RF Exposure Requirements

General information:

Device category: Mobile per Part 2.1091
Environment: Uncontrolled Exposure

The device is a 802.11 b, g module used in a vehicle mounted application fixed mounted. 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)
Mobile	Any	omni	2400 MHz	2

Operating configuration and exposure conditions:

The conducted output power is 0.1 Watts. Typical use qualifies for a maximum duty cycle factor of 50%.

MPE Calculation:

The minimum separation distance is calculated as follows:

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

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

Channel frequency: 2440 MHz
The conducted power output is 100 mWatt.
Antenna gain was taken as 2.15 dBi
100 % Duty cycle

$W := 0.1$ power in Watts

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

1 for FM

$E := 30$ exposure time in minutes

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

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

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

$Wexp = 0.1$ Watts

$PC = 100$ % on time

$Po := 100$ mWatts

$f := 2440$ Frequency in MHz

$dBd := 0.0$ antenna gain in dBd

$S := 1.0$ power density limit for controlled exposure

$G1 := dBd + 2.15$ gain in dBi

$G1 = 2.15$ dBi

$CL := 0$ dB coax loss

$G := G1 - CL$

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

$Gn = 1.641$ dB

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

$R = 3.613$ distance in centimeters required for compliance

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

$inches = 1.423$

Conclusion:

The device complies with the MPE requirements for a mobile device by providing a 20 cm safe operating distance.

User's manual has RF exposure statements.