

# FCC RF Exposure Requirements

## General information:

FCCID: MMA901090  
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 an antenna. A typical fix mounted antenna has a gain of anywhere from 0 dBi.

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

Configuration	Antenna p/n	Type	Max. Gain (dBi)
mobile	Any	omni	0

## Operating configuration and exposure conditions:

The conducted output power is 110 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).

- Mobile operation: A typical installation consists of an antenna system with a coaxial cable of the type RG 8U which has a loss of 1dB for a length of 25 feet at UHF frequencies.

## MPE Calculation:

The minimum separation distance is calculated as follows:

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

The limit for occupation/controlled exposure environment above 300 MHz is f/300 mW/cm<sup>2</sup>.

Frequency: 136 - 174 MHz  
 The conducted power output is 110 watt.  
 The coax loss was taken as 1 dB.  
 Antenna gain was taken as 0 dBi  
 50% talk time in 6 minutes  
 Power Density =  $S = 1 \text{mw/cm}^2$

W := 110 power in Watts

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

E := 3 exposure time in minutes

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

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

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

W<sub>exp</sub> = 50 Watts

PC = 50 % on time

Po := 50000 mWatts

f := 300 Frequency in MHz

dBd := 0.85 antenna gain in dBd

$S := \frac{f}{300}$  power density limit for  
 controlled exposure

G1 := dBd + 2.15

S = 1  $\frac{\text{mW}}{\text{cm}^2}$  for all frequencies  
 from 30 to 300 MHz

G1 = 3 dBi gain in dBi

CL := 1  
 dB coax loss

G := G1 - CL

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

Gn = 1.585 dB

$$R := \sqrt{\frac{(P_o \cdot G_n)}{(4 \cdot \pi \cdot S)}}$$

R = 79.411 distance in centimeters  
 required for compliance

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

inches = 31.264

**Conclusion:**

The device complies with the MPE requirements by providing a safe separation distance of 80 cm (31 inches) between the antenna, including any radiating structure, and any persons when normally operated .

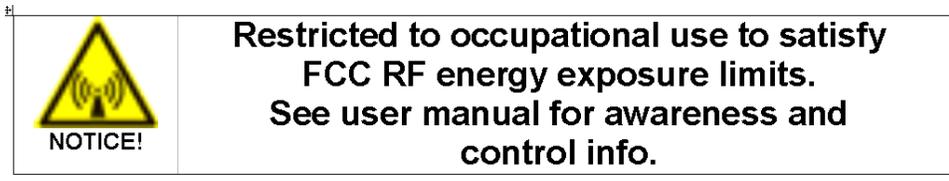
**Proposed RF exposure safety information to include in User’s Manual:**

**“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%.

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.