9. RADIO FREQUENCY EXPOSURE

9.1. 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 Wi-Fi is 5dBi(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, AV)			Power Tune Up (dBm)
			Ant 1	Ant 2	Ant 1+Ant 2	
802.11a	Low	5745	**12.22**	11.85	/	12.0±1.0
	Middle	5785	11.77	11.74	/	12.0±1.0
	High	5825	11.67	11.73	/	12.0±1.0
802.11n(HT20)	Low	5745	8.25	8.14	11.21	11.0±1.0
	Middle	5785	8.11	8.53	11.34	11.0±1.0
	High	5825	8.46	8.21	11.35	11.0±1.0
802.11n(HT40)	Low	5755	8.37	8.70	11.55	11.0±1.0
	High	5795	8.23	8.31	11.28	11.0±1.0

9.2 Test Results

Test Mode	Channel	Max. Tune Up Power (dBm, Average)	Max. Tune Up Power (mW)	Antenna gain(numeric)	MPE (mW/cm^2)	Limit (mW/cm^2)
802.11a	Low	13.0	19.95	3.16	0.0125	1.0
	Middle	13.0	19.95	3.16	0.0125	1.0
	High	13.0	19.95	3.16	0.0125	1.0
802.11n(HT20)	Low	12.0	15.85	6.32	0.0199	1.0
	Middle	12.0	15.85	6.32	0.0199	1.0
	High	12.0	15.85	6.32	0.0199	1.0
802.11n(HT40)	Low	12.0	15.85	6.32	0.0199	1.0
	High	12.0	15.85	6.32	0.0199	1.0

Antenna Gain (typical): Wi-Fi: 5dBi, 3.16 (numeric)

For 802.11n mode, additional gain is 10*log(2)=3.01dBi,

So for n mode, the total gain is 5+3.01=8.01dBi, 6.32(numeric)

Prediction distance: >=20cm

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