RF EXPOSURE REPORT

REPORT NO.: SA940712L04
MODEL NO.: WMD-360A

ACCORDING: FCC Guidelines for Human Exposure
IEEE C95.1

APPLICANT: U-MEDIA Communications, Inc.

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ISSUED BY: Advance Data Technology Corporation

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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 : Pd = (Pout*G) / (4*pi*r^2)

where
Pd = power density in mW/cm^2
Pout = output power to antenna in mW
G = gain of antenna in linear scale
Pi = 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 modular is specified to be installed in access point or router which 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 4dBi or 2.512(numeric)

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

(FOR SINGLE CHAIN (TX))

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	40.179	0.020	1.0
6	2437	40.179	0.020	1.0
11	2462	40.458	0.020	1.0

802.11g OFDM modulation_normal mode

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
1	2412	40.644	0.020	1.0
6	2437	40.458	0.020	1.0
11	2462	40.272	0.020	1.0

802.11g OFDM modulation_turbo mode

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
6	2437	40.551	0.020	1.0

(FOR DUAL CHAIN (TX))

802.11g OFDM modulation_normal mode

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)		TOTAL PEAK POWER (mW)	POWER DENSITY (MW/CM2)	LIMIT OF POWER DENSITY (MW/CM2)
		CHAIN 0	CHAIN 1			
1	2412	31.989	31.769	63.758	0.032	1.0
6	2437	32.137	31.769	63.905	0.032	1.0
11	2462	32.211	31.842	64.053	0.032	1.0

802.11g OFDM modulation_turbo mode

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)		TOTAL PEAK POWER (mW)	POWER DENSITY (MW/CM2)	LIMIT OF POWER DENSITY (MW/CM2)
		CHAIN 0	CHAIN 1			
6	2437	32.137	31.989	64.126	0.032	1.0