FCC ID:2BEJUM2

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 (V/m) = $\frac{\sqrt{30 * P * G}}{d}$ Power Density: *Pd* (W/m²) = $\frac{E^2}{377}$

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^2

Antenna Type: FPC antenna

Antenna gain:2.42dBi;

R=20cm

mW=10^(dBm/10)

antenna gain Numeric=10^(dBi/10)= 10^(2.42/10)=1.75

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Max tune-up power (mW)	Antenna Gain (dBi)	Antenna Gain Numeric	Evaluation result (mW/cm2)	Power density (mW/cm2)
2402	DH5	4.74	4±1	5	3.162	2.42	1.75	0.0011	1
2441		4.62	4±1	5	3.162	2.42	1.75	0.0011	1
2480		3.53	4±1	5	3.162	2.42	1.75	0.0011	1
2402	2DH5	6.25	5.5±1	6.5	4.467	2.42	1.75	0.0016	1
2441		5.93	5.5±1	6.5	4.467	2.42	1.75	0.0016	1
2480		4.73	5.5±1	6.5	4.467	2.42	1.75	0.0016	1
2402	3DH5	6.7	6±1	7	5.012	2.42	1.75	0.0017	1
2441		6.44	6±1	7	5.012	2.42	1.75	0.0017	1
2480		5.2	6±1	7	5.012	2.42	1.75	0.0017	1

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Max tune-up power (mW)	Antenna Gain (dBi)	Antenna Gain Numeric	Evaluation result (mW/cm2)	Power density (mW/cm2)
2402	GFSK(1M）	1.99	2±1	3	1.995	2.42	1.75	0.0007	1
2440		2.35	3±1	4	2.512	2.42	1.75	0.0009	1
2480		3.57	3±1	4	2.512	2.42	1.75	0.0009	1
2402	GFSK(2M)	1.93	2±1	3	1.995	2.42	1.75	0.0007	1
2440		2.28	3±1	4	2.512	2.42	1.75	0.0009	1
2480		3.46	3±1	4	2.512	2.42	1.75	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^2
Antenna Type: FPC antenna
Antenna gain: 2.42dBi;
R=20cm
mW=10^(dBm/10)
antenna gain Numeric=10^(dBi/10)= 10^(2.42/10)=1.75

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density
		(dBm)		tune-up power		Gain		(mW/cm2)	(mW/cm2)
				(dBm)	(mW)	(dBi)	Numeric		
2412	802.11b	16.06	16±1	17	50.119	2.42	1.75	0.0174	1
2437		15.97	16±1	17	50.119	2.42	1.75	0.0174	1
2462		15.93	16±1	17	50.119	2.42	1.75	0.0174	1
2412	802.11g	15.2	15±1	16	39.811	2.42	1.75	0.0138	1
2437		15.49	15±1	16	39.811	2.42	1.75	0.0138	1
2462		15.63	15±1	16	39.811	2.42	1.75	0.0138	1
2412	802.11n H20	15.1	15±1	16	39.811	2.42	1.75	0.0138	1
2437		15.3	15±1	16	39.811	2.42	1.75	0.0138	1
2462		15.44	15±1	16	39.811	2.42	1.75	0.0138	1
2422	802.11n(HT40)	15.61	15±1	16	39.811	2.42	1.75	0.0138	1
2437		15.7	15±1	16	39.811	2.42	1.75	0.0138	1
2452		15.92	15±1	16	39.811	2.42	1.75	0.0138	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: FPC antenna
Antenna gain:2.69dBi;
R=20cm
mW=10^(dBm/10)
antenna gain Numeric=10^(dBi/10)= 10^(2.69/10)=1.86

5.2G

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		
5180	802.11a	11.947	12±1	13	19.953	2.69	1.86	0.0074	1
5200		12.018	12±1	13	19.953	2.69	1.86	0.0074	1
5240		11.969	12±1	13	19.953	2.69	1.86	0.0074	1
5180	802.11ac20	12.216	12±1	13	19.953	2.69	1.86	0.0074	1
5200		12.838	12±1	13	19.953	2.69	1.86	0.0074	1
5240		12.766	12±1	13	19.953	2.69	1.86	0.0074	1
5190	802.11ac40	13.174	13±1	14	25.119	2.69	1.86	0.0093	1
5230		13.079	13±1	14	25.119	2.69	1.86	0.0093	1
5180	802.11n H20	11.774	11±1	12	15.849	2.69	1.86	0.0059	1
5200		11.732	11±1	12	15.849	2.69	1.86	0.0059	1
5240		11.782	11±1	12	15.849	2.69	1.86	0.0059	1
5190	802.11n H40	12.073	12±1	13	19.953	2.69	1.86	0.0074	1
5230		12.073	12±1	13	19.953	2.69	1.86	0.0074	1

5.3G

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		
5260	802.11a	12.051	12±1	13	19.953	2.69	1.86	0.0074	1
5280		11.762	12±1	13	19.953	2.69	1.86	0.0074	1
5320		11.39	12±1	13	19.953	2.69	1.86	0.0074	1
5260	802.11ac20	12.118	12±1	13	19.953	2.69	1.86	0.0074	1
5280		11.845	12±1	13	19.953	2.69	1.86	0.0074	1
5320		11.35	12±1	13	19.953	2.69	1.86	0.0074	1
5270	802.11ac40	11.317	11±1	12	15.849	2.69	1.86	0.0059	1
5310		11.02	11±1	12	15.849	2.69	1.86	0.0059	1
5260	802.11n H20	11.869	11±1	12	15.849	2.69	1.86	0.0059	1
5280		11.582	11±1	12	15.849	2.69	1.86	0.0059	1
5320		11.299	11±1	12	15.849	2.69	1.86	0.0059	1
5270	802.11n H40	12.416	12±1	13	19.953	2.69	1.86	0.0074	1
5310		11.8	12±1	13	19.953	2.69	1.86	0.0074	1

5.6G

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Max tune-up power (mW)	Antenna Gain (dBi)	Antenna Gain Numeric	Evaluation result (mW/cm2)	Power density (mW/cm2)
5500	802.11a	11.813	12±1	13	19.953	2.69	1.86	0.0074	1
5600		11.978	12±1	13	19.953	2.69	1.86	0.0074	1
5700		12.385	12±1	13	19.953	2.69	1.86	0.0074	1
5500	802.11ac20	10.625	11.5±1	12.5	17.783	2.69	1.86	0.0066	1
5600		10.834	11.5±1	12.5	17.783	2.69	1.86	0.0066	1
5700		12.162	11.5±1	12.5	17.783	2.69	1.86	0.0066	1
5510	802.11ac40	11.182	12±1	13	19.953	2.69	1.86	0.0074	1
5590		11.234	12±1	13	19.953	2.69	1.86	0.0074	1
5670		12.614	12±1	13	19.953	2.69	1.86	0.0074	1
5500	802.11n(HT20)	11.666	12±1	13	19.953	2.69	1.86	0.0074	1
5600		11.814	12±1	13	19.953	2.69	1.86	0.0074	1
5700		12.167	12±1	13	19.953	2.69	1.86	0.0074	1
5510	802.11n(HT40)	11.995	12±1	13	19.953	2.69	1.86	0.0074	1
5590		12.302	12±1	13	19.953	2.69	1.86	0.0074	1
5670		12.483	12±1	13	19.953	2.69	1.86	0.0074	1

5.8G

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Max tune-up power (mW)	Antenna Gain (dBi)	Antenna Gain Numeric	Evaluation result (mW/cm2)	Power density (mW/cm2)
5745	802.11a	12.605	12±1	13	19.953	2.69	1.86	0.0074	1
5785		11.892	12±1	13	19.953	2.69	1.86	0.0074	1
5825		11.967	12±1	13	19.953	2.69	1.86	0.0074	1
5745	802.11ac20	11.375	11±1	12	15.849	2.69	1.86	0.0059	1
5785		10.739	11±1	12	15.849	2.69	1.86	0.0059	1
5825		10.779	11±1	12	15.849	2.69	1.86	0.0059	1
5755	802.11ac40	11.562	11±1	12	15.849	2.69	1.86	0.0059	1
5795		10.954	11±1	12	15.849	2.69	1.86	0.0059	1
5745	802.11n H20	12.407	12±1	13	19.953	2.69	1.86	0.0074	1
5785		11.615	12±1	13	19.953	2.69	1.86	0.0074	1
5825		11.773	12±1	13	19.953	2.69	1.86	0.0074	1
5755	802.11n H40	12.714	12±1	13	19.953	2.69	1.86	0.0074	1
5795		11.842	12±1	13	19.953	2.69	1.86	0.0074	1

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

Conclusion:

For the max result : 0.0174≤ 1.0 for Max Power Density, compliance RF exposure.

Signature:

Date: 2024-02-01

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

COMPANY (Please print or type): Shenzhen NTEK Testing Technology Co., Ltd./ 1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street Bao'an District, Shenzhen P.R. China.