FCC ID: 2AAA9- RA621EX

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

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

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.

2.4G WIFI:

Operation Frequency: WIFI 802.11b/g/n20/ax20: 2412-2462MHz,
802.11n40/ax40:2422-2452MHz
Power density limited: 1mW/ cm^2
Antenna Type: External Antenna
Antenna 1: 5.17dBi; Antenna 2: 5.17dBi
R=20cm

Antenna	Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power		Antenna Gain		Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
					(dBm)	(mW)	(dBi)	Numeric		
Ant1	2412	b	19.1	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	2437	b	19.55	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	2462	b	19.49	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	2412	b	19.25	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	2437	b	19.45	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	2462	b	19.24	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	2412	g	19.46	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	2437	g	19.81	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	2462	g	19.65	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	2412	g	19.37	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	2437	g	19.61	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	2462	g	19.37	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	2412	n20	19.2	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	2437	n20	19.61	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	2462	n20	19.22	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	2412	n20	19.12	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	2437	n20	19.29	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	2462	n20	19.06	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	2422	n40	19.78	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	2437	n40	19.92	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	2452	n40	19.82	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	2422	n40	19.73	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	2437	n40	19.81	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	2452	n40	19.76	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	2412	ax20	19.05	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	2437	ax20	19.47	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	2462	ax20	19.07	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	2412	ax20	18.92	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	2437	ax20	19.16	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	2462	ax20	18.92	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	2422	ax40	19.49	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	2437	ax40	19.72	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	2452	ax40	19.63	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	2422	ax40	19.4	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	2437	ax40	19.5	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	2452	ax40	19.45	19±1	20	100.000	5.17	3.29	0.0654	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 802.11ac/ax80:5210-5210MHz;5775-5775MHz
Power density limited: 1mW/cm
Antenna Type: External Antenna
Antenna 1: 5.17dBi; Antenna 2: 5.17dBi
R=20cm

5.2G

Antenna	Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
					tune-up power		Gain			
					(dBm)	(mW)	(dBi)	Numeric		
Ant1	5180	a	19.04	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5200	a	19.28	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5240	a	18.92	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5180	a	19.02	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5200	a	19.5	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5240	a	19.32	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5180	n20	18.84	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5200	n20	19.04	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5240	n20	18.68	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5180	n20	18.92	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5200	n20	19.19	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5240	n20	19.08	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5190	n40	19.48	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5230	n40	19.35	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5190	n40	19.56	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5230	n40	19.86	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5180	ac20	18.63	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5200	ac20	18.99	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5240	ac20	18.69	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5180	ac20	19.02	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5200	ac20	19.25	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5240	ac20	19.16	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5190	ac40	19.44	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5230	ac40	19.36	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5190	ac40	19.58	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5230	ac40	19.91	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5210	ac80	19.35	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5210	ac80	19.75	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5180	ax20	18.55	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5200	ax20	18.86	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5240	ax20	18.57	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5180	ax20	18.75	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5200	ax20	19.1	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5240	ax20	18.97	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5190	ax40	19.21	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5230	ax40	18.98	19±1	20	100.000	5.17	3.29	0.0654	1

Ant2	5190	ax40	19.2	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5230	ax40	19.51	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5210	ax80	19.19	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5210	ax80	19.35	19±1	20	100.000	5.17	3.29	0.0654	1

5.8G

Antenna	Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
					tune-up power		Gain			
					(dBm)	(mW)	(dBi)	Numeric		
Ant1	5745	a	17.77	18±1	19	79.433	5.17	3.29	0.0520	1
Ant1	5785	a	18.54	18±1	19	79.433	5.17	3.29	0.0520	1
Ant1	5825	a	18.69	18±1	19	79.433	5.17	3.29	0.0520	1
Ant2	5745	a	18.76	18±1	19	79.433	5.17	3.29	0.0520	1
Ant2	5785	a	18.91	18±1	19	79.433	5.17	3.29	0.0520	1
Ant2	5825	a	18.95	18±1	19	79.433	5.17	3.29	0.0520	1
Ant1	5745	n20	17.73	18±1	19	79.433	5.17	3.29	0.0520	1
Ant1	5785	n20	18.24	18±1	19	79.433	5.17	3.29	0.0520	1
Ant1	5825	n20	18.5	18±1	19	79.433	5.17	3.29	0.0520	1
Ant2	5745	n20	18.46	18±1	19	79.433	5.17	3.29	0.0520	1
Ant2	5785	n20	18.68	18±1	19	79.433	5.17	3.29	0.0520	1
Ant2	5825	n20	18.71	18±1	19	79.433	5.17	3.29	0.0520	1
Ant1	5755	n40	18.61	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5795	n40	19.03	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5755	n40	19.08	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5795	n40	19.28	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5745	ac20	17.74	18±1	19	79.433	5.17	3.29	0.0520	1
Ant1	5785	ac20	18.3	18±1	19	79.433	5.17	3.29	0.0520	1
Ant1	5825	ac20	18.49	18±1	19	79.433	5.17	3.29	0.0520	1
Ant2	5745	ac20	18.4	18±1	19	79.433	5.17	3.29	0.0520	1
Ant2	5785	ac20	18.7	18±1	19	79.433	5.17	3.29	0.0520	1
Ant2	5825	ac20	18.72	18±1	19	79.433	5.17	3.29	0.0520	1
Ant1	5755	ac40	18.59	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5795	ac40	19.04	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5755	ac40	19.06	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5795	ac40	19.3	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5775	ac80	18.6	19±1	20	100.000	5.17	3.29	0.0654	1
Ant2	5775	ac80	18.93	19±1	20	100.000	5.17	3.29	0.0654	1
Ant1	5745	ax20	17.59	18±1	19	79.433	5.17	3.29	0.0520	1
Ant1	5785	ax20	18.09	18±1	19	79.433	5.17	3.29	0.0520	1
Ant1	5825	ax20	18.24	18±1	19	79.433	5.17	3.29	0.0520	1
Ant2	5745	ax20	18.17	18±1	19	79.433	5.17	3.29	0.0520	1
Ant2	5785	ax20	18.49	18±1	19	79.433	5.17	3.29	0.0520	1
Ant2	5825	ax20	18.55	18±1	19	79.433	5.17	3.29	0.0520	1
Ant1	5755	ax40	18.24	18±1	19	79.433	5.17	3.29	0.0520	1
Ant1	5795	ax40	18.59	18±1	19	79.433	5.17	3.29	0.0520	1
Ant2	5755	ax40	18.63	18±1	19	79.433	5.17	3.29	0.0520	1
Ant2	5795	ax40	18.88	18±1	19	79.433	5.17	3.29	0.0520	1
Ant1	5775	ax80	18.28	18±1	19	79.433	5.17	3.29	0.0520	1
Ant2	5775	ax80	18.67	18±1	19	79.433	5.17	3.29	0.0520	1

SIMULTANEOUS TRANSMISSIONS

When a number of sources at different frequencies, and/or broadband sources, contribute to the total exposure, it becomes necessary to weigh each contribution relative to the MPE. To comply with the MPE, the fraction of the MPE in terms of E^2, H^2 (or power density) incurred within each frequency interval should be determined and the sum of all such fractions should not exceed unity. In order to ensure compliance with the MPE for a controlled environment, the sum of the ratios of the power density to the corresponding MPE should not exceed unity. That is

$$\sum_{i=1}^{n} \frac{S_i}{MPE_i} \leq 1$$

Max. SIMULTANEOUS TRANSMISSIONS MODE

| Band | Antenna | SISO | | | | | MIMO | | Verdict |
		tune-up power (dBm)	Antenna Gain (dBi)	Separation distance (cm)	Evaluation result (mW/cm2)	Power density (mW/cm2)	Evaluation result	Power density Limits	
Wi-Fi 2.4G AX20	Ant1	20	5.17	20	0.065421	1	0.261684	1	PASS
	Ant2	20	5.17	20	0.065421	1			
Wi-Fi 5.2G AX20	Ant1	20	5.17	20	0.065421	1			
	Ant2	20	5.17	20	0.065421	1			

Conclusion:

For the max ratio : 0.261684≤ 1 for Power density, compliance with RF exposure.

Signature:

Date: 2023-09-08

Alex

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.