

FCC ID: 2AI8ATHR51XR1MT1PLA

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: $P_d = \frac{P_{out} * G}{4 * \pi * R^2}$

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(20cm)

P_d the limit of MPE, 1mW/cm². 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.

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

11.2 Measurement Result

Operation Frequency: WIFI 802.11b/g/n HT20: 2412-2462MHz,
802.11n HT40: 2422-2452MHz,

Power density limited: $1\text{mW}/\text{cm}^2$

Antenna Type: External Antenna

Antenna gain: 5.0dBi(ANT A), 5.0dBi(ANT B),

For MIMO, Antenna Gain= $5+10\log(N)=8\text{dBi}$

$R=20\text{cm}$

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

ANT A (802.11b/g):

Channel Freq. (MHz)	modulation	conducted power (mW)	conducted 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)
2412	802.11b	29.79	14.74	14±1	15	3.16	0.0199	1
2437	802.11b	28.58	14.56	14±1	15	3.16	0.0199	1
2462	802.11b	25.88	14.13	14±1	15	3.16	0.0199	1
2412	802.11g	20.89	13.20	12±2	14	3.16	0.0158	1
2437	802.11g	13.24	11.22	12±2	14	3.16	0.0158	1
2462	802.11g	11.59	10.64	12±2	14	3.16	0.0158	1

ANT B (802.11b/g):

Channel Freq. (MHz)	modulation	conducted power (mW)	conducted 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)
2412	802.11b	29.31	14.67	14±1	15	3.16	0.0199	1
2437	802.11b	28.18	14.50	14±1	15	3.16	0.0199	1
2462	802.11b	26.24	14.19	14±1	15	3.16	0.0199	1
2412	802.11g	17.78	12.50	12±2	14	3.16	0.0158	1
2437	802.11g	24.89	13.96	12±2	14	3.16	0.0158	1
2462	802.11g	16.00	12.04	12±2	14	3.16	0.0158	1

ANT A&B (802.11n-HT20/40):

Channel Freq. (MHz)	modulation	conducted power (mW)	conducted 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)
2412	802.11n-HT20	22.91	13.60	13±2	15	6.31	0.0397	1
2437	802.11n-HT20	24.43	13.88	13±2	15	6.31	0.0397	1
2462	802.11n-HT20	26.18	14.18	13±2	15	6.31	0.0397	1
2422	802.11n-HT40	15.38	11.87	12±2	14	6.31	0.0315	1
2437	802.11n-HT40	17.70	12.48	12±2	14	6.31	0.0315	1
2452	802.11n-HT40	19.14	12.82	12±2	14	6.31	0.0315	1

Conclusion:

For the max result : $0.0397 \leq 3.0$ for 1g SAR, No SAR is required.

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Signature:

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