FCC §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for Maximum Permissible Exposure (MPE)

Limits for Occupational/Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time |E|, |H| or S (minutes)
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	/	/	5	6

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

MPE Calculation

Predication of MPE limit at a given distance

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

Where: S = power density (in appropriate units, e.g. mW/cm^2);
      P = power input to the antenna (in appropriate units, e.g., mW);
      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 (appropriate units, e.g., cm);

MPE Results

The device support VHF and UHF, the highest Power is 50+/-1W for UHF band, and 50+/-1W for VHF band:

Frequency Bands	Antenna Gain		Max. Conducted Output Power	Output Power* 50% duty cycle (PTT)	P*G	S_{limit}
	(dBi)	(numeric)	(W)	(W)	(mW)	(mW/cm^2)
VHF(136-174MHz)	3.5	2.24	51	25.5	57087	1.0
UHF(400-480MHz)	3.5	2.24	51	25.5	57087	1.33

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

$=>R^2=PG/(S*4\pi)$

$=>R^2$ should more than $PG/(S_{limit}*4\pi)$

For VHF:

$R_{VHF} > [57087/(1 \times 4 \times 3.14)]^{0.5} = 67.4$ cm

For UHF:

$R_{UHF} > [57087/(1.33 \times 4 \times 3.14)]^{0.5} = 58.4$ cm

Result: Compliance, The device meets MPE requirement for Occupational/Controlled use at 70 cm distance(> 67.4cm).