

FCC ID:2AKCT-ECR3588SPCFD

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.

BT:**Measurement Result**

Operation Frequency: 2402MHz~2480MHz

Power density limited: 1mW/ cm²

Antenna Type: External antenna

Antenna gain: 2.98dBi;

R=20cm

 $mW=10^{(dBm/10)}$ antenna gain Numeric= $10^{(dBi/10)}=10^{(0/10)}=1$

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
2402	DH5	3.40	3±1	4	2.512	2.98	1.99	0.0010	1
2441		3.63	3±1	4	2.512	2.98	1.99	0.0010	1
2480		3.35	3±1	4	2.512	2.98	1.99	0.0010	1
2402	2DH5	3.28	3±1	4	2.512	2.98	1.99	0.0010	1
2441		3.53	3±1	4	2.512	2.98	1.99	0.0010	1
2480		3.29	3±1	4	2.512	2.98	1.99	0.0010	1
2402	3DH5	3.55	3±1	4	2.512	2.98	1.99	0.0010	1
2441		3.80	3±1	4	2.512	2.98	1.99	0.0010	1
2480		3.51	3±1	4	2.512	2.98	1.99	0.0010	1

BLE:

Operation Frequency: 2402MHz~2480MHz

Power density limited: 1mW/ cm²

Antenna Type: External antenna

Antenna gain: 2.98dBi;

R=20cm

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

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
2402	GFSK	3.55	3±1	4	2.512	2.98	1.99	0.0010	1
2440		3.69	3±1	4	2.512	2.98	1.99	0.0010	1
2480		3.42	3±1	4	2.512	2.98	1.99	0.0010	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: External antenna

Antenna gain: 2.98dBi;

R=20cm

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

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

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
2412	b20	16.47	16±1	17	50.119	2.98	1.99	0.0198	1
2437		16.11	16±1	17	50.119	2.98	1.99	0.0198	1
2462		15.86	16±1	17	50.119	2.98	1.99	0.0198	1
2412	g20	14.33	14±1	15	31.623	2.98	1.99	0.0125	1
2437		13.99	14±1	15	31.623	2.98	1.99	0.0125	1
2462		13.70	14±1	15	31.623	2.98	1.99	0.0125	1
2412	n20	12.79	12±1	13	19.953	2.98	1.99	0.0079	1
2437		12.57	12±1	13	19.953	2.98	1.99	0.0079	1
2462		12.19	12±1	13	19.953	2.98	1.99	0.0079	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: External antenna

Antenna gain: 2.97dBi

R=20cm

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

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

5.2G

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
5180	a20	11.90	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5200		12.14	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5240		11.93	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5180	n20	11.76	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5200		11.85	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5240		11.94	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5190	n40	12.30	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5230		12.38	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5180	ac20	11.95	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5200		12.05	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5240		11.89	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5190	ac40	11.96	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5230		12.37	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5210	ac80	11.01	10.5±1	11.5	14.125	2.97	1.98	0.0056	1

5.3G

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
5260	a20	11.87	11±1	12	15.849	2.97	1.98	0.0062	1
5280		11.57	11±1	12	15.849	2.97	1.98	0.0062	1
5320		11.55	11±1	12	15.849	2.97	1.98	0.0062	1
5260	n20	11.58	11±1	12	15.849	2.97	1.98	0.0062	1
5280		11.69	11±1	12	15.849	2.97	1.98	0.0062	1
5320		11.51	11±1	12	15.849	2.97	1.98	0.0062	1
5270	n40	11.86	11±1	12	15.849	2.97	1.98	0.0062	1
5310		11.94	11±1	12	15.849	2.97	1.98	0.0062	1
5260	ac20	11.83	11±1	12	15.849	2.97	1.98	0.0062	1
5280		11.62	11±1	12	15.849	2.97	1.98	0.0062	1
5320		11.74	11±1	12	15.849	2.97	1.98	0.0062	1
5270	ac40	11.83	11±1	12	15.849	2.97	1.98	0.0062	1
5310		11.89	11±1	12	15.849	2.97	1.98	0.0062	1
5290	ac80	10.74	10±1	11	12.589	2.97	1.98	0.0050	1

5.6G

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
5500	a20	11.34	12±1	13	19.953	2.97	1.98	0.0079	1
5600		12.42	12±1	13	19.953	2.97	1.98	0.0079	1
5700		12.42	12±1	13	19.953	2.97	1.98	0.0079	1
5500	n20	11.78	12±1	13	19.953	2.97	1.98	0.0079	1
5600		12.60	12±1	13	19.953	2.97	1.98	0.0079	1
5700		11.55	12±1	13	19.953	2.97	1.98	0.0079	1
5510	n40	11.51	12±1	13	19.953	2.97	1.98	0.0079	1
5590		11.58	12±1	13	19.953	2.97	1.98	0.0079	1
5670		12.45	12±1	13	19.953	2.97	1.98	0.0079	1
5500	ac20	11.12	12±1	13	19.953	2.97	1.98	0.0079	1
5600		12.15	12±1	13	19.953	2.97	1.98	0.0079	1
5700		12.50	12±1	13	19.953	2.97	1.98	0.0079	1
5510	ac40	11.60	12±1	13	19.953	2.97	1.98	0.0079	1
5590		12.64	12±1	13	19.953	2.97	1.98	0.0079	1
5670		12.14	12±1	13	19.953	2.97	1.98	0.0079	1
5530	ac80	11.97	12±1	13	19.953	2.97	1.98	0.0079	1
5610		12.21	12±1	13	19.953	2.97	1.98	0.0079	1

5.8G

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
5745	a20	12.19	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5785		11.84	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5825		11.33	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5745	n20	12.44	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5785		11.92	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5825		11.3	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5755	n40	12.13	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5795		12.11	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5745	ac20	12.07	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5785		11.94	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5825		11.53	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5755	ac40	12.41	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5795		12.04	11.5±1	12.5	17.783	2.97	1.98	0.0070	1
5775	ac80	11.32	11.5±1	12.5	17.783	2.97	1.98	0.0070	1

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

Conclusion:

BT+2.4GWIFI:0.001+0.0198=0.0208 ≤ 1.0
BLE+2.4GWIFI:0.001+0.0198=0.0208 ≤ 1.0
BT+5GWIFI:0.001+0.0079=0.0089 ≤ 1.0
BLE+5GWIFI:0.001+0.0079=0.0089 ≤ 1.0

compliance RF exposure.

Signature:
Date: 2024-04-01



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