

FCC ID:2BEXHBITDOORCCD100

Maximum Permissible Exposure (MPE)

According to FCC 1.1310: 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 Exposure				
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
300-1,500			f/300	6
1,500-100,000			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
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

MPE Calculation Method

$$E \text{ (V/m)} = \frac{\sqrt{30 * P * G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = Average RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 * P * G}{377 * D^2}$$

From the EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

2.4G WIFI:

Operation Frequency: WIFI 802.11b/g/n HT20: 2412-2462MHz,
WIFI 802.11n HT40:2422-2452MHz
Power density limited: 1mW/ cm²

Antenna Type: FPC antenna

Antenna gain: 2.58dBi;

R=20cm

mW=10^{^(dBm/10)}

antenna gain Numeric=10^{^(dBi/10)}

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density
		(dBm)		tune-up power		Gain		(mW/cm2)	(mW/cm2)
				(dBm)	(mW)	(dBi)	Numeric		
2412	802.11b	16.91	17±1	18	63.096	1.58	1.44	0.0181	1
2437		17.09	17±1	18	63.096	1.58	1.44	0.0181	1
2462		16.96	17±1	18	63.096	1.58	1.44	0.0181	1
2412	802.11g	13.75	14±1	15	31.623	1.58	1.44	0.0091	1
2437		13.92	14±1	15	31.623	1.58	1.44	0.0091	1
2462		13.91	14±1	15	31.623	1.58	1.44	0.0091	1
2412	802.11n H20	12.45	13±1	14	25.119	1.58	1.44	0.0072	1
2437		12.59	13±1	14	25.119	1.58	1.44	0.0072	1
2462		12.67	13±1	14	25.119	1.58	1.44	0.0072	1

5G WIFI:

Operation Frequency: WIFI 802.11a/n(HT20): 5180-5240MHz;5260-5320MHz,5500-5700MHz,5745-5825MHz;WIFI 802.11n(HT40): 5190-5230MHz;5270-5310MHz,5510-5670MHz5755-5795MHz

Power density limited: 1mW/cm

Antenna Type: FPC antenna

Antenna gain: WIFI 5.2G/5.3G/5.6G: 3.23 dBi; WIFI 5.8G:3.97dBi

R=20cm

mW=10^{^(dBm/10)}

antenna gain Numeric=10^{^(dBi/10)}

5.2G

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm2)	Power density (mW/cm2)
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
5180	802.11a	10.41	10±1	11	12.589	3.23	2.10	0.0053	1
5200		10.43	10±1	11	12.589	3.23	2.10	0.0053	1
5240		9.4	10±1	11	12.589	3.23	2.10	0.0053	1
5180	802.11n H20	9.98	10±1	11	12.589	3.23	2.10	0.0053	1
5200		10.14	10±1	11	12.589	3.23	2.10	0.0053	1
5240		17.63	17±1	17	50.119	3.23	2.10	0.0210	1

5.3G

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm2)	Power density (mW/cm2)
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
5260	802.11a	9.22	10±1	11	12.589	3.23	2.10	0.0053	1
5280		9.17	10±1	11	12.589	3.23	2.10	0.0053	1
5320		9.08	10±1	11	12.589	3.23	2.10	0.0053	1
5260	802.11n H20	9.04	10±1	11	12.589	3.23	2.10	0.0053	1
5280		8.76	10±1	11	12.589	3.23	2.10	0.0053	1
5320		8.83	10±1	11	12.589	3.23	2.10	0.0053	1

5.6G

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density
		(dBm)		tune-up power		Gain			
				(dBm)	(dBm)	(mW)	(dBi)	Numeric	(mW/cm2)
5500	802.11a	10.16	10±1	11	12.589	3.23	2.10	0.0053	1
5600		9.85	10±1	11	12.589	3.23	2.10	0.0053	1
5700		9.98	10±1	11	12.589	3.23	2.10	0.0053	1
5500	802.11n(HT20)	9.93	10±1	11	12.589	3.23	2.10	0.0053	1
5600		9.67	10±1	11	12.589	3.23	2.10	0.0053	1
5700		9.72	10±1	11	12.589	3.23	2.10	0.0053	1

5.8G

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density
		(dBm)		tune-up power		Gain		(mW/cm2)	(mW/cm2)
				(dBm)	(mW)	(dBi)	Numeric		
5745	802.11a	9.69	10±1	11	12.589	3.97	2.49	0.0062	1
5785		9.66	10±1	11	12.589	3.97	2.49	0.0062	1
5825		9.87	10±1	11	12.589	3.97	2.49	0.0062	1
5745	802.11n H20	9.48	10±1	11	12.589	3.97	2.49	0.0062	1
5785		9.42	10±1	11	12.589	3.97	2.49	0.0062	1
5825		9.41	10±1	11	12.589	3.97	2.49	0.0062	1

Note: No simultaneous transmissions are possible for this device of Wi-Fi 2.4G/5G

Conclusion:

For the max result : $0.0210 \leq 1.0$ for Max Power Density, compliance RF exposure.

Signature:

Date: 2024-02-28



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