FCC RF Exposure Requirements

General information:

FCCID: K6610614630
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 specify an antenna with a gain of 2.2 dBi 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	2

Operating configuration and exposure conditions:

The conducted output power is 25 Watts. Typical use qualifies for a maximum duty cycle factor of 50%. The manufacturer also markets this device only for occupation use.

- Part 2.1091 states that devices are excluded from routine evaluation if the EIRP is less than 2.46Watt (or 1.5WERP).

- Vehicle Operation: The maximum antenna gain that can be used is 2dBi. 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:

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

The limit for occupation/controlled exposure environment below 300 MHz is 1 mW/cm^2 .

Channel frequency: 450 MHz
The conducted power output is 25 watt.
The coax loss was taken as 1 dB.
Antenna gain was taken as 2.2 dBi
50% talk time in 6 minutes

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

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

$$Wexp = 12.5 \qquad \text{Watts}$$

Power output   antenna gain   Calculation of S

$Po := 12500 \ \text{mWatts}$ $dBd := -.15$ $f := 450$ Frequency in MHz

$CL := 1$ coax loss

                                                    controlled exposure

$G := dBd + 2.2 - CL$

$G = 1.05$ net-gain in dBi $S := \dfrac{f}{300}$

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

$$S = 1.5 \qquad \frac{mW}{cm^2}$$

$Gn = 1.274$

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

$R = 29.061$ distance in centimeters $Rinches = 11.441$

                  required for compliance

Conclusion:

The device complies with the MPE requirements by providing a safe separation distance of 29 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 2.2 dBi with a minimum cable loss of 1dB.
- For rear deck trunk and roof top installations, the antenna must be located at least 29 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.
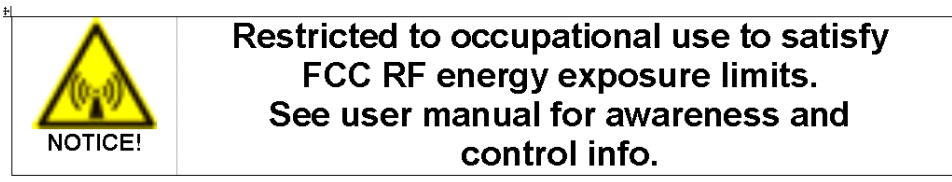
Failure to observe these restrictions will result in exceeding the FCC RF exposure limits.