產 品 規 格 承 認 書

Specification For Approval

日 期： 2005 / 03 / 23
Date

編 號： STA - 0804
File No.

承認廠商： 鈺誠通訊股份有限公司
Customer

製造廠商： 英碩企業股份有限公司
Manufacturer

型號品名： 2.4GHz RF Antenna with 大 SMA Connector
Part Number
Description

INVAX P/N : AN2400-0301RS

廠商審核：
Approved By

Invax 英碩企業股份有限公司

台北市忠孝東路五段 815 號 4 樓
Tel: (02)2788-5218 Fax: (02)2783-1658

Web Site:www.invax.com.tw
E-maill:info@invax.com.tw

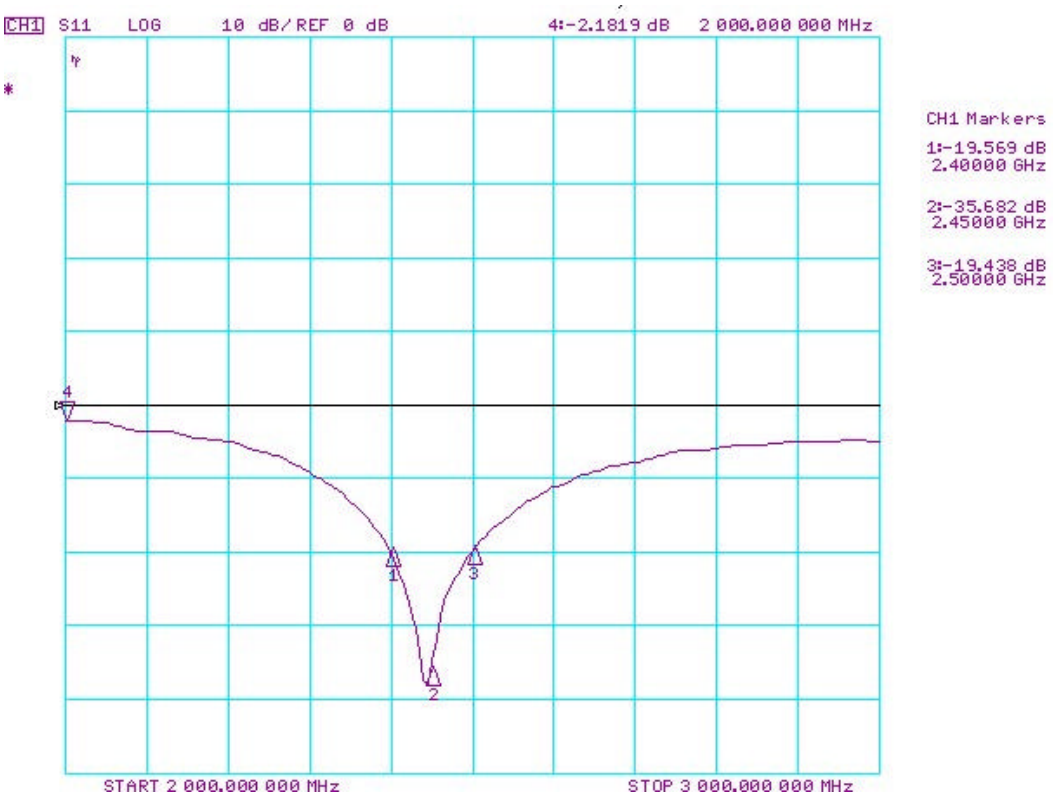
1. Feature and Application

- dipole antenna design
- small size / high gain / omni-directional radiation pattern
- IEEE 802.11 b / g WLAN AP (Access Point) application
- Bluetooth / HomeRF / ISM Band and other 2.4 GHz wireless communication application

2. Specification

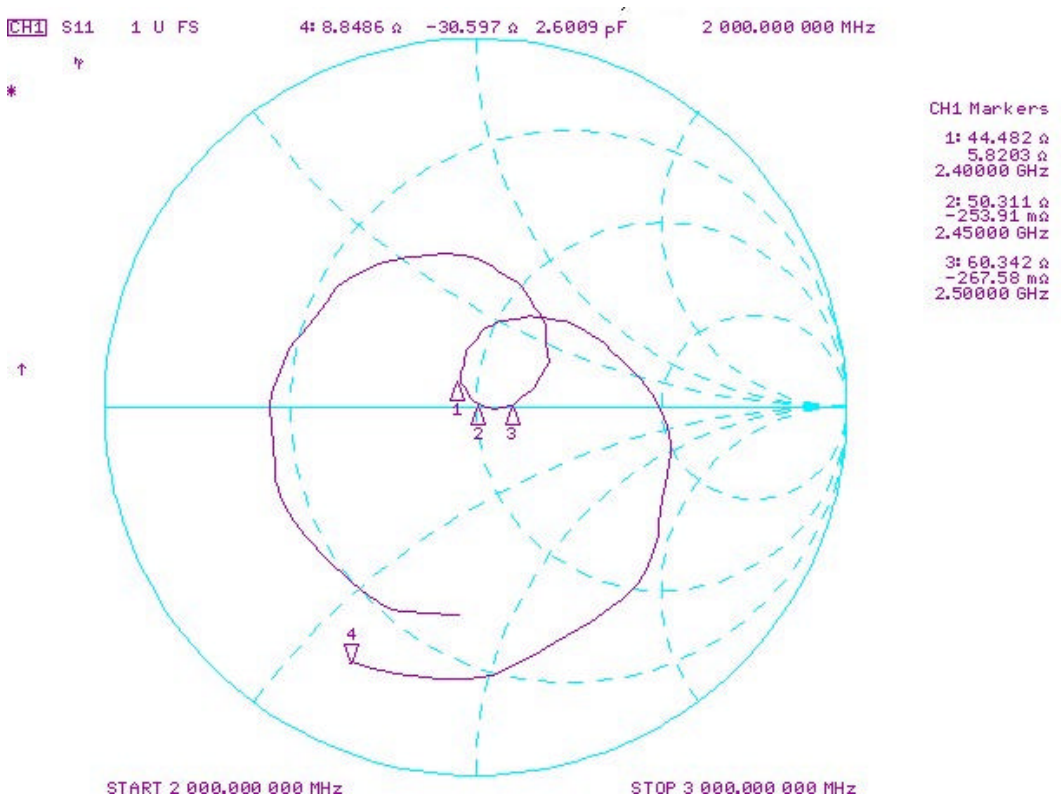
1. Frequency Range	2400 ~ 2500 MHz
2. V.S.W.R.	< 2.0
3. Antenna Gain	2.0 dBi ±0.5dBi
4. Antenna Radiation Pattern	Omni-directional
5. Impedance	50 ohm
6. Color of Outer Cover	Black
7. Material of Outer Cover	TPE (Black)
8. Material of Hinge	PC (Black)
9. Connector	SMA Male Reverse
10. Operation Temperature	-40℃ ~ + 90 ℃
11. Storage Temperature	-30°C ~ + 75 ℃

3. S11 Return Loss Testing Data



4. V.S.W.R Testing Data

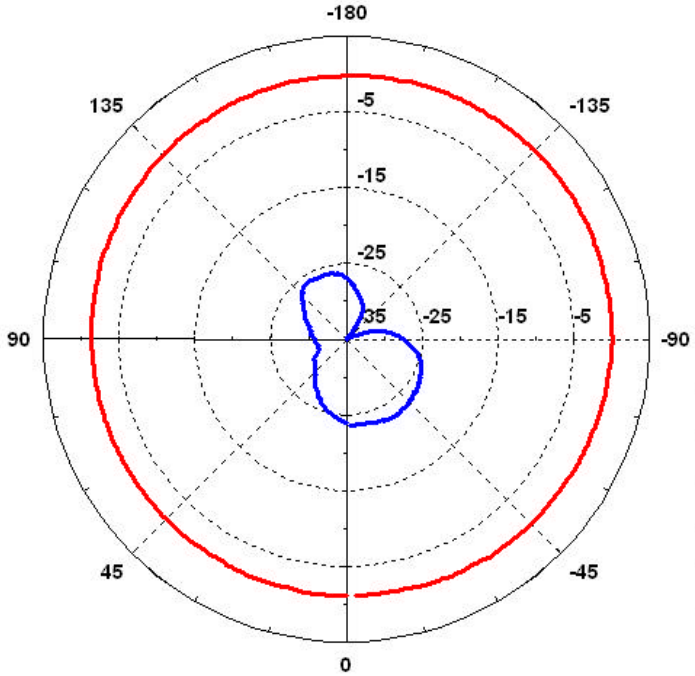
5. Smith Chart and Impedance Testing Data



6. Antenna Radiation Pattern

Horizontal Plane

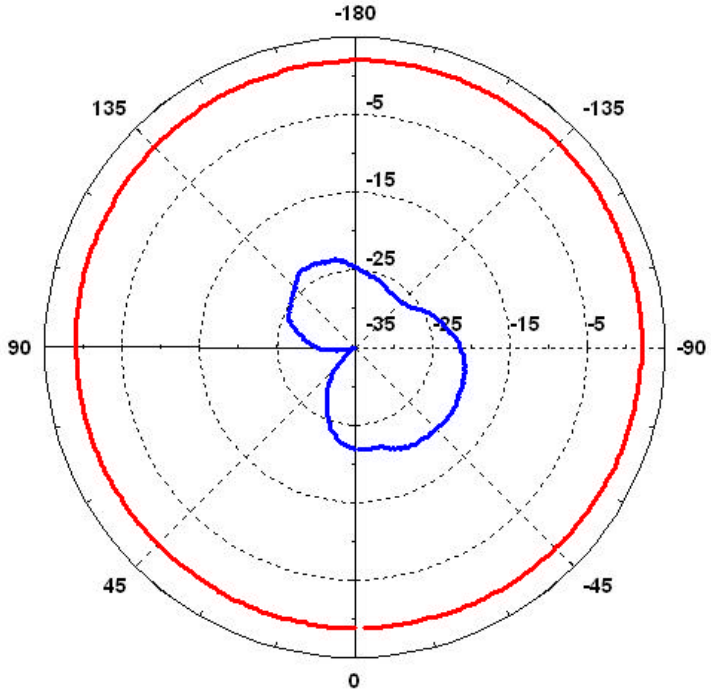
2300MHz Radiation Pattern



Ver. Pol. (max.)=	0.2
Ver. Pol. (avg.)=	-0.6
Hor. Pol. (max.)=	-22.9
Hor. Pol. (avg.)=	-26.7
Tol. Gain (max.)=	0.2
Tol. Gain (avg.)=	-0.6

Unit: dBi

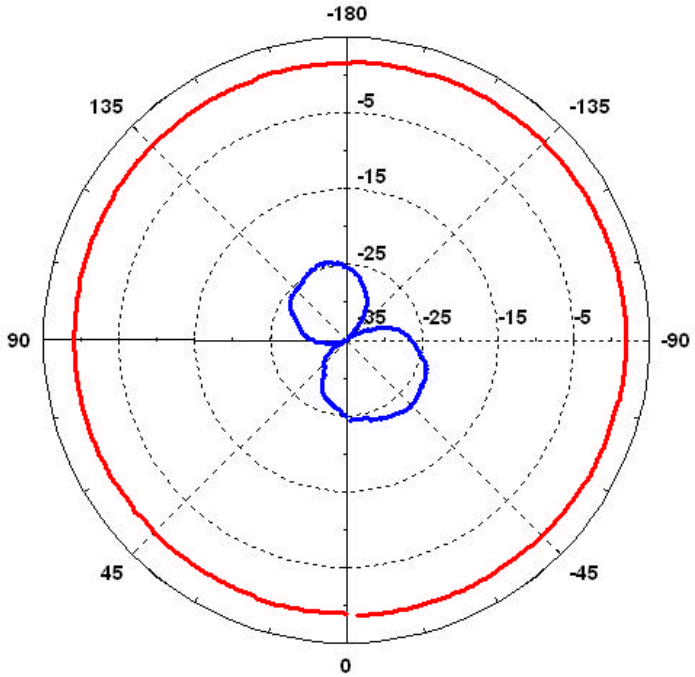
2400MHz Radiation Pattern



Ver. Pol. (max.)=	2.2
Ver. Pol. (avg.)=	1.6
Hor. Pol. (max.)=	-19.9
Hor. Pol. (avg.)=	-23.7
Tol. Gain (max.)=	2.2
Tol. Gain (avg.)=	1.6

Unit: dBi

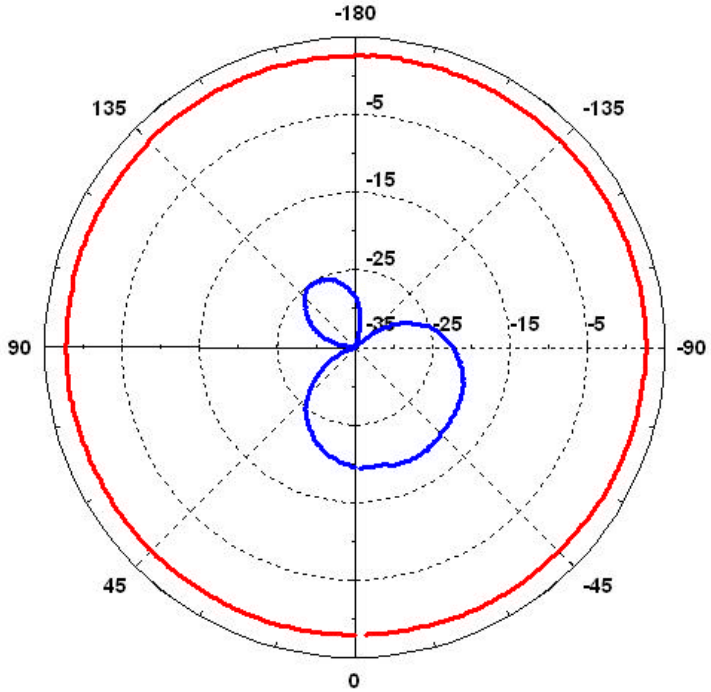
2450MHz Radiation Pattern



Ver. Pol. (max.)=	1.9
Ver. Pol. (avg.)=	1.4
Hor. Pol. (max.)=	-22.8
Hor. Pol. (avg.)=	-26.4
Tol. Gain (max.)=	1.9
Tol. Gain (avg.)=	1.4

Unit: dBi

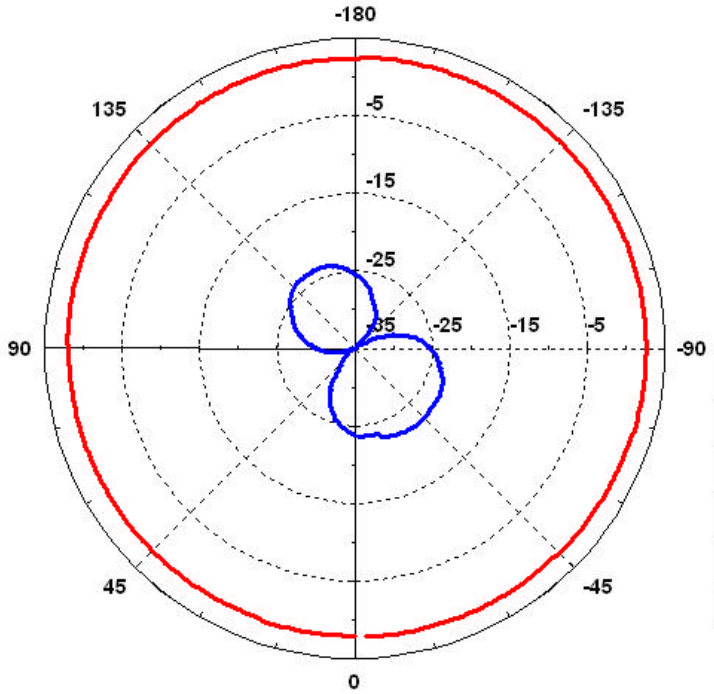
2500MHz Radiation Pattern



Ver. Pol. (max.)=	2.7
Ver. Pol. (avg.)=	2.4
Hor. Pol. (max.)=	-18.8
Hor. Pol. (avg.)=	-23.5
Tol. Gain (max.)=	2.7
Tol. Gain (avg.)=	2.4

Unit: dBi

2600MHz Radiation Pattern

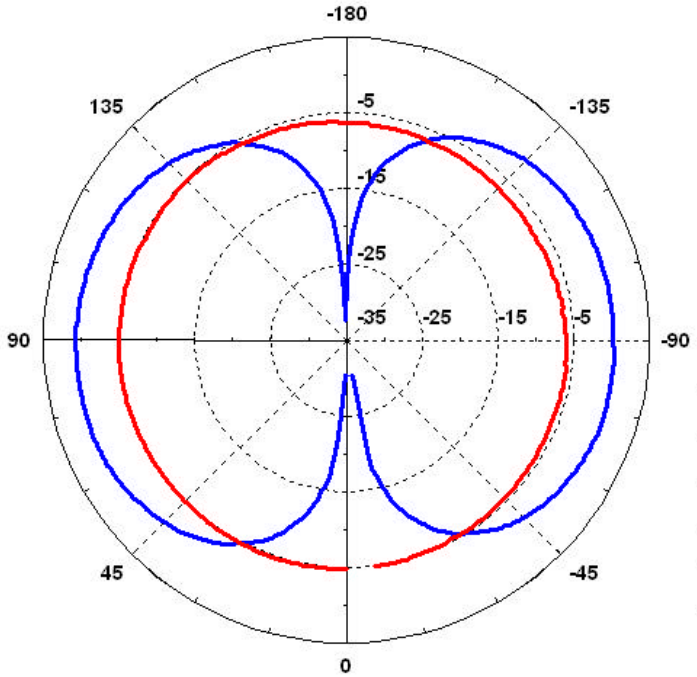


Ver. Pol. (max.)=	2.6
Ver. Pol. (avg.)=	2.3
Hor. Pol. (max.)=	-22.3
Hor. Pol. (avg.)=	-25.7
Tol. Gain (max.)=	2.6
Tol. Gain (avg.)=	2.3

Unit: dBi

Vertical Plane

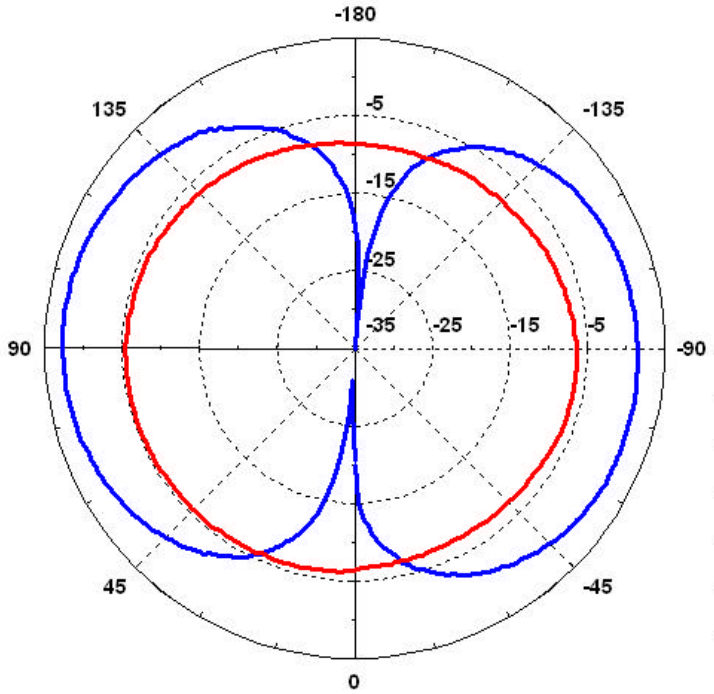
2300MHz Radiation Pattern



Ver. Pol. (max.)=	-4.8
Ver. Pol. (avg.)=	-5.5
Hor. Pol. (max.)=	0.7
Hor. Pol. (avg.)=	-2.0
Tol. Gain (max.)=	0.9
Tol. Gain (avg.)=	-1.4

Unit: dBi

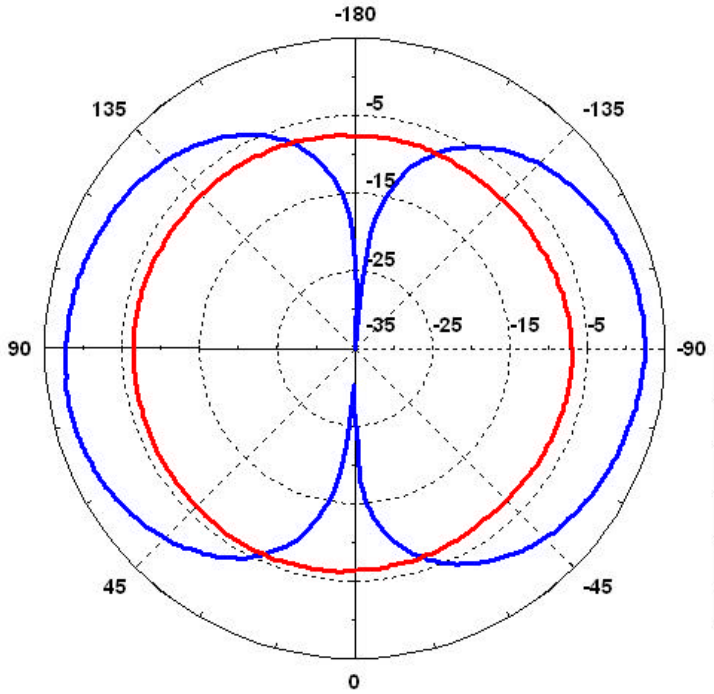
2400MHz Radiation Pattern



Ver. Pol. (max.)=	-4.9
Ver. Pol. (avg.)=	-6.6
Hor. Pol. (max.)=	2.7
Hor. Pol. (avg.)=	-0.6
Tol. Gain (max.)=	2.8
Tol. Gain (avg.)=	-0.3

Unit: dBi

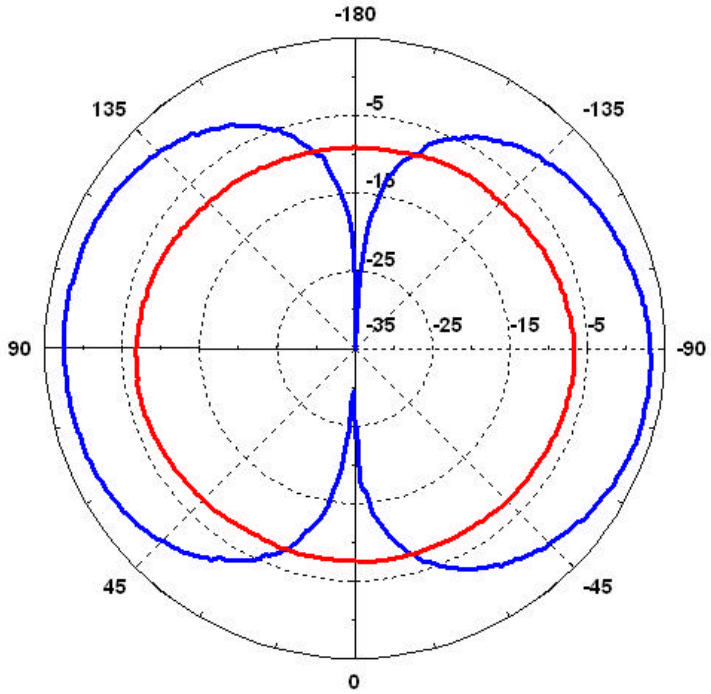
2450MHz Radiation Pattern



Ver. Pol. (max.)=	-4.9
Ver. Pol. (avg.)=	-6.8
Hor. Pol. (max.)=	2.6
Hor. Pol. (avg.)=	-0.8
Tol. Gain (max.)=	2.6
Tol. Gain (avg.)=	-0.5

Unit: dBi

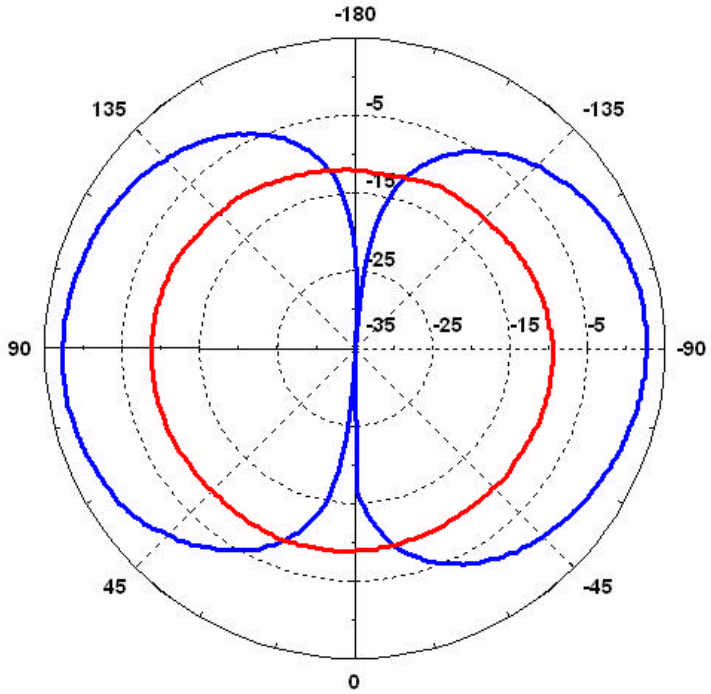
2500MHz Radiation Pattern



Ver. Pol. (max.)=	-4.9
Ver. Pol. (avg.)=	-7.5
Hor. Pol. (max.)=	3.2
Hor. Pol. (avg.)=	-0.1
Tol. Gain (max.)=	3.3
Tol. Gain (avg.)=	0.1

Unit: dBi

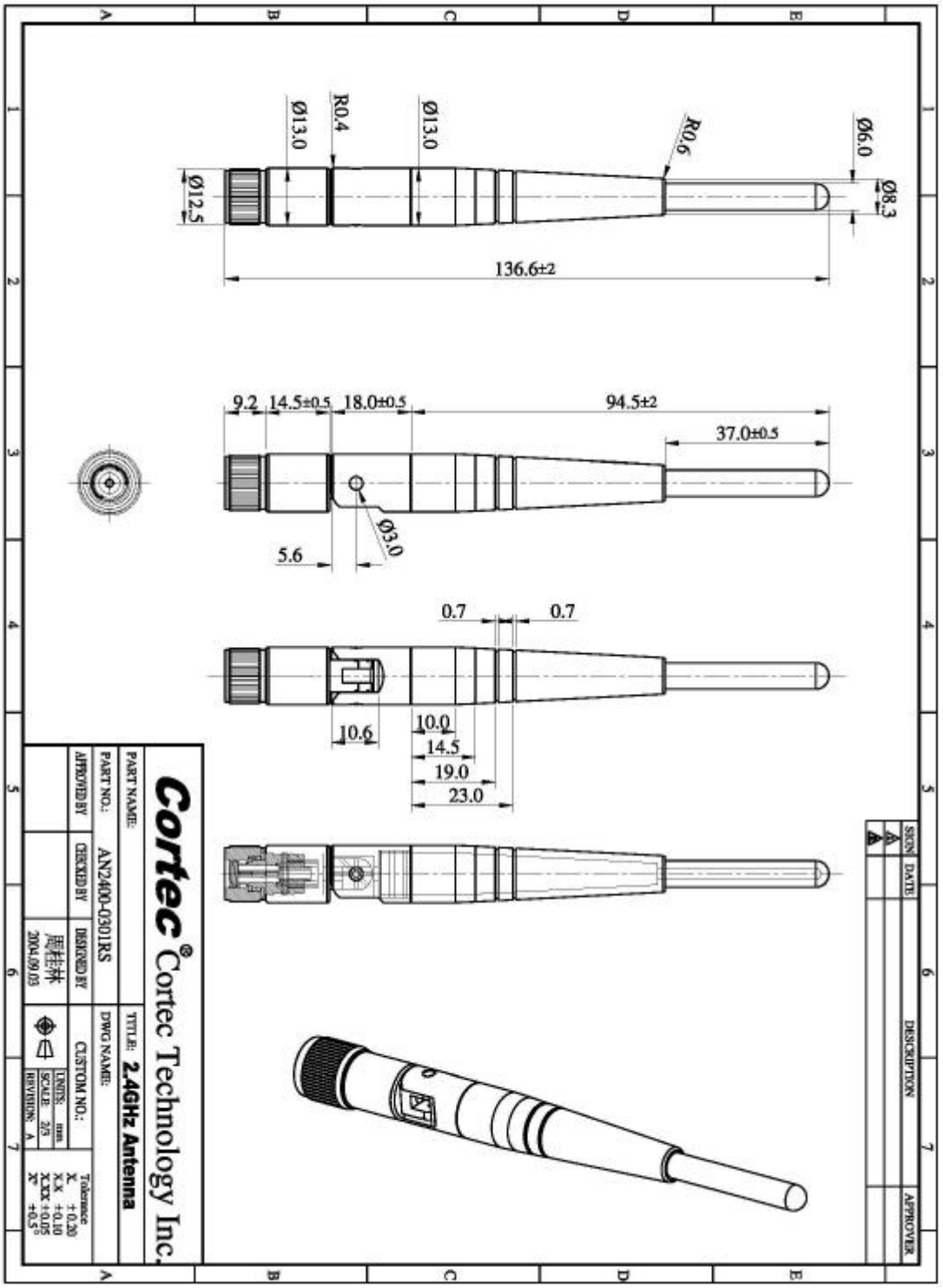
2600MHz Radiation Pattern



Ver. Pol. (max.)=	-4.9
Ver. Pol. (avg.)=	-9.5
Hor. Pol. (max.)=	2.7
Hor. Pol. (avg.)=	-0.7
Tol. Gain (max.)=	2.8
Tol. Gain (avg.)=	-0.6

Unit: dBi

7. Mechanical Dimension Drawing



8. Plastic Parts Material Specification

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.	℃	D648	80
熔融指數 Melt Flow Index	G/ min^2	D1238	10
燃燒性 Flammability	---	UL94	HB
Testing Data from 東莞市合春塑料有限公司 Tel:86-0769-2774772 台灣大雅國際股份有限公司 Tel:886-02-27775232			

TEIJIN POLYCARBONATE SINGAPORE PTE LTD

#01-01 111 SAKRA AVE. SINGAPORE 627881 SINGAPORE

Material Designation: L-1250#(f2), L-1250U#, L-1250V#, L-1250Z#
Product Description: Polycarbonate (PC)

Color	Min. thick. (mm)	Flame Class	HWI	HAI	RTI. Elec.	RTI. Imp.	RTI. Str.
ALL	0.40	V-2	4	3	80	80	80
	0.84	V-2	4	3	80	80	80
	1.5	HB	4	0	125	115	125
	3.0	HB	1	0	125	115	125
	6.0	HB	1	0	125	115	125
CXT:2, HVTR:2, D495:5							

 # Material designation may be suffixed with any one or two letters.

Subjected to one or more of the following tests; Ultraviolet Light, Water Exposure in accordance with UL 746C, where the acceptability for outdoor use is to be determined by UL Inc.

Report Date: 1999-07-29

9. Coaxial Cable RG-178 Data Sheet

RG-178 Coaxial Cable Specification		
1. Cable Type	MIL – C – 17 / RG-178	
2. Impedance	50 ±3 ohm	
3. Inner Conductor	**Material**	silver-coated cooper
	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 cooper
	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 (DC ~ 6GHz)	< 1.3	
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 Voltage	200℃ / 30V	
13. Conductor Resistance	335 ohm / KM / 20℃ max.	
14. Dielectric Resistance	3 G ohm / KM / 20℃ min.	

10. Reliability Testing on Antenna Body

Test Item	Procedure	Requirement
1. Visual inspection and dimension check	Applicable methods using x5 magnification	follow Specification
2. Rapid changing of temperature	-40℃ (30minutes) to 90℃ (30minutes); 120 cycles	After 2 hours recovery: 1. no visible damage 2. bandwidth tolerance < ±5%
3. Damp Heat	500 hours at 60℃; 90 ~ 95% RH	After 2 hours recovery: 1. no visible damage 2. bandwidth tolerance < ±5%
4. Endurance	500 hours at 90℃	After 2 hours recovery: 1. no visible damage 2. bandwidth tolerance < ±5%

11. Ordering Information

Part Number: AN 2400 – 03 01 RS

Product Type

AN= Antenna

Frequency Code

2400= 2400 ~ 2500 MHz

Dimension Code

03= see the mechanical drawing page

Cable Code

01= RG-178

Connector Code

RT= TNC male reverse

RS= SMA male reverse