

5 FCC §15.407(f), §1.1310, § 2.1091 - Maximum Permissible Exposure (MPE)

5.1 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);

5.2 RF Exposure Evaluation Result

MPE evaluation for single transmission:

Mode	Frequency Range (MHz)	Antenna Gain		Target Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
BLE	2402-2480	2.93	1.963	11.5	14.125	20	0.005	1
WI-FI	2412-2462	2.93	1.963	23.5	223.872	20	0.087	1
WI-FI	5150-5250	3.53	2.254	12.50	17.783	20	0.008	1
WI-FI	5725-5850	2.46	1.762	15.00	31.623	20	0.011	1

Note: the maximum antenna gain was used for evaluation.

Note: Wi-Fi 2.4G, Wi-Fi 5G and BLE can't transmit simultaneously.

Result: MPE evaluation meets the requirements of the **20cm** standard.