RF EXPOSURE REPORT

REPORT NO.: SA950720L03
MODEL NO.: WPC-370A

ACCORDING: FCC Guidelines for Human Exposure
IEEE C95.1

APPLICANT: U-MEDIA Communications, Inc.

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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 20cm.

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

The antenna of the product, under normal use condition, is at least 20cm away from the body of the user. Warning statement for keeping 20cm-separation distance and the prohibition of operating next to a person has been printed on the user's manual. So, this product is classified as the **Mobile Device**.

6 Test Results

6.1 Antenna Gain

The Gain measured in Fully Anechoic Chamber are 5dBi or 3.16228 (numeric) and 4dBi or 2.51189 (numeric).

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

For 802.11b DSSS MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)		PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	POWER DENSITY (mW/CM2))	LIMIT OF POWER DENSITY (mW/CM2)
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2412	25.468	25.586	14.06	14.08	51.054	17.08	0.02881	1.0
6	2437	64.121	64.417	18.07	18.09	128.538	21.09	0.07253	1.0
11	2462	25.293	25.351	14.03	14.04	50.644	17.05	0.02858	1.0

For 802.11g OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)		PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	POWER DENSITY (mW/CM2))	LIMIT OF POWER DENSITY (mW/CM2)
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2412	35.727	35.975	15.53	15.56	71.702	18.56	0.04045	1.0
6	2437	63.826	64.121	18.05	18.07	127.947	21.07	0.07220	1.0
11	2462	22.491	22.646	13.52	13.55	45.137	16.55	0.02547	1.0

DRAFT 802.11n (20MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)		PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	POWER DENSITY (mW/CM2))	LIMIT OF POWER DENSITY (mW/CM2)
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2412	28.314	28.510	14.52	14.55	56.824	17.55	0.03206	1.0
6	2437	63.387	63.826	18.02	18.05	127.213	21.05	0.07177	1.0
11	2462	19.953	20.137	13.00	13.04	40.090	16.03	0.02262	1.0

DRAFT 802.11n (40MHz) OFDM MODULATION:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)		PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	POWER DENSITY (mW/CM2))	LIMIT OF POWER DENSITY (mW/CM2)
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2422	14.125	14.322	11.50	11.56	28.447	14.54	0.01604	1.0
4	2437	25.119	25.410	14.00	14.05	50.529	17.04	0.02850	1.0
7	2452	10.000	10.116	10.00	10.05	20.116	13.04	0.01135	1.0