Maximum Permissible Exposure (MPE) Evaluation Report

Report No. : 060555
Model No. : BTD-43X, LM058
Issued Date : Sep. 13, 2006

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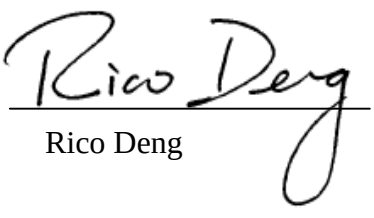

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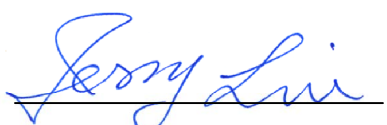

Jerry Liu

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Summary of Tests

MPE Evaluation meet FCC OET No. 65: 1997/ IEEE C95.1-1999

Bluetooth Serial Adapter-Model: BTD-430
FCC ID: QWOBTD-430

Test	Reference	Results
MPE Evaluation	FCC Guidelines for Human Exposure IEEE C95.1	Complies

1. Introduction

The EUT operates in the 2.4GHz ISM band. Due to the EUT (include antenna) at its normal operation distance is near by the human body (assume 0.1cm), the EUT was defined as a Portable Device.

The reason to do the MPE Evaluation is to avoid the RF hazard to human body. The maximum output power and gain of the antenna were used to calculate the limited distance from the product. The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 is followed.

This a portable/mobile device and the max peak output power is 2.54 dBm (.0018 W). Lower that low threshold 60/f GHz mW (24.48 mW), d<2.5 cm general population category.

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				
30-300	61.4	0.163	1.0	6
300-1500	-	-	F/300	6
1500-100,000	-	-	5	6
(B) Limits for General Population / Uncontrolled Exposure				
30-300	27.5	0.073	0.2	30
300-1500	-	-	F/1500	30
1500-100,000	-	-	1.0	30

F= Frequency in MHz

3. RF Exposure calculations

From §FCC 1.1310 table 1, the maximum permissible RF exposure for an uncontrolled environment is 1mW/(cm^2)
Power density (S) is calculated by the following formula:

$S = (P * G)/4\pi R^2$

where, S = Power density (mW/cm^2)
P = Output power to antenna (mW)
R = Distance between radiating structure and observation point (cm)
G = Gain of antenna in numeric
$\pi = 3.1416$

Example:
Assume a portable device operates at 2412MHz and its maximum output power is 20mW, and the maximum gain of antenna is 1 (numeric) /0dBi.

then the power density (S) = $(20 * 1)/4*\pi*(0.1)^2 =$ (mW/cm^2)

4. Test results

Test mode: GFSK

Channel	Channel Frequency (MHz)	Maximum antenna gain (numeric)	Output power to antenna (mW)	Power density (mW/cm^2)	Limit of power density (mW/cm^2)
0 (lowest)	2402	1.58	13.49	0.042533	1.0
39 (middle)	2441	1.58	12.30	0.038791	1.0
78 (highest)	2480	1.58	6.07	0.01913	1.0

Test mode: DQPSK

Channel	Channel Frequency (MHz)	Maximum antenna gain (numeric)	Output power to antenna (mW)	Power density (mW/cm^2)	Limit of power density (mW/cm^2)
0 (lowest)	2402	1.58	13.49	0.042533	1.0
39 (middle)	2441	1.58	13.18	0.041565	1.0
78 (highest)	2480	1.58	0.77	0.002436	1.0

Test mode: 8DPSK

Channel	Channel Frequency (MHz)	Maximum antenna gain (numeric)	Output power to antenna (mW)	Power density (mW/cm^2)	Limit of power density (mW/cm^2)
0 (lowest)	2402	1.58	13.49	0.042533	1.0
39 (middle)	2441	1.58	12.30	0.038791	1.0
78 (highest)	2480	1.58	0.81	0.002545	1.0

The Notice in Installation Manual has been stated as below:
While installing and operating this transmitter, the radio frequency exposure limit of 1mW/(cm*cm) may be exceeded at distances close to the transmitter. therefore, the user must maintain a minimum distance of 20 cm from the device at all time.