

## *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** : MSQWL500B
- Product name** : Wireless Router
- Model name** : WL-500b
- 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** : Powered by Switching Power Adaptor  
Manufacturer: DVE  
Model: DSA-0101F-05 A  
I/P: AC 100-240V, 50-60Hz, 0.3A, 10VA  
O/P: +5VDC, 2A, 10W
- Power Cable** : 185cm long, non-shielded, incorporates a ferrite core

### 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 <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
<b>(A) Limits for Occupational/Controlled Exposure</b>				
0.3-3.0	614	1.63	100	6
3.0-30	1842/f	4.89/f	900/f <sup>2</sup>	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	100	30
1.34-30	824/f	2.19/f	180/f <sup>2</sup>	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:

$$\text{Friis Transmission Formula: } S = \frac{PG}{4pR^2} = \frac{46.238 \times 2.249}{4p(20)^2} = 2.069 \times 10^{-2} \text{ mW / cm}^2$$

$$\text{Estimated safe separation: } R = \sqrt{\frac{PG}{4p}} = \sqrt{\frac{46.238 \times 2.249}{4p}} = 2.877 \text{ cm}$$

Remarks: "The safe estimated separation that the user must maintain from the antenna is at least 2.877 cm."

Where: S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)

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:

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

$$G = \text{Log}^{-1} (3.52 / 10) = 2.249$$

<b>Input Output</b> Enterprise Corp.	<b>PRODUCT SPECIFICATION</b>	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

 W201-108-D2

## 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

**Input Output**  
Enterprise Corp.

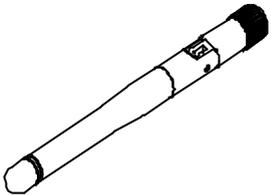
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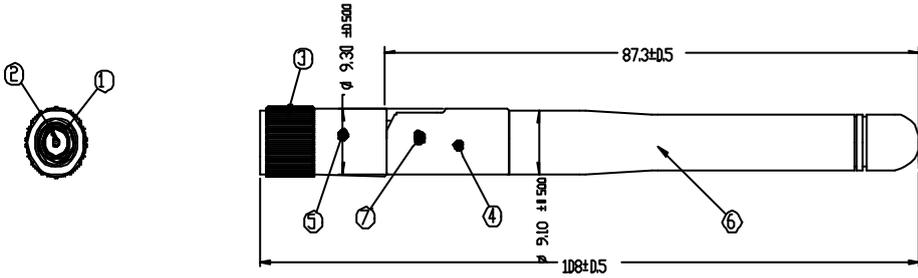
2.4 G ANTENNA WITH RP-SMA PLUG

DOC. No: WL-TL-17

DATE: 25-MAR-02

REV. : C





**ELECTRICAL PERFORMANCE :**

- 1. Impedance : 50 ohms
- 2. Frequency Range : 2.4--2.5 GHz
- 3. VSWR : 2.0 maximum
- 4. Gain: 1.5dBi

ITEM	DESCRIPTION	MATERIALS	FINISHED
7	銷子	Brass	鍍銀
6	帽套	TPR	Black
5	底座	ABS	Black
4	天線座	ABS	Black
3	RP-SMA 焊殼	Brass	鍍黑鎳
2	Contacter 端子	Be-Copper	鍍金 30"
1	RP-SMA 主體	Brass	鍍金 40"

					REMARK:	TITLE: RP SMA 2.4--2.5GHz Antenna				 <b>INPUT OUTPUT</b>
A						DESIGNED: Yang	DRAWN: Yang	CHECK: Yang	SCALE: 1:1	
1	Sample	ECN:	DRAWN: Yang	DATE: 07/30/2002		REV. NO: W201-108-D2				
REV.	DESCRIPTION	ECN	DRAWN	DATE	RELEASED BY: JCC-0105	CHECKED:	APPROVAL:	LINE:	REV: 1	FILE: W201-108-D2
REVISIONS										

# NInput Output

Enterprise Corp.

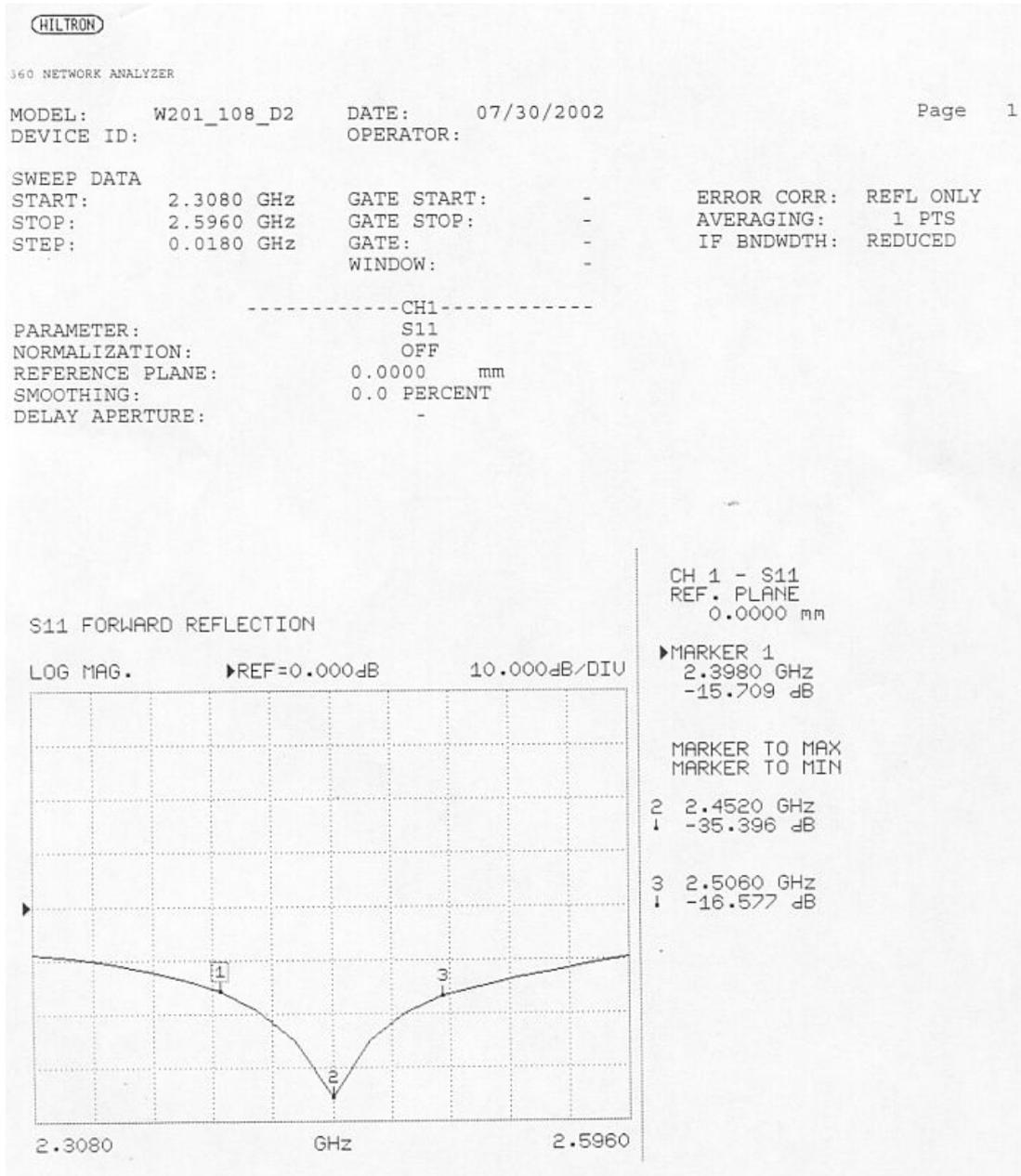
# PRODUCT SPECIFICATION

RP-SMA R/A JACK  
PCB RECEPTACLE

DOC. No: WL-TL-17

DATE: 25-MAR-02

REV. : C



<b>Input Output</b> Enterprise Corp.	<b>PRODUCT SPECIFICATION</b> 2.4 G ANTENNA WITH RP-SMA PLUG	DOC. No: WL-TL-17 <del>DATE:</del> 25-MAR-02 REV. : C
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**W201-108-D2 2.4G ANTENNA  
SPECIFICATION**

1. Electrical Properties

- 1-1 Frequency Range .....2.4~2.5GHz
- 1-2 Impedance .....50 Ohms nominal
- 1-3 V.S.W.R .....2.0 (Max.)
- 1-4 Return Loss .....-10.0 dB(Max.)
- 1-5 Max. Gain .....3.52dBi
- 1-6 Polarization ..... Vertical
- 1-7 Admitted Power .....1 W
- 1-8 Electrical Wave .....1/4 λ Dipole

2. Mechanical Properties

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

## IO ANTENNA PATTEM

ANTENNA TEST NO. -

TEST DATE: 10/17/07

TEST FREQUENCY: 2450MHz

TEST POLARIZATION: VERTICAL  
(H-PLANE)

TEST ANTENNA: HORN ANTENNA

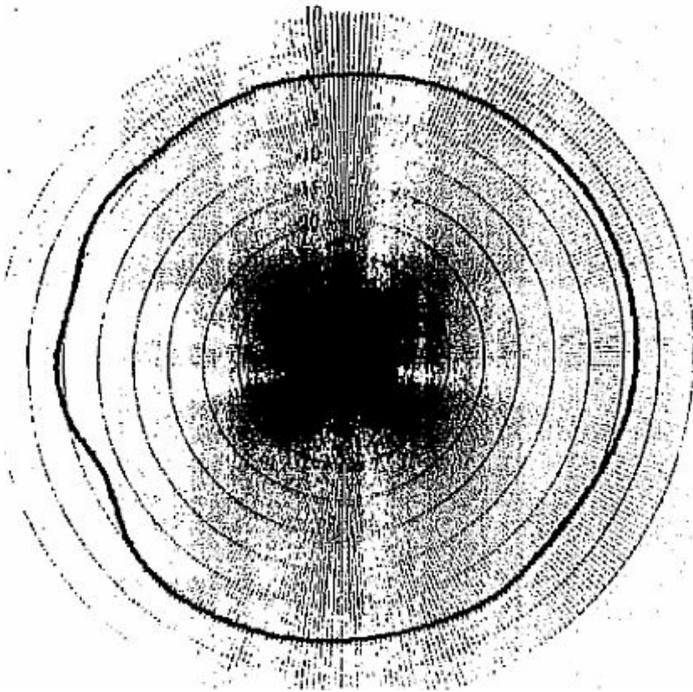
TEST CHAMBER: RF CHAMBER

TEST PERSONNEL: Yang

MAX GAIN: 1.93 dBi

MIN GAIN: -2.54 dBi

AVE GAIN: 0.64 dBi



## IO ANTENNA PATTEM

ANTENNA TEST NO.

TEST DATE:2002/06/20

TEST FREQUENCY:2450MHz

TEST POLARIZATION:HORIZONTAL  
(E-PLANE)

TEST ANTENNA:HORN ANTENNA

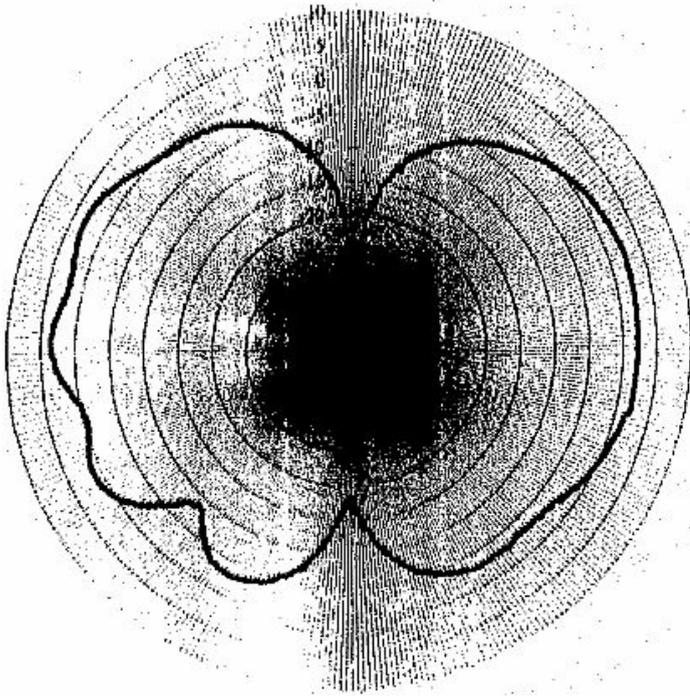
TEST CHAMBER:RF CHAMBER

TEST PERSONNEL: Yang

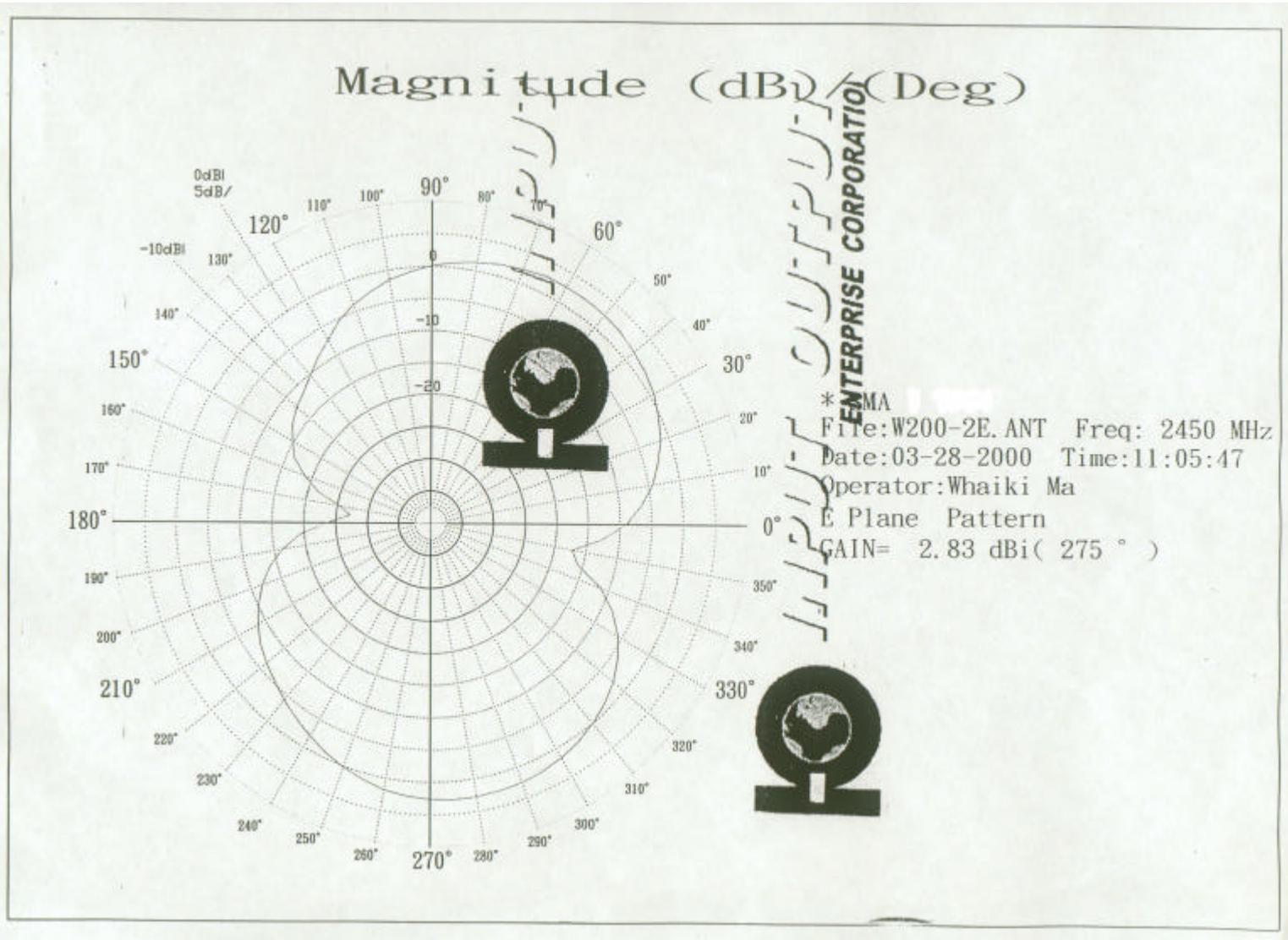
MAX GAIN: 3.52 dBi

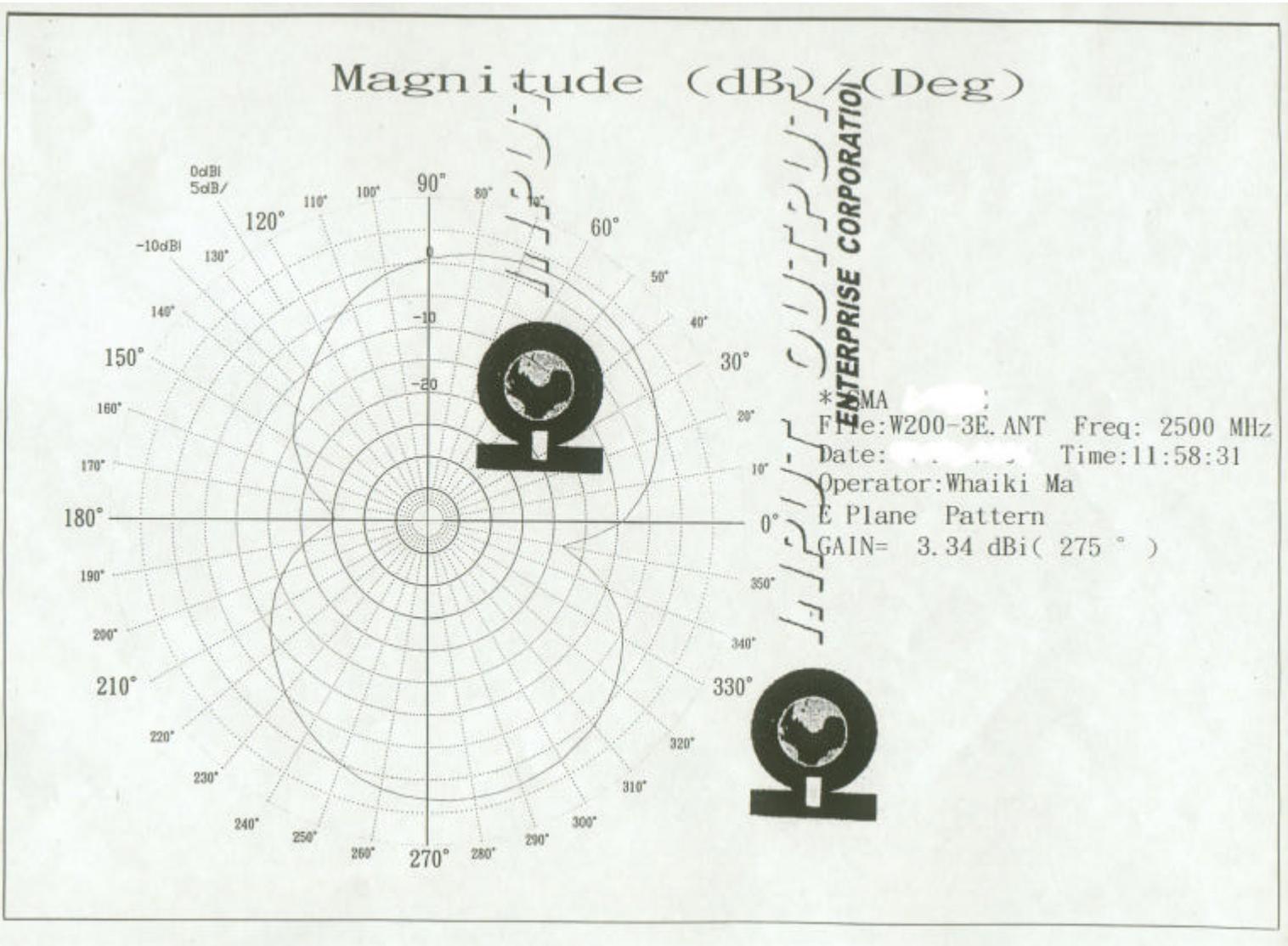
MIN GAIN: -35.06 dBi

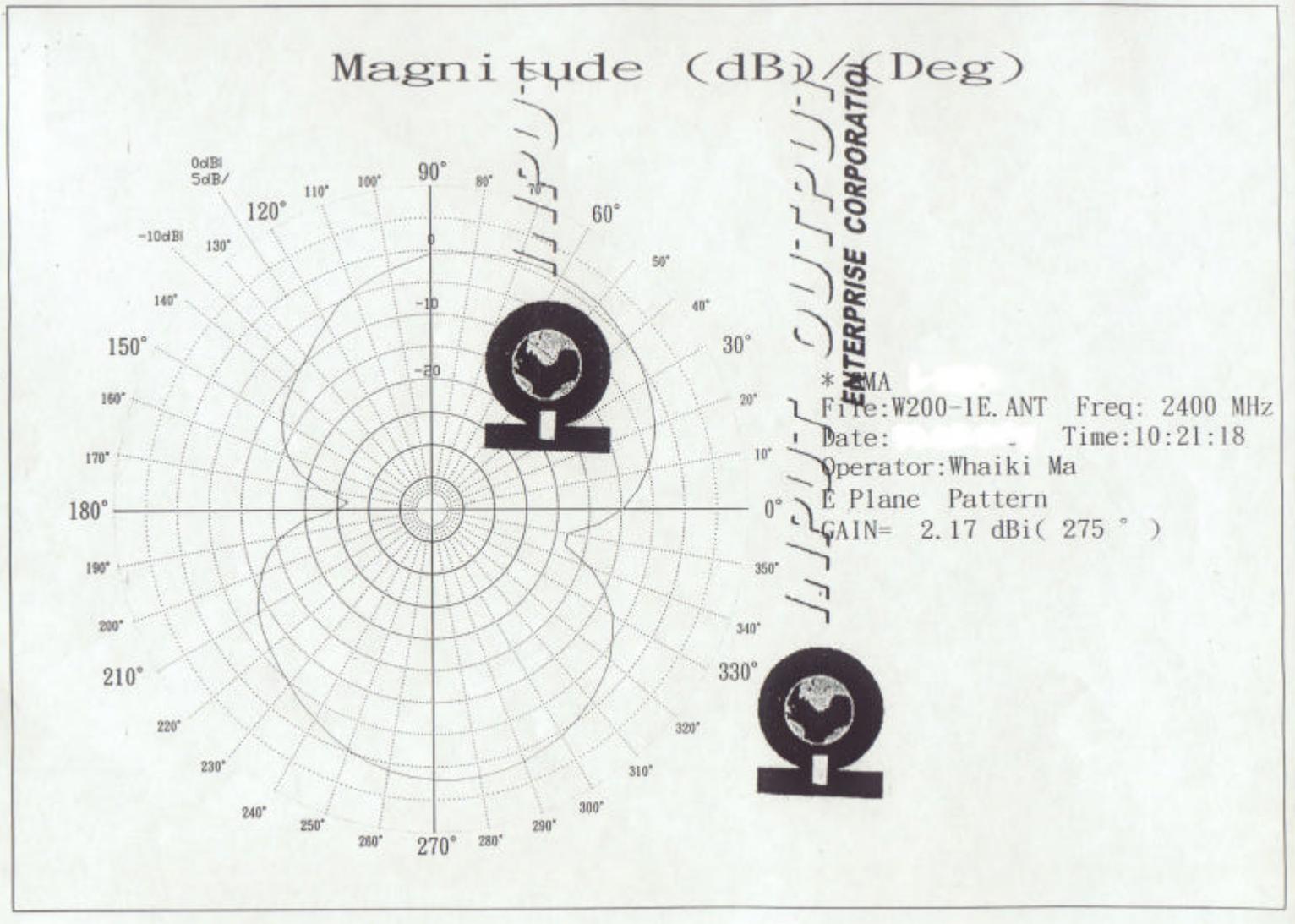
AVE GAIN: -3.38 dBi



1 (1652x2338x16M).jpeg

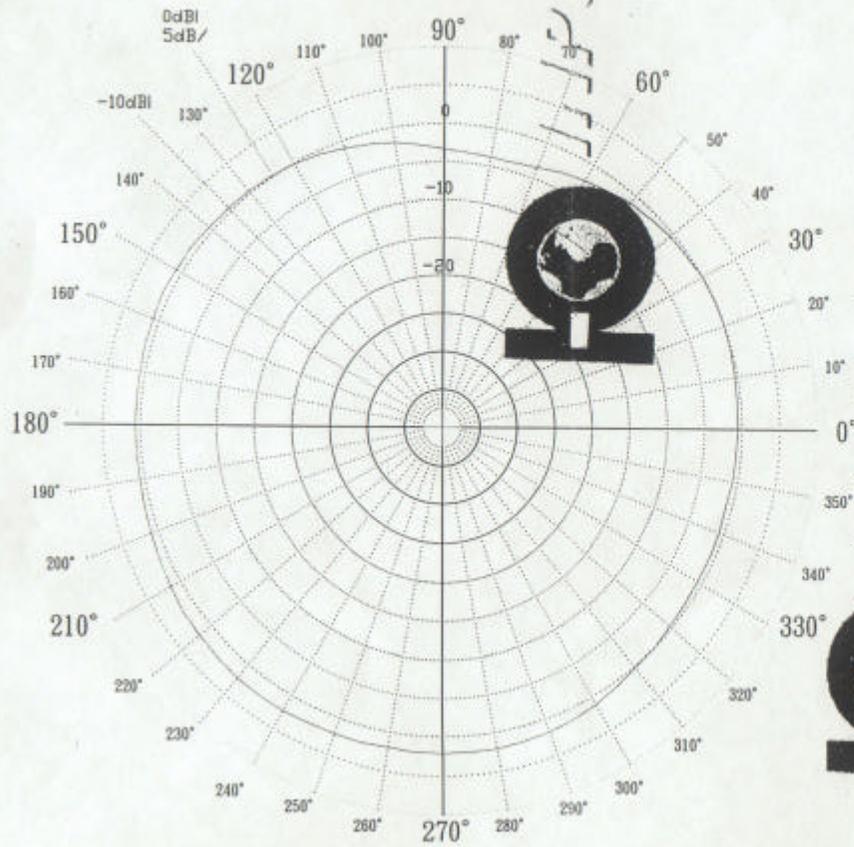






4 (1652x2338x16M.jpeg)

# Magnitude (dB) / (Deg)



ENTERPRISE CORPORATION

\*EMA  
File: W200-3H.ANT Freq: 2500 MHz  
Date: Time: 14:42:39  
Operator: Whaiki Ma  
H Plane Pattern  
GAIN= 1.92 dBi( 230 ° )

