

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			
TBA Module						
Frequency	Peak Power Conducted*	Peak Power Conducted +10% for tolerance	Power Density	Limit at specified distance	% of limit	Result
MHz	mW	mW	mW/cm^2	mW/cm^2		
902.4	92.47	101.72	0.020246	0.601600	3.37%	PASS
914.8	91.20	100.32	0.019968	0.609867	3.27%	PASS
927.6	89.33	98.26	0.019559	0.618400	3.16%	PASS

*Peak Power Conducted is the worst case vs. EIRP. Antenna gain is less than 0 dBi.

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.

Power 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 (Set to 1 when Conducted Power is used.)

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

TBA Module				
Frequency	Peak Conducted Power*	Peak Conducted Power +10% for tolerance	Exemption Limit	Compliant
MHz	mW	mW	mW	
902.4	92.47	101.72	1370.853	YES
915.0	91.20	100.32	1383.689	YES
927.6	89.33	98.26	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. Antenna gain is less than 0 dBi.