

FCC ID:2BEX7-SX-350D

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: PCB antenna

Antenna gain:0.55dBi;

R=20cm

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

antenna gain Numeric=10^{^(dBi/10)}= 10^{^(0.55/10)}=1.14

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	DH5	5.46	5±1	6	3.981	0.55	1.14	0.0009	1
2441		4.73	5±1	6	3.981	0.55	1.14	0.0009	1
2480		4.55	5±1	6	3.981	0.55	1.14	0.0009	1
2402	2DH5	4.98	4±1	5	3.162	0.55	1.14	0.0007	1
2441		4.18	4±1	5	3.162	0.55	1.14	0.0007	1
2480		3.76	4±1	5	3.162	0.55	1.14	0.0007	1
2402	3DH5	4.94	4±1	5	3.162	0.55	1.14	0.0007	1
2441		4.27	4±1	5	3.162	0.55	1.14	0.0007	1
2480		3.71	4±1	5	3.162	0.55	1.14	0.0007	1

Channel Freq. (MHz)	modulation	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		
2402	GFSK(1M)	-6.77	-6±1	-5	0.316	0.55	1.14	0.0001	1
2440		-5.35	-6±1	-5	0.316	0.55	1.14	0.0001	1
2480		-4.8	-4±1	-3	0.501	0.55	1.14	0.0001	1
2402	GFSK(2M)	-6.83	-6±1	-5	0.316	0.55	1.14	0.0001	1
2440		-5.42	-6±1	-5	0.316	0.55	1.14	0.0001	1
2480		-4.88	-4±1	-3	0.501	0.55	1.14	0.0001	1

2.4G WIFI:

Operation Frequency: WIFI 802.11b/g/n HT20: 2412-2462MHz,
WIFI 802.11n HT40:2422-2452MHz
Power density limited: $1\text{mW}/\text{cm}^2$

Antenna Type: PCB antenna

Antenna gain: 0.55dBi;

R=20cm

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

antenna gain Numeric= $10^{(\text{dBi}/10)}=10^{(0.55/10)}=1.14$

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	15.75	15±1	16	39.811	0.55	1.14	0.0090	1
2437		15.72	15±1	16	39.811	0.55	1.14	0.0090	1
2462		15.23	15±1	16	39.811	0.55	1.14	0.0090	1
2412	802.11g	13.09	13±1	14	25.119	0.55	1.14	0.0057	1
2437		13.42	13±1	14	25.119	0.55	1.14	0.0057	1
2462		13.12	13±1	14	25.119	0.55	1.14	0.0057	1
2412	802.11n H20	11.22	11±1	12	15.849	0.55	1.14	0.0036	1
2437		11.44	11±1	12	15.849	0.55	1.14	0.0036	1
2462		11.17	11±1	12	15.849	0.55	1.14	0.0036	1
2422	802.11n(H T40)	11.86	11±1	12	15.849	0.55	1.14	0.0036	1
2437		11.69	11±1	12	15.849	0.55	1.14	0.0036	1
2452		11.57	11±1	12	15.849	0.55	1.14	0.0036	1

5G WIFI:

Operation Frequency: WIFI 802.11a/ac/n(HT20): 5180-5240MHz;;WIFI 802.11ac/n(HT40): 5190-5230MHz;; WIFI 802.11ac80:5210-5210MHz;

Power density limited: 1mW/cm

Antenna Type: PCB antenna

Antenna gain:1.08dBi;

R=20cm

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

antenna gain Numeric= $10^{(dBi/10)}=10^{(1.08/10)}=1.28$

5.2G

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)
5180	802.11a	12.651	12±1	13	19.953	1.08	1.28	0.0051	1
5200		12.559	12±1	13	19.953	1.08	1.28	0.0051	1
5240		12.137	12±1	13	19.953	1.08	1.28	0.0051	1
5180	802.11ac20	13.131	13±1	14	25.119	1.08	1.28	0.0064	1
5200		12.383	13±1	14	25.119	1.08	1.28	0.0064	1
5240		12.735	13±1	14	25.119	1.08	1.28	0.0064	1
5190	802.11ac40	12.974	12±1	13	19.953	1.08	1.28	0.0051	1
5230		12.081	12±1	13	19.953	1.08	1.28	0.0051	1
5210	802.11ac80	9.68	9±1	10	10.000	1.08	1.28	0.0026	1
5180	802.11n H20	12.419	12±1	13	19.953	1.08	1.28	0.0051	1
5200		12.324	12±1	13	19.953	1.08	1.28	0.0051	1
5240		12.096	12±1	13	19.953	1.08	1.28	0.0051	1
5190	802.11n H40	10.606	11.5±1	12.5	17.783	1.08	1.28	0.0045	1
5230		12.044	11.5±1	12.5	17.783	1.08	1.28	0.0045	1

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

Conclusion:

For the max result : $0.009 \leq 1.0$ for Max Power Density, compliance RF exposure.

Signature:

Date: 2024-02-22



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