

## 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)

FCC ID: **S8J-R8192EU6**

### EUT Specification

<b>EUT</b>	WLAN 11b/g/n USB MODULE
<b>Frequency band (Operating)</b>	<input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz <input type="checkbox"/> WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz <input type="checkbox"/> WLAN: 5.745GHz ~ 5825GHz <input type="checkbox"/> Others
<b>Device category</b>	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others ____
<b>Exposure classification</b>	<input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm <sup>2</sup> ) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm <sup>2</sup> )
<b>Antenna diversity</b>	<input type="checkbox"/> Single antenna <input checked="" type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
<b>Max. output power</b>	13.59dBm for 802.11b; 12.98dBm for 802.11g; 12.68Bm for 802.11n(HT20); 12.17dBm for 802.11n(HT40);
<b>Antenna gain (Max)</b>	2.0dBi ( for per antenna port Max) 5.01dBi for MIMO(Ant1+Ant2 Directional Gain)
<b>Evaluation applied</b>	<input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> SAR Evaluation

Limits for Maximum Permissible Exposure(MPE)

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density(mW/cm <sup>2</sup> )	Average Time
<b>(A) Limits for Occupational/Control Exposures</b>				
300-1500	--	--	F/300	6
1500-100000	--	--	5	6
<b>(B) Limits for General Population/Uncontrol Exposures</b>				
300-1500	--	--	F/1500	6
1500-100000	--	--	1	30

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

Where

$P_d$ = Power density in  $mW/cm^2$ ,  $P_{out}$ =output power to antenna in Mw

$G$ = gain of antenna in linear scale,  $\pi=3.1416$

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

$P_d$  the limit of MPE,  $1mW/cm^2$ . 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.

## Measurement Result

Operation Mode	Channel Number	Channel Frequency (MHz)	Measurement Level (dBm)			Limit (dBm)	Verdict
			Ant1	Ant2	Sum		
802.11b	1	2412	12.34	11.03	--	30	PASS
	6	2437	13.09	12.32	--	30	PASS
	11	2462	13.59	13.24	--	30	PASS
802.11g	1	2412	10.24	10.39	--	30	PASS
	6	2437	11.33	11.08	--	30	PASS
	11	2462	12.98	12.83	--	30	PASS
802.11n (HT20)	1	2412	8.25	8.05	11.16	30	PASS
	6	2437	9.16	8.64	11.92	30	PASS
	11	2462	9.89	9.43	12.68	30	PASS
802.11n (HT40)	3	2422	7.59	7.36	10.49	30	PASS
	6	2437	8.33	8.23	11.29	30	PASS
	9	2452	9.04	9.28	12.17	30	PASS

Antenna 1

Operating Mode	Test Channel	Tune up tolerance (dBm)	Max tune up conducted power(dBm)	Output Peak power (mW)	Ant. Gain (dBi)	Ant. Gain (numeric)	Power density at 20cm (mW/cm <sup>2</sup> )	Power density Limits (mW/cm <sup>2</sup> )
802.11b	1	12±1	13	19.95	2	1.585	0.006291	1
	6	13±1	14	25.12	2	1.585	0.007920	1
	11	14±1	15	31.62	2	1.585	0.009971	1
802.11g	1	10±1	11	12.59	2	1.585	0.003969	1
	6	11±1	12	15.85	2	1.585	0.004997	1
	11	13±1	14	25.12	2	1.585	0.007920	1
802.11n (H20)	1	8±1	9	7.94	2	1.585	0.002505	1
	6	9±1	10	10.00	2	1.585	0.003153	1
	11	10±1	11	12.59	2	1.585	0.003969	1
802.11n (H40)	3	8±1	9	7.94	2	1.585	0.002505	1
	6	8±1	9	7.94	2	1.585	0.002505	1
	9	9±1	10	10.00	2	1.585	0.003153	1

Antenna 2:

Operating Mode	Test Channel	Tune up tolerance (dBm)	Max tune up conducted power(dBm)	Output Peak power (mW)	Ant. Gain (dBi)	Ant. Gain (numeric)	Power density at 20cm (mW/cm <sup>2</sup> )	Power density Limits (mW/cm <sup>2</sup> )
802.11b	1	11±1	12	15.85	2	1.585	0.004997	1
	6	12±1	13	19.95	2	1.585	0.006291	1
	11	13±1	14	25.12	2	1.585	0.007920	1
802.11g	1	10±1	11	12.59	2	1.585	0.003969	1
	6	11±1	12	15.85	2	1.585	0.004997	1
	11	13±1	14	25.12	2	1.585	0.007920	1
802.11n (HT20)	1	8±1	9	7.94	2	1.585	0.002505	1
	6	9±1	10	10.00	2	1.585	0.003153	1
	11	9±1	10	10.00	2	1.585	0.003153	1
802.11n (HT40)	3	7±1	8	6.31	2	1.585	0.001989	1
	6	8±1	9	7.94	2	1.585	0.002505	1
	9	9±1	10	10.00	2	1.585	0.003153	1

MPE Result:

Operation Mode	Channel Number	Channel Frequency (MHz)	Power density at 20cm (mW/ cm <sup>2</sup> )			Power density Limits (mW/cm <sup>2</sup> )	Verdict
			Ant1	Ant2	Sum		
802.11b	1	2412	0.006291	0.004997	--	1	PASS
	6	2437	0.007920	0.006291	--	1	PASS
	11	2462	0.009971	0.007920	--	1	PASS
802.11g	1	2412	0.003969	0.003969	--	1	PASS
	6	2437	0.004997	0.004997	--	1	PASS
	11	2462	0.007920	0.007920	--	1	PASS
802.11n (HT20)	1	2412	0.002505	0.002505	0.005010	1	PASS
	6	2437	0.003153	0.003153	0.006306	1	PASS
	11	2462	0.003969	0.003153	0.007122	1	PASS
802.11n (HT40)	3	2422	0.002505	0.001989	0.004494	1	PASS
	6	2437	0.002505	0.002505	0.005010	1	PASS
	9	2452	0.003153	0.003153	0.006306	1	PASS

Signature:



Print: Sam Lv

Title: Manager

Date: 2016-03-15