

# 1. RADIO FREQUENCY EXPOSURE

## 1.1. 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/cm <sup>2</sup> )
0.3–1.34	*(100)
1.34–30	*(180/f <sup>2</sup> )
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 18dBi(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	5180	13.95	13.57	/	$14.0 \pm 1.0$
	Middle	5220	14.01	13.90	/	$14.0 \pm 1.0$
	High	5240	13.82	13.45	/	$14.0 \pm 1.0$
802.11n(HT20)	Low	5180	10.48	10.58	13.54	$14.0 \pm 1.0$
	Middle	5220	10.83	10.95	13.90	$14.0 \pm 1.0$
	High	5240	10.78	11.05	13.93	$14.0 \pm 1.0$
802.11n(HT40)	Low	5190	10.54	11.13	13.85	$14.0 \pm 1.0$
	High	5230	10.82	11.06	13.95	$14.0 \pm 1.0$
802.11a	Low	5745	13.79	14.16	/	$14.0 \pm 1.0$
	Middle	5785	13.86	13.82	/	$14.0 \pm 1.0$
	High	5825	13.73	14.19	/	$14.0 \pm 1.0$
802.11n(HT20)	Low	5745	10.61	10.63	13.63	$14.0 \pm 1.0$
	Middle	5785	10.73	10.69	13.72	$14.0 \pm 1.0$
	High	5825	10.89	11.13	14.02	$14.0 \pm 1.0$
802.11n(HT40)	Low	5755	10.94	11.02	13.99	$14.0 \pm 1.0$
	High	5795	10.67	10.91	13.80	$14.0 \pm 1.0$

## 1.2 Test Results

Test Mode	Channel	Max. Tune Up Power (dBm, Average)	Max. Tune Up Power (mW)	Antenna gain(numeric)	MPE (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
802.11a	Low	15.0	31.62	63	0.40	1.0
	Middle	15.0	31.62	63	0.40	1.0
	High	15.0	31.62	63	0.40	1.0
802.11n(HT20)	Low	15.0	31.62	128	0.79	1.0
	Middle	15.0	31.62	128	0.79	1.0
	High	15.0	31.62	128	0.79	1.0
802.11n(HT40)	Low	15.0	31.62	128	0.79	1.0
	High	15.0	31.62	128	0.79	1.0
802.11a	Low	15.0	31.62	63	0.40	1.0
	Middle	15.0	31.62	63	0.40	1.0
	High	15.0	31.62	63	0.40	1.0
802.11n(HT20)	Low	15.0	31.62	128	0.79	1.0
	Middle	15.0	31.62	128	0.79	1.0
	High	15.0	31.62	128	0.79	1.0
802.11n(HT40)	Low	15.0	31.62	128	0.79	1.0
	High	15.0	31.62	128	0.79	1.0

Antenna Gain (typical): Wi-Fi: 18dBi, 63 (numeric)

For 802.11n mode, additional gain is  $10 \cdot \log(2) = 3\text{dBi}$ ,

So for n mode, the total gain is  $18 + 3 = 21\text{dBi}$ , 125(numeric)

Prediction distance:  $\geq 20\text{cm}$

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