

FCC ID: 2BK5Y-JD-410WF

Maximum Permissible Exposure (MPE)

According to FCC 2.1091, FCC 1.1310 and KDB 447498 D04 Interim General RF Exposure Guidance v01: 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

$$E \text{ (V/m)} = \frac{\sqrt{30 * P * G}}{d}$$

$$\text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

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.

Measurement Result

EDR:

Antenna gain: 1.8dBi;

R=20cm

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		
2402	GFSK	2.15	2±1	3	1.995	1.80	1.51	0.0006	1
2441		3.25	3±1	4	2.512	1.80	1.51	0.0008	1
2480		2.38	2±1	3	1.995	1.80	1.51	0.0006	1
2402	π/4- DQPSK	4.4	4±1	5	3.162	1.80	1.51	0.0010	1
2441		5.99	5±1	6	3.981	1.80	1.51	0.0012	1
2480		4.97	4±1	5	3.162	1.80	1.51	0.0010	1
2402	8-DPSK	4.85	4±1	5	3.162	1.80	1.51	0.0010	1
2441		6.29	6±1	7	5.012	1.80	1.51	0.0015	1
2480		5.24	5±1	6	3.981	1.80	1.51	0.0012	1

BLE:

Antenna gain: 1.8dBi;

R=20cm

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	BLE 1M	2.5	2±1	3	1.995	1.80	1.51	0.0006	1
2440		3.5	3±1	4	2.512	1.80	1.51	0.0008	1
2480		4.99	4±1	5	3.162	1.80	1.51	0.0010	1
2402	BLE 2M	2.47	2±1	3	1.995	1.80	1.51	0.0006	1
2440		3.42	3±1	4	2.512	1.80	1.51	0.0008	1
2480		4.95	4±1	5	3.162	1.80	1.51	0.0010	1

2.4GWIFI:
Antenna gain ANT1: 1.8dBi
R=20cm

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	11b	12.54	12±1	13	19.953	1.80	1.51	0.0060	1
2437		12.93	12±1	13	19.953	1.80	1.51	0.0060	1
2462		13.05	13±1	14	25.119	1.80	1.51	0.0076	1
2412	11g	15.34	15±1	16	39.811	1.80	1.51	0.0120	1
2437		15.55	15±1	16	39.811	1.80	1.51	0.0120	1
2462		15.33	15±1	16	39.811	1.80	1.51	0.0120	1
2412	11n20	15.46	15±1	16	39.811	1.80	1.51	0.0120	1
2437		15.55	15±1	16	39.811	1.80	1.51	0.0120	1
2462		15.6	15±1	16	39.811	1.80	1.51	0.0120	1
2422	11n40	15.78	15±1	16	39.811	1.80	1.51	0.0120	1
2437		16.26	16±1	17	50.119	1.80	1.51	0.0151	1
2452		15.95	15±1	16	39.811	1.80	1.51	0.0120	1
2412	11ax20	15.38	15±1	16	39.811	1.80	1.51	0.0120	1
2437		15.61	15±1	16	39.811	1.80	1.51	0.0120	1
2462		15.16	15±1	16	39.811	1.80	1.51	0.0120	1
2422	11ax40	17.26	17±1	18	63.096	1.80	1.51	0.0190	1
2437		16.09	16±1	17	50.119	1.80	1.51	0.0151	1
2452		15.95	15±1	16	39.811	1.80	1.51	0.0120	1

WIFI 5.2G
Antenna gain ANT1: 0.4dBi
R=20cm

modulation	Antenna	Channel Freq. (MHz)	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)
802.11a	Ant 1	5180	11.38	11±1	12.00	15.849	0.40	1.10	0.0035	1
	Ant 1	5200	11.57	11±1	12.00	15.849	0.40	1.10	0.0035	1
	Ant 1	5240	12.43	12±1	13.00	19.953	0.40	1.10	0.0044	1
802.11n20	Ant 1	5180	10.92	10±1	11.00	12.589	0.40	1.10	0.0027	1
	Ant 1	5200	11.13	11±1	12.00	15.849	0.40	1.10	0.0035	1
	Ant 1	5240	12.11	12±1	13.00	19.953	0.40	1.10	0.0044	1
802.11n40	Ant 1	5190	10.74	10±1	11.00	12.589	0.40	1.10	0.0027	1
	Ant 1	5230	11.4	11±1	12.00	15.849	0.40	1.10	0.0035	1
802.11ac20	Ant 1	5180	10.33	10±1	11.00	12.589	0.40	1.10	0.0027	1
	Ant 1	5200	10.49	10±1	11.00	12.589	0.40	1.10	0.0027	1
	Ant 1	5240	11.63	11±1	12.00	15.849	0.40	1.10	0.0035	1
802.11ac40	Ant 1	5190	10.08	10±1	11.00	12.589	0.40	1.10	0.0027	1
	Ant 1	5230	11.26	11±1	12.00	15.849	0.40	1.10	0.0035	1
802.11ax20	Ant 1	5180	10.29	10±1	11.00	12.589	0.40	1.10	0.0027	1
	Ant 1	5200	10.36	10±1	11.00	12.589	0.40	1.10	0.0027	1
	Ant 1	5240	11.39	11±1	12.00	15.849	0.40	1.10	0.0035	1
802.11ax40	Ant 1	5190	10.18	10±1	11.00	12.589	0.40	1.10	0.0027	1
	Ant 1	5230	11.27	11±1	12.00	15.849	0.40	1.10	0.0035	1

WIFI 5.3G

Antenna gain ANT1: 0.7dBi

R=20cm

modulation	Antenna	Channel Freq. (MHz)	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm2)	Power density (mW/cm2)
			(dBm)		tune-up power		Gain			
					(dBm)	(mW)	(dBi)	Numeric		
802.11a	Ant 1	5260	11.21	11±1	12.00	15.849	0.70	1.17	0.0037	1
	Ant 1	5280	12.05	12±1	13.00	19.953	0.70	1.17	0.0047	1
	Ant 1	5320	12.87	12±1	13.00	19.953	0.70	1.17	0.0047	1
802.11n20	Ant 1	5260	11.64	11±1	12.00	15.849	0.70	1.17	0.0037	1
	Ant 1	5280	11.92	11±1	12.00	15.849	0.70	1.17	0.0037	1
	Ant 1	5320	12.73	12±1	13.00	19.953	0.70	1.17	0.0047	1
802.11n40	Ant 1	5270	10.52	10±1	11.00	12.589	0.70	1.17	0.0029	1
	Ant 1	5310	11.25	11±1	12.00	15.849	0.70	1.17	0.0037	1
802.11ac20	Ant 1	5260	12	11±1	12.00	15.849	0.70	1.17	0.0037	1
	Ant 1	5280	11.85	11±1	12.00	15.849	0.70	1.17	0.0037	1
	Ant 1	5320	12.76	12±1	13.00	19.953	0.70	1.17	0.0047	1
802.11ac40	Ant 1	5270	10.6	10±1	11.00	12.589	0.70	1.17	0.0029	1
	Ant 1	5310	10.29	10±1	11.00	12.589	0.70	1.17	0.0029	1
802.11ax20	Ant 1	5260	11.32	11±1	12.00	15.849	0.70	1.17	0.0037	1
	Ant 1	5280	11.77	11±1	12.00	15.849	0.70	1.17	0.0037	1
	Ant 1	5320	11.79	11±1	12.00	15.849	0.70	1.17	0.0037	1
802.11ax40	Ant 1	5270	10.31	10±1	11.00	12.589	0.70	1.17	0.0029	1
	Ant 1	5310	11.28	11±1	12.00	15.849	0.70	1.17	0.0037	1

WIFI 5.6G

Antenna gain ANT1: 1.0dBi

R=20cm

modulation	Antenna	Channel Freq. (MHz)	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)
802.11a	Ant 1	5500	12.41	12±1	13.00	19.953	1.00	1.26	0.0050	1
	Ant 1	5600	11.04	11±1	12.00	15.849	1.00	1.26	0.0040	1
	Ant 1	5700	10.37	10±1	11.00	12.589	1.00	1.26	0.0032	1
802.11n20	Ant 1	5500	10.96	10±1	11.00	12.589	1.00	1.26	0.0032	1
	Ant 1	5600	10.14	10±1	11.00	12.589	1.00	1.26	0.0032	1
	Ant 1	5700	10.59	10±1	11.00	12.589	1.00	1.26	0.0032	1
802.11n40	Ant 1	5510	11.01	11±1	12.00	15.849	1.00	1.26	0.0040	1
	Ant 1	5590	10.38	10±1	11.00	12.589	1.00	1.26	0.0032	1
	Ant 1	5670	10.46	10±1	11.00	12.589	1.00	1.26	0.0032	1
802.11ac20	Ant 1	5500	11.14	11±1	12.00	15.849	1.00	1.26	0.0040	1
	Ant 1	5600	10.1	10±1	11.00	12.589	1.00	1.26	0.0032	1
	Ant 1	5700	10.74	10±1	11.00	12.589	1.00	1.26	0.0032	1
802.11ac40	Ant 1	5510	10.87	10±1	11.00	12.589	1.00	1.26	0.0032	1
	Ant 1	5590	10.23	10±1	11.00	12.589	1.00	1.26	0.0032	1
	Ant 1	5670	11.52	11±1	12.00	15.849	1.00	1.26	0.0040	1
802.11ax20	Ant 1	5500	11.44	11±1	12.00	15.849	1.00	1.26	0.0040	1
	Ant 1	5600	10.46	10±1	11.00	12.589	1.00	1.26	0.0032	1
	Ant 1	5700	10.59	10±1	11.00	12.589	1.00	1.26	0.0032	1
802.11ax40	Ant 1	5510	11.31	11±1	12.00	15.849	1.00	1.26	0.0040	1
	Ant 1	5590	10.46	10±1	11.00	12.589	1.00	1.26	0.0032	1
	Ant 1	5670	11.49	11±1	12.00	15.849	1.00	1.26	0.0040	1

WIFI 5.8G
Antenna gain ANT1: 1.0dBi
R=20cm

modulation	Antenna	Channel Freq. (MHz)	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm2)	Power density (mW/cm2)
			(dBm)		tune-up power		Gain			
					(dBm)	(mW)	(dBi)	Numeric		
802.11a	Ant 1	5745	11.19	11±1	12.00	15.849	1.00	1.26	0.0040	1
	Ant 1	5785	10.08	10±1	11.00	12.589	1.00	1.26	0.0032	1
	Ant 1	5825	10.96	10±1	11.00	12.589	1.00	1.26	0.0032	1
802.11n20	Ant 1	5745	10.98	10±1	11.00	12.589	1.00	1.26	0.0032	1
	Ant 1	5785	11.06	11±1	12.00	15.849	1.00	1.26	0.0040	1
	Ant 1	5825	10.89	10±1	11.00	12.589	1.00	1.26	0.0032	1
802.11n40	Ant 1	5755	11.75	11±1	12.00	15.849	1.00	1.26	0.0040	1
	Ant 1	5795	10.48	10±1	11.00	12.589	1.00	1.26	0.0032	1
802.11ac20	Ant 1	5745	11.23	11±1	12.00	15.849	1.00	1.26	0.0040	1
	Ant 1	5785	10.85	10±1	11.00	12.589	1.00	1.26	0.0032	1
	Ant 1	5825	10.49	10±1	11.00	12.589	1.00	1.26	0.0032	1
802.11ac40	Ant 1	5755	11.5	11±1	12.00	15.849	1.00	1.26	0.0040	1
	Ant 1	5795	10.55	10±1	11.00	12.589	1.00	1.26	0.0032	1
802.11ax20	Ant 1	5745	11.19	11±1	12.00	15.849	1.00	1.26	0.0040	1
	Ant 1	5785	10.88	10±1	11.00	12.589	1.00	1.26	0.0032	1
	Ant 1	5825	10.87	10±1	11.00	12.589	1.00	1.26	0.0032	1
802.11ax40	Ant 1	5755	11.87	11±1	12.00	15.849	1.00	1.26	0.0040	1
	Ant 1	5795	10.86	10±1	11.00	12.589	1.00	1.26	0.0032	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

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

Note: The BR/EDR/BLE/WIFI 2.4G/WIFI 5G share the same ANT cannot transmit at same time.

Conclusion: pass

Signature: 

Date: 2026-07-04

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