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MPE Evaluation

FCC

Maximum exposure limits from CFR 47, FCC Part 1.1310:

Table 1—Limits for Maximum Permissible Exposure (MPE)

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

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Table 2 – Power Density Calculations

Occupational/Controlled	0
General Population/uncontrolled	1

Transmitter	Frequency	Antenna Gain	Power (conducted)	Power (conducted) +10% for tolerance	Power Density	Limit at specified distance	% of limit	Highest	Total
	MHz	numerical	mW	mW	mW/cm^2	mW/cm^2			
1	2412	1.48	680.7700	748.8470	0.22060	1.00	22.0600%	1	22.0600%
1	2437	1.48	685.4900	754.0390	0.22213	1.00	22.2129%		
1	2462	1.48	650.1300	715.1430	0.21067	1.00	21.0671%		
2	699 - 1910	1.48	316.0000	347.6000	0.10240	0.47	21.9738%	1	21.9738%
								TOTAL	44.0338%

Distance	20	cm	PASS?	YES

Note: The user's manual will stipulate that a 20cm distance from the user is to be maintained.

The power density is calculated as shown below:

S = (P x G)/(4 x π x d^2) – used to calculate exposure at 20 cm

d = √(S/(P x G) x 4 X π) – used to calculate minimum distance to meet limits

S= power density
P = transmitter conducted power (in mW)
G = antenna numeric gain
D = distance to radiation center (20 cm)