RF EXPOSURE REPORT

REPORT NO.: SA960724L02

MODEL NO.: WLN-1204, ENLWI-N

ACCORDING: FCC Guidelines for Human Exposure

IEEE C95.1

APPLICANT: CAMEO COMMUNICATIONS, INC.

ADDRESS: 5F, No. 42, Sec. 6, Mincyuan E. Rd., Neihu District, Taipei City 114, Taiwan

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	30
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

The antenna of this product, under normal use condition, is at least 20cm 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 2.0dBi or 1.5849 (numeric).

6.2 OUTPUT POWER INTO ANTENNA & RF EXPOSURE VALUE AT DISTANCE 20cm:

For DSSS:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
1	2412	71.945	0.023	1.0
6	2437	71.121	0.022	1.0
11	2462	72.277	0.023	1.0

For OFDM:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
1	2412	57.810	0.018	1.0
6	2437	64.269	0.020	1.0
11	2462	56.364	0.018	1.0

DRAFT 802.11n (20MHz) OFDM modulation

CHAN.	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)		PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	POWER DENSITY (mW/CM^2)	PEAK POWER LIMIT (dBm)
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2412	45.499	40.365	16.58	16.06	85.863	19.34	0.027	1.0
6	2437	50.466	50.816	17.03	17.06	101.282	20.06	0.032	1.0
11	2462	44.771	45.082	16.51	16.54	89.853	19.54	0.028	1.0

DRAFT 802.11n (40MHz) OFDM modulation

CHAN.	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)		PEAK POWER OUTPUT (dBm)		TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	POWER DENSITY (mW/CM^2)	PEAK POWER LIMIT (dBm)
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2412	40.272	40.644	16.05	16.09	80.916	19.08	0.026	1.0
6	2437	45.709	44.978	16.60	16.53	90.687	19.58	0.029	1.0
11	2462	25.586	28.774	14.08	14.59	54.360	17.35	0.017	1.0