



RF EXPOSURE REPORT

REPORT NO.: SA940525L14

MODEL NO.: WPIA-116G (refer to Appendix for other model)

ACCORDING: FCC Guidelines for Human Exposure
IEEE C95.1

APPLICANT: Gemtek Technology Co., Ltd.

ADDRESS: No.1, Jen Ai Road, Hsinchu Industrial Park, Hukou
Hsinchu, Taiwan, R.O.C. 303

ISSUED BY: Advance Data Technology Corporation

LAB ADDRESS: No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou
Hsiang 244, Taipei Hsien, Taiwan, R.O.C.

TEST LOCATION: No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen, Kwei
Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.



RF Exposure Measurement (Mobile Device)

1. Introduction

In this document, we try to prove the safety of radiation harmfulness to the human body for our product. The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 is followed. The Gain of the antenna used in this product is measured in a Fully Anechoic Chamber (FAC) calibrated for antenna measurement in ADT, and also the maximum total power input to the antenna is measured. Through the Friis transmission formula and the maximum gain of the antenna, we can calculate the distance, away from the product, where the limit of MPE is reached.

Although the Friis transmission formula is a far field assumption, the calculated result of that is an over-prediction for near field power density. We will take that as the worst case to specify the safety range.

2. RF Exposure Limit

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (minutes)
(A)Limits For Occupational / Control Exposures				
300-1500	...	...	F/300	6
1500-100,000	...	...	5	6
(B)Limits For General Population / Uncontrolled Exposure				
300-1500	...	...	F/1500	6
1500-100,000	...	...	1.0	30

F = Frequency in MHz



3. Friis Formula

Friis transmission formula : $P_d = (P_{out} * G) / (4 * \pi * r^2)$

where

P_d = power density in mW/cm^2

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

If we know the maximum Gain of the antenna and the total power input to the antenna, through the calculation, we will know the MPE value at distance r .

Ref. : David K. Cheng, *Field and Wave Electromagnetics*, Second Edition,
Page 640, Eq. (11-133).

4. EUT Operating condition

The software provided by Manufacturer enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

5. Classification

This device is not fixed inside the host equipment, it is connected with host through wire. So it is easy to be re-located in the place where at least 20cm far away from the body of the user. Warning statement to the user for keeping at least 20cm or more separation distance with the antenna should be included in users manual. So, this device is classified as **Mobile Device**.



6. Test Results

6.1 Antenna Gain

The maximum Gain measured in Fully Anechoic Chamber is 2.85dBi or 1.9275 (numeric) (Long Antenna) 2dBi or 1.5849 (numeric)(Short Antenna).

6.2 Output Power Into Antenna & RF Exposure value at distance 20cm:

Antenna gain: 2.85dBi:

802.11b DSSS modulation

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density (mW/cm ²)	Limit of Power Density (mW/cm ²)
1	2412	35.645	0.014	1.0
6	2437	100.925	0.039	1.0
11	2462	35.975	0.014	1.0

802.11g OFDM modulation

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density (mW/cm ²)	Limit of Power Density (mW/cm ²)
1	2412	50.582	0.019	1.0
6	2437	100.462	0.039	1.0
11	2462	28.510	0.011	1.0

802.11g Turbo modulation

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density (mW/cm ²)	Limit of Power Density (mW/cm ²)
6	2437	63.533	0.024	1.0



Antenna gain: 2 dBi:

802.11b DSSS modulation

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density (mW/cm ²)	Limit of Power Density (mW/cm ²)
1	2412	35.645	0.011	1.0
6	2437	100.925	0.032	1.0
11	2462	35.975	0.011	1.0

802.11g OFDM modulation

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density (mW/cm ²)	Limit of Power Density (mW/cm ²)
1	2412	50.582	0.016	1.0
6	2437	100.462	0.032	1.0
11	2462	28.510	0.009	1.0

802.11g Turbo modulation

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density (mW/cm ²)	Limit of Power Density (mW/cm ²)
6	2437	63.533	0.020	1.0



Appendix

1. The model as below are identical to other expect for their model and brand due to marketing requirement.

Product Name	Model Name	Brand	Remark
Super G Wireless PCI Adapter	AWLH-4030-II	AirLink 101	OEM for marketing different.
802.11g WLAN Super PCI Adapter	WL-660GS	SparkLAN	OEM for marketing different.
802.11g WLAN Super PCI Adapter	WNC-0300	LevelOne	OEM for marketing different.
IEEE802.11g 108Mbps Wireless LAN PCI Bus Adapter	GW-DS54SGX	PLANEX	OEM for marketing different.