Measurement of Maximum Permissible Exposure

1. Foreword

In adopt with the Human Exposure IEEE C95.1, and according to the FCC 1.1310. The *Maximum Permissible Exposure (MPE)* is obligated to measure in order to prove the safety of radiation harmfulness to the human body.

The *Gain* of the antenna used is measured in an *Anechoic chamber.* The *maximum total power to the antenna* is to be recorded. By adopting the ***Friis Transmission Formula*** and the *power gain of the antenna,* we can find the distance right away from the product, where the limit of the MPE is.

2. Description of EUT

FCC ID	**:**	VUIAAM6KVIT2
Product Name	**:**	Wireless ADSL 2+
Model Name	**:**	AAM6020VI-T2, AAM6XXXVI-T2, 6388-AX-XXX (X= 0~9, A~Z)
Frequency Range	**:**	2.412GHz ~ 2.462GHz
Channel Spacing	**:**	5MHz
Support Channel	**:**	11 Channels
Modulation Skill	**:**	DBPSK, DQPSK, CCK, OFDM
Power Type	**:**	Powered by the switching adapter, Manufacture: UMEC Model: UP0181B-12PA I/P: 100-240VAC 50/60Hz 0.4A. O/P: 12VDC 1.5A. 18W 180cm length, non-shielded, no ferrite core

3. Limits for *Maximum Permissible Exposure (MPE)*

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Filed Strength (H) (A/m)	Power Density (S) (mW/cm2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	100	6
3.0-30	1842/f	4.89/f	$900/f^2$	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	100	30
1.34-30	824/f	2.19/f	$180/f^2$	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

[The EUT is tested in transmit and receive modes and in the first, middle and the last channel separately. The following shows only our observation have the greatest emissions.]

According to **OET BULLETIN 56 Fourth Edition/August 1999**, **Equation for Predicting RF Fields:**

Friis Transmission Formula: $S = \frac{PG}{4\pi R^2} = \frac{301.30 \times 1.932}{4\pi (20)^2} = 0.116 mW/cm^2$

Estimated safe separation: $R = \sqrt{\frac{PG}{4\pi}} = \sqrt{\frac{301.30 \times 1.932}{4\pi}} = 6.806 cm$

Note: "The safe estimated separation that the user must maintain from the antenna is at least 6.5cm"

Where: S = *power density* (in appropriate units, e.g. mW/cm2)

P = *power input* to the antenna (in appropriate units, e.g., mW)

G = *power gain* of the antenna in the direction of interest relative to an isotropic radiator

R = *distance* to the center of radiation of the antenna (appropriate units, e.g., cm)

The *Numeric gain G* of antenna with a gain specified in dB is determined by:

G = Log $^{-1}$ (***dB*** antenna gain / 10)

G = Log $^{-1}$ (2.86 / 10) = 1.932

Appendix

Antenna Specification

產 品 規 格 承 認 書

Specification For Approval

日 期： 2008 / 08 / 01
Date

編 號： 080801006
File No.

版 本： 1.0
Revision

承認廠商： 和碩聯合科技股份有限公司
Customer

製造廠商： 英碩科技股份有限公司
Manufacturer

型號品名： **2.4 GHz External Antenna**
Part Number

Description **INVAX P/N: AN2400-37B39GX**

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

Index:

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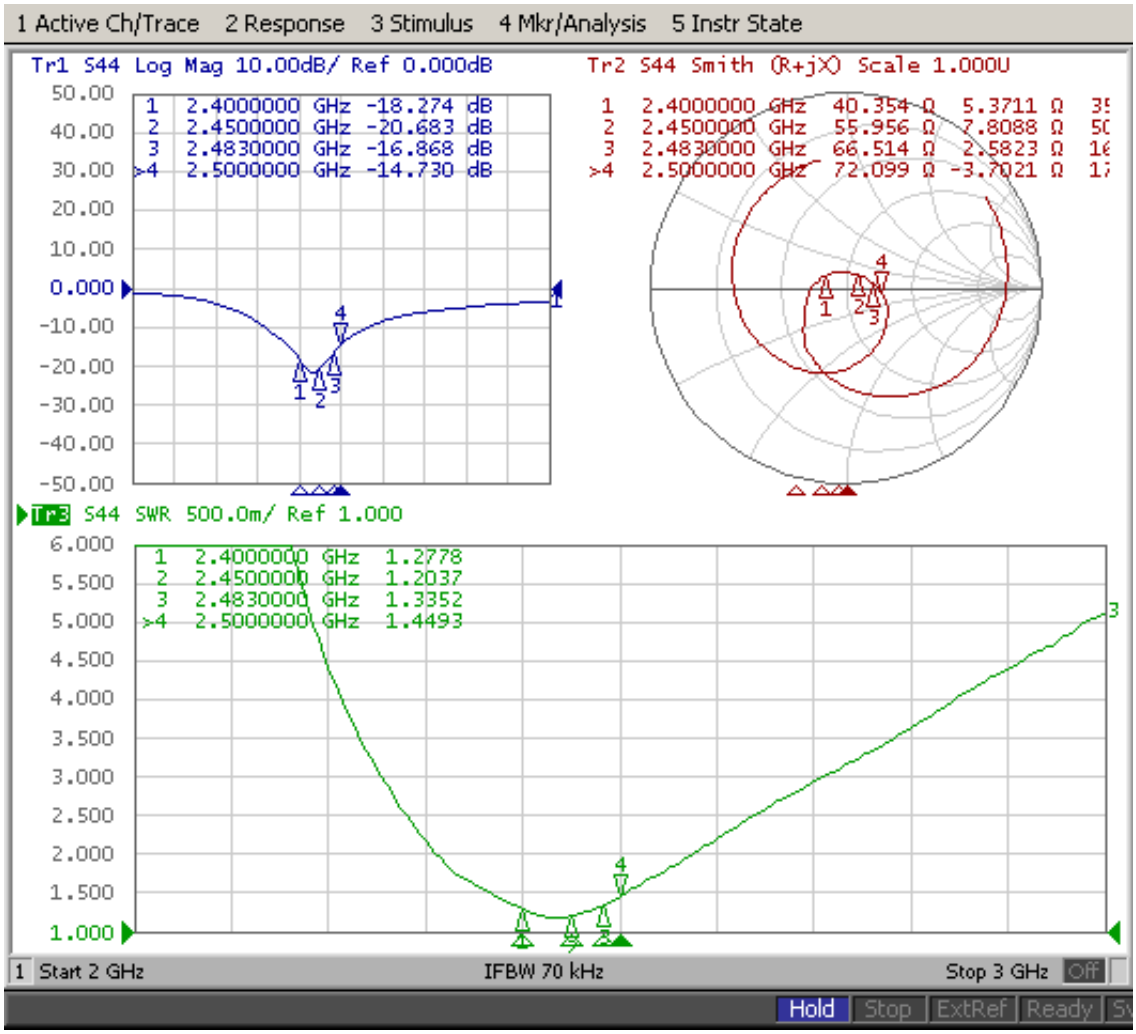
1. Reliability Testing

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 ± 0.8 dBi @ 2450 MHz
Impedance	50 Ohm
B. Material	
Material of Radiator	Cu (Plated)
Connector Type	I-Pex or I-Pex compatible
C. Environmental	
Operation Temperature	- 30 ˚C ~ + 85 ˚C
Storage Temperature	- 30 ˚C ~ + 85 ˚C

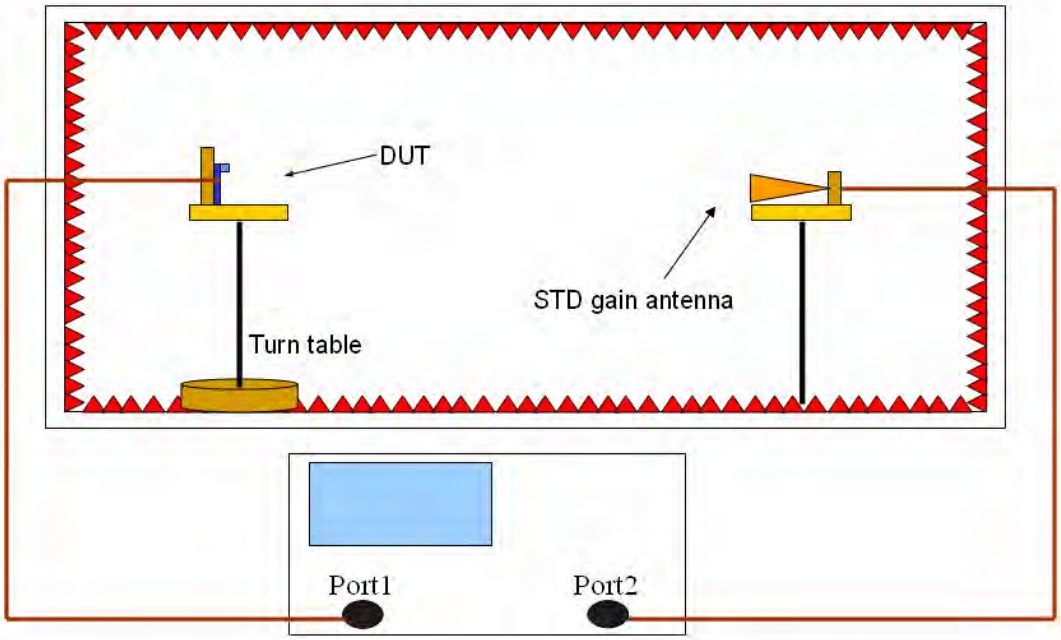
3. S Parameter Test Data



4. Antenna Radiation Pattern

Testing Equipment Specification:

Antenna Anechoic Chamber Dimension: 8 x 4 x 4 m
Quite 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

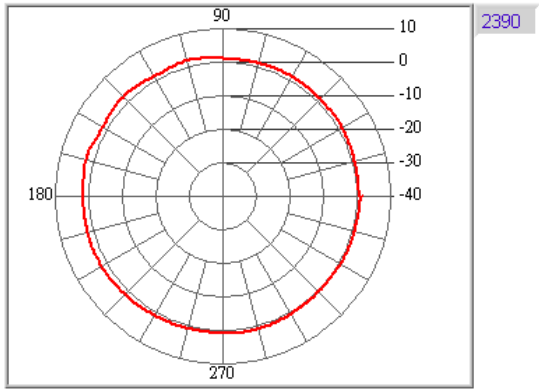
Cortec Technology Inc.

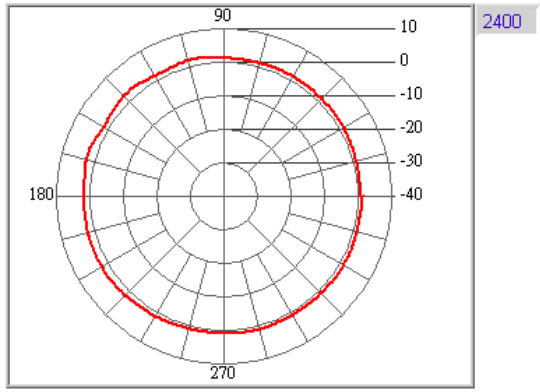
广东省东莞市长安镇振安路沙头段咸西工业区

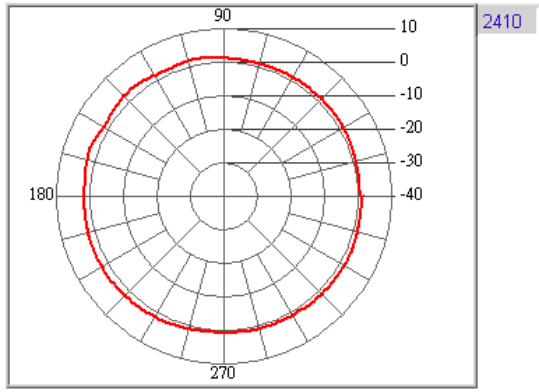
Model : 2.4GHz Antenna // Cortec
Remark : H-plane // Vertical Polazation
Tested by : CORTEC Antenna 3D Lab // Zhang Bing Xiang

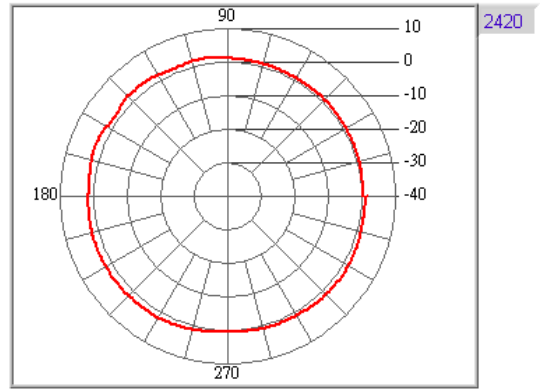
Location: **Chamber**
Date: **2007/11/22**
Time: **上午 11:24:23**
Temperatuer (℃): **22.00**
Humidity (%): **55.00**
Approved by:

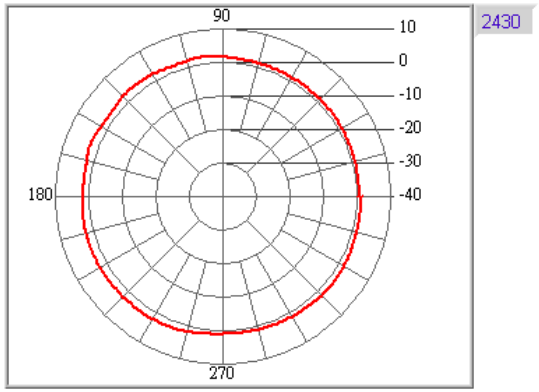
Freq. (MHz)	2390	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500
Peak Gain (dBi)	2.23	2.4	2.39	2.28	2.48	2.1	2.24	2.19	1.77	2.01	1.98	1.61
Peak Degree	166	160	160	160	159	123	123	123	148	147	147	147
AV Gain (dBi)	1.18	1.4	1.37	1.33	1.62	1.25	1.36	1.37	0.95	0.96	0.72	0.28

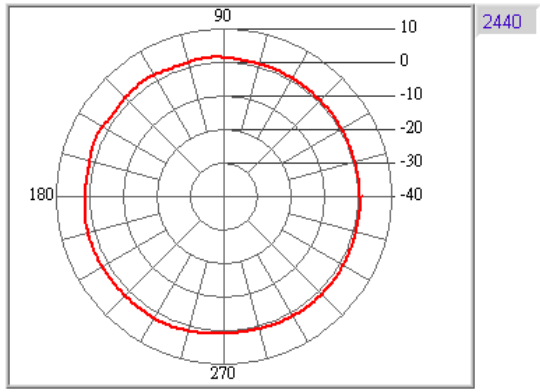


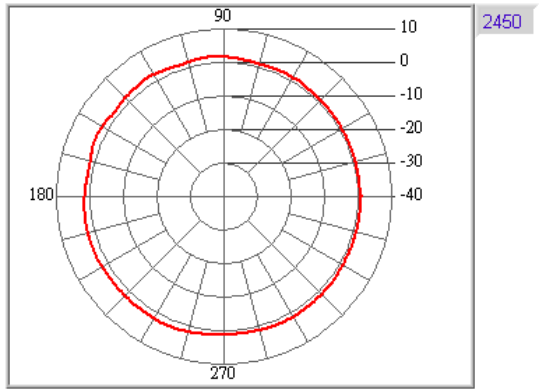


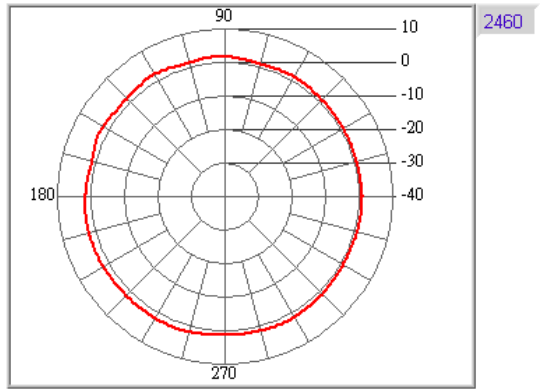


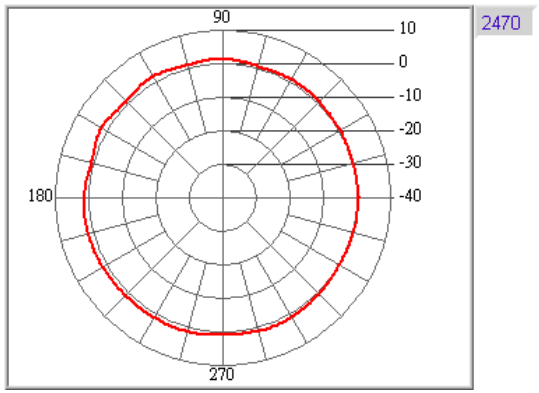


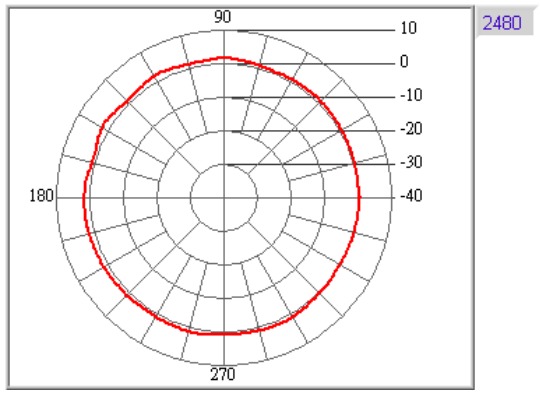


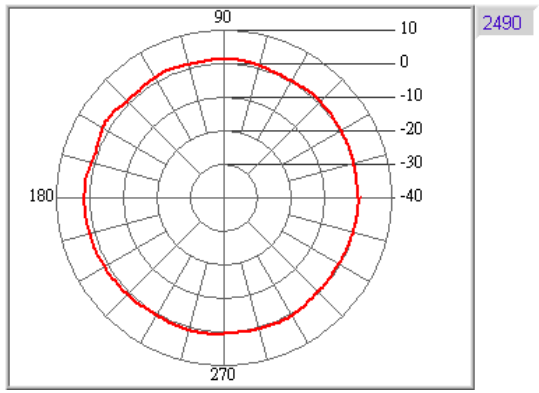


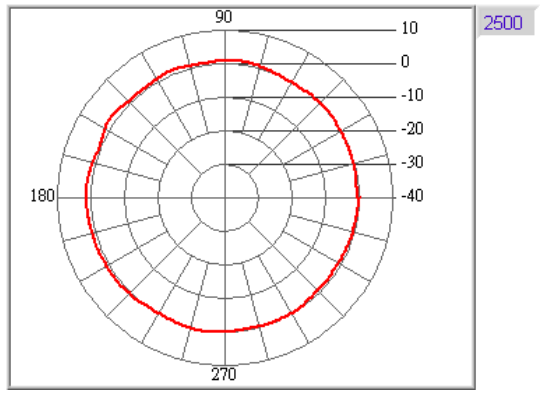












Cortec Technology Inc.

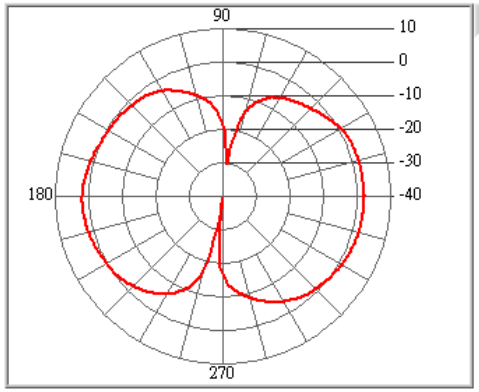
广东省东莞市长安镇振安路沙头段咸西工业区

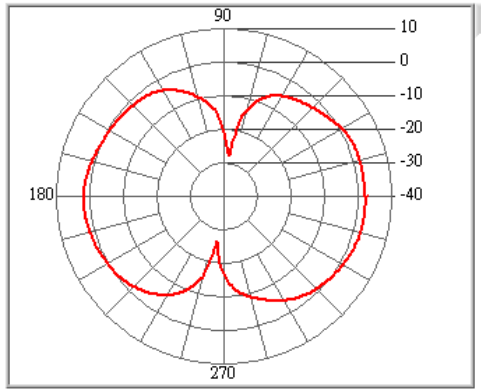
Model : 2.4GHz Antenna // Cortec
Remark : E-plane // Horizontal Polazation
Tested by : CORTEC Antenna 3D Lab // Zhang Bing Xiang

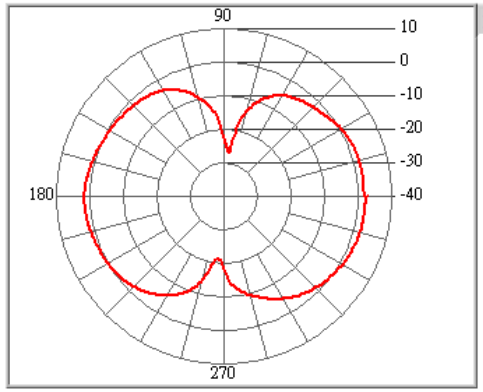
Location: **Chamber** Date: **2007/11/22** Time: **上午 11:31:24**

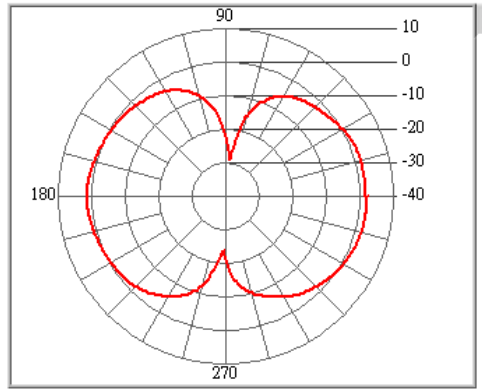
Temperatuer (℃): **22.00** Humidity (%): **55.00** Approved by:

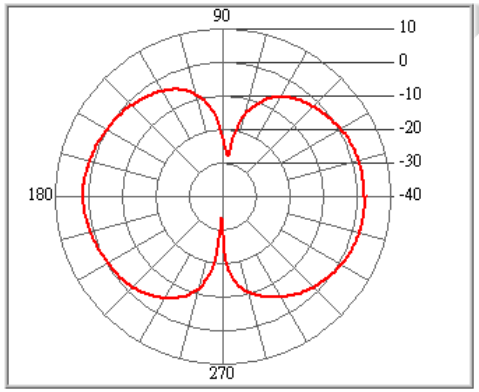
Freq. (MHz)	2390	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500
Peak Gain (dBi)	2.22	2.47	2.34	2.21	2.47	2.11	2.4	2.76	2.62	2.86	2.84	2.49
Peak Degree	359	360	360	360	359	359	360	360	357	358	360	357
AV Gain (dBi)	-1.37	-1.33	-1.49	-1.65	-1.38	-1.71	-1.43	-1.18	-1.38	-1.23	-1.37	-1.79

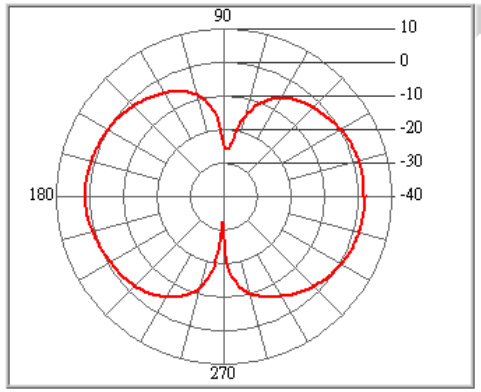


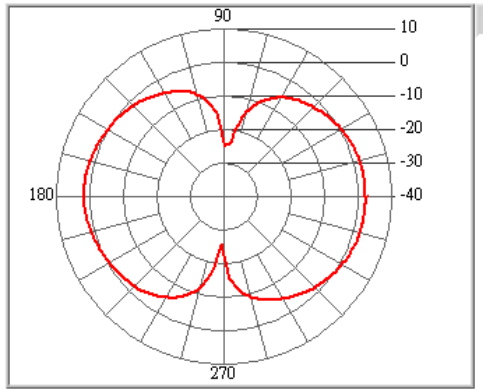


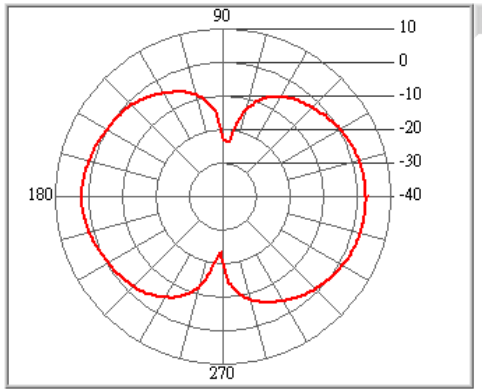


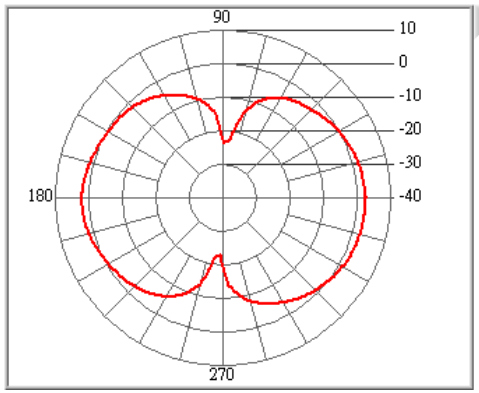


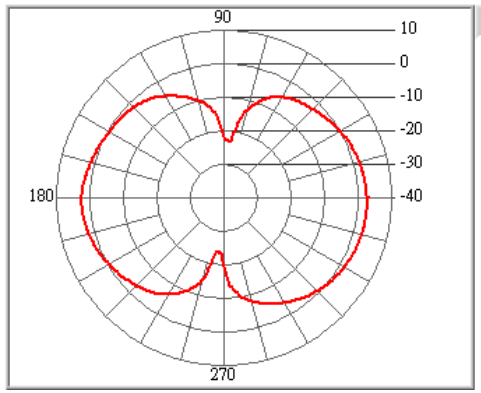


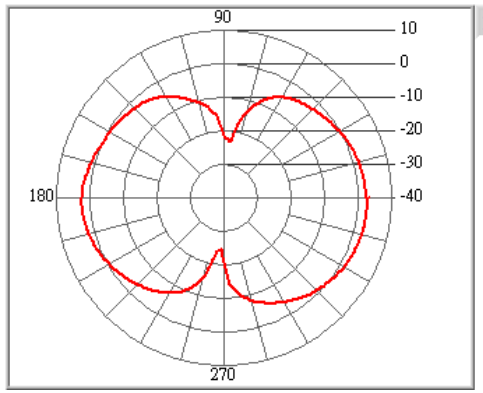


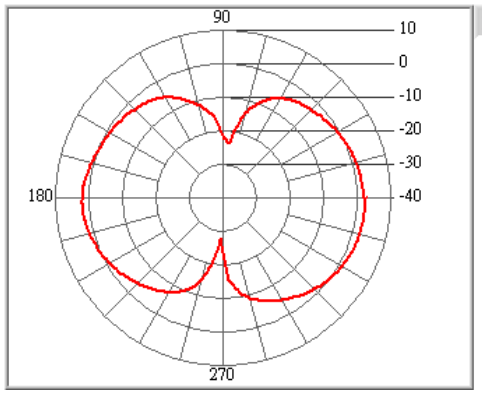






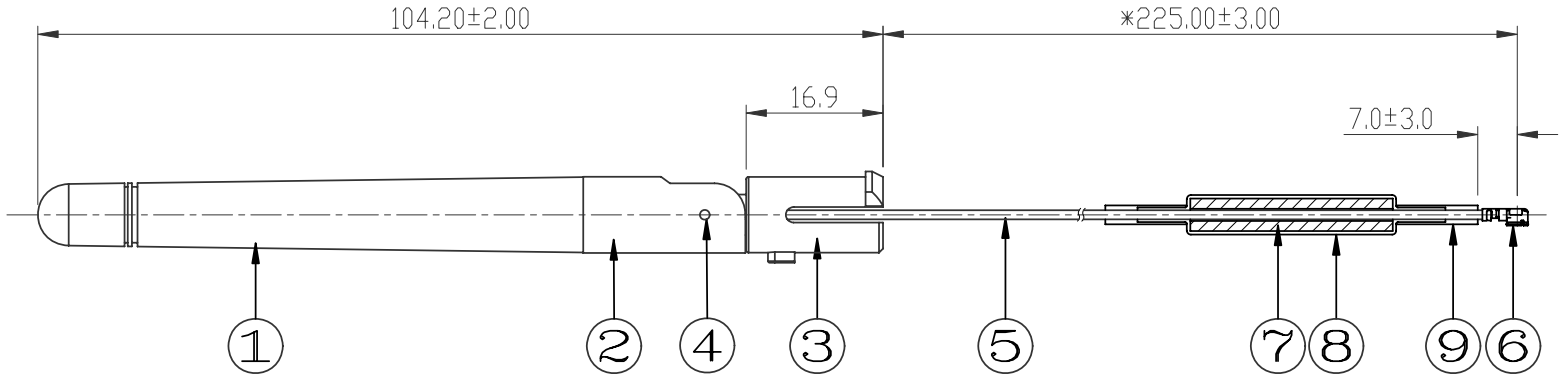


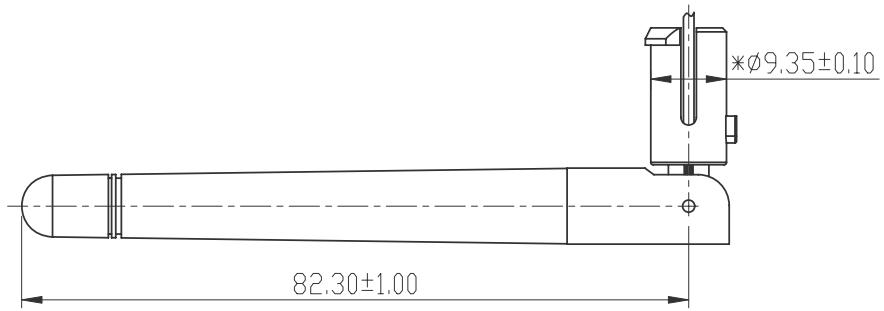




RoHS Compatible

SIGN	DATE	DESCRIPTION	APPROVER
B			
C			
D			





No.	Part Number	Description	Material	Finish	Q'ty
9	R-HSTUBE-020N	Hstube		⌀2.0*10mm	2
8	R-HSTUBE-035N	Hstube		⌀3.5*38mm	1
7	R-MR-040015250	Core	Fe_2O_3	⌀4.0*25mm	1
6	CI-113	MHF Conn		I-pex or I-pex compatible	1
5	R-CB-113A	Cable	⌀1.13	Gray	1
4	R-AN01-1213Z	Hinge Pin	Brass	Black	2
3	R-AN3701-02P	Body3	PC+ABS	Purple Gray	1
2	R-AN57-05P	Body2	PC+ABS	Purple Gray	1
1	R-AN57-03P	Body1	TPE	Purple Gray	1

Note:

1. Dimension: Take * is the important dimension
2. Tolerance: Unmarked tolerance refer to the standard tolerance please
3. CONN orientation is as shown

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

PART NAME: ANTENNA-2.4GHz-2dBi

PART NO.: AN2400-37B39GX | DWG NAME: AN2400-37B39GX.dwg

APPROVED BY	CHECKED BY	DESIDNED BY	
Grant 2008/07/26	Jack 2008/07/26	Roger 2008/07/26	UNITS: mm SCALE: 1/1 REVISION: A

Tolerance

X.X	±0.30
X.XX	±0.15
X°	±3°

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/ cm³	D638	3.1
扭曲強度 Flexural Strength	Kg/ cm³	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/ min²	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

PC Datasheet

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

ABS Datasheet

台灣台達化學工業股份有限公司
ABS 通用級(一般用)規格性質一覽表

性質 Properties			試驗方法 ASTM	通用級（一般用）General Purpose						
				3000H	3000D	3000	6000	1000	5000	5000s
MECHANICAL	機械質	ZOD 沖擊強度 (IZOD Impact Strength)	D256	34 50	30 38	25 33	23 30	21 27	17 21	13 16
		抗張彎度-降伏點 (Tensile Strength at Yield) 抗張強度－斷裂點 (Tensile Strength at Break)	D638	400 340	410 360	380 310	400 340	430 340	460 360	480 380
		伸張率-斷裂點 (Elongation at Break)	D638	60	40	40	30	30	20	20
		抗折強度 (Flexural Yield)	D790	620	600	580	640	700	750	800
		抗折系數 (Flexural Modulus)	D790	21,000	21,000	20,000	22,000	24,000	26,000	30,000
THERMAL	熱性質	熱變形溫度 (Heat Distortion Temp)	D648	87	86	85	86	87	88	89
		Vicat 軟化溫度 (Vicat Softening Temp)	D1525	102	101	100	101	102	103	104
		流動指數 (Melt Flow index)	D1238	0.5 6.0	1.0 10.0	1.2 12.0	1.6 16.0	1.8 18.0	2.2 20.0	2.1 19.0
		燃燒性 (Flammability)	UL-94	94HB	94HB	94HB	94HB	94HB	94HB	94HB
ELECTRICAL	電氣性	相對溫度指數 (Relative Temp index)	UL-746B	-	-	60	60	60	60	60
		抗熱線燃燒性 (High Current Arc ignition)	UL-746A	-	-	15	13	17	18	15
		抗電弧性 (High Current Arc ignition)	UL-746A	-	-	200	200	200	200	15
		電弧產生速率 (Arc Tracking Rate)	UL-746A	-	-	0	0	0	0	0
OTHERS	其他	比重 (Specific Gravity)	D792	1.03	1.03	1.03	1.03	1.03	1.03	1.04
		硬度 (Rockwell Hardness)	D785	103	102	100	107	110	115	119
		成型收縮 (Mold shrinkage)	D955	0.4	0.4	0.4	0.4	0.4	0.4	0.4
		吸水率 (Water Absorption)	D570	0.3	0.3	0.3	0.3	0.3	0.3	0.3

SHIYANG（ZHING SHAN）METAL PRODUCTS CO.,LTD

世扬金属制品有限公司

TEST CERTIFICATE

材质证明书

CLIENT 客户	天诚							certificate NO. 证明书号	070127-15	
name article 品名	Brass									
LOT NO.	SIZE(MM)	OUTWGT	DESIGNATION	Cu(%)	Pb(%)	Fe(%)	Fe+Sn(%)	Cd(%)	Zn(%)	REMARK
	STANDARD	(KG)	JISC3604	57~61	1.8~3.7	≤0.5	≤1.2	≤0.0075	REM	
7916	14.5 ϕ		JISC3604	58.92	2.986	0.446	0.971	0.0042	REM	

兹证明本表所列产品,均依材料规格制造及试验,并符合规格之要求.
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED JERE IN MAS BEEN MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENT OF THE ABOVE MATERIAL SPECIFICATION.

MANAGER: 曾敦義　　PABLE: 李玉奎　　DATE:2007/02/27

THE THREE INDUSTRIAL AREA NAN LANG TOWN ZHONG SHAN CITY
中国广东省中山市南朗镇第三工业区
TEL:0760-5214770　FAX:0760-5214769
E-Mail:sales@shiyangmetal.com

Coaxial Cable Datasheet

O.D. 1.13 mm (AWG32) Coaxial Cable Specification		
1. Cable Type	O.D. 1.13 mm (AWG32)	
2. Impedance	50 ± 3 ohm	
3. Inner Conductor	**Material**	silver-coated cooper
	Conductor Numbers	7
	Conductor Size	0.08 mm
	Outer Diameter	0.24 mm
4. Dielectric Layer	**Material**	FEP
	Color	Clear
	Average Thickness	0.22 mm
	Diameter	0.68 mm
5. Braid (Shielding)	**Material**	tin-coated cooper
	Construction	16-4-0.05 mm
	Coverage	90 %
6. Outer Cover	**Material**	FEP
	Color	Black / white / gray
	Average Thickness	0.10 mm
	Diameter	1.13 ± 0.05 mm
7. V.S.W.R Testing (DC ~ 6GHz)	< 1.3	
8. Attenuation (dB / 1 meter)	**100 MHz**	0.60
	400 MHz	1.25
	1800 MHz	2.23
	2400 MHz	2.70
	5200 MHz	4.15
9. Capacitance	97 ± 3 (pF / meter)	
10. Maximum Power	30 dBm	
11. Spark Test	500 V	
12. Rating Temp. and Volt.	200˚C / 30V	
13. Conductor Resistance	520 ohm / KM / 20˚C max.	
14. Dielectric Resistance	1500 M ohm / KM / 20˚C min.	

材　料　成　分　表

茲證明提供才貴公司產品由以下材料成分組成：

本公司熱縮套管　　本公司產品規格

解析部位名稱	原材料名稱	原材料產地國	原材料制造供應商	物質 1		物質 2		物質 3		物質 4		物質 5		物質 6	
				名稱	構成比率	名稱	構成比率	名稱	構成比率	名稱	構成比率	名稱	構成比率	名稱	構成比率
	EVA	中国	北有机	EVA	100%										
	PE	广东	茂名石化	PE	100%										
	阻燃剂	山东	山东铝厂	$AL(OH)_3$	99%										
	阻燃剂	深圳	商祺化工	$Mg(OH)_2$	99%										
	色母料	深圳	威远公司	PE	60%	色粉	30%								

深圳电子有限公司 2006.11.27

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)

Cortec®

康捷電子有限公司	
填表：	張恆雪
部門：	研發部
職務：	文員

物料中RoHS對象物質含量調查表

物料名稱：AN2400-37B39GX

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-AN57-03P R-AN57-05P R-AN3701-02P	Body1 Body2 Body3	TPE	N.D.	5	N.D.	N.D.	N.D.	N.D.	GZ0710157632/CHEM	2007.10.26	TPEE	大陸SGS
			PC+ABS	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	GZ0801004228/CHEM PC	2008.01.11	PC/ABS-T85	大陸SGS
			色粉	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	CANEC0803104101	2008.06.16	灰色色粉	大陸SGS
2	R-AN01-1213Z	Hing Pin	銅	27	29017	N.D.	Negative			CANEC0800023303	2008.01.23	JisC3604BD	大陸SGS
			鍍黑鋅	20	16144	N.D.	Negative			CANEC0800926603	2008.3.21	Black Zn Pla	大陸SGS
3	R-CB-113A	Cable O.D.1.13	灰色外皮	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	CE/2007/A4663	2007.10.31	KHCX-32AWG-SB	台北SGS
			編織	N.D.	11	N.D.	Negative			CE/2007/A4664	2007.10.29	KHCX-32AWG-SB	台北SGS
			隔離層/絕緣	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	CE/2007/A4665	2007.10.29	KHCX-32AWG-SB	台北SGS
			芯線	N.D.	N.D.	N.D.	Negative			CE/2007/A4666	2007.10.29	KHCX-32AWG-SB-	台北SGS
4	CI-113	MHF Conn	HOUSING(BLACK)	N.D	23	N.D	N.D			CE/2008/31207	2008.03.10	MHF PLUG HOU	台北SGS
			CONTACT	N.D	20	N.D	N.D			CE/2008/31217	2008.03.10	MHF PLUG CON	台北SGS
			GROUND CONTACT	N.D	17	N.D	N.D			CE/2008/31216	2008.03.10	MHF PLUG GRO	台北SGS
5	R-MR-040015250	Core	Fe_2O_3	N.D.	18	N.D.	N.D.	N.D.	N.D.	GZ0709130255/CHEM	2007.09.11	Ferrite Mat	大陸SGS
6	R-HSTUBE-035N R-HSTUBE-020N	Hstube	EVA	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	CE/2007/B1115	2007.11.12	CB-HFT TUBE	台北SGS
7	R-AN4424517S	Tube	銅	27	29017	N.D.	Negative			CANEC0800023303	2008.01.23	JisC3604BD	大陸SGS
			鍍錫銅管	4	55	N.D.	Negative			CANEC0801495101	2008.04.10	鍍錫銅管	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，鎘的允許濃度爲5ppm