

FCC RF Exposure Requirements

General information:

FCCID:

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	3

Operating configuration and exposure conditions:

The conducted output power is 40 watt. 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 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:

$E(V/m) = \frac{\sqrt{30 \times P \times G}}{d}$	$\text{Power density: } P_d(mW/cm^2) = \frac{E^2}{3770}$
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The limit for occupation/controlled exposure environment above 300 MHz and below 1500 MHz is $f/300 \text{ mW/cm}^2$.

Channel Frequency: 440-475 MHz

The conducted power output is 45 watt.

The coax loss was taken as 1 dB.

Antenna gain was taken as 3 dBi

50% talk time in 6 minutes

W := 45 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)

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

$$PC := \frac{E}{U}$$

PC = 0.5 percent on time

Wexp = 22.5 Watts

0.5 = 50%

CL := 1 Coax loss

Po := 17780 mWatts dBd := 1 antenna gain f := 450 Frequency in MHz

G := dBd + 2.15 gain in dBi

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

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

300 for controlled

Gn = 2.065

S = 1.5 1500 for uncontrolled

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

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

R = 44.138 distance in centimeters
required for compliance

Rinches = 17.377

Conclusion:

The device complies with the MPE requirements by providing a safe separation distance of 125.6 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:

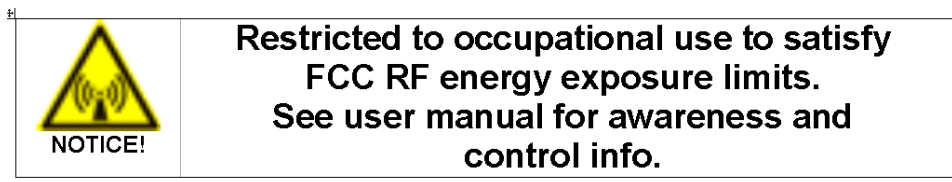
CAUTION:

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 3 dBi with a minimum cable loss of 1dB.
- For rear deck trunk and roof top installations, the antenna must be located at least 125.6 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.



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