RF EXPOSURE

1. Regulation

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this Chapter.

Limits for Maximum Permissive Exposure: RF exposure is calculated.

Frequency Range	Electric Field Strength [V/m]	Magnetic Field Strength [A/m]	Power Density [mW/cm^2]	Averaging Time [minute]
Limits for General Population / Uncontrolled Exposure				
0.3 ~ 1.34	614	1.63	*(100)	30
1.34 ~ 30	824/f	2.19/f	*(180/f2)	30
30 ~ 300	27.5	0.073	0.2	30
300 ~ 1 500	/	/	f/1 500	30
1 500 ~ 15 000	/	/	1	30

f=frequency in MHz, *= plane-wave equivalent power density

MPE (Maximum Permissive Exposure) Prediction

Predication of MPE limit at a given distance: Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2 \quad \left(\Rightarrow R = \sqrt{PG/4\pi S} \right)$$

S = power density [mW/cm^2]

P = Power input to antenna [mW]

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna [cm]

2. RF Exposure Compliance Issue

The information should be included in the user's manual:

This appliance and its antenna must not be co-located or operation in conjunction with any other antenna or transmitter. A minimum separation distance of 20 cm must be maintained between the antenna and the person for this appliance to satisfy the RF exposure requirements.

MPE Calculations : Bluetooth BDR

- Frequency Range :   2 402   MHz   ~   2 480   MHz

- Measured RF Output Power (Peak) :   3.08   dBm

- Target Power & Tolerance   2.50   dBm   &   ±   1.50   dB

             (Maximum :   4.00   dBm &   Minimum :   1.00   dBm   )

- Maximum Peak Antenna Gain :   -1.10   dBi

- Maximum Output Power for the Calculation :   4.00   dBm

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the
The MPE calculation for this exposure is shown below.

- EIRP = P + G	- NOTE
= 4.00 dBm + -1.10 dBi	P : Max tuneup Power (dBm)
= 2.90 dBm	G : Maximum Peak Antenna Gain (dBi)
= 1.95 mW	

Power Density at the specific separation

- S = EIRP / (4 X $R^2\pi$)	- NOTE
= 1.95 / (4 X 20^2 X π)	S : Maximum Power Density (mW/cm^2)
= **0.000 388** mW/cm^2	EIRP : Equivalent Isotropic Radiated Power (mW)
	R : Distance to the center of the radiation of the
	antenna (20 cm)

MPE Calculations : Bluetooth EDR

- Frequency Range :   <u>2 402</u>   MHz   ~   <u>2 480</u>   MHz

- Measured RF Output Power (Peak) :   <u>3.74</u>   dBm

- Target Power & Tolerance   <u>2.50</u>   dBm   &   ±   <u>1.50</u>   dB

(Maximum :   <u>4.00</u>   dBm   &   Minimum :   <u>1.00</u>   dBm   )

- Maximum Peak Antenna Gain :   <u>-1.10</u>   dBi

- Maximum Output Power for the Calculation :   <u>4.00</u>   dBm

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the
The MPE calculation for this exposure is shown below.

- EIRP   =   P + G
 	
 =   <u>4.00</u>   dBm   +   <u>-1.10</u>   dBi
 	
 =   <u>2.90</u>   dBm
 	
 =   <u>1.95</u>   mW
	- NOTE
	
	  P : Max tuneup Power (dBm)
	
	  G : Maximum Peak Antenna Gain (dBi)

Power Density at the specific separation

- S   =   EIRP / (4 X $R^2\pi$)
 	
 =   1.95   /   (4 X 20^2 X π)
 	
 =   **<u>0.000 388</u>**   mW/cm^2
	- NOTE
	
	  S : Maximum Power Density (mW/cm^2)
	
	  EIRP : Equivalent Isotropic Radiated Power (mW)
	
	  R : Distance to the center of the radiation of the
	     antenna (<u>20</u> cm)