RF Exposure Report

General information:

Device category: Mobile per Part 2.1091
Environment: Uncontrolled Exposure

Fixed 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:

This device is typically used in fixed location service only.

The although the manufacturer does not specify an antenna. A typical antenna in this type of service has a gain of 0 dBi.

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

Operating configuration and exposure conditions:

The conducted output power is 250 Watts. In typical use the duty cycle can approach 100%.

The manufacturer also markets this device only for occupation use. But in fixed use the exposure is generally uncontrollable.

A typical installation consists of an antenna system with a coaxial cable of the type RG 213/U which has a loss of 1dB for a length of 40 feet at these frequencies.

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 uncontrolled exposure environment below 300 MHz is 0.2 mW/cm^2.

Channel frequency: 136 to 174 MHz
The conducted power output is 250 watt.
The coax loss was taken as 1.5 dB (50 ft).
Antenna gain was taken as 0 dBi

W := 250.0 power in Watts

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

1 for FM
0.6 for SSB

E := 30 exposure time in minutes

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

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

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

Wexp = 250 Watts

PC = 100 % on time

Po := 250000 mWatts

f := 300 Frequency in MHz

dBd := 0 antenna gain in dBd

G1 := dBd + 2.15 gain in dBi

$S := \frac{f}{1500}$ power density limit for uncontrolled exposure

G1 = 2.15 dBi

CL := 1.5 dB coax loss

$S = 0.2 \quad \frac{mW}{cm^2}$

G := G1 − CL

General population
S is 1 between 1500 and 100k MHz
S is f/1500 for 300 to 1500 MHz
S is 0.2 between 30 and 300 MHz

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

Occupational
S is 1 between 30 and 300 MHz
S is f/300 between 300 and 1500 MHz
S is 5 between 1500 and 100k MHz
(See 47 CFR 1.1310)

Gn = 1.161

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

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

R = 339.899 distance in centimeters required for compliance

inches = 133.819

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

ft = 11.152

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 transmitter/antenna system. The antenna should be mounted so as to maintain a distance of at least 11.2 ft (3.4 m) between the antenna and bystanders, when operated in a typical installation and a 0 dBi antenna.

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