FCC ID : RI5-ER2809VI

1. RF EXPOSURE

1.1.The Requirement

System 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 Section 15.247(b)(4) and Section 1.1307(b)(1)

1.2.Limit For Maximum Permissible Exposure (MPE)

Limits for General Population/ Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2, \|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

F = frequency in MHz, * Plane-wave equivalent power density

1.3.MPE Calculations

$$E(V/m) = \frac{\sqrt{30 \times P \times G}}{d},$$

$$\text{Power Density: } S(mW/cm^2) = \frac{E^2}{377}$$

Where
E = Electric Field (V/m)
P = Peak Output Power (mW)

G = Antenna Numeric Gain (numeric) $=10^{x}$, x = Antenna Gain(dBi) /10

d = Separation Distance (cm)

We can change the formula to:

$$S = \frac{30 \times P \times G}{377 \times d^2} \quad \text{or, } d = \sqrt{\frac{30 \times P \times G}{377 \times S}}$$

Because the EUT is belong to general population/uncontrolled exposure. So

1.3.1. We considering the limit of minimum separation distance (d) is 20cm,

Maximum Output Power = 0.989mW
Antenna Gain = 2(dBi) = 1.58(numeric)

$$S = \frac{30 \times P \times G}{377 \times d^2} = 0.00031\,\text{mW/cm}^2 < 1.0\,\text{mW/cm}^2\,(\text{limit})$$

Calculated RF Exposure power density is $0.00031\,\text{mW/cm}^2$, less than the limit.

1.3.2. We considering the limit of power density (S) is $1.0\,\text{mW/cm}^2$,

Maximum Output Power = 0.989mW
Antenna Gain = 2(dBi) = 1.58numeric)

$$d = \sqrt{\frac{30 \times P \times G}{377 \times S}} = 0.35\text{ cm} < 20\text{ cm}$$

Calculated RF Exposure separation distance is 0.35 cm, less than the minimum separation distance

1.3.3.FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, Human proximity to the antenna shall not be less than 20cm(8 inches) during normal operation. Proposed RF exposure safety information to include in User's Manual.