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^2)	Averaging Time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*($900/f^2$)	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	f/300	6
1500-100,000	/	/	1	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	842/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/150	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^2)	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	$3.54\ f^{0.5}$	$0.0094f^{0.5}$	f/30	6
1 500 – 15 000	137	0.364	50	6
15 000 – 150 000	137	0.364	50	$616000 / f^{1.2}$
150 000- 300 000	$0.354f^{0.5}$	$9.4 \times 10^{-4}\ f^{0.5}$	$3.33 \times 10^{-4}\ f$	$616000 / f^{1.2}$

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 4 slots)	25%
Maximum peak output power at antenna input terminal (dBm):	33.04
Maximum peak output power at antenna input terminal (mW):	2013.724
Prediction distance (cm):	25
Prediction frequency (MHz):	806.1
Maximum Antenna Gain, typical (dBi):	16
Maximum Antenna Gain (numeric):	39.81
Power density of prediction frequency at 25 cm (W/m^2):	25.52
Power density of prediction frequency at 25 cm (mW/cm^2):	2.552
MPE limit for uncontrolled exposure at prediction frequency (W/m^2):	26.87
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	2.687

Conclusion

The device complies with MPE requirements by providing a safe separation distance of 25 cm between the antenna, which have a maximum gain of 16 dBi, including any radiating structure, and any person 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 16 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.