

# FCC RF Exposure Requirements

## **General information:**

FCC ID: VNE001000101

Device category: Mobile per Part 2.1091

Environment: Uncontrolled Exposure

Mobile devices that operate under Part 15.247 of this chapter are subject to environmental evaluation for RF exposure prior to equipment authorization.

## **Antenna:**

The manufacturer does specify an antenna with a gain of 2.15 dBi to be used with this device.

This device has provisions for operation in a vehicle location.

Configuration	Antenna p/n	Type	Freq. Band	Max. Gain (dBi)
Car	Any	omni	2400 MHz	2.15

## **Operating configuration and exposure conditions:**

The conducted output power is 0.125 Watts. Typical use qualifies for a maximum duty cycle factor of <50%.

## **MPE Calculation:**

The minimum separation distance is calculated as follows:

$$E(V/m) = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power density: } P_d(mW/cm^2) = \frac{E^2}{3770}$$

The limit for general uncontrolled exposure environment above 1500 MHz is 1.0 mW/cm<sup>2</sup>.

Channel frequency: 2440 MHz  
The conducted power output is 125 mwatt.  
Antenna gain was taken as 3 dBi  
50% Duty cycle

**Conclusion:**

The device complies with the MPE requirements by providing a safe separation distance of 3 cm between the antenna, including any radiating structure, and any persons when normally operated.

**Proposed RF exposure safety information to include in User's Manual:****“FCC RF Exposure Requirements:****CAUTION:**

The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This device is approved with emissions having a source-based time-averaging duty factor not exceeding 50%. The safe operating distance between the general population and the antenna when transmitting is 20 cm or 8 inches.

Failure to observe these restrictions will result in exceeding the FCC RF exposure limits.

W := 0.125 power in Watts

D := 1 Duty Factor in decimal % (1=100%)

1 for FM

E := 15 exposure time in minutes

U := 30 (use 6 for controlled and 30 for uncontrolled)

$$W_{exp} := W \cdot D \cdot \left( \frac{E}{U} \right)$$

$$PC := \left( \frac{E}{U} \right) \cdot 100$$

Wexp = 0.063 Watts

PC = 50 % on time

---

Po := 63 mWatts

f := 2400 Frequency in MHz

dBd := 0 antenna gain in dBd

$S := \frac{f}{2400}$  power density limit for  
uncontrolled exposure

G1 := dBd + 2.15 gain in dBi

G1 = 2.15 dBi

S = 1  $\frac{mW}{cm^2}$

CL := 0 dB coax loss

G := G1 - CL

$G_n := 10^{\frac{G}{10}}$  gain numeric

Gn = 1.641 dB

$$R := \sqrt{\frac{(Po \cdot G_n)}{(4 \cdot \pi \cdot S)}}$$

$$\text{inches} := \frac{R}{2.54}$$

R = 2.868 distance in centimeters  
required for compliance

inches = 1.129