

§1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 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 General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (Minutes)
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
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

Result

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm²)

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, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
	(dBi)	(numeric)	(dBm)	(mW)			
2412-2462	1.5	1.41	20.7	117.49	20	0.033	1.0
5250-5350	2.0	1.58	18.5	70.79	20	0.022	1.0
5470-5725	2.0	1.58	17.5	56.23	20	0.018	1.0
5150-5250&5725-5850	2.0	1.58	9.4	8.71	20	0.003	1.0

- Note: 1. The antenna gain was provided by the applicant.
 2. The 2.4GHz and 5GHz WiFi can transmit simultaneously for this device.
 3. Please refer to the MPE report of the FCC ID: TV7RB952-5AC2ND grant on 2016-08-04 for the 2412-2462MHz/5150-5250MHz/5725-5850MHz bands output power.

So the worst simultaneous transmitting consideration:

$$\text{The ratio} = \text{MPE}_{2.4\text{GHz}}/\text{limit} + \text{MPE}_{5\text{GHz}}/\text{limit} = 0.033/1.0 + 0.022/1.0 = 0.055 < 1.0$$

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

Result: Compliance