

FCC ID: 2BDTM-HSD-215ZJ

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: Metal antenna

Antenna gain:-0.34dBi;

R=20cm

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

antenna gain Numeric= $10^{(\text{dBi}/10)}=10^{(-0.34/10)}=0.92$

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		
2402	DH5	8.41	8±1	9	7.943	-0.34	0.92	0.0015	1
2441		8.74	8±1	9	7.943	-0.34	0.92	0.0015	1
2480		8.04	8±1	9	7.943	-0.34	0.92	0.0015	1
2402	2DH5	7.58	8±1	9	7.943	-0.34	0.92	0.0015	1
2441		8.24	8±1	9	7.943	-0.34	0.92	0.0015	1
2480		7.62	8±1	9	7.943	-0.34	0.92	0.0015	1
2402	3DH5	7.56	8±1	9	7.943	-0.34	0.92	0.0015	1
2441		8.39	8±1	9	7.943	-0.34	0.92	0.0015	1
2480		7.72	8±1	9	7.943	-0.34	0.92	0.0015	1

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		
2402	GFSK(1M)	3.17	4±1	5	3.162	-0.34	0.92	0.0006	1
2440		3.27	4±1	5	3.162	-0.34	0.92	0.0006	1
2480		4.72	4±1	5	3.162	-0.34	0.92	0.0006	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: Metal antenna

Antenna gain: -0.34dBi;

R=20cm

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

antenna gain Numeric= $10^{(dBi/10)}=10^{(-0.34/10)}=0.92$

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	16.32	16±1	17	50.119	-0.34	0.92	0.0092	1
2437		16.32	16±1	17	50.119	-0.34	0.92	0.0092	1
2462		16.4	16±1	17	50.119	-0.34	0.92	0.0092	1
2412	802.11g	13.63	13±1	14	25.119	-0.34	0.92	0.0046	1
2437		13.87	13±1	14	25.119	-0.34	0.92	0.0046	1
2462		13.98	13±1	14	25.119	-0.34	0.92	0.0046	1
2412	802.11n H20	13.37	13±1	14	25.119	-0.34	0.92	0.0046	1
2437		13.71	13±1	14	25.119	-0.34	0.92	0.0046	1
2462		13.88	13±1	14	25.119	-0.34	0.92	0.0046	1
2422	802.11n(H T40)	13.69	13±1	14	25.119	-0.34	0.92	0.0046	1
2437		13.66	13±1	14	25.119	-0.34	0.92	0.0046	1
2452		13.72	13±1	14	25.119	-0.34	0.92	0.0046	1

5G WIFI:

Operation Frequency: WIFI 802.11a/ac/n(HT20): 5180-5240MHz; 5745-5825MHz;
 WIFI 802.11ac/n(HT40): 5190-5230MHz; 5755-5795MHz;
 WIFI 802.11ac80:5210-5210MHz; 5775-5775MHz

Power density limited: 1mW/cm

Antenna Type: Metal antenna

Antenna gain:2.04dBi;

R=20cm

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

antenna gain Numeric= $10^{(dBi/10)}=10^{(2.04/10)}=1.6$

5.2G

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		
5180	802.11a	15.26	15±1	16	39.811	2.04	1.60	0.0127	1
5200		15.23	15±1	16	39.811	2.04	1.60	0.0127	1
5240		15.39	15±1	16	39.811	2.04	1.60	0.0127	1
5180	802.11n20	15.2	15±1	16	39.811	2.04	1.60	0.0127	1
5200		14.55	15±1	16	39.811	2.04	1.60	0.0127	1
5240		15.17	15±1	16	39.811	2.04	1.60	0.0127	1
5190	802.11n40	15.19	15±1	16	39.811	2.04	1.60	0.0127	1
5230		14.99	15±1	16	39.811	2.04	1.60	0.0127	1
5210	802.11ac80	15.54	15±1	16	39.811	2.04	1.60	0.0127	1
5180	802.11ac20	15.04	15±1	16	39.811	2.04	1.60	0.0127	1
5200		14.56	15±1	16	39.811	2.04	1.60	0.0127	1
5240		15.18	15±1	16	39.811	2.04	1.60	0.0127	1
5190	802.11ac40	15.32	15±1	16	39.811	2.04	1.60	0.0127	1
5230		14.97	15±1	16	39.811	2.04	1.60	0.0127	1

5.8G

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		
5745	802.11a	15.18	15±1	16	39.811	2.04	1.60	0.0127	1
5785		14.91	15±1	16	39.811	2.04	1.60	0.0127	1
5825		15.55	15±1	16	39.811	2.04	1.60	0.0127	1
5745	802.11n20	15.15	15±1	16	39.811	2.04	1.60	0.0127	1
5785		14.9	15±1	16	39.811	2.04	1.60	0.0127	1
5825		15.28	15±1	16	39.811	2.04	1.60	0.0127	1
5755	802.11n40	15.22	15±1	16	39.811	2.04	1.60	0.0127	1
5795		15	15±1	16	39.811	2.04	1.60	0.0127	1
5775	802.11ac80	15.1	15±1	16	39.811	2.04	1.60	0.0127	1
5745	802.11ac20	15.01	15±1	16	39.811	2.04	1.60	0.0127	1
5785		14.83	15±1	16	39.811	2.04	1.60	0.0127	1
5825		15.25	15±1	16	39.811	2.04	1.60	0.0127	1
5755	802.11ac40	15.32	15±1	16	39.811	2.04	1.60	0.0127	1
5795		14.93	15±1	16	39.811	2.04	1.60	0.0127	1

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

Conclusion:

For the max result : $0.0127 \leq 1.0$ for Max Power Density, compliance RF exposure.

Signature:**Date:** 2023-12-27

NAME AND TITLE (Please print or type): alex li/Manager

COMPANY (Please print or type): Shenzhen NTEK Testing Technology Co., Ltd./ 1&5/F, Building C, 1&2/F, Building E, Fenda Science Park, Sanwei Community, Hangcheng Street, Baoan District, Shenzhen ,Guangdong, China