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)	Ave.eraging 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.e 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/cm^2)
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:

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

Frequency (MHz)	Antenna Gain		Tune up conducted power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
	(dBi)	(numeric)	(dBm)	(mW)			
2412-2462	6	3.98	26.0	398.11	20	0.315	1
5150-5250	7	5.01	22.5	177.83	20	0.177	1
5725-5850	7	5.01	22.5	177.83	20	0.177	1
5250-5350	7	5.01	20.0	100.00	20	0.100	1
5470-5725	7	5.01	20.0	100.00	20	0.100	1

Note: The tune up power of 2.4GHz Wi-Fi and 5G Wi-Fi 5150-5250MHz/5725-5850MHz band refer to the MPE report of FCC ID: YZZGWN7660
The 2.4G Wi-Fi and 5G Wi-Fi can transmit at the same time.
The antenna gain is 3dBi for 2.4GHz Wi-Fi and 4dBi for 5G Wi-Fi.
EUT support beamforming
Directional gain = G_{ANT} + Array Gain
Array Gain=10*log(N_{ant}/N_{ss}) dB
For the worst case, N_{ss}=1, so:
For 2.4GHz Wi-Fi, Directional gain=3dBi+10*log(2/1)dB=6dBi
For 5GHz Wi-Fi, Directional gain=4dBi+10*log(2/1)dB=7dBi

Simultaneous transmitting consideration:

The ratio=MPE$_{DTS}$/limit+MPE$_{NII}$/limit =0.315/1+0.177/1=0.492＜1.0

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

Result: Pass