

RF Exposure Evaluation declaration

National Chiao Tung University

EUT:

Bluetooth UART module

Model Number:

HL-MD08R-C2

FCC ID:

A2QHLMD08RC2

Prepared for:

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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: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, 1 mW/cm². 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.

1.3. Test Result of RF Exposure Evaluation

Date of Test	September 28, 2011	Temperature	25.9 deg/C
EUT	Bluetooth UART module	Humidity	66 %RH
Working Cond.	TX Mode		

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is -2dBi or 0.630957344 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel No.	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
0	2402	0.07534	0.0000094571
40	2441.96	0.07586	0.0000095223
78	2480	0.08892	0.0000111617

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/cm².