

## 4 FCC §2.1091 & IC RSS-102 - RF Exposure Information

### 4.1 Applicable Standards

#### FCC §2.1091

(a) Requirements of this section are a consequence of Commission responsibilities under the National Environmental Policy Act to evaluate the environmental significance of its actions. See subpart I of part 1 of this chapter, in particular §1.1307(b).

According to §1.1310 and §2.1091 RF exposure is calculated.

#### Limits for Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	f/300	6
1500-100,000	/	/	1	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	*(100)	30
1.34-30	842/f	2.19/f	*(180/f <sup>2</sup> )	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1	30

f = frequency in MHz

\* = Plane-wave equivalent power density

Note 1 to Table 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

Note 2 to Table 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

According to IC RSS-102 Issue 2 section 4.4, RF Field Strength Limits for Controlled Use Devices (Controlled Environment).

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m <sup>2</sup> )	Time Averaging (min)
0.003 - 1	600	2.19	-	6
1 - 10	600 / f	4.9 / f	-	6
10 - 30	60	4.9 / f	-	6
30 - 300	60	0.163	10*	6
300 - 1 500	3.54 f <sup>0.5</sup>	0.0094f <sup>0.5</sup>	f/30	6
1 500 - 15 000	137	0.364	50	6
15 000 - 150 000	137	0.364	50	616000 / f <sup>1.2</sup>
150 000- 300 000	0.354f <sup>0.5</sup>	9.4 x10 <sup>-4</sup> f <sup>0.5</sup>	3.33 x 10 <sup>-4</sup> f	616000 / f <sup>1.2</sup>

**Note:** *f* is frequency in MHz

\* = Power density limit is applicable at frequencies greater than 100 MHz

## Antenna

The manufacturer does not specify an antenna. This device has provisions for operation in a vehicle, or a fixed location.

## MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

Duty Cycle (TDMA 4slots)	<u>25%</u>
Maximum peak output power at antenna input terminal (dBm):	<u>38.29</u>
Maximum peak output power at antenna input terminal (mW):	<u>6745.280</u>
Prediction distance (cm):	<u>25</u>
Prediction frequency (MHz):	<u>450.1</u>
Maximum Antenna Gain, typical (dBi):	<u>8</u>
Maximum Antenna Gain (numeric):	<u>6.310</u>
Power density of prediction frequency at 25 cm (W/m <sup>2</sup> ):	<u>13.55</u>
Power density of prediction frequency at 25 cm (mW/cm <sup>2</sup> ):	<u>1.355</u>
MPE limit for uncontrolled exposure at prediction frequency (W/m <sup>2</sup> ):	<u>15.00</u>
MPE limit for uncontrolled exposure at prediction frequency (mW/cm <sup>2</sup> ):	<u>1.500</u>

## **Conclusion**

The device complies with the MPE requirements by providing a safe separation distance of at least 25 cm between the antenna with maximum 8dBi gain, 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.

- Antennas used for this transmitter must not exceed an antenna gain of 8 dBi
- For rear deck trunk and roof top installations, the antenna must be located at least 25 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.

