FCC RF Exposure Requirements

General information

FCC ID: IV9FNCV-70
Device category: Mobile per Part 2.1091
Environment: Controlled Exposure

Mobile devices that operate under Part 90 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 any antenna to be used with this device.

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

Configuration	Antenna p/n	Type	Max. Gain (dBi)
Passenger car	Any	omni	5

Operating configuration and exposure conditions

The conducted output power is 72 watts. Typical use qualifies for a maximum duty cycle factor of 50%. The manufacturer also markets this device only for occupation use.

- Vehicle Operation: The maximum antenna gain that can be used is 5dBi or 3 dBd. 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 occupation/controlled exposure environment below 300 MHz is 1 mW/cm^2 .

Channel frequency: 134-174 MHz
The conducted power output is 72.4 watt.
The coax loss was taken as 1 dB.
Antenna gain was taken as 3 dBd
50% talk time

$W := 72.5$ power in Watts $D := 1$ Duty Factor in decimal % (1=100%)

$E := 3.0$ exposure time in minutes $U := 6$ (use 6 for controlled and 30 for uncontrolled)

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

$$PC = 0.5 \quad \text{percent on time}$$

$$Wexp = 36.25 \quad \text{Watts}$$

Power output	antenna gain	Calculation of S

$Po := 36250$ mWatts $dBd := 3$ $f := 300$ Frequency in MHz

$CL := 1$ coax loss

$G := dBd + 2.15 - CL$ uncontrolled exposure

$G = 4.15$ net-gain in dBi

$$S := \frac{f}{300}$$

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

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

$Gn = 2.6$

$$R := \sqrt{\frac{(Po \cdot Gn)}{(4 \cdot \pi \cdot S)}} \qquad\qquad Rinches := \frac{R}{2.54}$$

$R = 86.606$ distance in centimeters $Rinches = 34.097$
            required for compliance

Conclusion

The device complies with the MPE requirements by providing a safe separation distance of 86.6 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
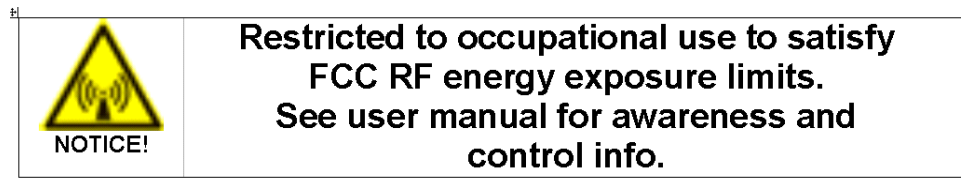
"FCC RF Exposure Requirements:

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%.

Vehicle – Antenna Installation:
- Antennas used for this transmitter must not exceed an antenna gain of 5 dBi with a minimum cable loss of 1dB.
- For rear deck trunk and roof top installations, the antenna must be located at least 86.6 cm away from rear-seat passengers and bystanders in order to comply with the FCC RF exposure requirements.

The following label will be mounted in conspicuous view on the radio.

NOTICE!	Restricted to occupational use to satisfy FCC RF energy exposure limits. See user manual for awareness and control info.

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