

FCC ID: 2A2JY-FUNBOX

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

$$E \text{ (V/m)} = \frac{\sqrt{30 * P * G}}{d}$$

$$\text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

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.

2.4GWIFI:

Measurement Result

Operation Frequency: 2412MHz~2462MHz (20M)
2422MHz~2452MHz (40M)

Power density limited: 1mW/ cm²

Antenna Type: PCB antenna

Antenna gain : 2.88dBi;

R=20cm

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

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
2412	11b	13.88	13±1	14	25.119	2.88	1.94	0.0097	1
2437		13.71	13±1	14	25.119	2.88	1.94	0.0097	1
2462		13.73	13±1	14	25.119	2.88	1.94	0.0097	1
2412	11g	13.09	13±1	14	25.119	2.88	1.94	0.0097	1
2437		13.14	13±1	14	25.119	2.88	1.94	0.0097	1
2462		13.61	13±1	14	25.119	2.88	1.94	0.0097	1
2412	11n20	12.18	12±1	13	19.953	2.88	1.94	0.0077	1
2437		12.77	12±1	13	19.953	2.88	1.94	0.0077	1
2462		12.56	12±1	13	19.953	2.88	1.94	0.0077	1
2422	11n40	11.97	12±1	13	19.953	2.88	1.94	0.0077	1
2437		12.8	12±1	13	19.953	2.88	1.94	0.0077	1
2452		12.89	12±1	13	19.953	2.88	1.94	0.0077	1
2412	11ax20	12.05	12±1	13	19.953	2.88	1.94	0.0077	1
2437		12.8	12±1	13	19.953	2.88	1.94	0.0077	1
2462		12.26	12±1	13	19.953	2.88	1.94	0.0077	1
2422	11ax40	11.94	12±1	13	19.953	2.88	1.94	0.0077	1
2437		12.76	12±1	13	19.953	2.88	1.94	0.0077	1
2452		12.58	12±1	13	19.953	2.88	1.94	0.0077	1

5G WIFI:

Operation Frequency: WIFI 802.11a/ax/ac/n(HT20): 5180-5240MHz; 5745-5825MHz;

WIFI 802.11ax/ac/n(HT40): 5190-5230MHz;5755-5795MHz;

Power density limited: 1mW/cm

Antenna Type: PCB Antenna

Antenna gain: **4.05dBi**

R=20cm

mW=10^(dBm/10)

5.2G

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain			(mW/cm2)
				(dBm)	(mW)	(dBi)	Numeric		
5180	a	11.96	12±1	13	19.953	4.05	2.54	0.0101	1
5200	a	11.88	12±1	13	19.953	4.05	2.54	0.0101	1
5240	a	11.04	12±1	13	19.953	4.05	2.54	0.0101	1
5180	n20	11.89	12±1	13	19.953	4.05	2.54	0.0101	1
5200	n20	11.62	12±1	13	19.953	4.05	2.54	0.0101	1
5240	n20	11.24	12±1	13	19.953	4.05	2.54	0.0101	1
5190	n40	11.65	12±1	13	19.953	4.05	2.54	0.0101	1
5230	n40	11.07	12±1	13	19.953	4.05	2.54	0.0101	1
5180	ac20	11.88	12±1	13	19.953	4.05	2.54	0.0101	1
5200	ac20	11.69	12±1	13	19.953	4.05	2.54	0.0101	1
5240	ac20	11.03	12±1	13	19.953	4.05	2.54	0.0101	1
5190	ac40	11.92	12±1	13	19.953	4.05	2.54	0.0101	1
5230	ac40	11.41	12±1	13	19.953	4.05	2.54	0.0101	1
5180	ax20	12.02	12±1	13	19.953	4.05	2.54	0.0101	1
5200	ax20	11.55	12±1	13	19.953	4.05	2.54	0.0101	1
5240	ax20	11.09	12±1	13	19.953	4.05	2.54	0.0101	1
5190	ax40	11.79	12±1	13	19.953	4.05	2.54	0.0101	1
5230	ax40	11.09	12±1	13	19.953	4.05	2.54	0.0101	1

5.3G

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density limits
		(dBm)		tune-up power		Gain			(mW/cm2)
				(dBm)	(mW)	(dBi)	Numeric		
5260	a	11.12	11±1	12	15.849	4.05	2.54	0.0080	1
5280	a	11	11±1	12	15.849	4.05	2.54	0.0080	1
5320	a	10.27	11±1	12	15.849	4.05	2.54	0.0080	1
5260	n20	10.86	10±1	11	12.589	4.05	2.54	0.0064	1
5280	n20	10.93	10±1	11	12.589	4.05	2.54	0.0064	1
5320	n20	10.09	10±1	11	12.589	4.05	2.54	0.0064	1
5270	n40	10.83	10±1	11	12.589	4.05	2.54	0.0064	1
5310	n40	10.08	10±1	11	12.589	4.05	2.54	0.0064	1
5260	ac20	10.99	10±1	11	12.589	4.05	2.54	0.0064	1
5280	ac20	10.94	10±1	11	12.589	4.05	2.54	0.0064	1
5320	ac20	10.17	10±1	11	12.589	4.05	2.54	0.0064	1
5270	ac40	9.78	10±1	11	12.589	4.05	2.54	0.0064	1
5310	ac40	9.8	10±1	11	12.589	4.05	2.54	0.0064	1
5260	ax20	11.09	11±1	12	15.849	4.05	2.54	0.0080	1
5280	ax20	10.9	11±1	12	15.849	4.05	2.54	0.0080	1
5320	ax20	11.06	11±1	12	15.849	4.05	2.54	0.0080	1
5270	ax40	11.03	11±1	12	15.849	4.05	2.54	0.0080	1
5310	ax40	10.14	11±1	12	15.849	4.05	2.54	0.0080	1

5.6G

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
5500	a	10.53	11±1	12	15.849	4.05	2.54	0.0080	1
5600	a	11.41	11±1	12	15.849	4.05	2.54	0.0080	1
5700	a	10.13	11±1	12	15.849	4.05	2.54	0.0080	1
5500	n20	10.88	11±1	12	15.849	4.05	2.54	0.0080	1
5600	n20	11.22	11±1	12	15.849	4.05	2.54	0.0080	1
5700	n20	10.25	11±1	12	15.849	4.05	2.54	0.0080	1
5510	n40	10.54	11±1	12	15.849	4.05	2.54	0.0080	1
5590	n40	11.03	11±1	12	15.849	4.05	2.54	0.0080	1
5670	n40	10.45	11±1	12	15.849	4.05	2.54	0.0080	1
5500	ac20	11.81	11±1	12	15.849	4.05	2.54	0.0080	1
5600	ac20	11	11±1	12	15.849	4.05	2.54	0.0080	1
5700	ac20	10.03	11±1	12	15.849	4.05	2.54	0.0080	1
5510	ac40	10.31	11±1	12	15.849	4.05	2.54	0.0080	1
5590	ac40	10.76	11±1	12	15.849	4.05	2.54	0.0080	1
5670	ac40	10.56	11±1	12	15.849	4.05	2.54	0.0080	1
5500	ax20	10.89	10±1	11	12.589	4.05	2.54	0.0064	1
5600	ax20	10.94	10±1	11	12.589	4.05	2.54	0.0064	1
5700	ax20	9.17	10±1	11	12.589	4.05	2.54	0.0064	1
5510	ax40	10.59	11±1	12	15.849	4.05	2.54	0.0080	1
5590	ax40	10.92	11±1	12	15.849	4.05	2.54	0.0080	1
5670	ax40	10.62	11±1	12	15.849	4.05	2.54	0.0080	1

5.8G

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain			
				(dBm)	(dBm)	(mW)	(dBi)	Numeric	(mW/cm2)
5745	a	10.61	11±1	12	15.849	4.05	2.54	0.0080	1
5785	a	10.89	11±1	12	15.849	4.05	2.54	0.0080	1
5825	a	10.77	11±1	12	15.849	4.05	2.54	0.0080	1
5745	n20	10.55	11±1	12	15.849	4.05	2.54	0.0080	1
5785	n20	10.99	11±1	12	15.849	4.05	2.54	0.0080	1
5825	n20	11.02	11±1	12	15.849	4.05	2.54	0.0080	1
5755	n40	10.74	11±1	12	15.849	4.05	2.54	0.0080	1
5795	n40	11.24	11±1	12	15.849	4.05	2.54	0.0080	1
5745	ac20	10.43	11±1	12	15.849	4.05	2.54	0.0080	1
5785	ac20	11.2	11±1	12	15.849	4.05	2.54	0.0080	1
5825	ac20	11.01	11±1	12	15.849	4.05	2.54	0.0080	1
5755	ac40	10.66	11±1	12	15.849	4.05	2.54	0.0080	1
5795	ac40	11.22	11±1	12	15.849	4.05	2.54	0.0080	1
5745	ax20	10.56	11±1	12	15.849	4.05	2.54	0.0080	1
5785	ax20	11.08	11±1	12	15.849	4.05	2.54	0.0080	1
5825	ax20	10.89	11±1	12	15.849	4.05	2.54	0.0080	1
5755	ax40	11.09	11±1	12	15.849	4.05	2.54	0.0080	1

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