RF EXPOSURE REPORT

REPORT NO.: SA980611L15

MODEL NO.: MP-8150-CPE

ACCORDING: FCC Guidelines for Human Exposure
IEEE C95.1

APPLICANT: Proxim Wireless Corporation

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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	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 50cm away from the body of the user. Warning statement to the user for keeping at least 50cm 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 are 16dBi or 39.8107(numeric).

6.2 OUTPUT POWER INTO ANTENNA & RF EXPOSURE VALUE AT DISTANCE 50cm:

802.11a OFDM MODULATION:

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER DENSITY (mW/CM^2)	LIMIT OF POWER DENSITY (mW/CM^2)
		CHAIN 0	CHAIN 1				
36	5180	3.03	4.02	4.533	6.56	0.006	1.000
40	5200	3.54	3.53	4.514	6.55	0.006	1.000
48	5240	3.52	3.06	4.272	6.31	0.005	1.000
52	5260	10.51	10.54	22.570	13.54	0.029	1.000
60	5300	10.55	10.07	21.513	13.33	0.027	1.000
64	5320	10.56	10.05	21.492	13.32	0.027	1.000
100	5500	10.03	11.02	22.717	13.56	0.029	1.000
120	5600	10.05	10.54	21.440	13.31	0.027	1.000
140	5700	10.76	10.85	24.074	13.82	0.031	1.000
149	5745	24.54	25.05	604.336	27.81	0.766	1.000
157	5785	24.02	25.06	572.975	27.58	0.726	1.000
165	5825	24.06	25.01	571.640	27.57	0.724	1.000

DRAFT 802.11n (20MHz) OFDM MODULATION:

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER DENSITY (mW/CM^2)	LIMIT OF POWER DENSITY (mW/CM^2)
		CHAIN 0	CHAIN 1				
36	5180	3.04	4.01	4.532	6.56	0.006	1.000
40	5200	3.02	3.53	4.259	6.29	0.005	1.000
48	5240	3.01	3.05	4.018	6.04	0.005	1.000
52	5260	10.55	10.02	21.396	13.30	0.027	1.000
60	5300	10.56	10.04	21.469	13.32	0.027	1.000
64	5320	10.53	10.07	21.460	13.32	0.027	1.000
100	5500	10.05	10.52	21.388	13.30	0.027	1.000
120	5600	10.03	10.51	21.315	13.29	0.027	1.000
140	5700	10.74	10.86	24.048	13.81	0.030	1.000
149	5745	24.53	25.01	600.749	27.79	0.761	1.000
157	5785	24.06	25.04	573.837	27.59	0.727	1.000
165	5825	24.07	25.06	575.897	27.60	0.730	1.000

DRAFT 802.11n (40MHz) OFDM MODULATION:

CHAN.	CHAN. FREQ. (MHz)	POWER OUTPUT (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER DENSITY (mW/CM^2)	LIMIT OF POWER DENSITY (mW/CM^2)
		CHAIN 0	CHAIN 1				
38	5190	3.04	4.03	4.543	6.57	0.006	1.000
46	5230	3.53	3.54	4.514	6.55	0.006	1.000
54	5270	10.55	10.55	22.700	13.56	0.029	1.000
62	5310	7.52	7.52	11.299	10.53	0.014	1.000
102	5510	3.03	3.52	4.258	6.29	0.005	1.000
118	5590	10.05	10.54	21.440	13.31	0.027	1.000
134	5670	10.54	11.01	23.942	13.79	0.030	1.000
151	5755	24.54	25.53	641.719	28.07	0.813	1.000
159	5795	24.56	25.55	644.681	28.09	0.817	1.000