7. RADIO FREQUENCY EXPOSURE

7.1．Limit

According to §1.1310 and §2.1091 RF exposure is calculated.

Table: Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Power Density (S) (mW/cm2)
0.3—1.34	*(100)
1.34—30	*(180/f^2)
30—300	0.2
300—1500	f/1500
1500—100,000	1.0

F = frequency in MHz
* = Plane-wave equivalent power density

Maximum Permissible Exposure

The MPE was calculated at 20cm to show compliance with the power density limit.

$S = PG/4\pi R^2$

S = Power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna.

Note:

1. Manufacturer declared that the maximum antenna gain for 2.4G Wi-Fi is 2dBi(Max.)
   5.2G & 5.8G Wi-Fi is 3 dBi(Max.)

2. Manufacturer declared that the nearest distance between human and the EUT is 20cm.

3. Only record worst case data.

Test Mode	Channel	Frequency (MHz)	Power (dBm, Average)	Power Tune Up (dBm)
802.11b	Low	2412	**17.42**	17.0±1.0
	Middle	2437	17.18	17.0±1.0
	High	2462	17.04	17.0±1.0
802.11g	Low	2412	14.47	14.0±1.0
	Middle	2437	14.05	14.0±1.0
	High	2462	14.01	14.0±1.0
802.11n HT20	Low	2412	14.31	14.0±1.0
	Middle	2437	13.84	14.0±1.0
	High	2462	13.75	14.0±1.0
802.11n HT40	Low	2422	14.08	14.0±1.0
	Middle	2437	13.97	14.0±1.0
	High	2452	13.81	14.0±1.0
802.11a	Low	5180	17.42	17.0±1.0
	Middle	5220	**17.51**	17.0±1.0
	High	5240	17.39	17.0±1.0
802.11n(HT20)	Low	5180	16.98	17.0±1.0
	Middle	5220	17.29	17.0±1.0
	High	5240	16.68	17.0±1.0
802.11n(HT40)	Low	5190	16.62	17.0±1.0
	High	5230	16.80	17.0±1.0
802.11ac(VHT20)	Low	5180	16.95	17.0±1.0
	Middle	5220	17.33	17.0±1.0
	High	5240	16.61	17.0±1.0
802.11ac(VHT40)	Low	5190	16.73	17.0±1.0
	High	5230	16.78	17.0±1.0
802.11ac(VHT80)	Middle	5210	16.58	17.0±1.0
802.11a	Low	5745	17.27	17.0±1.0
	Middle	5785	**17.41**	17.0±1.0
	High	5825	17.11	17.0±1.0
802.11n(HT20)	Low	5745	16.89	17.0±1.0
	Middle	5785	17.21	17.0±1.0
	High	5825	16.80	17.0±1.0
802.11n(HT40)	Low	5755	16.88	17.0±1.0
	High	5795	16.78	17.0±1.0
802.11ac(VHT20)	Low	5745	17.00	17.0±1.0
	Middle	5785	17.29	17.0±1.0
	High	5825	16.55	17.0±1.0
802.11ac(VHT40)	Low	5755	16.63	17.0±1.0
	High	5795	16.66	17.0±1.0
802.11ac(VHT80)	Middle	5775	16.89	17.0±1.0

7.2 Test Results

Test Mode	Channel	Max. Tune Up Power (dBm, Average)	Max. Tune Up Power (mW)	MPE (mW/cm^2)	Limit (mW/cm^2)
802.11b	Low	18.0	63.10	0.0199	1.0
802.11b	Middle	18.0	63.10	0.0199	1.0
802.11b	High	18.0	63.10	0.0199	1.0
802.11g	Low	15.0	31.62	0.0100	1.0
802.11g	Middle	15.0	31.62	0.0100	1.0
802.11g	High	15.0	31.62	0.0100	1.0
802.11n HT20	Low	15.0	31.62	0.0100	1.0
802.11n HT20	Middle	15.0	31.62	0.0100	1.0
802.11n HT20	High	15.0	31.62	0.0100	1.0
802.11n HT40	Low	15.0	31.62	0.0100	1.0
802.11n HT40	Middle	15.0	31.62	0.0100	1.0
802.11n HT40	High	15.0	31.62	0.0100	1.0
802.11a	Low	18.0	63.10	0.0251	1.0
802.11a	Middle	18.0	63.10	0.0251	1.0
802.11a	High	18.0	63.10	0.0251	1.0
802.11n(HT20)	Low	18.0	63.10	0.0251	1.0
802.11n(HT20)	Middle	18.0	63.10	0.0251	1.0
802.11n(HT20)	High	18.0	63.10	0.0251	1.0
802.11n(HT40)	Low	18.0	63.10	0.0251	1.0
802.11n(HT40)	High	18.0	63.10	0.0251	1.0
802.11ac(VHT20)	Low	18.0	63.10	0.0251	1.0
802.11ac(VHT20)	Middle	18.0	63.10	0.0251	1.0
802.11ac(VHT20)	High	18.0	63.10	0.0251	1.0
802.11ac(VHT40)	Low	18.0	63.10	0.0251	1.0
802.11ac(VHT40)	High	18.0	63.10	0.0251	1.0
802.11ac(VHT80)	Middle	18.0	63.10	0.0251	1.0
802.11a	Low	18.0	63.10	0.0251	1.0
802.11a	Middle	18.0	63.10	0.0251	1.0
802.11a	High	18.0	63.10	0.0251	1.0
802.11n(HT20)	Low	18.0	63.10	0.0251	1.0
802.11n(HT20)	Middle	18.0	63.10	0.0251	1.0
802.11n(HT20)	High	18.0	63.10	0.0251	1.0
802.11n(HT40)	Low	18.0	63.10	0.0251	1.0
802.11n(HT40)	High	18.0	63.10	0.0251	1.0
802.11ac(VHT20)	Low	18.0	63.10	0.0251	1.0
802.11ac(VHT20)	Middle	18.0	63.10	0.0251	1.0
802.11ac(VHT20)	High	18.0	63.10	0.0251	1.0
802.11ac(VHT40)	Low	18.0	63.10	0.0251	1.0
802.11ac(VHT40)	High	18.0	63.10	0.0251	1.0

802.11ac(VHT80)	Middle	18.0	63.10	0.0251	1.0

Antenna Gain (typical): 2.4G Wi-Fi: 2dBi, 1.58 (numeric)

5.2G Wi-Fi: 3dBi, 2.00 (numeric)

5.8G Wi-Fi: 3dBi, 2.00 (numeric)

Prediction distance: >=20cm

The power density level worst case at 20 cm is below the uncontrolled exposure limit.

Simultaneous RF exposure evaluation:

This device support simultaneous transmitting when operate at 2.4G Wi-Fi+5.2G Wi-Fi, 2.4G Wi-Fi+5.8G Wi-Fi, there's no any other mode that support simultaneous transmitting.

Simultaneous TX Mode	Max. Tune Up Power (mW)	MPE (mW/cm^2)	Limit (mW/cm^2)
2.4G Wi-Fi+5.2G Wi-Fi	126.20	0.0501	1.0
2.4G Wi-Fi+5.8G Wi-Fi	126.20	0.0501	1.0