# *Appendix 11. RF Exposure Requirement*

## 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/cm2) | 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*r2)

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.

## 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: 23℃and 42％ RH.

## 3.Test Result of RF Exposure Evaluation

| Operating mode | Frequency | RF Output Power(dBm) |
|---|---|---|
| GFSK | 2403 | 7.22 |
| GFSK | 2441 | 6.41 |
| GFSK | 2480 | 3.61 |
| GFSK | 5728 | 11.02 |
| GFSK | 5775 | 10.66 |
| GFSK | 5825 | 10.32 |

(2.4GHz)Maximum RF Power=7.22dBm+2.1dBi=9.32dBm=8.55mW
8.55/(4*3.14*400)=0.001702

(5GHz)Maximum RF Power=11.02dBm+2.4dBi=13.42dBm=21.98mW
21.98/(4*3.14*400)=0.004375

| Frequency Band(MHz) | Maximum RF Power(mW) | Power Density at R = 20cm(mW/$cm^2$) |
|---|---|---|
| 2403-2480 | 8.55 | 0.001702 |
| 5728-5825 | 21.98 | 0.004375 |

Note:
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/$cm^2$ .