

FCC ID: 2AKCT-SPCP1PRO

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: External Antenna

antenna gain: 3 dBi;

R=20cm

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

antenna gain Numeric= $10^{(\text{dBi}/10)}=10^{(5/10)}=3.16$

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	2.663	2±1	3	1.995	3.00	2.00	0.0008	1
2441		1.78	1±1	2	1.585	3.00	2.00	0.0006	1
2480		1.254	1±1	2	1.585	3.00	2.00	0.0006	1
2402	2DH5	1.884	1±1	2	1.585	3.00	2.00	0.0006	1
2441		2.442	2±1	3	1.995	3.00	2.00	0.0008	1
2480		2.145	2±1	3	1.995	3.00	2.00	0.0008	1
2402	3DH5	2.023	2±1	3	1.995	3.00	2.00	0.0008	1
2441		2.898	2±1	3	1.995	3.00	2.00	0.0008	1
2480		2.618	2±1	3	1.995	3.00	2.00	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(1M)	1.812	1±1	2	1.585	3.00	2.00	0.0006	1
2440		2.493	2±1	3	1.995	3.00	2.00	0.0008	1
2480		1.959	1±1	2	1.585	3.00	2.00	0.0006	1
2402	GFSK(2M)	1.811	1±1	2	1.585	3.00	2.00	0.0006	1
2440		2.433	2±1	3	1.995	3.00	2.00	0.0008	1
2480		2.125	2±1	3	1.995	3.00	2.00	0.0008	1

2.4G WIFI:

Operation Frequency: WIFI 802.11b/g/n20/ax20: 2412-2462MHz,

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

Antenna Type: External Antenna

antenna gain: 3 dBi;

R=20cm

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

antenna gain Numeric= $10^{(\text{dBi}/10)}=10^{(5/10)}=3.16$

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		
2412	802.11b	13.55	13±1	14	25.119	3.00	2.00	0.0100	1
2437		13.21	13±1	14	25.119	3.00	2.00	0.0100	1
2462		13.8	13±1	14	25.119	3.00	2.00	0.0100	1
2412	802.11g	12.18	12±1	13	19.953	3.00	2.00	0.0079	1
2437		12.69	12±1	13	19.953	3.00	2.00	0.0079	1
2462		12.8	12±1	13	19.953	3.00	2.00	0.0079	1
2412	802.11n H20	11.46	11±1	12	15.849	3.00	2.00	0.0063	1
2437		12.37	12±1	13	19.953	3.00	2.00	0.0079	1
2462		12.42	12±1	13	19.953	3.00	2.00	0.0079	1
2422	802.11n(H T40)	11.55	11±1	12	15.849	3.00	2.00	0.0063	1
2437		11.89	11±1	12	15.849	3.00	2.00	0.0063	1
2452		12	12±1	13	19.953	3.00	2.00	0.0079	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: External Antenna

antenna gain:3dBi;

R=20cm

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

antenna gain Numeric= $10^{(dBi/10)}=10^{(5/10)}=3.16$

5.2G

Antenna	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)	(dBm)	(dBm)	(mW)	(dBi)	Numeric		
Ant 1	5180	802.11a	10.08	10±1	11	12.589	3.00	2.00	0.0050	1
Ant 1	5200		10.13	10±1	11	12.589	3.00	2.00	0.0050	1
Ant 1	5240		10.278	10±1	11	12.589	3.00	2.00	0.0050	1
Ant 1	5180	802.11ac20	8.885	8±1	9	7.943	3.00	2.00	0.0032	1
Ant 1	5200		8.597	8±1	9	7.943	3.00	2.00	0.0032	1
Ant 1	5240		8.311	8±1	9	7.943	3.00	2.00	0.0032	1
Ant 1	5190	802.11ac40	8.308	8±1	9	7.943	3.00	2.00	0.0032	1
Ant 1	5230		8.443	8±1	9	7.943	3.00	2.00	0.0032	1
Ant 1	5210	802.11ac80	7.819	7±1	8	6.310	3.00	2.00	0.0025	1
Ant 1	5180	802.11n H20	7.884	7±1	8	6.310	3.00	2.00	0.0025	1
Ant 1	5200		9.423	9±1	10	10.000	3.00	2.00	0.0040	1
Ant 1	5240		9.027	9±1	10	10.000	3.00	2.00	0.0040	1
Ant 1	5190	802.11n H40	9.109	9±1	10	10.000	3.00	2.00	0.0040	1
Ant 1	5230		8.317	8±1	9	7.943	3.00	2.00	0.0032	1

5.3G

Antenna	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)	(dBm)	(dBm)	(mW)	(dBi)	Numeric		
Ant 1	5260	802.11a	8.473	8±1	9	7.943	3.00	2.00	0.0032	1
Ant 1	5280		8.106	8±1	9	7.943	3.00	2.00	0.0032	1
Ant 1	5320		8.049	8±1	9	7.943	3.00	2.00	0.0032	1
Ant 1	5260	802.11ac20	7.594	7±1	8	6.310	3.00	2.00	0.0025	1
Ant 1	5280		7.434	7±1	8	6.310	3.00	2.00	0.0025	1
Ant 1	5320		6.805	7±1	8	6.310	3.00	2.00	0.0025	1
Ant 1	5270	802.11ac40	7.263	7±1	8	6.310	3.00	2.00	0.0025	1
Ant 1	5310		6.732	7±1	8	6.310	3.00	2.00	0.0025	1
Ant 1	5290	802.11ac80	6.7	6±1	7	5.012	3.00	2.00	0.0020	1
Ant 1	5260	802.11n H20	8.462	8±1	9	7.943	3.00	2.00	0.0032	1
Ant 1	5280		7.648	8±1	9	7.943	3.00	2.00	0.0032	1
Ant 1	5320		7.396	8±1	9	7.943	3.00	2.00	0.0032	1
Ant 1	5270	802.11n H40	7.289	8±1	9	7.943	3.00	2.00	0.0032	1
Ant 1	5310		6.587	7±1	7	5.012	3.00	2.00	0.0020	1

5.6G

Antenna	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		
Ant1	5500	802.11a	8.376	8±1	9	7.943	3.00	2.00	0.0032	1
Ant1	5600		8.798	8±1	9	7.943	3.00	2.00	0.0032	1
Ant1	5700		8.837	8±1	9	7.943	3.00	2.00	0.0032	1
Ant1	5500	802.11ac20	7.235	7±1	8	6.310	3.00	2.00	0.0025	1
Ant1	5600		7.784	7±1	8	6.310	3.00	2.00	0.0025	1
Ant1	5700		7.957	7±1	8	6.310	3.00	2.00	0.0025	1
Ant1	5510	802.11ac40	7.468	7±1	8	6.310	3.00	2.00	0.0025	1
Ant1	5590		7.663	7±1	8	6.310	3.00	2.00	0.0025	1
Ant1	5670		7.63	7±1	8	6.310	3.00	2.00	0.0025	1
Ant1	5530	802.11ac80	7.292	7±1	8	6.310	3.00	2.00	0.0025	1
Ant1	5610		7.457	7±1	8	6.310	3.00	2.00	0.0025	1
Ant1	5500	802.11n20	7.442	7±1	8	6.310	3.00	2.00	0.0025	1
Ant1	5600		7.77	7±1	8	6.310	3.00	2.00	0.0025	1
Ant1	5700		7.792	7±1	8	6.310	3.00	2.00	0.0025	1
Ant1	5510	802.11n40	7.472	7±1	8	6.310	3.00	2.00	0.0025	1
Ant1	5590		7.754	7±1	8	6.310	3.00	2.00	0.0025	1
Ant1	5670		7.626	7±1	8	6.310	3.00	2.00	0.0025	1

5.8G

Ant 1	5745	802.11a	9.429	9±1	10	10.000	3.00	2.00	0.0040	1
Ant 1	5785		9.466	9±1	10	10.000	3.00	2.00	0.0040	1
Ant 1	5825		9.245	9±1	10	10.000	3.00	2.00	0.0040	1
Ant 1	5745	802.11ac20	8.621	8±1	9	7.943	3.00	2.00	0.0032	1
Ant 1	5785		8.286	8±1	9	7.943	3.00	2.00	0.0032	1
Ant 1	5825		8.011	8±1	9	7.943	3.00	2.00	0.0032	1
Ant 1	5755	802.11ac40	7.684	7±1	8	6.310	3.00	2.00	0.0025	1
Ant 1	5795		7.432	7±1	8	6.310	3.00	2.00	0.0025	1
Ant 1	5775	802.11ac80	7.552	7±1	8	6.310	3.00	2.00	0.0025	1
Ant 1	5745	802.11n H20	8.664	8±1	9	7.943	3.00	2.00	0.0032	1
Ant 1	5785		8.279	8±1	9	7.943	3.00	2.00	0.0032	1
Ant 1	5825		7.905	7±1	8	6.310	3.00	2.00	0.0025	1
Ant 1	5755	802.11n H40	7.631	7±1	8	6.310	3.00	2.00	0.0025	1
Ant 1	5795		7.454	7±1	8	6.310	3.00	2.00	0.0025	1

Note: This product does not support simultaneous delivery

Conclusion:

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

Signature:

Date: 2022-07-13



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