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 Exposure				
0.3-1.34	614	1.63	*(100)	6
1.34-30	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	/	/	5	6

f = frequency in MHz
** = Plane-wave equivalent power density*

According to IC RSS-102 Issue 4 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)	Averaging Time (minutes)
0.003-1	600	4.9	-	6
1-10	$600/f$	$4.9/f$	-	6
10-30	60	$4.9/f$	-	6
30-300	60	0.163	10^*	6
300-1500	$3.54\ f^{0.5}$	$0.0094\ f^{0.5}$	$f/30$	6
1500-15000	137	0.364	50	6
15000-150000	137	0.364	50	$616000/f^{1.2}$
150000-300000	$0.354\ f^{0.5}$	$9.4 \times 10^{-4}\ f^{0.5}$	$3.33 \times 10^{-4}\ f$	$616000/f^{1.2}$

Antenna:

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

4.2 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

FCC Frequency: 809-824 MHz

Duty Cycle (TDMA 4 slots)	25%
Maximum peak output power at antenna input terminal (dBm):	34.8
Maximum peak output power at antenna input terminal (mW):	3019.95
Prediction distance (cm):	30
Prediction frequency (MHz):	809.1
Maximum Antenna Gain, typical (dBi):	16
Maximum Antenna Gain (numeric):	39.81
Power density of prediction frequency at 30 cm (mW/cm^2):	2.658
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	2.697

FCC Frequency: 854-869 MHz

Duty Cycle (TDMA 4 slots)	25%
Maximum peak output power at antenna input terminal (dBm):	34.1
Maximum peak output power at antenna input terminal (mW):	2570.40
Prediction distance (cm):	30
Prediction frequency (MHz):	854.1
Maximum Antenna Gain, typical (dBi):	16
Maximum Antenna Gain (numeric):	39.81
Power density of prediction frequency at 30 cm (mW/cm^2):	2.262
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	2.847

IC Frequency: 806-824 MHz

Duty Cycle (TDMA 4 slots)	25%
Maximum peak output power at antenna input terminal (dBm):	34.1
Maximum peak output power at antenna input terminal (mW):	2570.40
Prediction distance (cm):	30
Prediction frequency (MHz):	806.1
Maximum Antenna Gain, typical (dBi):	16
Maximum Antenna Gain (numeric):	39.81
Power density of prediction frequency at 30 cm (W/m^2):	22.62
MPE limit for uncontrolled exposure at prediction frequency (W/m^2):	26.87

IC Frequency: 851-869 MHz

Duty Cycle (TDMA 4 slots)	25%
Maximum peak output power at antenna input terminal (dBm):	34.2
Maximum peak output power at antenna input terminal (mW):	2630.27
Prediction distance (cm):	30
Prediction frequency (MHz):	851.1
Maximum Antenna Gain, typical (dBi):	16
Maximum Antenna Gain (numeric):	39.81
Power density of prediction frequency at 30 cm (W/m^2):	23.15
MPE limit for uncontrolled exposure at prediction frequency (W/m^2):	28.37

Conclusion

The device complies with the MPE requirements by providing a safe separation distance of at least 30 cm between the antenna with maximum 16 dBi gain, including any radiating structure, and any persons when normally operated.