

FCC ID: 2AKCT-SPCM2

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.

BT:

Measurement Result

Operation Frequency: 2402MHz~2480MHz

Power density limited: $1\text{mW}/\text{cm}^2$

Antenna Type: FPCB antenna

antenna gain: 2 dBi;

R=20cm

$\text{mW}=10^{(\text{dBm}/10)}$

antenna gain Numeric= $10^{(\text{dBi}/10)}=10^{(2/10)}=1.58$

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm ²)	Power density (mW/cm ²)
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
2402	DH5	6.278	6±1	7	5.012	2.00	1.58	0.0016	1
2441		6.235	6±1	7	5.012	2.00	1.58	0.0016	1
2480		5.955	6±1	7	5.012	2.00	1.58	0.0016	1
2402	2DH5	2.342	2±1	3	1.995	2.00	1.58	0.0006	1
2441		2.702	2±1	3	1.995	2.00	1.58	0.0006	1
2480		1.623	2±1	3	1.995	2.00	1.58	0.0006	1
2402	3DH5	2.667	3±1	4	2.512	2.00	1.58	0.0008	1
2441		3.167	3±1	4	2.512	2.00	1.58	0.0008	1
2480		2.019	3±1	4	2.512	2.00	1.58	0.0008	1

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm ²)	Power density (mW/cm ²)
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
2402	GFSK	5.968	6±1	7	5.012	2.00	1.58	0.0016	1
2440		6.157	6±1	7	5.012	2.00	1.58	0.0016	1
2480		5.443	6±1	7	5.012	2.00	1.58	0.0016	1

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: FPCB antenna

antenna gain: 2 dBi;

R=20cm

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

antenna gain Numeric= $10^{(dBi/10)}=10^{(2/10)}=1.58$

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm ²)	Power density (mW/cm ²)
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
2412	802.11b	13.27	14±1	15	31.623	2.00	1.58	0.0100	1
2437		14.45	14±1	15	31.623	2.00	1.58	0.0100	1
2462		13.49	14±1	15	31.623	2.00	1.58	0.0100	1
2412	802.11g	12.22	12±1	13	19.953	2.00	1.58	0.0063	1
2437		12.96	12±1	13	19.953	2.00	1.58	0.0063	1
2462		12.73	12±1	13	19.953	2.00	1.58	0.0063	1
2412	802.11n H20	11.88	12±1	13	19.953	2.00	1.58	0.0063	1
2437		12.57	12±1	13	19.953	2.00	1.58	0.0063	1
2462		12.14	12±1	13	19.953	2.00	1.58	0.0063	1
2422	802.11n(H T40)	12.57	12±1	13	19.953	2.00	1.58	0.0063	1
2437		12.78	12±1	13	19.953	2.00	1.58	0.0063	1
2452		12.48	12±1	13	19.953	2.00	1.58	0.0063	1

5G WIFI:

Operation Frequency: WIFI 802.11a/ac/n(HT20): 5180-5240MHz;5260-5320MHz,5500-5700MHz,5745-5825MHz;WIFI 802.11ac/n(HT40): 5190-5230MHz;5270-5310MHz,5510-5670MHz5755-5795MHz; WIFI 802.11ac80:5210-5210MHz;5290-5290MHz;5530-5610MHz; 5775-5775MHz

Power density limited: 1mW/cm

Antenna Type: FPCB antenna

antenna gain:2dBi;

R=20cm

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

antenna gain Numeric= $10^{(dBi/10)}=10^{(2/10)}=1.58$

5.2G

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm ²)	Power density (mW/cm ²)
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
5180	802.11a	10.58	10±1	11	12.589	2.00	1.58	0.0040	1
5200		10.99	10±1	11	12.589	2.00	1.58	0.0040	1
5240		10.07	10±1	11	12.589	2.00	1.58	0.0040	1
5180	802.11ac20	9.57	10±1	11	12.589	2.00	1.58	0.0040	1
5200		10.67	10±1	11	12.589	2.00	1.58	0.0040	1
5240		9.69	10±1	11	12.589	2.00	1.58	0.0040	1
5190	802.11ac40	9.99	10±1	11	12.589	2.00	1.58	0.0040	1
5230		10.39	10±1	11	12.589	2.00	1.58	0.0040	1
5210	802.11ac80	10.32	10±1	11	12.589	2.00	1.58	0.0040	1
5180	802.11n H20	9.35	10±1	11	12.589	2.00	1.58	0.0040	1
5200		10.68	10±1	11	12.589	2.00	1.58	0.0040	1
5240		9.52	10±1	11	12.589	2.00	1.58	0.0040	1
5190	802.11n H40	9.93	10±1	11	12.589	2.00	1.58	0.0040	1
5230		10.21	10±1	11	12.589	2.00	1.58	0.0040	1

5.3G

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm ²)	Power density (mW/cm ²)
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
5260	802.11a	10.62	10±1	11	12.589	2.00	1.58	0.0040	1
5280		10.97	10±1	11	12.589	2.00	1.58	0.0040	1
5320		9.97	10±1	11	12.589	2.00	1.58	0.0040	1
5260	802.11ac20	10.15	10±1	11	12.589	2.00	1.58	0.0040	1
5280		10.48	10±1	11	12.589	2.00	1.58	0.0040	1
5320		9.94	10±1	11	12.589	2.00	1.58	0.0040	1
5270	802.11ac40	10.2	10±1	11	12.589	2.00	1.58	0.0040	1
5310		9.19	10±1	11	12.589	2.00	1.58	0.0040	1
5290	802.11ac80	8.3	8±1	9	7.943	2.00	1.58	0.0025	1
5260	802.11n H20	10.1	10±1	11	12.589	2.00	1.58	0.0040	1
5280		10.46	10±1	11	12.589	2.00	1.58	0.0040	1
5320		9.47	10±1	11	12.589	2.00	1.58	0.0040	1
5270	802.11n H40	10.48	10±1	11	12.589	2.00	1.58	0.0040	1
5310		9.25	10±1	11	12.589	2.00	1.58	0.0040	1

5.6G

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm ²)	Power density (mW/cm ²)
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
5500	802.11a	10.54	10±1	11	12.589	2.00	1.58	0.0040	1
5600		10.18	10±1	11	12.589	2.00	1.58	0.0040	1
5700		9.99	10±1	11	12.589	2.00	1.58	0.0040	1
5500	802.11ac20	10.28	10±1	11	12.589	2.00	1.58	0.0040	1
5600		9.79	10±1	11	12.589	2.00	1.58	0.0040	1
5700		9.53	10±1	11	12.589	2.00	1.58	0.0040	1
5510	802.11ac40	9.77	9±1	10	10.000	2.00	1.58	0.0032	1
5590		9.23	9±1	10	10.000	2.00	1.58	0.0032	1
5670		9.51	9±1	10	10.000	2.00	1.58	0.0032	1
5530	802.11ac80	9.08	9±1	10	10.000	2.00	1.58	0.0032	1
5610		8.95	9±1	10	10.000	2.00	1.58	0.0032	1
5500	802.11n(HT20)	10.32	10±1	11	12.589	2.00	1.58	0.0040	1
5600		9.58	10±1	11	12.589	2.00	1.58	0.0040	1
5700		9.5	10±1	11	12.589	2.00	1.58	0.0040	1
5510	802.11n(HT40)	9.8	9±1	10	10.000	2.00	1.58	0.0032	1
5590		9.33	9±1	10	10.000	2.00	1.58	0.0032	1
5670		9.08	9±1	10	10.000	2.00	1.58	0.0032	1

5.8G

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm ²)	Power density (mW/cm ²)
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
5745	802.11a	9.78	9±1	10	10.000	2.00	1.58	0.0032	1
5785		9.49	9±1	10	10.000	2.00	1.58	0.0032	1
5825		9.47	9±1	10	10.000	2.00	1.58	0.0032	1
5745	802.11ac20	9.58	9±1	10	10.000	2.00	1.58	0.0032	1
5785		9.17	9±1	10	10.000	2.00	1.58	0.0032	1
5825		9.06	9±1	10	10.000	2.00	1.58	0.0032	1
5755	802.11ac40	9.76	9±1	10	10.000	2.00	1.58	0.0032	1
5795		9.27	9±1	10	10.000	2.00	1.58	0.0032	1
5775	802.11ac80	9.33	9±1	10	10.000	2.00	1.58	0.0032	1
5745	802.11n H20	9.56	9±1	10	10.000	2.00	1.58	0.0032	1
5785		9.2	9±1	10	10.000	2.00	1.58	0.0032	1
5825		9.19	9±1	10	10.000	2.00	1.58	0.0032	1
5755	802.11n H40	9.78	9±1	10	10.000	2.00	1.58	0.0032	1
5795		9.21	9±1	10	10.000	2.00	1.58	0.0032	1

Conclusion:

For the max result : $0.0100 \leq 1\text{mW}/\text{cm}^2$ for Power density, compliance with RF exposure.

Note: This product does not support simultaneous delivery.

Signature:

Date: 2021-12-28



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