RF Exposure Requirements

General information:

Device category: Mobile per Part 2.1091
Environment: Uncontrolled Exposure

Mobile devices that operate under Part 80 of this chapter are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if they operate at frequencies of 1.5 GHz or below and their effective radiated power (ERP) is 1.5 watts or more. However, compliance with the power density limits of 1.1310 is not required.

Antenna:

The manufacturer does not specify an antenna to be used with this device, but a typical installation has a gain up to 3 dBi.

This device has provisions for operation in a vehicle (boat), or a fixed location.

Configuration	Antenna p/n	Type	Max. Gain (dBi)
Boat	Any	omni	3

Operating configuration and exposure conditions:

The conducted output power is 25 Watts. Typical use qualifies for a maximum duty cycle factor of 50%. In normal operation the use of this transmitter is considered uncontrolled exposure.

- Vehicle Operation: The maximum antenna gain that can be used is 3dBi. A coaxial cable of the type RG 58 has a loss of 1dB for a length of 15 feet.

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 below 300 MHz is 0.2 mW/cm^2 .

Channel frequency: 156.025-157.425 MHz
The conducted power output is 25 watt.
The coax loss was taken as 1 dB.
Antenna gain was taken as 3 dBi
50% talk time in 30 minutes

$W := 25$ 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)

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

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

$Wexp = 12.5$ Watts

$PC = 50$ % on time

$Po := 12500$ mWatts

$dBd := .85$ antenna gain in dBd

$G1 := dBd + 2.15$ gain in dBi

$G1 = 3$ dBi

$CL := 1$ dB coax loss

$G := G1 - CL$

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

$Gn = 1.585$ dB

$f := 300$ Frequency in MHz

$$S := \frac{f}{1500}$$ power density limit for uncontrolled exposure

$S = 0.2$

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

$R = 88.784$ distance in centimeters required for compliance

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

$inches = 34.954$