

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	: MSQWL300g
Product name	: Wireless LAN Access Point
Model name	: WL-300g
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, OFDM
Power Type	: Powered by (1)Switching Power Adaptor Manufacturer: PHIHONG Model: PSC10A-050(A2) I/P: AC 100-240V, 50-60Hz, 0.3A O/P: +5V DC, 2A (2)POE M/N: PD-PH-6001/AC/48 ; S/N: A02486040000118 I/P: 100-240Vac, 50-60Hz; 0.34A – 0.17A

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:

Friis Transmission Formula:
$$S = \frac{PG}{4\pi R^2} = \frac{153.815 \times 1.315}{4\pi (20)^2} = 4.024 \times 10^{-2} \text{ mW/cm}^2$$

Estimated safe separation:
$$R = \sqrt{\frac{PG}{4\pi}} = \sqrt{\frac{153.815 \times 1.315}{4\pi}} = 4.012 \text{ cm}$$

Remarks: "The safe estimated separation that the user must maintain from the antenna is at least 4.012 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)

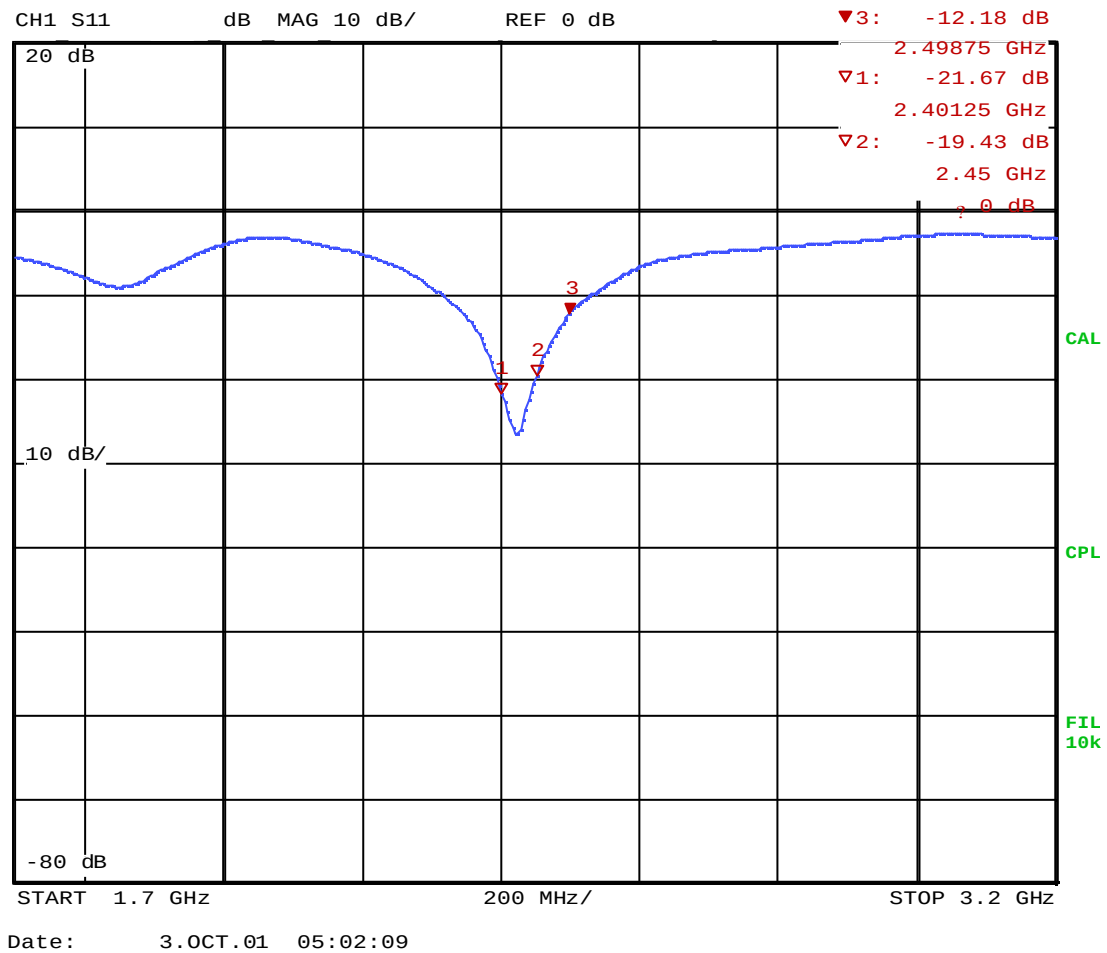
The Numeric gain G of antenna with a gain specified in dB is determined by:

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

$$G = \text{Log}^{-1} (1.19 / 10) = 1.315$$

AP PCB dipole antenna(Vertical) :

Frequency (MHz)	H-plane	E-plane	S11 return loss (dB)
	Max (dBi)	Max (dBi)	
2400	0.61	0.43	19.43
2450	0.55	1.19	21.67
2500	0.00	0.10	12.18



ANTENNA

TEST DATE:2001/10/08

TEST FREQUENCY:2400MHZ

TEST POLARIZATION:VERTICAL
(H-PLANE)

TEST ANTENNA: HORN ANTENNA

TEST STEP DEGREE: 2 DEGREE

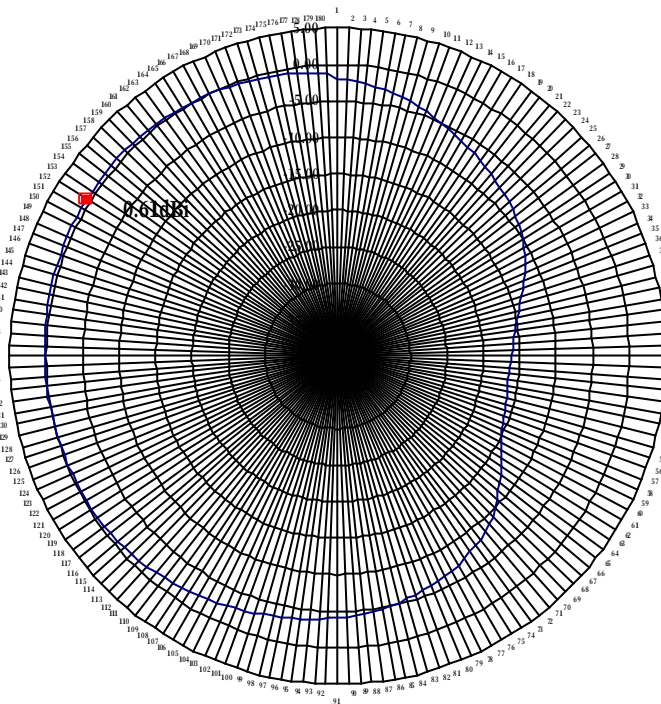
TEST CHAMBER: RF CHAMBER

TEST PERSONNEL:JAMES

MAX GAIN : 0.61dBi

MIN GAIN :-16.41dBi

AVE GAIN : -5.04dBi



ANTENNA

TEST DATE:2001/10/08

TEST FREQUENCY:2400MHZ

TEST
POLARIZATION:HORIZONTAL
(E-PLANE)

TEST ANTENNA: HORN ANTENNA

TEST STEP DEGREE: 2 DEGREE

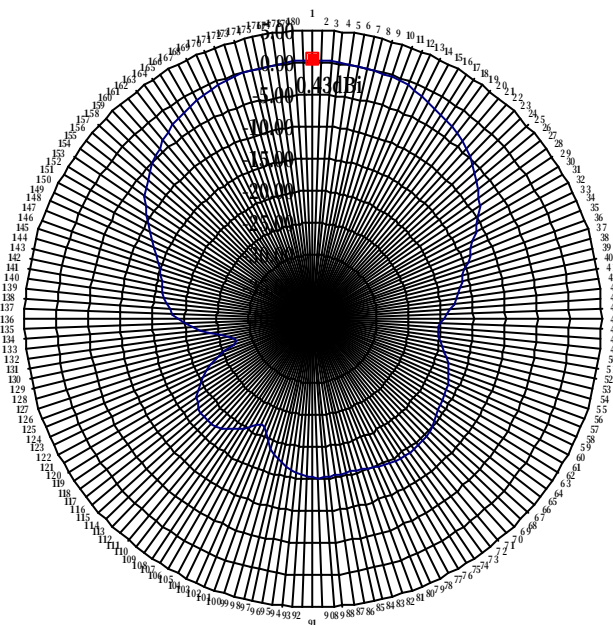
TEST CHAMBER: RF CHAMBER

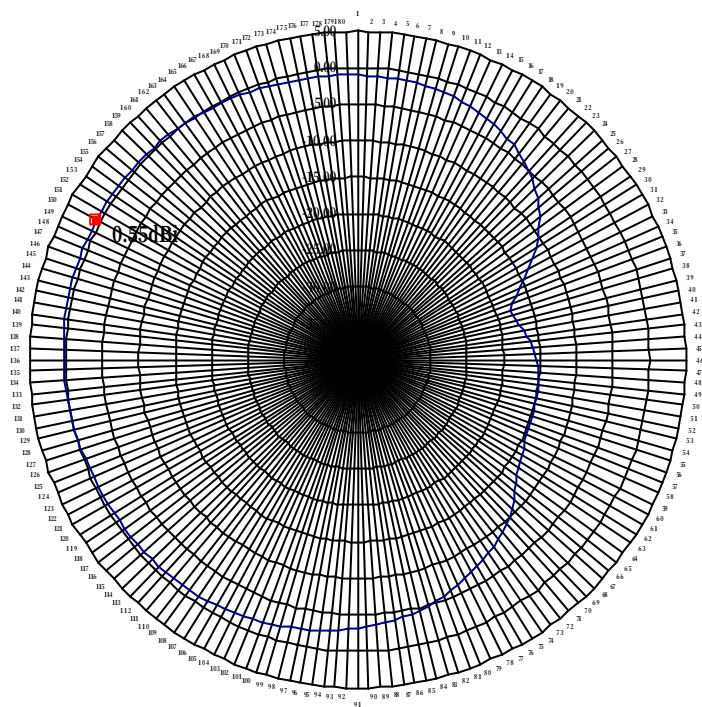
TEST PERSONNEL:JAMES

MAX GAIN :0.43dBi

MIN GAIN :-27.56dBi

AVE GAIN : -12.56dBi





ANTENNA

TEST DATE:2001/10/08

TEST FREQUENCY:2450MHz

TEST POLARIZATION:VERTICAL
(H-PLANE)

TEST ANTENNA: HORN ANTENNA

TEST STEP DEGREE: 2 DEGREE

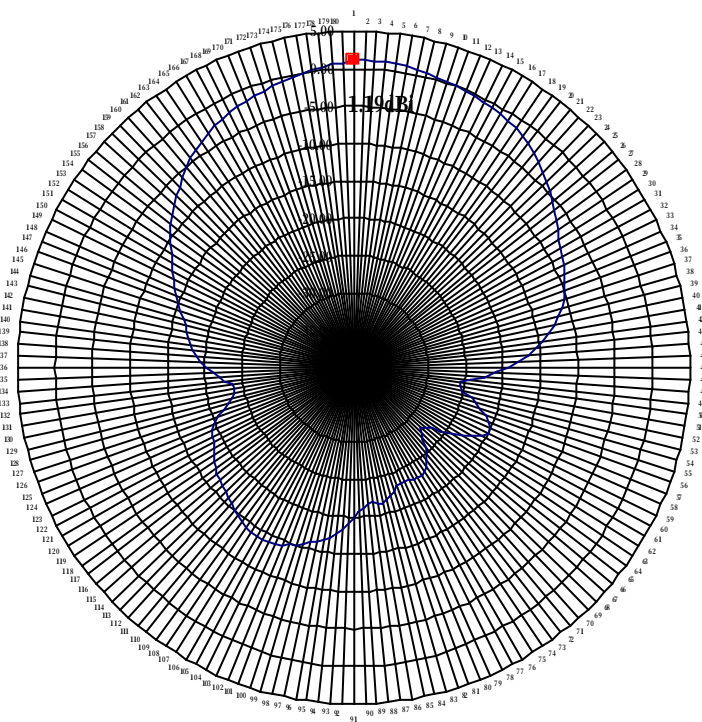
TEST CHAMBER: RF CHAMBER

TEST PERSONNEL:JAMES

MAX GAIN : 0.55dBi

MIN GAIN :-17.96dBi

AVE GAIN : -4.79dBi



ANTENNA

TEST DATE:2001/10/08

TEST FREQUENCY:2450MHz

TEST POLARIZATION:HORIZONTAL
(E-PLANE)

TEST ANTENNA: HORN ANTENNA

TEST STEP DEGREE: 2 DEGREE

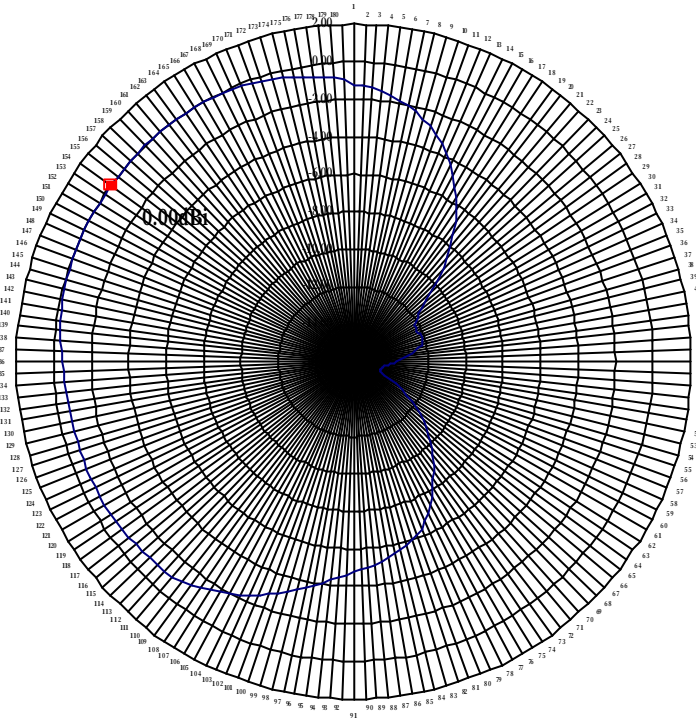
TEST CHAMBER: RF CHAMBER

TEST PERSONNEL:JAMES

MAX GAIN :1.19dBi

MIN GAIN :-28.14dBi

AVE GAIN : -13.54dBi



ANTENNA

TEST DATE:2001/10/08

TEST FREQUENCY:2500MHz

TEST POLARIZATION:VERTICAL
(H-PLANE)

TEST ANTENNA: HORN ANTENNA

TEST STEP DEGREE: 2 DEGREE

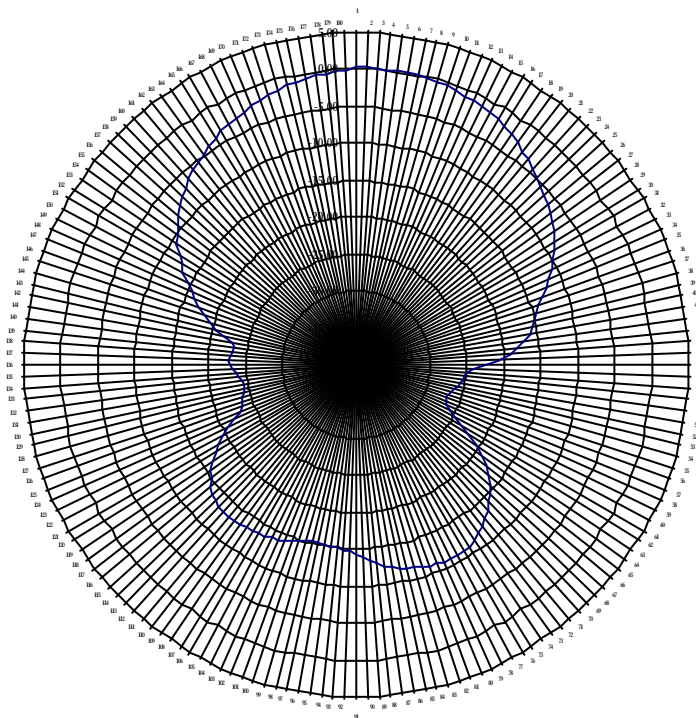
TEST CHAMBER: RF CHAMBER

TEST PERSONNEL:JAMES

MAX GAIN : 0dB

MIN GAIN :-14.55dB

AVE GAIN : -5.02dB



ANTENNA

TEST DATE:2001/10/08

TEST FREQUENCY:2500MHz

TEST POLARIZATION:HORIZONTAL
(E-PLANE)

TEST ANTENNA: HORN ANTENNA

TEST STEP DEGREE: 2 DEGREE

TEST CHAMBER: RF CHAMBER

TEST PERSONNEL:JAMES

MAX GAIN :0.1dB

MIN GAIN :-27.15dB

AVE GAIN : -12.93dB