

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

Occupational/Controlled							
General Population/uncontrolled		YES					
EN 1248							
Frequency	Antenna Gain	Power EIRP	Power (conducted) +10% for tolerance	Power Density	Limit at specified distance	% of limit	Result
MHz	numerical	mW	mW	mW/cm ²	mW/cm ²		
902.4	1.000	15.79	17.37	0.003457	0.601600	0.57%	PASS
914.8	1.000	15.78	17.36	0.003455	0.609867	0.57%	PASS
927.6	1.000	11.62	12.78	0.002544	0.618400	0.41%	PASS

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

EIRP values are average values calculated from peak measurements with a duty cycle correction applied.

EIRP values in mW were multiplied by 1.1 to account for a 10% tolerance

The power density is calculated as shown below:

$$S = (P \times G) / (4 \times \pi \times d^2) - \text{used to calculate exposure at 20 cm}$$

$$EIRP = P \times G, \text{ measured as field strength}$$

$$d = \sqrt{(S / (P \times G) \times 4 \times \pi)} - \text{used to calculate minimum distance to meet limits}$$

S= power density

P = transmitter conducted power (in mW)

G = antenna numeric gain

D = distance to radiation center (20 cm)

IC / ISED

Using RSS-102, Issue 5, Section 2.5.2

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{(0.6834)}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance). In these cases, the information contained in the RF exposure

Table 1 - Power Density Calculations, IC/ISED

EN 1248				
Frequency	Peak EIRP	EIRP +10% for tolerance	Exemption Limit	Compliant
MHz	mW	mW	mW	
902.4	15.79	17.37	1370.853	YES
914.8	15.78	17.36	1383.689	YES
927.6	11.62	12.78	1396.901	YES

Peak power was used to show compliance, as it would be equal to or higher than the source-based, time averaged maximum EIRP.