

RF Exposure Evaluation

LIMIT

The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

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 Exposures				
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
300–1500	-	-	f/300	6
1500–100,000	-	-	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
300–1500	-	-	f/1500	30
1500–100,000	-	-	1.0	30

Note: f = frequency in MHz

EVALUATION METHOD

Transmission formula: $Pd = (Pout * G) / (4 * pi * r^2)$

Where

Pd = power density in mW/cm², **Pout** = output power to antenna in mW, **G** = gain of antenna in linear scale;

Pi = 3.1416, **R** = distance between observation point and center of the radiator in cm

TEST RESULT

Passed

Not Applicable

Radio Type	Frequency range (MHz)	Conducted Average Power (dBm)	Maximum Tune-up (dBm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
2.4G WIFI	2412-2472	26.96	27.00	0.4888	1.0000	Pass
5G WIFI	5180-5240	21.52	22.00	0.1580	1.0000	Pass
5G WIFI	5260-5320	15.92	16.00	0.0397	1.0000	Pass
5G WIFI	5500-5720	18.56	19.00	0.0792	1.0000	Pass
5G WIFI	5745-5825	22.06	22.50	0.1773	1.0000	Pass

Consider the 2.4G WIFI and 5G WIFI can transmitting simultaneously, the total transmitting MPE rate as below formula:

$$\text{MPE rate} = \text{Power density of 5G WIFI} / \text{limit} + \text{Power density of 2.4G wifi} / \text{limit} < 1$$

The worst case is 5G WIFI and 2.4G WIFI transmitting simultaneously, the result as below:

Evaluation mode	Power density/limit	Sum of the MPE rate	limit
2.4G WIFI	0.4888	0.6661	1.0000
5G WIFI	0.1773		

Note:

- 1) The maximum antenna gain is 7.00dBi (5G WiFi) and 6.90dBi (2.4G WiFi)
- 2) The exposure evaluation safety distance is 20cm.