

FCC ID: 2A8XV-D317

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

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

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.

WIFI:

Operation Frequency: 2.4g WIFI 802.11b/g/n HT20: 2412-2462MHz,
 5.2gWIFI 802.11a/n/ac(HT20): 5180-5240MHz
 WIFI 802.11n/ac(HT40): 5190-5230MHz
 WIFI 802.11ac(HT80): 5210MHz
 5.8gWIFI 802.11a/n/ac(HT20): 5745-5825 MHz
 WIFI 802.11n/ac(HT40): 5755-5795MHz
 WIFI 802.11ac(HT80): 5775MHz

Power density limited: 1mW/ cm²

Antenna Type: FPC Antenna

Antenna gain: 2.4G:4.28dBi; 5G:5.49dBi

R=20cm

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

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

2.4g WIFI

Antenna	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		
Ant 1	2412	802.11b	16.03	16±1	17	50.119	4.28	2.68	0.0267	1
Ant 1	2437		16.19	16±1	17	50.119	4.28	2.68	0.0267	1
Ant 1	2462		15.8	16±1	17	50.119	4.28	2.68	0.0267	1
Ant 1	2412	802.11g	13.31	13±1	14	25.119	4.28	2.68	0.0134	1
Ant 1	2437		13.24	13±1	14	25.119	4.28	2.68	0.0134	1
Ant 1	2456		13.3	13±1	14	25.119	4.28	2.68	0.0134	1
Ant 1	2412	802.11n H20	10.94	10±1	11	12.589	4.28	2.68	0.0067	1
Ant 1	2437		10.2	10±1	11	12.589	4.28	2.68	0.0067	1
Ant 1	2462		10.7	10±1	11	12.589	4.28	2.68	0.0067	1
Ant 1	2422	802.11n H40	9.65	10±1	11	12.589	4.28	2.68	0.0067	1
Ant 1	2437		10.37	10±1	11	12.589	4.28	2.68	0.0067	1
Ant 1	2452		10.22	10±1	11	12.589	4.28	2.68	0.0067	1

5.2g WIFI

Antenna	Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density
			(dBm)		tune-up power		Gain			
					(dBm)	(mW)	(dBi)	Numeric	(mW/cm2)	(mW/cm2)
Ant 1	5180	802.11a	10.634	10±1	11	12.589	5.49	3.54	0.0089	1
Ant 1	5200		10.606	10±1	11	12.589	5.49	3.54	0.0089	1
Ant 1	5240		10.656	10±1	11	12.589	5.49	3.54	0.0089	1
Ant 1	5180	802.ac20	10.357	10±1	11	12.589	5.49	3.54	0.0089	1
Ant 1	5200		10.209	10±1	11	12.589	5.49	3.54	0.0089	1
Ant 1	5240		10.26	10±1	11	12.589	5.49	3.54	0.0089	1
Ant 1	5190	802.11ac40	10.706	10±1	11	12.589	5.49	3.54	0.0089	1
Ant 1	5230		10.729	10±1	11	12.589	5.49	3.54	0.0089	1
Ant 1	5210	802.11ac80	9.672	9±1	10	10.000	5.49	3.54	0.0070	1
Ant 1	5180	802.11n H20	10.355	10±1	11	12.589	5.49	3.54	0.0089	1
Ant 1	5200		10.263	10±1	11	12.589	5.49	3.54	0.0089	1
Ant 1	5240		10.211	10±1	11	12.589	5.49	3.54	0.0089	1
Ant 1	5190	802.11n H40	10.791	10±1	11	12.589	5.49	3.54	0.0089	1
Ant 1	5230		10.703	10±1	11	12.589	5.49	3.54	0.0089	1

5.8G WIFI:

Antenna	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		
Ant 1	5745	802.11a	10.228	10±1	11	12.589	5.49	3.54	0.0089	1
Ant 1	5785		10.191	10±1	11	12.589	5.49	3.54	0.0089	1
Ant 1	5825		9.848	10±1	11	12.589	5.49	3.54	0.0089	1
Ant 1	5745	802.ac20	9.869	9±1	10	10.000	5.49	3.54	0.0070	1
Ant 1	5785		9.957	9±1	10	10.000	5.49	3.54	0.0070	1
Ant 1	5825		9.704	9±1	10	10.000	5.49	3.54	0.0070	1
Ant 1	5755	802.11ac40	10.181	10±1	11	12.589	5.49	3.54	0.0089	1
Ant 1	5795		10.131	10±1	11	12.589	5.49	3.54	0.0089	1
Ant 1	5775	802.11ac80	8.435	9±1	10	10.000	5.49	3.54	0.0070	1
Ant 1	5745	802.11n H20	9.777	9±1	10	10.000	5.49	3.54	0.0070	1
Ant 1	5785		9.877	9±1	10	10.000	5.49	3.54	0.0070	1
Ant 1	5825		9.567	9±1	10	10.000	5.49	3.54	0.0070	1
Ant 1	5755	802.11n H40	10.071	10±1	11	12.589	5.49	3.54	0.0089	1
Ant 1	5795		10.142	10±1	11	12.589	5.49	3.54	0.0089	1

Note: This product does not support simultaneous transmission.

The conclusion should be $0.00267 < 1$ for Max Power Density, Compliance the RF Exposure requirement.

Signature:

Date: 2022-10-24

Alex

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