

FCC ID:SMC-G3PRO

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: 1mW/ cm²
 Antenna Type: FPCB Antenna
 Antenna gain: 1dBi,
 R=20cm
 mW=10^(dBm/10)
 802.11b/g/n:

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	14.13	11.5	12±1	13	1.259	0.004997	1
2437	802.11b	17.38	12.4	12±1	13	1.259	0.004997	1
2462	802.11b	17.78	12.5	12±1	13	1.259	0.004997	1
2412	802.11g	8.13	9.1	9±1	10	1.259	0.002504	1
2437	802.11g	8.13	9.1	9±1	10	1.259	0.002504	1
2462	802.11g	8.13	9.1	9±1	10	1.259	0.002504	1
2412	802.11n H20	7.41	8.7	9±1	10	1.259	0.002504	1
2437	802.11n H20	8.71	9.4	9±1	10	1.259	0.002504	1
2462	802.11n H20	8.32	9.2	9±1	10	1.259	0.002504	1
2422	802.11n H40	6.46	8.1	9±1	10	1.259	0.002504	1
2437	802.11n H40	7.76	8.9	9±1	10	1.259	0.002504	1
2452	802.11n H40	8.13	9.1	9±1	10	1.259	0.002504	1

Operation Frequency: 5180-5240MHz for 802.11a/n(HT20)/ac20;
 5190-5230MHz for 802.11n(HT40)/ac40;
 5210MHz for 802.11 ac80;
 5745-5825 MHz for 802.11a/n(HT20)/ac20;
 5755-5795 MHz for 802.11a/n(HT40)/ac40;
 5775MHz for 802.11 ac80;
 Power density limited: 1mW/ cm²
 Antenna Type: FPCB Antenna
 Antenna gain: 1dBi,
 R=20cm
 mW=10^(dBm/10)
 802.11a/n/ac

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)
5180	802.11a	9.55	9.8	9±1	10	1.259	0.002504	1
5200	802.11a	8.91	9.5	9±1	10	1.259	0.002504	1
5240	802.11a	9.77	9.9	9±1	10	1.259	0.002504	1
5180	802.11n H20	7.59	8.8	8±1	9	1.259	0.001989	1
5200	802.11n H20	7.41	8.7	8±1	9	1.259	0.001989	1
5240	802.11n H20	7.76	8.9	8±1	9	1.259	0.001989	1
5190	802.11n H40	6.31	8.0	8±1	9	1.259	0.001989	1
5230	802.11n H40	6.61	8.2	8±1	9	1.259	0.001989	1
5180	802.11 AC20	7.41	8.7	8±1	9	1.259	0.001989	1
5200	802.11 AC20	7.76	8.9	8±1	9	1.259	0.001989	1
5240	802.11 AC20	7.59	8.8	8±1	9	1.259	0.001989	1
5190	802.11 AC40	6.76	8.3	8±1	9	1.259	0.001989	1
5230	802.11 AC40	6.31	8.0	8±1	9	1.259	0.001989	1
5210	802.11 AC80	7.59	8.8	8±1	9	1.259	0.001989	1

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)
5745	802.11a	6.92	8.4	8±1	9	1.259	0.001989	1
5785	802.11a	6.76	8.3	8±1	9	1.259	0.001989	1
5825	802.11a	7.41	8.7	8±1	9	1.259	0.001989	1
5745	802.11n H20	7.08	8.5	8±1	9	1.259	0.001989	1
5785	802.11n H20	6.92	8.4	8±1	9	1.259	0.001989	1
5825	802.11n H20	7.24	8.6	8±1	9	1.259	0.001989	1
5755	802.11n H40	6.92	8.4	8±1	9	1.259	0.001989	1
5795	802.11n H40	6.76	8.3	8±1	9	1.259	0.001989	1
5745	802.11 AC20	6.92	8.4	8±1	9	1.259	0.001989	1
5785	802.11 AC20	7.08	8.5	8±1	9	1.259	0.001989	1
5825	802.11 AC20	7.24	8.6	8±1	9	1.259	0.001989	1
5755	802.11 AC40	6.76	8.3	8±1	9	1.259	0.001989	1
5795	802.11 AC40	6.46	8.1	8±1	9	1.259	0.001989	1
5775	802.11 AC80	7.24	8.6	8±1	9	1.259	0.001989	1

Operation Frequency: 2402MHz~2480MHz

Power density limited: 1mW/ cm²

Antenna Type: FPCB Antenna

Antenna gain: 1.0dBi,

R=20cm

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

Bluetooth Moduel A DSS:

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)
2402	GFSK	1.49	1.742	2±1	3	1.259	0.000500	1
2441		1.89	2.772	2±1	3	1.259	0.000500	1
2480		1.94	2.868	2±1	3	1.259	0.000500	1
2402	π/4-DQPSK	1.37	1.354	2±1	3	1.259	0.000500	1
2441		1.80	2.545	2±1	3	1.259	0.000500	1
2480		1.79	2.538	2±1	3	1.259	0.000500	1
2402	8DPSK	1.53	1.861	2.5±1	3.5	1.259	0.000561	1
2441		1.76	2.452	2.5±1	3.5	1.259	0.000561	1
2480		2.01	3.033	2.5±1	3.5	1.259	0.000561	1

Operation Frequency: 2402MHz~2480MHz

Power density limited: 1mW/ cm²

Antenna Type: FPCB Antenna

Antenna gain: 1.0dBi,

R=20cm

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

Bluetooth Moduel B DSS:

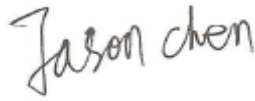
Channel Freq. (MHz)	modulation	conducted power (mW)	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Antenna Gain Numeric	Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
2402	GFSK	2.20	3.422	3±1	4	1.259	0.000629	1
2441		2.01	3.022	3±1	4	1.259	0.000629	1
2480		2.08	3.189	3±1	4	1.259	0.000629	1
2402	π/4-DQPSK	1.62	2.105	2±1	3	1.259	0.000500	1
2441		1.63	2.128	2±1	3	1.259	0.000500	1
2480		1.50	1.762	2±1	3	1.259	0.000500	1
2402	8DPSK	1.76	2.449	2±1	3	1.259	0.000500	1
2441		1.75	2.437	2±1	3	1.259	0.000500	1
2480		1.70	2.303	2±1	3	1.259	0.000500	1

simultaneous emission

Power density Limits (mW/cm ²) 2.4G WIFI	Power density Limits (mW/cm ²) 5.2G WIFI	Power density Limits (mW/cm ²) BT A	Power density Limits (mW/cm ²) BT B	Calculate Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
0.004997	0.002504	0.000561	0.000629	0.008691	1

Conclusion:

For the max result : $0.008691 \leq 1.0$, compliance with FCC's RF Exposure.

Handwritten signature of Jason Chen in black ink.

Signature:

Date: 2017-12-19

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