FCC RF Exposure Requirements

General information:

Device category: Fixed per Part 2.1091
Environment: Uncontrolled Exposure

Fixed mounted 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 fixed mounted antenna has a gain of 3 dBi.

This device has provisions for operation in a fixed location.

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

Operating configuration and exposure conditions:

The conducted output power is 110 Watts. In typical use the maximum duty cycle factor of can reach near 100 %. 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).

- Fixed 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 40 feet at VHF frequencies.

MPE Calculation:

The minimum separation distance is calculated as follows:

The limit for general population/uncontrolled exposure environment below 300 MHz is 0.2 mW/cm^2 .

Frequency: 136-174 MHz
The conducted power output is 110 watt.
The coax loss was taken as 1 dB.
Antenna gain was taken as 3 dBi

$W := 110$ power in Watts $D := 1$ Duty Factor in decimal % (1=100%)

                                                        1 for FM

                                          $E := 6$ exposure time in minutes

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

$Wexp := W \cdot D \cdot \left(\dfrac{E}{U}\right)$ $PC := \left(\dfrac{E}{U}\right) \cdot 100$

$Wexp = 110$ Watts $PC = 100$ % on time

$Po := 110000 \; mWatts$ $f := 160$ Frequency in MHz

$dBd := 0.85$ antenna gain in dBd

$G1 := dBd + 2.15$ gain in dBi $S := 0.2$ power density limit for
                                                       controlled exposure

     $G1 = 3$ dBi

     $CL := 1$ dB coax loss

 $G := G1 - CL$

            $\dfrac{G}{10}$ gain numeric
$Gn := 10$

$Gn = 1.585$ dB

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

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

$R = 263.376$ distance in centimeters
                required for compliance
                                          $inches = 103.691$

                                          $ft := \dfrac{inches}{12}$

                                          $ft = 8.641$

Conclusion:

The MPE calculations show that based on the conditions presented a safe separation distance of 9 ft between the antenna, including any radiating structure, and any persons when normally operated complies with the FCC limits for RF exposure.

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

"FCC RF Exposure Requirements:

See user's manual.