

# FCC ID: 2AKCT-SPCM3

## 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)

According to KDB447498 D01 General RF Exposure Guidance v06

Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposure</b>				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f <sup>2</sup>	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f <sup>2</sup>	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: 1mW/ cm<sup>2</sup>

Antenna Type: FPCB antenna

Antenna gain: 1.92dBi;

R=20cm

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

antenna gain Numeric= $10^{(dBi/10)}=10^{(1.92/10)}=1.56$

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		
2402	DH5	3.84	3±1	4	2.512	1.92	1.56	0.0008	1
2441		3.86	3±1	4	2.512	1.92	1.56	0.0008	1
2480		3.49	3±1	4	2.512	1.92	1.56	0.0008	1
2402	2DH5	5.86	5±1	6	3.981	1.92	1.56	0.0012	1
2441		5.89	5±1	6	3.981	1.92	1.56	0.0012	1
2480		5.58	5±1	6	3.981	1.92	1.56	0.0012	1
2402	3DH5	7.81	7.5±1	8.5	7.079	1.92	1.56	0.0022	1
2441		8.04	7.5±1	8.5	7.079	1.92	1.56	0.0022	1
2480		7.78	7.5±1	8.5	7.079	1.92	1.56	0.0022	1

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		
2402	GFSK	3.97	3.5±1	4.5	2.818	1.92	1.56	0.0009	1
2440		4.01	3.5±1	4.5	2.818	1.92	1.56	0.0009	1
2480		3.64	3.5±1	4.5	2.818	1.92	1.56	0.0009	1

## 2.4G WIFI:

Operation Frequency: WIFI 802.11b/g/n HT20: 2412-2462MHz,  
 WIFI 802.11n HT40:2422-2452MHz  
 Power density limited: 1mW/ cm<sup>2</sup>

Antenna Type: FPCB antenna

Antenna gain: 1.92dBi;

R=20cm

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

antenna gain Numeric= $10^{(dBi/10)}=10^{(1.92/10)}=1.56$

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm2 )	Power density (mW/cm2)
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
2412	802.11b	15.12	15±1	16	39.811	1.92	1.56	0.0123	1
2437		15.29	15±1	16	39.811	1.92	1.56	0.0123	1
2462		15.6	15±1	16	39.811	1.92	1.56	0.0123	1
2412	802.11g	12.91	13±1	14	25.119	1.92	1.56	0.0078	1
2437		13.5	13±1	14	25.119	1.92	1.56	0.0078	1
2462		13.34	13±1	14	25.119	1.92	1.56	0.0078	1
2412	802.11n H20	12.24	12±1	14	25.119	1.92	1.56	0.0078	1
2437		11.85	12±1	13	19.953	1.92	1.56	0.0062	1
2462		11.69	12±1	13	19.953	1.92	1.56	0.0062	1
2422	802.11n(H T40)	11.6	11±1	12	15.849	1.92	1.56	0.0049	1
2437		11.72	11±1	12	15.849	1.92	1.56	0.0049	1
2452		11.62	11±1	12	15.849	1.92	1.56	0.0049	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,5510-5670MHz;5755-5795MHz; WIFI 802.11ac80:5210-5210MHz;5290-5290MHz;5530-5610MHz; 5775-5775MHz

Power density limited: 1mW/cm

Antenna Type: FPCB antenna

Antenna gain:2.98dBi;

R=20cm

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

antenna gain Numeric= $10^{(dBi/10)}=10^{(2.98/10)}=1.62$

### 5.2G

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm <sup>2</sup> )	Power density (mW/cm <sup>2</sup> )
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
5180	a	9.62	9±1	10	10.000	2.98	1.99	0.0040	1
5200	a	9.65	9±1	10	10.000	2.98	1.99	0.0040	1
5240	a	9.24	9±1	10	10.000	2.98	1.99	0.0040	1
5180	n20	9.09	9±1	10	10.000	2.98	1.99	0.0040	1
5200	n20	9.59	9±1	10	10.000	2.98	1.99	0.0040	1
5240	n20	9.22	9±1	10	10.000	2.98	1.99	0.0040	1
5190	n40	9.25	9±1	10	10.000	2.98	1.99	0.0040	1
5230	n40	9.08	9±1	10	10.000	2.98	1.99	0.0040	1
5180	ac20	9.51	9±1	10	10.000	2.98	1.99	0.0040	1
5200	ac20	9.27	9±1	10	10.000	2.98	1.99	0.0040	1
5240	ac20	9.22	9±1	10	10.000	2.98	1.99	0.0040	1
5190	ac40	9.62	9±1	10	10.000	2.98	1.99	0.0040	1
5230	ac40	9.47	9±1	10	10.000	2.98	1.99	0.0040	1
5210	ac80	9.06	9±1	10	10.000	2.98	1.99	0.0040	1

### 5.3G

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm <sup>2</sup> )	Power density (mW/cm <sup>2</sup> )
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
5260	a	9.14	9±1	10	10.000	2.98	1.99	0.0040	1
5280	a	9.05	9±1	10	10.000	2.98	1.99	0.0040	1
5320	a	9.32	9±1	10	10.000	2.98	1.99	0.0040	1
5260	n20	9.08	9±1	10	10.000	2.98	1.99	0.0040	1
5280	n20	9.47	9±1	10	10.000	2.98	1.99	0.0040	1
5320	n20	9.72	9±1	10	10.000	2.98	1.99	0.0040	1
5270	n40	9.32	9±1	10	10.000	2.98	1.99	0.0040	1
5310	n40	8.96	9±1	10	10.000	2.98	1.99	0.0040	1
5260	ac20	9.52	9±1	10	10.000	2.98	1.99	0.0040	1
5280	ac20	9.44	9±1	10	10.000	2.98	1.99	0.0040	1
5320	ac20	9.24	9±1	10	10.000	2.98	1.99	0.0040	1
5270	ac40	9.14	9±1	10	10.000	2.98	1.99	0.0040	1
5310	ac40	8.94	9±1	10	10.000	2.98	1.99	0.0040	1
5290	ac80	8.79	9±1	10	10.000	2.98	1.99	0.0040	1

## 5.6G

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm <sup>2</sup> )	Power density (mW/cm <sup>2</sup> )
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
5500	a	9.26	9±1	10	10.000	2.98	1.99	0.0040	1
5600	a	9.62	9±1	10	10.000	2.98	1.99	0.0040	1
5700	a	9.71	9±1	10	10.000	2.98	1.99	0.0040	1
5500	n20	9.2	9±1	10	10.000	2.98	1.99	0.0040	1
5600	n20	9.54	9±1	10	10.000	2.98	1.99	0.0040	1
5700	n20	9.66	9±1	10	10.000	2.98	1.99	0.0040	1
5510	n40	9.19	9±1	10	10.000	2.98	1.99	0.0040	1
5590	n40	9.76	9±1	10	10.000	2.98	1.99	0.0040	1
5670	n40	9.29	9±1	10	10.000	2.98	1.99	0.0040	1
5500	ac20	9.21	9±1	10	10.000	2.98	1.99	0.0040	1
5600	ac20	9.51	9±1	10	10.000	2.98	1.99	0.0040	1
5700	ac20	9.64	9±1	10	10.000	2.98	1.99	0.0040	1
5510	ac40	9.18	9±1	10	10.000	2.98	1.99	0.0040	1
5590	ac40	9.73	9±1	10	10.000	2.98	1.99	0.0040	1

## 5.8G

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm <sup>2</sup> )	Power density (mW/cm <sup>2</sup> )
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
5745	a	9.62	9±1	10	10.000	2.98	1.99	0.0040	1
5785	a	9.23	9±1	10	10.000	2.98	1.99	0.0040	1
5825	a	9.31	9±1	10	10.000	2.98	1.99	0.0040	1
5745	n20	9.1	9±1	10	10.000	2.98	1.99	0.0040	1
5785	n20	9.62	9±1	10	10.000	2.98	1.99	0.0040	1
5825	n20	9.25	9±1	10	10.000	2.98	1.99	0.0040	1
5755	n40	9.48	9±1	10	10.000	2.98	1.99	0.0040	1
5795	n40	9.6	9±1	10	10.000	2.98	1.99	0.0040	1
5745	ac20	9.1	9±1	10	10.000	2.98	1.99	0.0040	1
5785	ac20	9.16	9±1	10	10.000	2.98	1.99	0.0040	1
5825	ac20	9.23	9±1	10	10.000	2.98	1.99	0.0040	1
5755	ac40	9.48	9±1	10	10.000	2.98	1.99	0.0040	1
5795	ac40	9.13	9±1	10	10.000	2.98	1.99	0.0040	1
5775	ac80	9.69	9±1	10	10.000	2.98	1.99	0.0040	1

Note: This product does not support 2.4G band and 5G band simultaneous delivery.

Signature:

Date: 2023-03-14



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