RF Exposure Evaluation declaration

Product Name	:	IEEE 802.11b/g Bluetooth 2.0+ EDR and GPS MiniCard
Model No.	:	M230-M
FCC ID.	:	N89-MM230M

Applicant	:	CyberTAN Technology, Inc.
Address	:	99 Park Avenue 3, Science Park Hsinchu 308, Taiwan, R.O.C.

Date of Receipt	:	2008/01/06
Date of Declaration	:	2008/01/08
Report No.	:	081090R-RFUSP06V01-Exp

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	IEEE 802.11b/g Bluetooth 2.0+ EDR and GPS MiniCard
Test Mode	Mode 1: Transmit
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.51dBi or 1.782 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

1M-GFSK Modulation, PRBS Packet Type			
Bluetooth Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
1	2402.00	2.4889	0.00088
6	2441.00	2.1478	0.00076
11	2480.00	2.1232	0.00075

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm^2.

Product	IEEE 802.11b/g Bluetooth 2.0+ EDR and GPS MiniCard
Test Mode	Mode 1: Transmit
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.51dBi or 1.782 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

2M-pi/4 Modulation, PRBS Packet Type			
Bluetooth Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
1	2402.00	1.4723	0.00052
6	2441.00	1.4355	0.00051
11	2480.00	1.2618	0.00045

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm^2.

Product	IEEE 802.11b/g Bluetooth 2.0+ EDR and GPS MiniCard
Test Mode	Mode 1: Transmit
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.51dBi or 1.782 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

3M-8DPSK Modulation, PRBS Packet Type			
Bluetooth Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
1	2402.00	1.4125	0.00050
6	2441.00	1.4421	0.00051
11	2480.00	1.2647	0.00045

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm^2.