

RF Exposure Evaluation

PRODUCT DESCRIPTION

Transmit Frequency Band:	156.025MHz – 157.425MHz
Maximum Output Power:	22W(43.42dBm)
Maximum Antenna Gain:	9dBi
Device Category:	<input type="checkbox"/> Portable (< 20cm separation) <input checked="" type="checkbox"/> Fixed (> 20cm separation) <input type="checkbox"/> Others:
Exposure Environment:	<input type="checkbox"/> Occupational / Controlled exposure <input checked="" type="checkbox"/> General Population / Uncontrolled exposure
Evaluation Applied:	<input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> SAR Evaluation

APPLICABLE STANDARD

FCC part 2.1091; KDB447498 v05r02;

LIMIT

FCC Part 1.1310(e):

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				
0.3-3.0	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
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

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

MPE CALCULATION

The minimum separation distance is calculated as follows:

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

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: The limit for general uncontrolled exposure environment 30-300MHz is 0.2mW/cm².

Typical use qualifies for a maximum duty cycle factor 50%, Averaging time 30 minutes for FCC.

FCC: $P = 22000\text{mW} \cdot (15/30) = 11000\text{mW}$, $G = 10^{(9/10)} = 7.943$, $S = 0.2\text{mW/cm}^2$

Safely distance $R = ((GP)/(4\pi S))^{(0.5)} = ((11000 \cdot 7.943)/(4 \cdot \pi \cdot 0.2))^{(0.5)} = 186.5\text{cm}$

CONCLUSION

If presumed the gain of the antenna is 9 dBi, the separation distance is at least 1.9 m from body and the antenna, so meet RF Exposure requirement.