

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

EUT	:	Wireless LAN Access Point
Model No.	:	PW-8120AR
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
FCC ID	:	MAA-PW8120AR
Frequency Range	:	2412 MHz-2462 MHz
Antenna type	:	1 PCB antenna
Modulation Skill	:	DBPSK / DQPSK / CCK
Power Type	:	Powered by the Power adapter M/N: SA0105-A I/P: 100-240VAC, 50-60Hz O/P: +5VDC, 1.4A
Applicant	:	Procomp Informatics Ltd. 5F, No 69-10, Chung Cheng E. Rd., Sec 2, Tamshui City , Taipei, Taiwan,R.O.C.

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, by the *Friis Transmission Formula*:

$$\text{Power density at the specific separation (Mobile): } S = \frac{PG}{4pR^2} = \frac{47.64 \times 2.355}{4p(20)^2} = 2.232 \times 10^{-2} \text{ mW / cm}^2$$

$$\text{Estimated safe separation: } R = \sqrt{\frac{PG}{4p}} = \sqrt{\frac{47.64 \times 2.355}{4p}} = 2.989 \text{ cm}$$

Remarks: "The safe estimated separation that the user must maintain from the antenna is at least 2.074 cm."

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

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

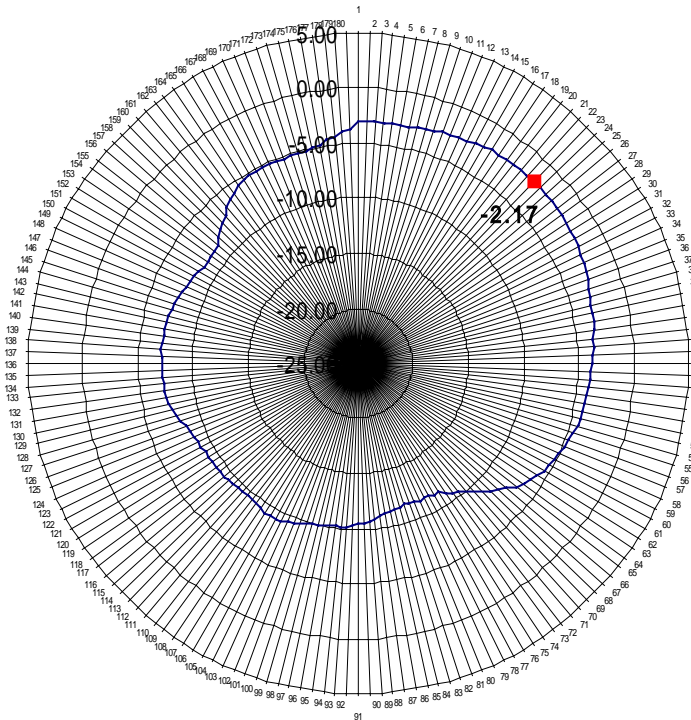
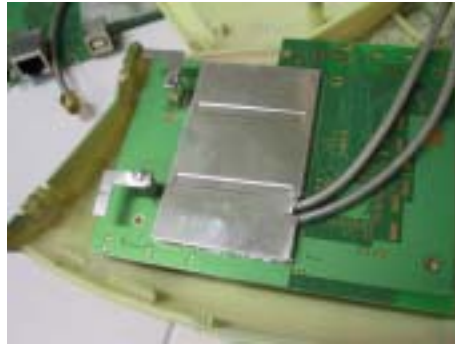
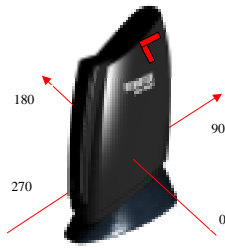
G = power gain of the antenna in the direction of interest relative to an isotropic radiator

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:

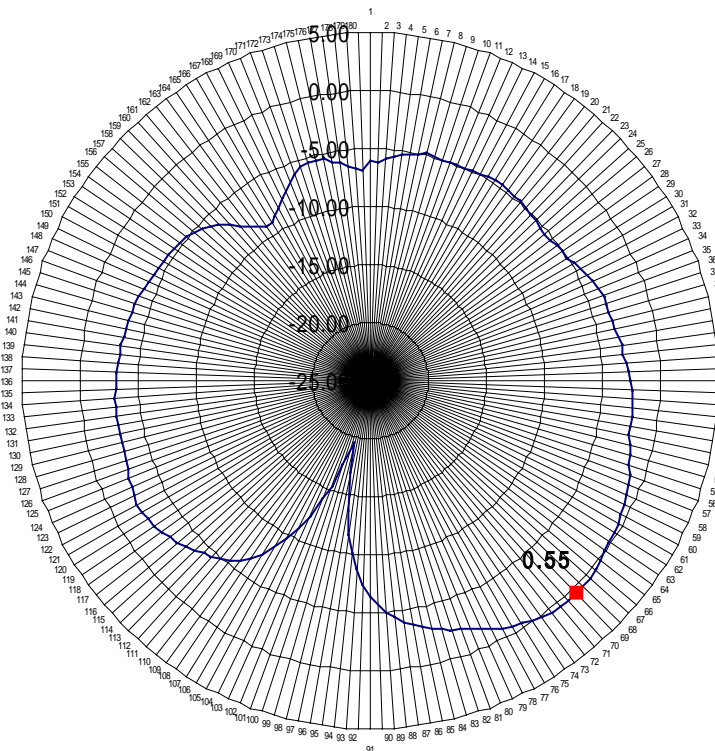
$$G = \text{Log}^{-1} (\text{dB antenna gain}/10)$$

$$G = \text{Log}^{-1} (3.72 / 10) = 2.355$$



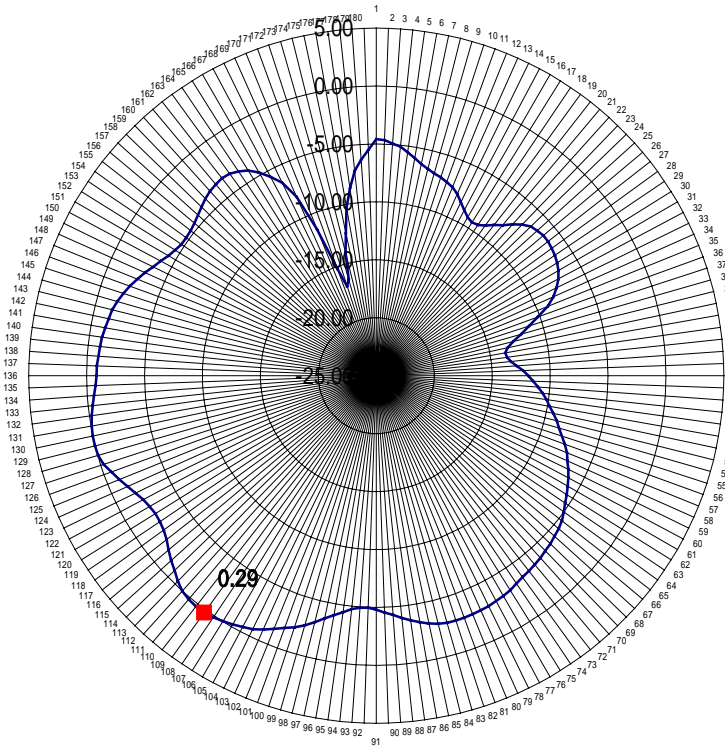
AP L METAL FRONT antenna
(站立 standup)

TEST DATE:2002/01/25
 TEST FREQUENCY:2450MHZ
 TEST POLARIZATION:VERTICAL
 (H-PLANE)
 TEST ANTENNA: HORN ANTENNA
 TEST STEP DEGREE: 2 DEGREE
 TEST CHAMBER: RF CHAMBER
 TEST PERSONNEL:BUNNY
 MAX GAIN : -2.17dBi
 MIN GAIN : -11.59dBi
 AVE GAIN : -6.63dBi



AP L METAL FRONT
(站立)

TEST DATE:2002/01/25
 TEST FREQUENCY:2450MHZ
 TEST POLARIZATION:CROSS
 TEST ANTENNA: HORN ANTENNA
 TEST STEP DEGREE: 2 DEGREE
 TEST CHAMBER: RF CHAMBER
 TEST PERSONNEL:BUNNY
 MAX GAIN : 0.55dBi
 MIN GAIN : -19.49dBi
 AVE GAIN : -4.57dBi



AP L METAL FRONT
(平放 AP)

TEST DATE:2002/01/25

TEST FREQUENCY:2450MHz

TEST POLARIZATION:HORIZONTAL
(E-PLANE)

TEST ANTENNA: HORN ANTENNA

TEST STEP DEGREE: 2 DEGREE

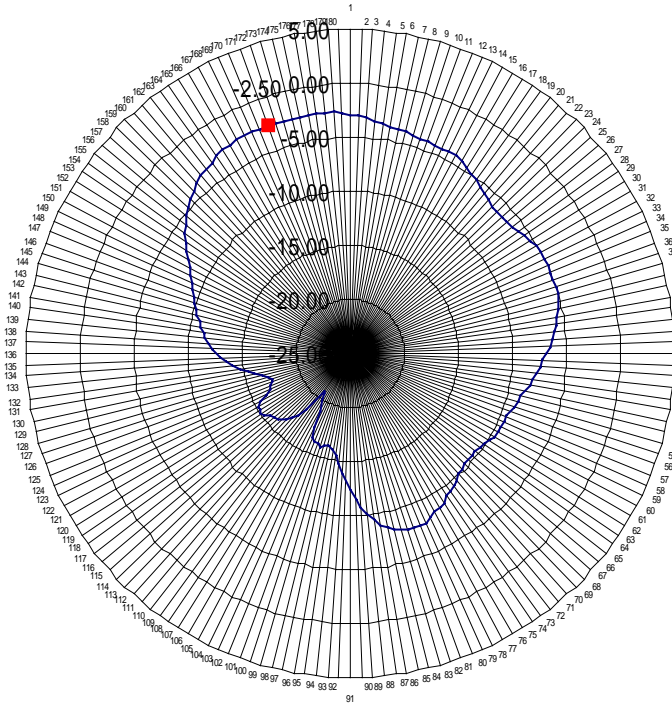
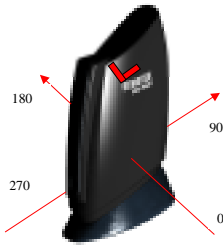
TEST CHAMBER: RF CHAMBER

TEST PERSONNEL:BUNNY

MAX GAIN : 0.29dBi

MIN GAIN : -16.90dBi

AVE GAIN: -5.17dBi



AP L METAL REAR antenna
(站立 standup)

TEST DATE:2002/01/25

TEST FREQUENCY:2450MHZ

TEST POLARIZATION:VERTICAL
(H-PLANE)

TEST ANTENNA: HORN ANTENNA

TEST STEP DEGREE: 2 DEGREE

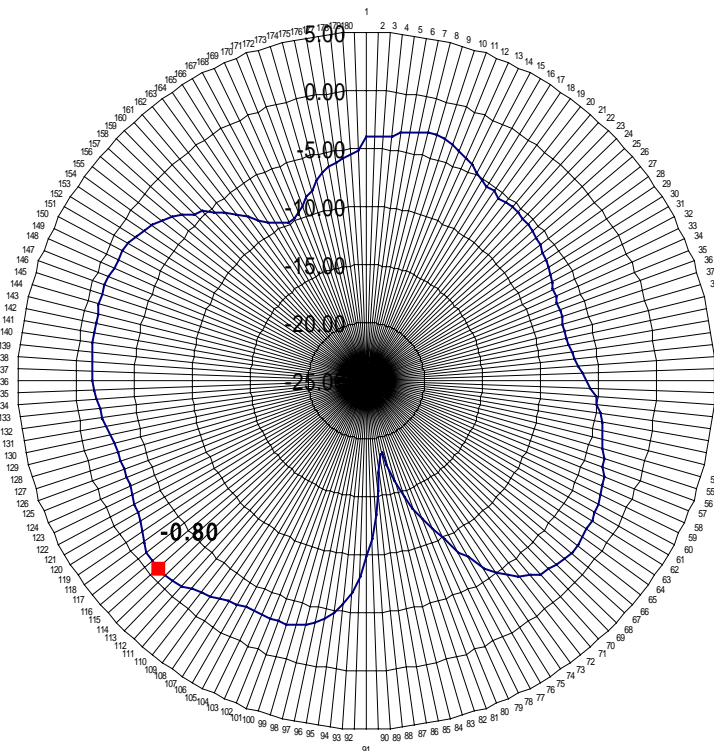
TEST CHAMBER: RF CHAMBER

TEST PERSONNEL:BUNNY

MAX GAIN : -2.50dBi

MIN GAIN : -20.66dBi

AVE GAIN : -9.02dBi



AP L METAL REAR
(站立)

TEST DATE:2002/01/25

TEST FREQUENCY:2450MHz

TEST POLARIZATION:CROSS

TEST ANTENNA: HORN ANTENNA

TEST STEP DEGREE: 2 DEGREE

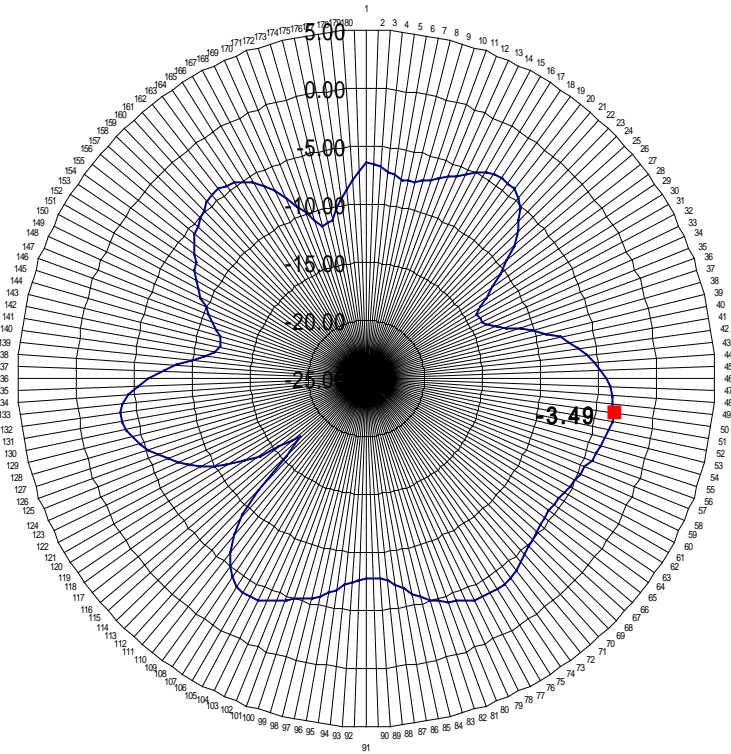
TEST CHAMBER: RF CHAMBER

TEST PERSONNEL:BUNNY

MAX GAIN : -0.80dBi

MIN GAIN : -18.57dBi

AVE GAIN: -4.91dBi



AP L METAL REAR
(平放)

TEST DATE:2002/01/25

TEST FREQUENCY:2450MHz

TEST POLARIZATION:HORIZONTAL
(E-PLANE)

TEST ANTENNA: HORN ANTENNA

TEST STEP DEGREE: 2 DEGREE

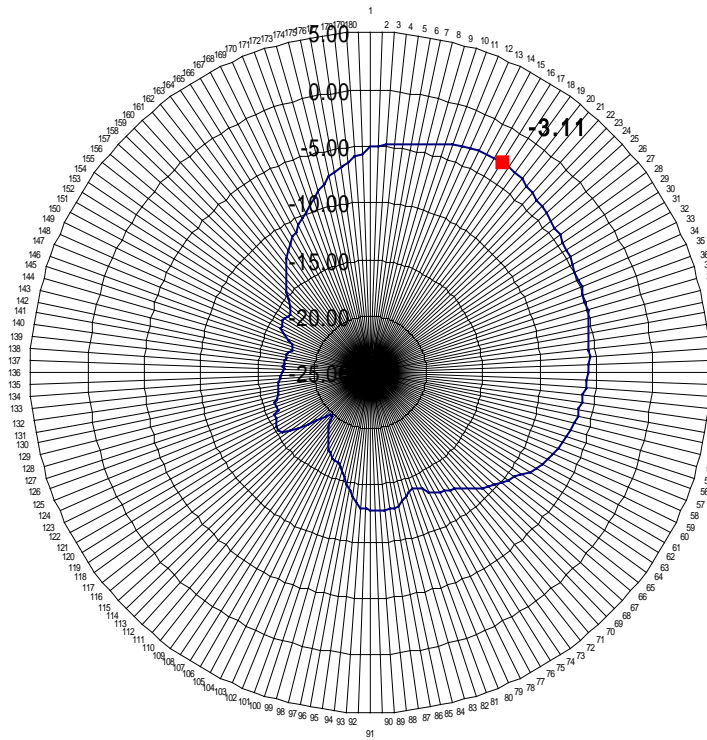
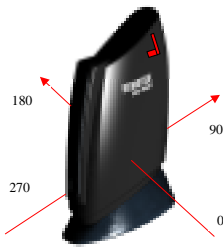
TEST CHAMBER: RF CHAMBER

TEST PERSONNEL:BUNNY

MAX GAIN : -3.49dBi

MIN GAIN : -17.38 dBi

AVE GAIN: -7.02dBi



AP 7 METAL ANT. FRONT
(站立)

TEST DATE:2002/01/25

TEST FREQUENCY:2450MHz

TEST POLARIZATION:H-PLANE

TEST ANTENNA: HORN ANTENNA

TEST STEP DEGREE: 2 DEGREE

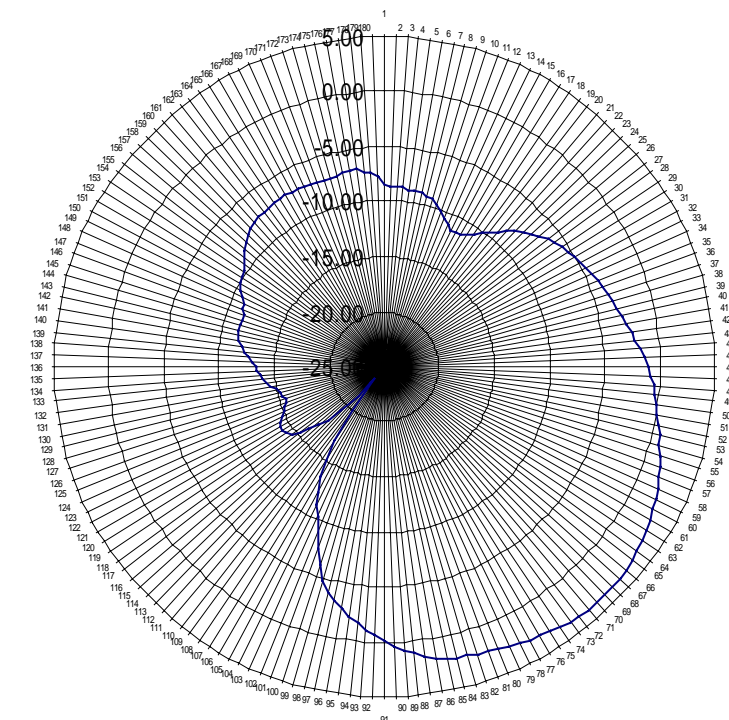
TEST CHAMBER: RF CHAMBER

TEST PERSONNEL:BUNNY

MAX GAIN : -3.11dBi

MIN GAIN : -19.87dBi

AVE GAIN: -11.11dBi



AP 7 METAL ANT. FRONT
(站立)

TEST DATE:2002/01/25

TEST FREQUENCY:2450MHz

TEST POLARIZATION:CROSS

TEST ANTENNA: HORN ANTENNA

TEST STEP DEGREE: 2 DEGREE

TEST CHAMBER: RF CHAMBER

TEST PERSONNEL:BUNNY

MAX GAIN : 3.72dBi

MIN GAIN : -23.47dBi

AVE GAIN:-6.64dBi