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	:	VUIWL194G
Product name	:	Wireless PCI Express Card
Model name	:	WL-194g
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 PCI of client's device

3. Limits for *Maximum Permissible Exposure (MPE)*

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Filed Strength (H) (A/m)	Power Density (S) (mW/cm2)	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: $S = \dfrac{PG}{4\pi R^2} = \dfrac{187.93 \times 1.585}{4\pi(20)^2} = 0.059 mW/cm^2$

Estimated safe separation: $R = \sqrt{\dfrac{PG}{4\pi}} = \sqrt{\dfrac{187.93 \times 1.585}{4\pi}} = 4.869 cm$

<u>*Remarks: "The safe estimated separation that the user must maintain from the antenna is at least 3.12cm."*</u>

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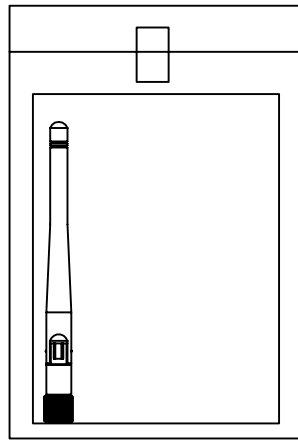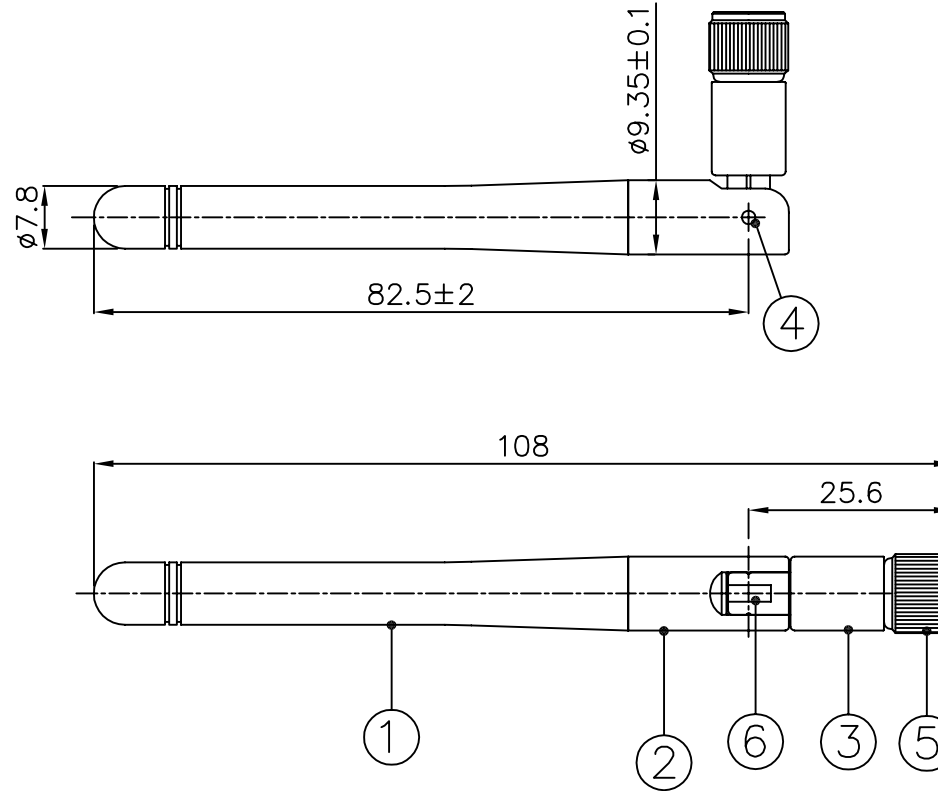
G = Log $^{-1}$ (*dB* antenna gain / 10)

G = Log $^{-1}$ (2.0 / 10) = 1.585

Appendix

Antenna Specification

CG-

REV	DATE	DESCRIPTION
X1	5/24-2007	New Issue

ø9.35±0.1

ø7.8

82.5±2

④

108

25.6

① ② ⑥ ③ ⑤

Packing :
(User guide+Dipole Antenna-->PE bag)
(詳細包裝請參照包裝SOP)

6	Cable	RG-178 , Translucent Brown ; 50 Ω	1	
5	Connector	SMA Straight Plug/Reverse	1	
4	Rivet	POM , Black	2	
3	Antenna Base	PBT ; Color:Black	1	
2	Antenna Base	PC ; Color:Black	1	
1	Antenna Cover	TPE ; Color:Black	1	
NO	DESCRIPTION		QTY	REMARK

CUSTOMER'S SINGATURE

XX.	±5	APPROVED
X.	±3.0	
.X	±1.0	CHECKED
.XX	±0.5	
.XXX	±0.1	DRAWING

CUSTOMER: ASUS

PART NO :

PARTNAME: RF Antenna Assembly

W.Y P/NO : C660S510177-A

| REV | UNIT | FILE : |
| X1 | m/m | SHEET : 1/1 |

M.gear Wha Yu Group

THIS DRAWING, AND IT'S INHERANT DESIGN CONCEPTS, ARE THE PROPERTY OF WHA YU AND AS SUCH MAY NOT BE COPIED, REPRODUCED, OR GIVEN TO THIRD PARTIES WITHOUT THE WRITTEN CONSENT OF WHA YU.

RF Antenna Cable Assembly

Specification

1. Electrical Properties :

    1.1 Frequency Range……….. 2.4GHz ~ 2.5GHz

    1.2 Impedance …………….. 50Ω Nominal

    1.3 VSWR ………………….2 Max.

    1.4 Return Loss…………….-10 dB Maximum

    1.5 Radiation ………………Omni-directional

    1.6 Gain(peak)…………..….2dBi

    1.7 Polarization…………….Linear Vertical

    1.8 Admitted Power………… 1W

2. Physical Properties :

    2.1 Cable…………………… RG-178 Coaxial Cable

    2.2 Antenna Cover………….TPE

    2.3 Antenna Base…………… PC

    2.4 Antenna Base…………… PBT

    2.5 Operating Temp. …………-20℃ ~ +65℃

    2.6 Storage Temp. …………..-30℃ ~ +75℃

    2.7 Color …………………….Black

    2.8 Connector…..…………… SMA Plug Reverse