

§1.1307 (b) (3) & §2.1091 –MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 1.1310, 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				
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

Calculated Formulary:

Predication of MPE limit at a given distance

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

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

Calculated Data:

Mode	Frequency Range (MHz)	Antenna Gain		Tune-up Output Power [*]		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
SRD	433.42	/	/	-26.0	0.003	20	<0.0001	0.3
5G Wi-Fi	5150-5250	2.7	1.86	13.0	19.95	20	0.0074	1.0
	5250-5350	2.7	1.86	13.0	19.95	20	0.0074	1.0
	5470-5725	2.7	1.86	12.0	15.85	20	0.0059	1.0
	5725-5850	2.7	1.86	12.0	15.85	20	0.0059	1.0

Note:

1. For the above tune up power were declared by the manufacturer.
2. The SRD EIRP = 68.93 dBμV/m -95.2 = -26.27dBm.
3. The worst condition of transmit simultaneously (WiFi&SRD) is as below:

$$\sum_i \frac{S_i}{S_{Limit,i}} = 0.0003 + 0.0074 = 0.0077 < 1.0$$

Conclusion: The device meets MPE at distance 20cm.