

FCC ID : 2AO2D-L176FGN

RF EXPOSURE EVALUATION

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)	Average Time
(A) Limits for Occupational/Control Exposures				
300-1500	--	--	F/300	6
1500-100000	--	--	5	6
(B) Limits for General Population/Uncontrol Exposures				
300-1500	--	--	F/1500	6
1500-100000	--	--	1	30

11.1 Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

P_d = Power density in mW/cm²

P_{out} = output power to antenna in mW

G = Numeric gain of the antenna relative to isotropic antenna

π = 3.1416

R= distance between observation point and center of the radiator in cm

Pd the limit of MPE, $1\text{mW}/\text{cm}^2$, If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

RF Exposure Information: The radiated output power of this device meets the limits of FCC/IC radio frequency exposure limits. This device should be operated with a minimum separation distance of 20cm (8 inches) between the equipment and a person's body.

11.2 Measurement Result

WIFI and BT cannot transmit at the same time

Wifi 2.4G---Antenna 1

Antenna gain: 3.25 dBi

modulation	Channel Freq. (MHz)	Measured power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Antenna Gain Numeric	Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
11b	2412	14.61	13 to 15	15	2.11	0.0133	1
	2437	14.65	13 to 15	15	2.11	0.0133	1
	2462	14.40	13 to 15	15	2.11	0.0133	1
11g	2412	20.52	19 to 21	21	2.11	0.0528	1
	2437	20.82	19 to 21	21	2.11	0.0528	1
	2462	20.21	19 to 21	21	2.11	0.0528	1
11n HT20	2412	21.32	20 to 22	22	2.11	0.0665	1
	2437	21.50	20 to 22	22	2.11	0.0665	1
	2462	20.44	19 to 21	21	2.11	0.0528	1

Wifi 2.4G---Antenna 2

Antenna gain: 3.50 dBi

modulation	Channel Freq. (MHz)	Measured power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Antenna Gain Numeric	Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
11b	2412	14.57	13 to 15	15	2.24	0.0141	1
	2437	14.79	13 to 15	15	2.24	0.0141	1
	2462	14.50	13 to 15	15	2.24	0.0141	1
11g	2412	21.05	20 to 22	22	2.24	0.0706	1
	2437	21.38	20 to 22	22	2.24	0.0706	1
	2462	20.89	19 to 21	21	2.24	0.0561	1
11n HT20	2412	21.10	20 to 22	22	2.24	0.0706	1
	2437	21.55	20 to 22	22	2.24	0.0706	1
	2462	21.16	20 to 22	22	2.24	0.0706	1

Wifi 2.4G---MIMO

Antenna gain: 3.50 dBi

modulation	Channel Freq. (MHz)	Measured power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Antenna Gain Numeric	Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
11n HT20	2412	24.22	23 to 25	25	2.24	0.1409	1
	2437	24.54	23 to 25	25	2.24	0.1409	1
	2462	23.83	22 to 24	24	2.24	0.1119	1

BT/BLE

Antenna gain: 3.28 dBi

modulation	Channel Freq. (MHz)	Measured power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Antenna Gain Numeric	Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
GFSK	2402	5.062	4 to 6	6	2.13	0.0017	1
	2441	6.738	5 to 7	7	2.13	0.0021	1
	2480	8.122	7 to 9	9	2.13	0.0034	1
pi/4-DQPSK	2402	3.574	2 to 4	4	2.13	0.0011	1
	2441	4.636	3 to 5	5	2.13	0.0013	1
	2480	6.006	5 to 7	7	2.13	0.0021	1
8DPSK	2402	4.361	3 to 5	5	2.13	0.0013	1
	2441	5.347	4 to 6	6	2.13	0.0017	1
	2480	6.545	5 to 7	7	2.13	0.0021	1
GFSK (BLE)	2402	5.948	4 to 6	6	2.13	0.0017	1
	2440	5.476	4 to 6	6	2.13	0.0017	1
	2480	6.067	5 to 7	7	2.13	0.0021	1

Wifi 5G

Antenna gain: 4.10 dBi

modulation	Measured power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Antenna Gain Numeric	Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
UNII-1	21.74	20 to 22	22	2.57	0.0810	1
UNII-2A	19.52	18 to 20	20	2.57	0.0511	1
UNII-2C	20.17	19 to 21	21	2.57	0.0644	1
UNII-3	17.90	16 to 18	18	2.57	0.0323	1