# RF Exposure Evaluation declaration

Product Name : 802.11n 1x1 MIMO Half Mini Card

Model No. : BCM4313

FCC ID : RK9-BCM4313N1T1R

Applicant : CastleNet Technology Inc.

Address : No.64,Chung-Shan Rd. Tu-Cheng Ciy, Taipei 236 Taiwan

Date of Receipt : Nov. 02, 2010

Date of Declaration : Nov. 22, 2010

Report No. : 10B125R-RFUSP42V01

# 1. RF Exposure Evaluation

## 1.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment 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 Exposures | | | | |
| 300-1500 | -- | -- | F/1500 | 6 |
| 1500-100,000 | -- | -- | 1 | 30 |

F= Frequency in MHz

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

Pd id the limit of MPE, 1 $mW/cm^2$. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

## 1.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

The temperature and related humidity: 18℃and 78％ RH.

## 1.3. Test Result of RF Exposure Evaluation

Product : 802.11n 1x1 MIMO Half Mini Card
Test Item : RF Exposure Evaluation
Test Site : No.3 OATS

**Antenna Gain**

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 4.98dBi in logarithm scale.

**802.11b**

**Output Power Into Antenna & RF Exposure Evaluation Distance (4.98dBi):**

| Channel | Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm2) |
|---|---|---|---|
| 1 | 2412.00 | 67.9204 | 0.042533 |
| 6 | 2437.00 | 72.2770 | 0.045262 |
| 11 | 2462.00 | 69.6627 | 0.043625 |

**802.11g**

**Output Power Into Antenna & RF Exposure Evaluation Distance (4.98dBi):**

| Channel | Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm2) |
|---|---|---|---|
| 1 | 2412.00 | 103.2761 | 0.064674 |
| 6 | 2437.00 | 108.6426 | 0.068035 |
| 11 | 2462.00 | 106.9055 | 0.066947 |

**802.11n-20M**

**Output Power Into Antenna & RF Exposure Evaluation Distance (4.98dBi):**

| Channel | Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm2) |
|---|---|---|---|
| 1 | 2412.00 | 112.2018 | 0.070264 |
| 6 | 2437.00 | 103.9920 | 0.065122 |
| 11 | 2462.00 | 115.3453 | 0.072232 |

The distance r ($4^{th}$ column) calculated from the Fries transmission formula is far shorter than 20 cm separation requirement.