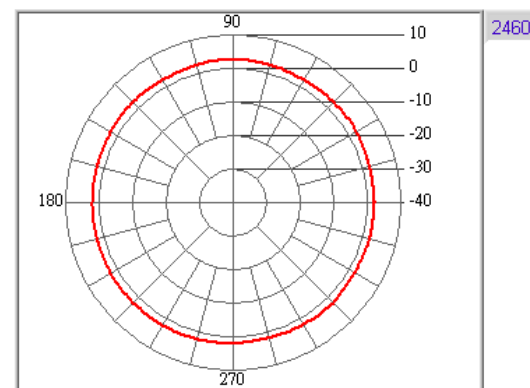
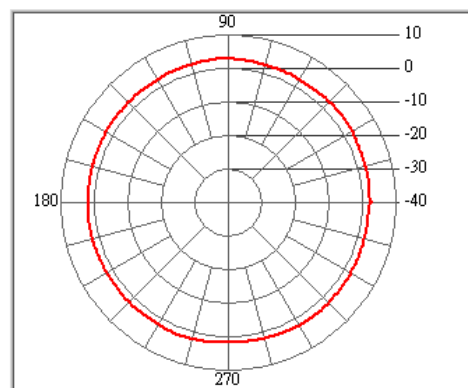
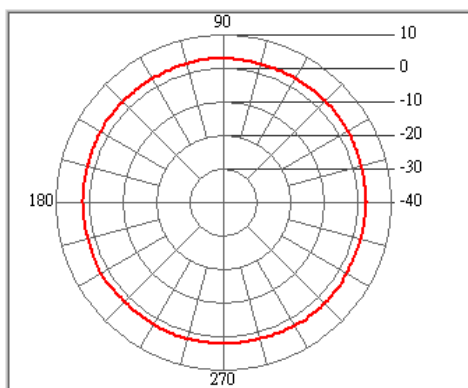
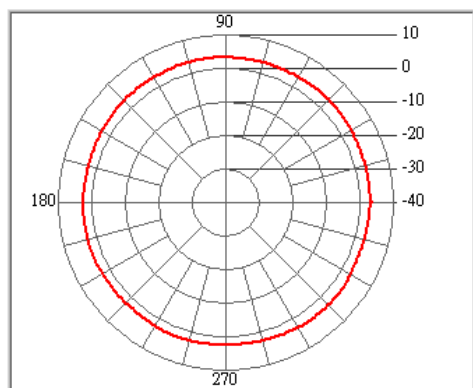
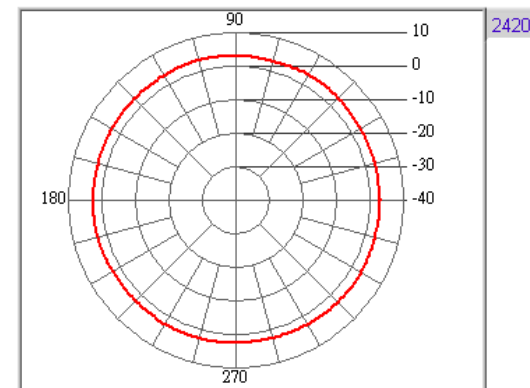
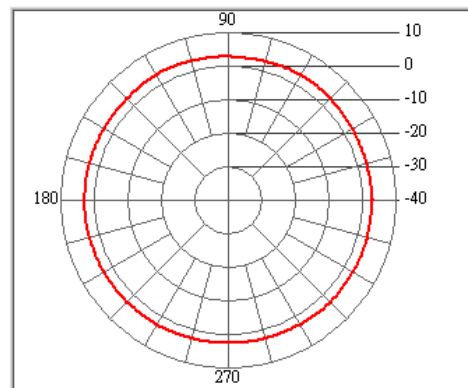
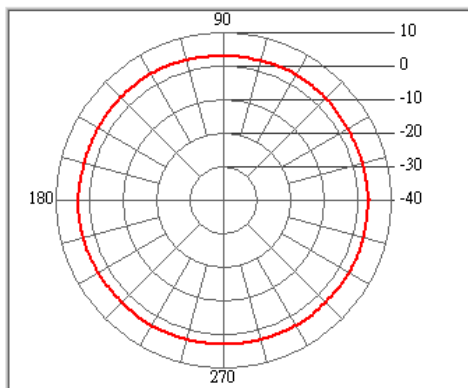
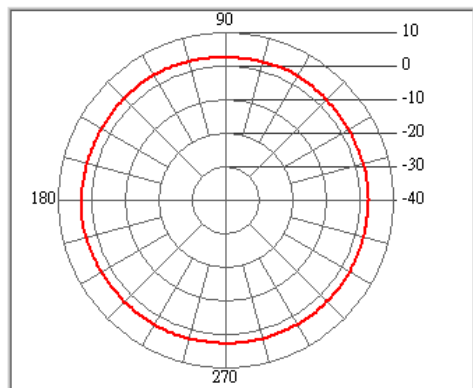
Model : 2.4GHz Antenna  
Remark : H-Plane // V-Pol  
Tested by : CORTEC Antenna Lab // Zhao Yao Rong

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

Date: **2010/5/24**  
Humidity (%): **55.00**

Time: **上午 11:22:00**  
Approved by:

Freq. (MHz)	2390	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500
Peak Gain (dBi)	3.19	3.6	3.29	3.4	3.43	3.05	2.92	2.62	2.32	3.22	3.25	3.21
Peak Degree	189	117	116	54	54	95	95	95	85	231	241	241
AV Gain (dBi)	2.74	3.13	2.85	2.81	2.9	2.41	2.21	2.17	1.95	2.46	2.5	2.54



Model : 2.4GHz Antenna  
 Remark : E-Plane // H-Pol  
 Tested by : CORTEC Antenna Lab // Zhao Yao Rong

Location: **Chamber**

Date: **2010/5/24**

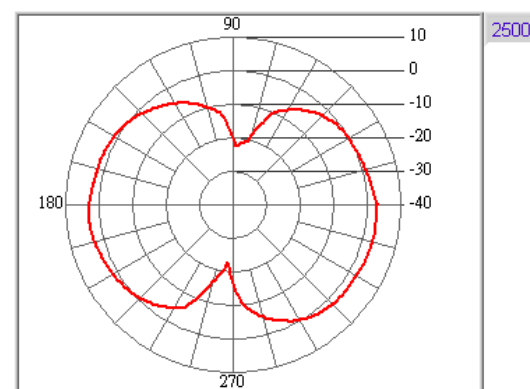
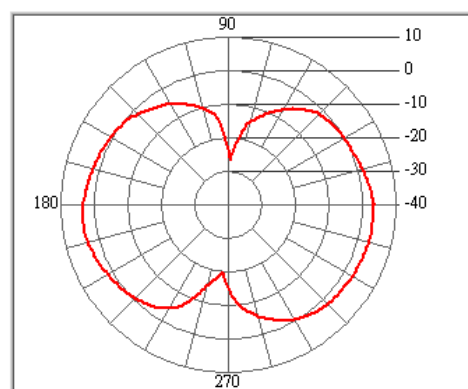
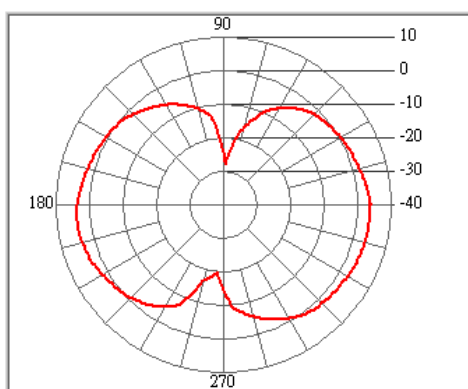
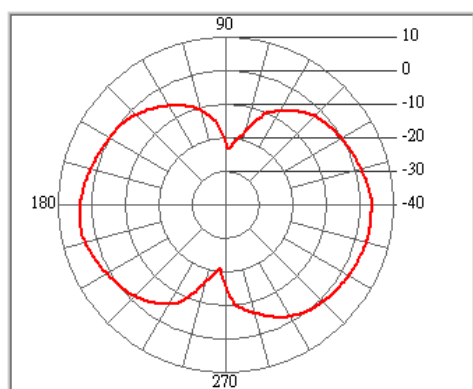
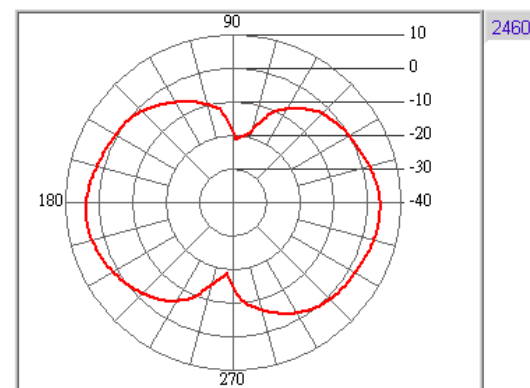
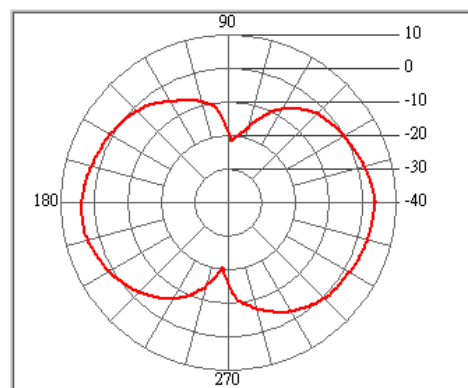
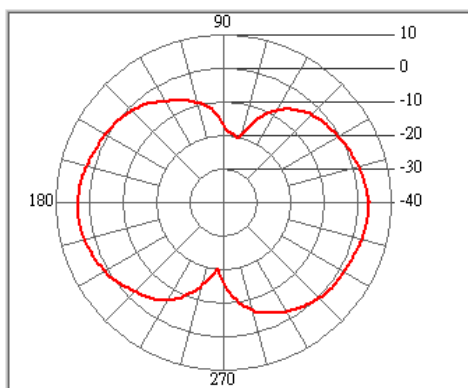
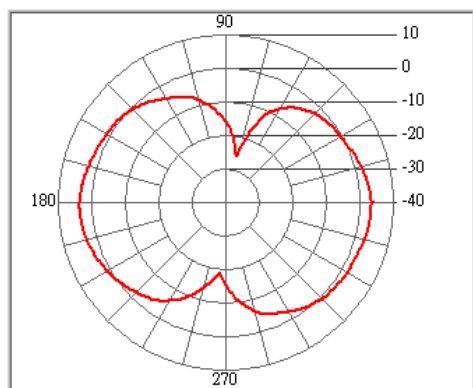
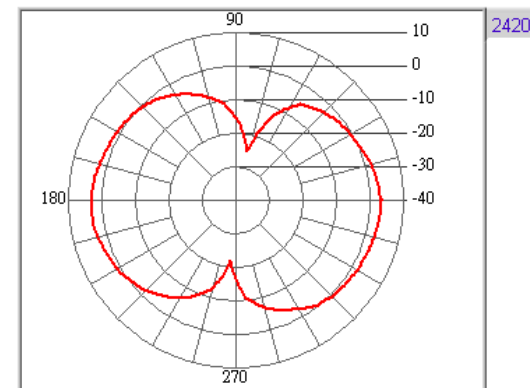
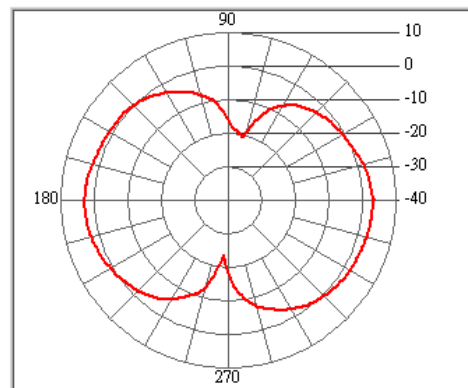
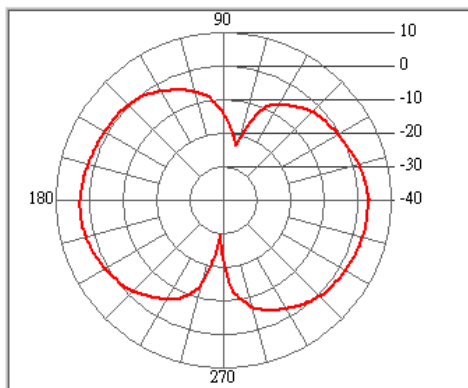
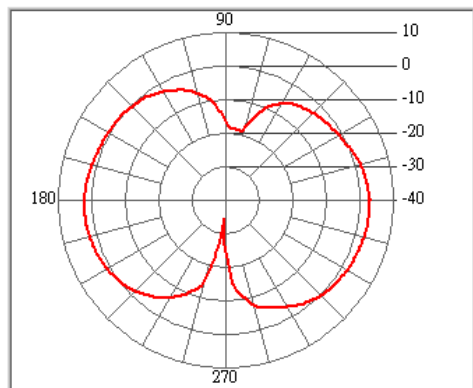
Time: **上午 11:26:32**

Temperatuer (°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)	3.07	3.41	3.31	3.47	3.67	3.48	3.8	3.99	3.78	3.9	3.58	3.14
Peak Degree	358	0	360	358	360	181	182	359	0	349	191	349
AV Gain (dBi)	-0.89	-0.57	-0.66	-0.64	-0.47	-0.64	-0.46	-0.25	-0.45	-0.05	-0.23	-0.42

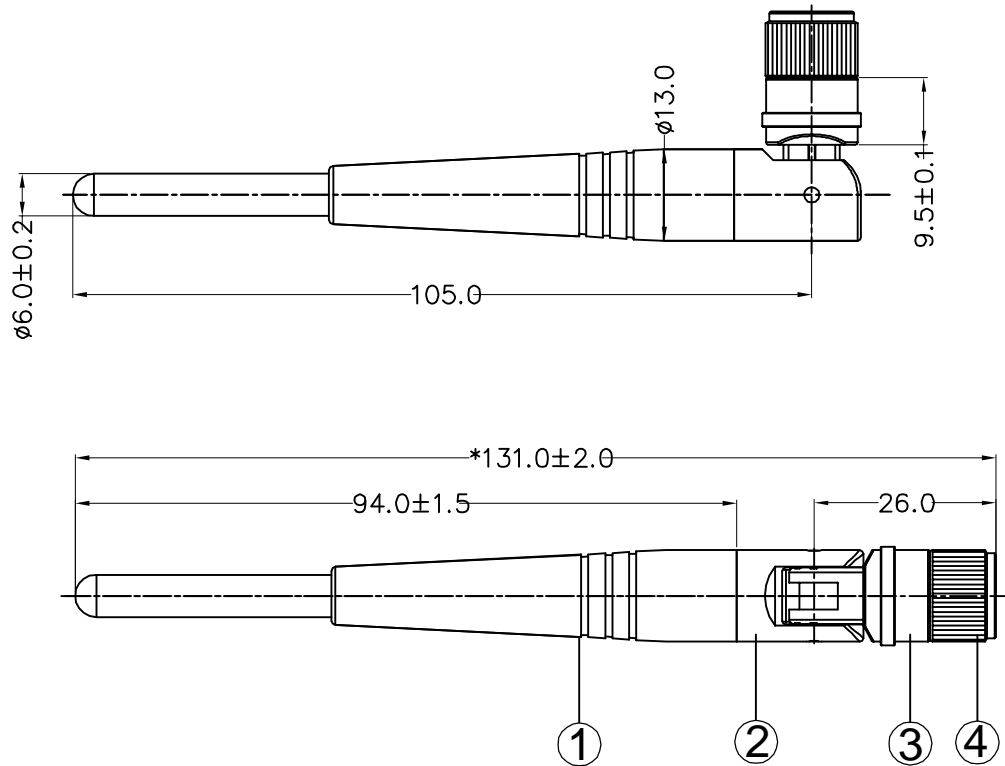




# RoHS

## Compatible

SIGN	DATE	DESCRIPTION	APPROVER
△			
△			
△			



4	SMA305-CPT5AN03	SMAMale Reverse	POM	White	1
3	AN03-T09WHQ2	Body-1	PA+ABS	White	1
2	AN9201-07WHQ2	Body-2	PA+ABS	White	1
1	AN0302-01WHQ2	Body-3	TPE	White	1
NO.	Part Number	Description	Material	Finished	Q'ty

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

**Cortec Technology Inc.**

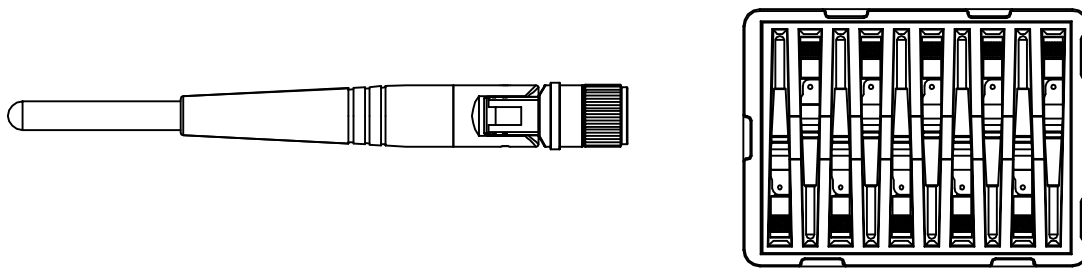
TITLE: 2.4GHz Antenna

PART NO.: AN2400-03A03RS DWG NAME: AN2400-03A03RS.dwg

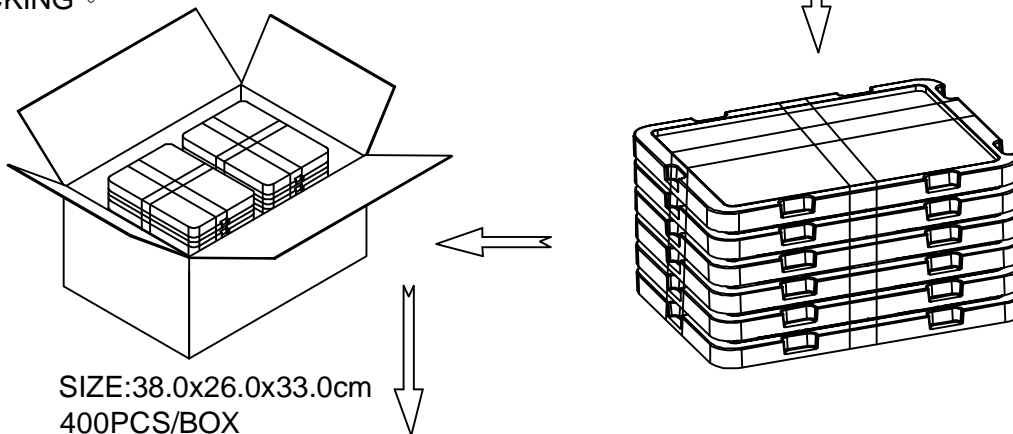
APPROVED BY	CHECKED BY	DESIGNED BY		Tolerance
Grant 2010.09.27	Liu Kui 2010.09.27	Yang Dong 2010.09.27		X.X ±0.3 X.XX ±0.1 X° ±1°
			UNITS: mm	
			SCALE: 1/1	
			REVISION: A	

Part Number : AN2400-03A03RS	Revision : A
Name: 2.4GHz Antenna	Customer : ALL

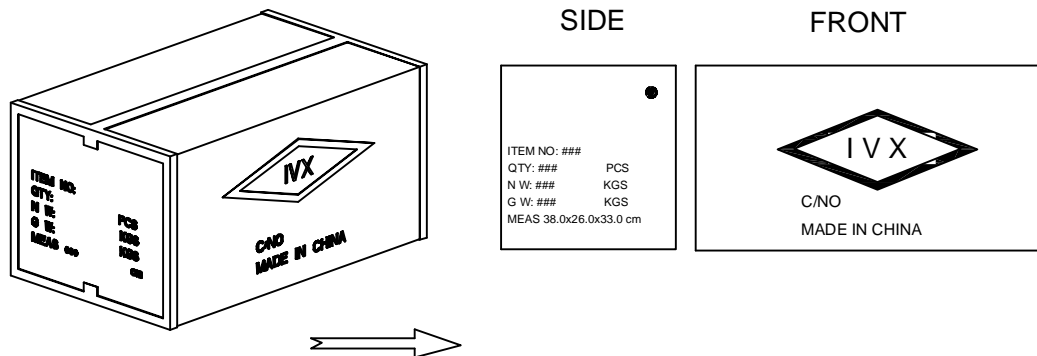
1. Enter the frame ◦



2. PACKING ◦



3. SEALING ◦



## 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>			



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

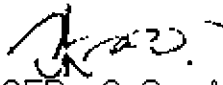
Contract number

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

# 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)									
C3605	(B)									
C3712	(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)		Excellent Hot Forging Uses Precision Forging, Machine Parts, Excellent Hot Forging and Good Machine-ability . Using Value, Watch, Machine Parts...							
C3771	(B)									

# 苏州市华诺线缆科技有限公司

电话: 0512-65433584

传真: 0512-65438693

邮编: 215137

地址: 苏州市相城区太平镇工业园

## RG 178



### 结构参数

	材料	直径(mm)
1. 内导体	镀银铜	7 X 0.102
2. 绝缘体	聚四氟乙烯 (PTFE)	0.86
3. 外导体	单层镀银铜线编织	1.30
4. 护套	FEP	1.83

### 电性能参数

电容(pF/m)	96.45
阻抗(ohm)	50
速率(%)	70
弯曲半径 (mm)	10
最大工作电压(VMS)	1000
最大工作频率 (MHz)	3000
工作温度范围(°C)	-55 至 +200

### 衰减 (典型值)

频率 (MHz)	衰减 (±dB/m)
100	0.453
400	0.912
1000	1.457
3000	2.572