

FCC ID: 2AQ9Y-OPI4A

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: 1mW/ cm²

Antenna Type: Copper antenna

Antenna gain: 3dBi;

R=20cm

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

BR EDR

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain			(mW/cm2)
				(dBm)	(mW)	(dBi)	Numeric		
2402	GFSK	4.68	4±1	5.00	3.162	3.00	2.00	0.0013	1
2441		4.79	4±1	5.00	3.162	3.00	2.00	0.0013	1
2480		4.8	4±1	5.00	3.162	3.00	2.00	0.0013	1
2402	π/4-DQPSK	2.71	2±1	3.00	1.995	3.00	2.00	0.0008	1
2441		2.77	2±1	3.00	1.995	3.00	2.00	0.0008	1
2480		2.49	2±1	3.00	1.995	3.00	2.00	0.0008	1
2402	8-DPSK	3.12	3±1	4.00	2.512	3.00	2.00	0.0010	1
2441		3.15	3±1	4.00	2.512	3.00	2.00	0.0010	1
2480		2.82	2±1	3.00	1.995	3.00	2.00	0.0008	1

BLE

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
2402	GFSK(1M)	4.32	4±1	5	3.162	3.00	2.00	0.0013	1
2440		4.34	4±1	5	3.162	3.00	2.00	0.0013	1
2480		4.01	4±1	5	3.162	3.00	2.00	0.0013	1
2402	GFSK(2M)	4.34	4±1	5	3.162	3.00	2.00	0.0013	1
2440		4.37	4±1	5	3.162	3.00	2.00	0.0013	1
2480		4.02	4±1	5	3.162	3.00	2.00	0.0013	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: Copper antenna

Antenna gain: 3. dBi;

R=20cm

mW=10^(dBm/10)

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric	(mW/cm2)	(mW/cm2)
2412	802.11b	15.22	15±1	16	39.811	3.02	2.00	0.0159	1
2437		15.45	15±1	16	39.811	3.02	2.00	0.0159	1
2462		14.9	14±1	15	31.623	3.02	2.00	0.0126	1
2412	802.11g	13.74	13±1	14	25.119	3.02	2.00	0.0100	1
2437		13.65	13±1	14	25.119	3.02	2.00	0.0100	1
2462		13.81	13±1	14	25.119	3.02	2.00	0.0100	1
2412	802.11n H20	12.38	12±1	13	19.953	3.02	2.00	0.0080	1
2437		12.93	12±1	13	19.953	3.02	2.00	0.0080	1
2462		12.8	12±1	13	19.953	3.02	2.00	0.0080	1
2422	802.11n(H T40)	11.78	11±1	12	15.849	3.02	2.00	0.0063	1
2437		11.74	11±1	12	15.849	3.02	2.00	0.0063	1
2452		11.83	11±1	12	15.849	3.02	2.00	0.0063	1

5G WIFI:

Operation Frequency:

- ☒ U-NII-1: 5180-5240MHz for 802.11a/n/ac (20MHz);
5190-5230MHz for 802.11n/ac (40MHz);
5210MHz for 802.11ac (80MHz)
- ☒ U-NII-2A: 5260-5320MHz for 802.11a/n/ac (20MHz);
5270-5310MHz for 802.11n/ac (40MHz);
5290MHz for 802.11ac (80MHz)
- ☒ U-NII-2C: 5500-5700MHz for 802.11a/n/ac (20MHz);
5510-5670MHz for 802.11n/ac (40MHz);
5530-5610MHz for 802.11ac (80MHz)
- ☒ U-NII-3: 5745-5825 MHz for 802.11a/n/ac (20MHz);
5755-5795 MHz for 802.11n/ac (40MHz);
5775MHz for 802.11ac (80MHz)

Power density limited: 1mW/cm

Antenna Type: Copper antenna

Antenna gain: 3dBi;

R=20cm

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

5.2G

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric	(mW/cm2)	(mW/cm2)
5180	a	11.37	11+1	12	15.849	3.00	2.00	0.0063	1
5200	a	11.68	11+1	12	15.849	3.00	2.00	0.0063	1
5240	a	11.78	11+1	12	15.849	3.00	2.00	0.0063	1
5180	n20	11.11	11+1	12	15.849	3.00	2.00	0.0063	1
5200	n20	11.16	11+1	12	15.849	3.00	2.00	0.0063	1
5240	n20	11.63	11+1	12	15.849	3.00	2.00	0.0063	1
5190	n40	11.35	11+1	12	15.849	3.00	2.00	0.0063	1
5230	n40	11.4	11+1	12	15.849	3.00	2.00	0.0063	1
5180	ac20	11.26	11+1	12	15.849	3.00	2.00	0.0063	1
5200	ac20	11.08	11+1	12	15.849	3.00	2.00	0.0063	1
5240	ac20	11.34	11+1	12	15.849	3.00	2.00	0.0063	1
5190	ac40	10.96	10+1	11	12.589	3.00	2.00	0.0050	1
5230	ac40	11.42	11+1	12	15.849	3.00	2.00	0.0063	1
5210	ac80	10.99	10+1	11	12.589	3.00	2.00	0.0050	1

5.3G

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
5260	a	11.67	11+1	12	15.849	3.00	2.00	0.0063	1
5280	a	11.77	11+1	12	15.849	3.00	2.00	0.0063	1
5320	a	11.8	11+1	12	15.849	3.00	2.00	0.0063	1
5260	n20	11.29	11+1	12	15.849	3.00	2.00	0.0063	1
5280	n20	11.29	11+1	12	15.849	3.00	2.00	0.0063	1
5320	n20	11.5	11+1	12	15.849	3.00	2.00	0.0063	1
5270	n40	11.59	11+1	12	15.849	3.00	2.00	0.0063	1
5310	n40	11.38	11+1	12	15.849	3.00	2.00	0.0063	1
5260	ac20	11.4	11+1	12	15.849	3.00	2.00	0.0063	1
5280	ac20	11.68	11+1	12	15.849	3.00	2.00	0.0063	1
5320	ac20	11.52	11+1	12	15.849	3.00	2.00	0.0063	1
5270	ac40	11.47	11+1	12	15.849	3.00	2.00	0.0063	1
5310	ac40	11.42	11+1	12	15.849	3.00	2.00	0.0063	1
5290	ac80	11.02	11+1	12	15.849	3.00	2.00	0.0063	1

5.6G

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric	(mW/cm2)	(mW/cm2)
5500	a	9.51	9+1	10	10.000	3.00	2.00	0.0040	1
5600	a	10.28	10+1	11	12.589	3.00	2.00	0.0050	1
5700	a	10.48	10+1	11	12.589	3.00	2.00	0.0050	1
5500	n20	9.2	9+1	10	10.000	3.00	2.00	0.0040	1
5600	n20	9.94	9+1	10	10.000	3.00	2.00	0.0040	1
5700	n20	10.32	10+1	11	12.589	3.00	2.00	0.0050	1
5510	n40	9.3	9+1	10	10.000	3.00	2.00	0.0040	1
5590	n40	9.72	9+1	10	10.000	3.00	2.00	0.0040	1
5670	n40	10.44	10+1	11	12.589	3.00	2.00	0.0050	1
5500	ac20	9.42	9+1	10	10.000	3.00	2.00	0.0040	1
5600	ac20	10.09	10+1	11	12.589	3.00	2.00	0.0050	1
5700	ac20	10.26	10+1	11	12.589	3.00	2.00	0.0050	1
5510	ac40	9.46	9+1	10	10.000	3.00	2.00	0.0040	1
5590	ac40	9.78	9+1	10	10.000	3.00	2.00	0.0040	1
5670	ac40	10.53	10+1	11	12.589	3.00	2.00	0.0050	1
5530	ac80	9.2	9+1	10	10.000	3.00	2.00	0.0040	1
5610	ac80	9.9	9+1	10	10.000	3.00	2.00	0.0040	1

5.8G

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density limits
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric	(mW/cm2)	(mW/cm2)
5745	a	11.88	11+1	12	15.849	3.00	2.00	0.0063	1
5785	a	11.39	11+1	12	15.849	3.00	2.00	0.0063	1
5825	a	11.16	11+1	12	15.849	3.00	2.00	0.0063	1
5745	n20	11.5	11+1	12	15.849	3.00	2.00	0.0063	1
5785	n20	11.11	11+1	12	15.849	3.00	2.00	0.0063	1
5825	n20	10.98	10+1	11	12.589	3.00	2.00	0.0050	1
5755	n40	11.43	11+1	12	15.849	3.00	2.00	0.0063	1
5795	n40	11.18	11+1	12	15.849	3.00	2.00	0.0063	1
5745	ac20	11.34	11+1	12	15.849	3.00	2.00	0.0063	1
5785	ac20	11.01	11+1	12	15.849	3.00	2.00	0.0063	1
5825	ac20	10.85	10+1	11	12.589	3.00	2.00	0.0050	1
5755	ac40	11.36	11+1	12	15.849	3.00	2.00	0.0063	1
5795	ac40	11.18	11+1	12	15.849	3.00	2.00	0.0063	1
5775	ac80	9.13	9+1	10	10.000	3.00	2.00	0.0040	1

Note: This product does not support the requirements under BT/WIFI transmission simultaneous

Signature:

Date: 2025-12-01



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