

FCC ID: 2A6N3-MAXCONNECT

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

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

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: FPCB Antenna

antenna gain: 3.91 dBi;

R=20cm

mW=10^{^(dBi/10)}

antenna gain Numeric=10^{^(dBi/10)}= 10^{^(3.91/10)}=2.46

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric	(mW/cm2)	(mW/cm2)
2402	DH5	4.35	5±1	6	3.981	3.91	2.46	0.0019	1
2441		4.61	5±1	6	3.981	3.91	2.46	0.0019	1
2480		5.13	5±1	6	3.981	3.91	2.46	0.0019	1
2402	2DH5	6.03	6±1	7	5.012	3.91	2.46	0.0025	1
2441		5.81	6±1	7	5.012	3.91	2.46	0.0025	1
2480		5.99	6±1	7	5.012	3.91	2.46	0.0025	1
2402	3DH5	6.5	6±1	7	5.012	3.91	2.46	0.0025	1
2441		6.23	6±1	7	5.012	3.91	2.46	0.0025	1
2480		6.41	6±1	7	5.012	3.91	2.46	0.0025	1

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density
		(dBm)		tune-up power		Gain			
				(dBm)	(dBm)	(mW)	(dBi)	Numeric	(mW/cm2)
2402	GFSK(1M)	4.56	4±1	5	3.162	3.91	2.46	0.0015	1
2440		3.39	4±1	5	3.162	3.91	2.46	0.0015	1
2480		4.3	4±1	5	3.162	3.91	2.46	0.0015	1
2402	GFSK(2M)	4.72	4±1	5	3.162	3.91	2.46	0.0015	1
2440		3.86	4±1	5	3.162	3.91	2.46	0.0015	1
2480		4.54	4±1	5	3.162	3.91	2.46	0.0015	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: FPCB Antenna

Antenna1 gain: 3.91 dBi;

Antenna 2 gain: 3.41 dBi;

R=20cm

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

Antenna 1 gain Numeric= $10^{(\text{dBi}/10)}=10^{(3.91/10)}=2.46$

Antenna 2 gain Numeric= $10^{(\text{dBi}/10)}=10^{(3.41/10)}=2.19$

Antenna	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		
Ant 1	2412	ax20	11.11	11±1	12	15.849	3.91	2.46	0.0078	1
Ant 1	2437	ax20	11.06	11±1	12	15.849	3.91	2.46	0.0078	1
Ant 1	2462	ax20	11.15	11±1	12	15.849	3.91	2.46	0.0078	1
Ant 2	2412	ax20	12.04	12±1	13	19.953	3.41	2.19	0.0087	1
Ant 2	2437	ax20	12.03	12±1	13	19.953	3.41	2.19	0.0087	1
Ant 2	2462	ax20	11.29	12±1	13	19.953	3.41	2.19	0.0087	1
Ant 1	2412	b	15.51	16±1	17	50.119	3.91	2.46	0.0245	1
Ant 1	2437	b	15.62	16±1	17	50.119	3.91	2.46	0.0245	1
Ant 1	2462	b	16.09	16±1	17	50.119	3.91	2.46	0.0245	1
Ant 2	2412	b	16.03	16±1	17	50.119	3.41	2.19	0.0219	1
Ant 2	2437	b	16.1	16±1	17	50.119	3.41	2.19	0.0219	1
Ant 2	2462	b	15.6	16±1	17	50.119	3.41	2.19	0.0219	1
Ant 1	2412	g	13.53	13±1	14	25.119	3.91	2.46	0.0123	1
Ant 1	2437	g	13.46	13±1	14	25.119	3.91	2.46	0.0123	1
Ant 1	2462	g	13.63	13±1	14	25.119	3.91	2.46	0.0123	1
Ant 2	2412	g	13.35	13±1	14	25.119	3.41	2.19	0.0110	1
Ant 2	2437	g	13.29	13±1	14	25.119	3.41	2.19	0.0110	1
Ant 2	2462	g	12.88	13±1	14	25.119	3.41	2.19	0.0110	1
Ant 1	2412	n20	11.94	11±1	12	15.849	3.91	2.46	0.0078	1
Ant 1	2437	n20	11.81	11±1	12	15.849	3.91	2.46	0.0078	1
Ant 1	2462	n20	10.93	11±1	12	15.849	3.91	2.46	0.0078	1
Ant 2	2412	n20	11.78	11±1	12	15.849	3.41	2.19	0.0069	1
Ant 2	2437	n20	11.92	11±1	12	15.849	3.41	2.19	0.0069	1
Ant 2	2462	n20	11.05	11±1	12	15.849	3.41	2.19	0.0069	1

5G WIFI:

Operation Frequency: WIFI 802.11a/ac/n/ax(HT20): 5180-5240MHz; 5745-5825MHz;

WIFI 802.11ac/n/ax(HT40): 5190-5230MHz;5755-5795MHz;

WIFI 802.11ac/ax80:5210MHz; 5775MHz

Power density limited: 1mW/cm

Antenna Type: FPCB Antenna

Antenna1 gain:3.86 dBi;

Antenna2 gain:3.65 dBi;

R=20cm

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

Antenna1 gain Numeric= $10^{(dBi/10)}=10^{(3.86/10)}=2.43$

Antenna2 gain Numeric= $10^{(dBi/10)}=10^{(3.65/10)}=2.32$

5.2G

Antenna	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		
Ant 1	5180	a	12.23	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 1	5200	a	12.52	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 1	5240	a	11.94	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 2	5180	a	10.84	11±1	12	15.849	3.65	2.32	0.0073	1
Ant 2	5200	a	11.15	11±1	12	15.849	3.65	2.32	0.0073	1
Ant 2	5240	a	11.59	11±1	12	15.849	3.65	2.32	0.0073	1
Ant 1	5180	ac20	11.7	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 1	5200	ac20	12.11	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 1	5240	ac20	11.39	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 2	5180	ac20	10.47	10±1	11	12.589	3.65	2.32	0.0058	1
Ant 2	5200	ac20	10.74	10±1	11	12.589	3.65	2.32	0.0058	1
Ant 2	5240	ac20	10.02	10±1	11	12.589	3.65	2.32	0.0058	1
Ant 1	5190	ac40	10.89	10±1	11	12.589	3.86	2.43	0.0061	1
Ant 1	5230	ac40	10.41	10±1	11	12.589	3.86	2.43	0.0061	1
Ant 2	5190	ac40	9.85	10±1	11	12.589	3.65	2.32	0.0058	1
Ant 2	5230	ac40	10.06	10±1	11	12.589	3.65	2.32	0.0058	1
Ant 1	5210	ac80	10.58	10±1	11	12.589	3.86	2.43	0.0061	1
Ant 2	5210	ac80	12.98	12±1	13	19.953	3.65	2.32	0.0092	1
Ant 1	5180	ax20	12.17	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 1	5200	ax20	12.66	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 1	5240	ax20	11.94	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 2	5180	ax20	11.22	11±1	12	15.849	3.65	2.32	0.0073	1
Ant 2	5200	ax20	11.39	11±1	12	15.849	3.65	2.32	0.0073	1
Ant 2	5240	ax20	11.46	11±1	12	15.849	3.65	2.32	0.0073	1
Ant 1	5190	ax40	11.84	11±1	12	15.849	3.86	2.43	0.0077	1
Ant 1	5230	ax40	11.34	11±1	12	15.849	3.86	2.43	0.0077	1
Ant 2	5190	ax40	9.86	10±1	11	12.589	3.65	2.32	0.0058	1
Ant 2	5230	ax40	10.83	10±1	11	12.589	3.65	2.32	0.0058	1
Ant 1	5210	ax80	11.3	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 2	5210	ax80	12.04	12±1	13	19.953	3.65	2.32	0.0092	1
Ant 1	5180	n20	11.91	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 1	5200	n20	12.37	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 1	5240	n20	11.8	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 2	5180	n20	10.75	11±1	12	15.849	3.65	2.32	0.0073	1
Ant 2	5200	n20	11.07	11±1	12	15.849	3.65	2.32	0.0073	1
Ant 2	5240	n20	11.31	11±1	12	15.849	3.65	2.32	0.0073	1
Ant 1	5190	n40	11.55	11±1	12	15.849	3.86	2.43	0.0077	1
Ant 1	5230	n40	11	11±1	12	15.849	3.86	2.43	0.0077	1
Ant 2	5190	n40	10.28	11±1	12	15.849	3.65	2.32	0.0073	1
Ant 2	5230	n40	10.7	11±1	12	15.849	3.65	2.32	0.0073	1

5.8G

Antenna	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		
Ant 1	5745	a	12.94	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 1	5785	a	12.72	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 1	5825	a	12.24	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 2	5745	a	11.53	12±1	13	19.953	3.65	2.32	0.0092	1
Ant 2	5785	a	11.75	12±1	13	19.953	3.65	2.32	0.0092	1
Ant 2	5825	a	12.27	12±1	13	19.953	3.65	2.32	0.0092	1
Ant 1	5745	ac20	11.92	11±1	12	15.849	3.86	2.43	0.0077	1
Ant 1	5785	ac20	11.89	11±1	12	15.849	3.86	2.43	0.0077	1
Ant 1	5825	ac20	11.55	11±1	12	15.849	3.86	2.43	0.0077	1
Ant 2	5745	ac20	11.11	11±1	12	15.849	3.65	2.32	0.0073	1
Ant 2	5785	ac20	11.29	11±1	12	15.849	3.65	2.32	0.0073	1
Ant 2	5825	ac20	11.54	11±1	12	15.849	3.65	2.32	0.0073	1
Ant 1	5755	ac40	11.18	11±1	12	15.849	3.86	2.43	0.0077	1
Ant 1	5795	ac40	11.11	11±1	12	15.849	3.86	2.43	0.0077	1
Ant 2	5755	ac40	10.86	11±1	12	15.849	3.65	2.32	0.0073	1
Ant 2	5795	ac40	10.24	11±1	12	15.849	3.65	2.32	0.0073	1
Ant 1	5775	ac80	12.33	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 2	5775	ac80	14.69	14±1	15	31.623	3.65	2.32	0.0146	1
Ant 1	5745	ax20	12.43	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 1	5785	ax20	12.2	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 1	5825	ax20	12.05	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 2	5745	ax20	11.68	12±1	13	19.953	3.65	2.32	0.0092	1
Ant 2	5785	ax20	11.79	12±1	13	19.953	3.65	2.32	0.0092	1
Ant 2	5825	ax20	12	12±1	13	19.953	3.65	2.32	0.0092	1
Ant 1	5755	ax40	12.21	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 1	5795	ax40	12.15	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 2	5755	ax40	11.7	12±1	13	19.953	3.65	2.32	0.0092	1
Ant 2	5795	ax40	11.33	12±1	13	19.953	3.65	2.32	0.0092	1
Ant 1	5775	ax80	12.1	13±1	14	25.119	3.86	2.43	0.0122	1
Ant 2	5775	ax80	13.69	13±1	14	25.119	3.65	2.32	0.0116	1
Ant 1	5745	n20	12.24	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 1	5785	n20	12.2	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 1	5825	n20	11.86	12±1	13	19.953	3.86	2.43	0.0097	1
Ant 2	5745	n20	11.52	12±1	13	19.953	3.65	2.32	0.0092	1
Ant 2	5785	n20	11.76	12±1	13	19.953	3.65	2.32	0.0092	1
Ant 2	5825	n20	11.82	12±1	13	19.953	3.65	2.32	0.0092	1
Ant 1	5755	n40	11.71	11±1	12	15.849	3.86	2.43	0.0077	1
Ant 1	5795	n40	11.65	11±1	12	15.849	3.86	2.43	0.0077	1
Ant 2	5755	n40	11.27	11±1	12	15.849	3.65	2.32	0.0073	1
Ant 2	5795	n40	10.89	11±1	12	15.849	3.65	2.32	0.0073	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	Antenna	Separation distance (cm)	Evaluation result	Power density	Evaluation result	Power density Limits	
		(dBm)	Gain		(mW/cm2)	(mW/cm2)			
			(dBi)						
Wi-Fi 2.4G ax20	Ant1	12	3.91	20	0.007757	1	0.016461	1	PASS
	Ant2	13	3.41	20	0.008704	1			
Wi-Fi 5.2G ax80	Ant1	13	3.86	20	0.009654	1	0.018853	1	PASS
	Ant2	13	3.65	20	0.009199	1			
Wi-Fi 5.8G n20	Ant1	13	3.86	20	0.009654	1	0.018853	1	PASS
	Ant2	13	3.65	20	0.009199	1			

Conclusion:

For the max result : $0.018853 \leq 1 \text{mW/cm}^2$ for Power density, compliance with RF exposure.

Note: This product does not support 2.4G band and 5G band simultaneous delivery.

Signature:

Date: 2023-08-14



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.