

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	:	MSQWL320GP
Product name	:	ASUS Wireless AP
Model	:	WL-320gP
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 Channels
Modulation Skill	:	DBPSK, DQPSK, CCK, OFDM

- Power Type** : Powered by the switching adapter,
- (1) Manufacture: UNIFIVE
Model: US300520
I/P: 100 ~ 240VAC ~ 50/60Hz 0.3A
O/P: 5VDC 2.0A MAX.
185cm length, non-shielded, without ferrite core
 - (2) Manufacture: DVE
Model: DAS-0101F-05 A
I/P: 100 ~ 240VAC ~ 50/60Hz 0.3A 30VA
O/P: 5VDC 2.0A MAX.
180cm length, non-shielded, 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 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:

$$\text{Friis Transmission Formula: } S = \frac{PG}{4\pi R^2} = \frac{559.79 \times 3.16}{4\pi(20)^2} = 0.352 \text{ mW} / \text{cm}^2$$

$$\text{Estimated safe separation: } R = \sqrt{\frac{PG}{4\pi}} = \sqrt{\frac{599.79 \times 3.16}{4\pi}} = 12.281 \text{ cm}$$

Remarks: "The safe estimated separation that the user must maintain from the antenna is at least 4.73cm"

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:

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

$$G = \text{Log}^{-1} (5.0 / 10) = 3.16227$$

Appendix

Antenna Specification

亞 驪 企 業 股 份 有 限 公 司
ARISTOTLE ENTERPRISES

承 認 申 請 書

客戶名稱: 華碩電腦股份有限公司
Customer
廠商料號: RFA-02-5-C15M3
Part No.
品名: Wireless Antenna
Description 2.4GHz,5dBi
圖號: RFA-02-5-C15M3.DWG
Drawing No.
客戶料號: 14G151038001
Drawing No.

出廠簽章:

檢 查 TEST BY	核 對 CHECK BY	承 認 APPROVE BY
周沂珮	黃秋芳	廖煥文

承認簽章:

檢 查 TEST BY	核 對 CHECK BY	承 認 APPROVE BY

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I N D E X

RFA-02-5-C15M3

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RFA-02-5-C15M3

Specifications

Frequency range	2400 MHz – 2500 MHz
Peak gain	5 dBi
Average gain	4 dBi
VSWR	2.0 : 1 Max.
Polarization	Linear, vertical
Impedance	50 Ω
Temperature	-10°C to +55°C
Connector	R/P SMA PLUG
Cable	RG178



