

Measurement of MPE

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

Granted FCC ID	:	NDD9571260303
Product name	:	Wireless LAN PCI Card
Model name	:	EW-7126; GWA-E16; DN-7006
Classification	:	Mobile Device (i) Under normal use condition, the antenna is at least 20cm away from the user; (ii) Warning statement for keeping 20cm separation distance and the prohibition of operating next to the person has been printed in the user's manual
Frequency Range	:	2.412 GHz ~ 2.462GHz
Supported Channel	:	11 Channel
Modulation Skill	:	DBPSK, DQPSK, CCK
Power Type	:	by the PCI interface of computer

3. Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	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:

$$\text{Friis Transmission Formula: } S = \frac{PG}{4pR^2} = \frac{74.989 \times 1.122}{4p(20)^2} = 1.674 \times 10^{-2} \text{ mW/cm}^2$$

$$\text{Estimated safe separation: } R = \sqrt{\frac{PG}{4p}} = \sqrt{\frac{74.989 \times 1.122}{4p}} = 2.587 \text{ cm}$$

Remarks: "The safe estimated separation that the user must maintain from the antenna is at least 2.587 cm."

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:

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

$$G = \text{Log}^{-1} (0.5 / 10) = 1.122$$

NInput Output Enterprise Corp.	PRODUCT SPECIFICATION	DOC. No: WL-TL-17 DATE: 25-MAR-02 REV. : C
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PRODUCT NAME

2.4G ANTENNA WITH RP SMA

PART NUMBER



W111-094-D200

Signed By Customers

Approved By:

供應商： 垠 旺 精 密 股 份 有 限 公 司

TEL:02-2917-7528;FAX:02-2912-1659

台北縣新店市寶興路 37 號 3 樓

W111-094-D200 2.4G ANTENNA

SPECIFICATION

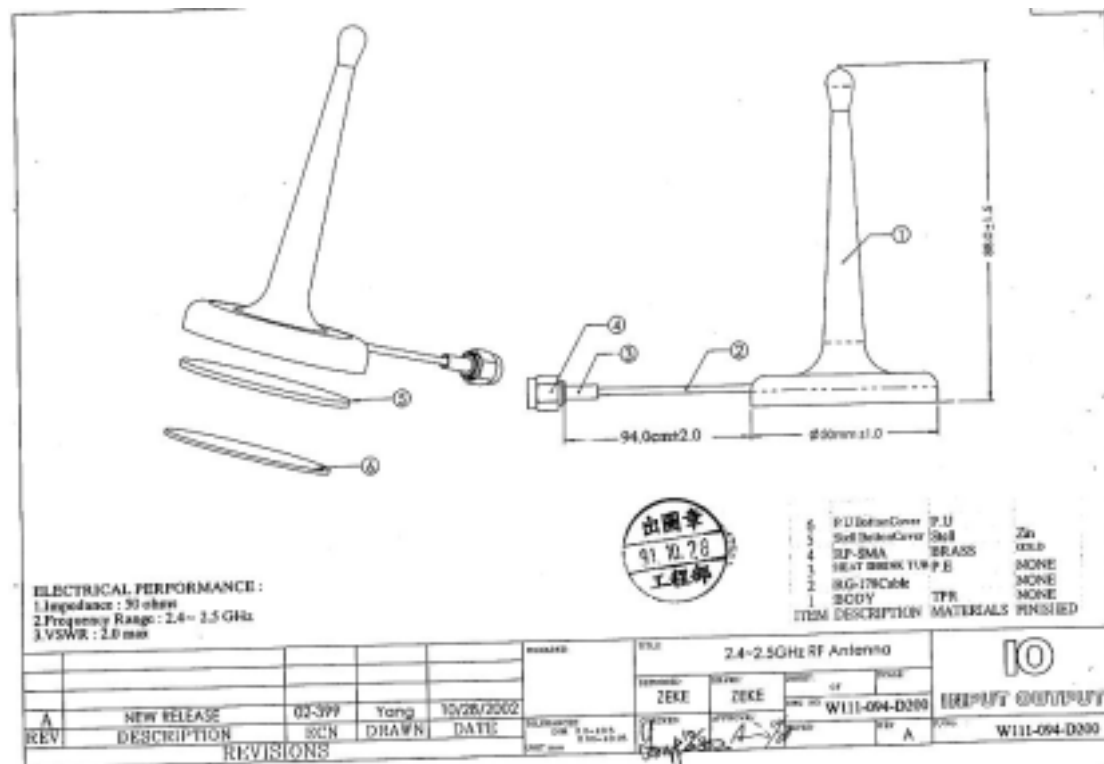
1. Electrical Properties

- 1-1 Frequency Range2.4~2.5GHz
- 1-2 Impedance.....50 Ohms nominal
- 1-3 V.S.W.R.....2.0 (Max.)
- 1-4 Return Loss.....-10.0 dB(Min.)
- 1-5 Max. Gain0.5dBi
- 1-6 Polarization..... Vertical
- 1-7 Admitted Power.....1W
- 1-8 Electrical Wave.....1/4 λ Dipole

2. Mechanical Properties

- 2-1 Connector.....Reverse SMA Plug Straight
- 2-2 Cable.....RG178
- 2-3 Antenna Body.....T.P.R.
- 2-4 Operating Temperature Range.....-20 ~ +50
- 2-5 Storage Temperature Range..... -20 ~ +50

工程成品圖



WILTRON

360 NETWORK ANALYZER

MODEL: W111-094-d200
DEVICE ID:

DATE:
OPERATOR:

Page

SWEEP DATA

START: 2.3080 GHz
STOP: 2.5960 GHz
STEP: 0.0180 GHz

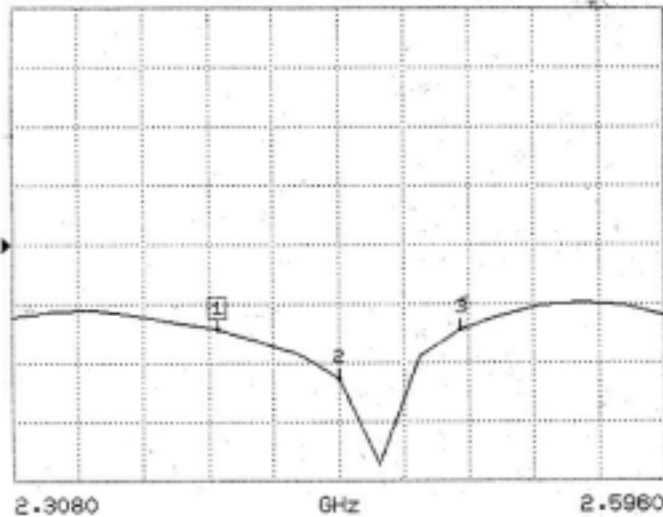
GATE START: -
GATE STOP: -
GATE: -
WINDOW: -

ERROR CORR: REFL ONLY
AVERAGING: 1 PTS
IF BNDWIDTH: REDUCED

-----CH1-----
PARAMETER: S11
NORMALIZATION: OFF
REFERENCE PLANE: 0.0000 mm
SMOOTHING: 0.0 PERCENT
DELAY APERTURE:

S11 FORWARD REFLECTION

LOG MAG. REF=0.000dB 10.000dB/DIV



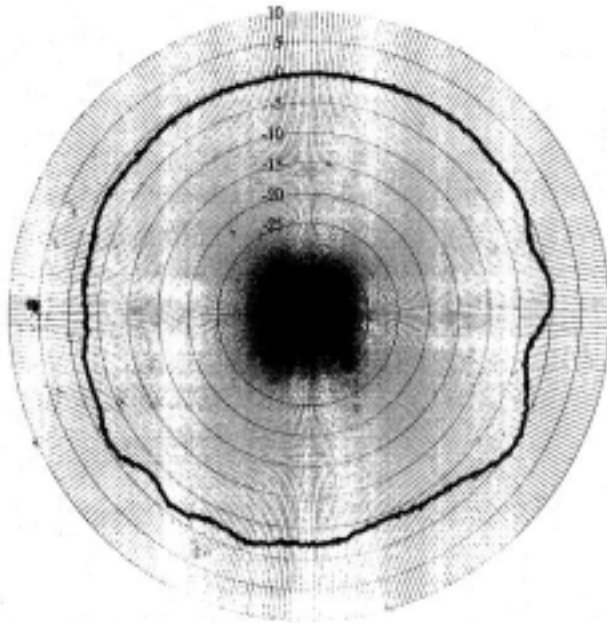
CH 1 - S11
REF. PLANE
0.0000 mm

MARKER 1
2.3980 GHz
-14.366 dB

MARKER TO MAX
MARKER TO MIN

2 2.4520 GHz
-22.720 dB

3 2.5060 GHz
-14.315 dB



IO ANTENNA PATTEM

ANTENNA TEST NO: W111-094-d200

TEST DATE: 2002/09/13

TEST FREQUENCY: 2450MHz

TEST POLARIZATION: VERTICAL
(H-PLANE)

TEST ANTENNA: HORN ANTENNA

TEST CHAMBER: RF CHAMBER

TEST PERSONNEL: Yang

MAX GAIN: 0.55 dBi

MIN GAIN: -4.21 dBi

AVE GAIN: -1.47 dBi

CABLE SPECIFICATION

SPECIFICATION FOR APPROVAL

DOCUMENT: A30178B001

STYLE : 200 30V
RG-178B/U

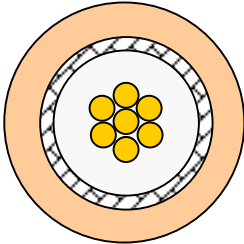
SIZE: 7/0.102 SCCS

RECOGNIZED:

WONDERFUL WIRE CABLE CO.,LTD

**WONDERFUL WIRE CABLE CO.,
LTD
SPECIFICATION**

STYLE	200 30V COAXIAL	DOCUMENT NO : A30178B001	
SIZE	RG-178B/U	ESTABLISHED DATE: 2000/06/29	
STANDARD : MIL-C-17			
Conductor	Size	AWG	30
	Material	----	Silver-Coated Copper Clad Steel
	Conductors No.	----	7
	Conductors Size	mm	0.102
	O.D.	mm	0.30
Insulation	Average Thickness	mm	0.28
	Diameter	mm	0.86

	Material	----	FEP
	Color	----	Clear
Braid	Material	----	Silver-Coated Copper
	Construction	mm	16 / 3 / 0.10
	Coverage	%	95
Jacket	Average Thickness	mm	0.25
	Diameter	mm	1.80 ±0.05
	Material	----	FEP
	Color	----	
Marking	M17/93-RG178B/U WONDERFUL		
Drawing			

AK001/210X297/1.0

PAGE : 1

EDITION : 1.0

MAKER :

CONFIRM :

REVISED DATE :

APPROVAL :

WONDERFUL WIRE CABLE CO., LTD

SPECIFICATION

Electrical & Physical Properties						
Item			RG-178B/U			
Rating Temp Voltage			200 30V			
Conductor Resistance			838.0 OHM/KM/20 MAX			
Insulation Resistance			100 MEGA OHM/KM MIN.			
Dielectric Strength			AC 1.0 KV/Minute			
Spark Test			0.5 KV			
Insulation	Unaged	Tensile Strength	2500 PSI MIN.(1.76 Kg / mm ²)			
		Elongation	200% MIN.			
	Aged	Tensile Strength	UNAGED MIN 75%(168HRS×232)			
		Elongation	UNAGED MIN 75%(168HRS×232)			
Jacket	Unaged	Tensile Strength	2500 PSI MIN.(1.76 Kg / mm ²)			
		Elongation	200% MIN.			
	Aged	Tensile Strength	UNAGED MIN 75%(168HRS×232)			
		Elongation	UNAGED MIN 75%(168HRS×232)			
Nom. Impedance			50 Ohms			
VSWR			MAX. 1.3 at 0.4G~3GHz			
Nom. Vel. of Prop.			69.5%			
Flame Test			VW-1 OK			
Attenuation (dB/100m)	50MHz	100MHz	400MHz	900MHz	1.8GHz	3GHz

	34.4	45.9	91.8	139.4	207.5	308.2
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AK001/210X297/1.0

PAGE : 2

EDITION : 1.0

REVISED

DATE :

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APPROVAL :