

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/cm ²)
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.

Band 1:

Test Mode	Channel	Frequency (MHz)	Power (dBm, AV)	Power Tune Up (dBm)
802.11a	Low	5180	18.32	19.0 ± 1.0
	Middle	5200	19.21	19.0 ± 1.0
	High	5240	19.24	19.0 ± 1.0
802.11n(HT20)	Low	5180	18.19	19.0 ± 1.0
	Middle	5200	18.47	19.0 ± 1.0
	High	5240	19.16	19.0 ± 1.0
802.11n(HT40)	Low	5190	18.16	19.0 ± 1.0
	High	5230	19.01	19.0 ± 1.0
IEEE 802.11ac VHT20	Low	5180	18.37	19.0 ± 1.0
	Middle	5200	19.13	19.0 ± 1.0
	High	5240	19.18	19.0 ± 1.0
IEEE 802.11ac VHT40	Low	5190	17.93	18.5 ± 1.0
	High	5230	19.15	18.5 ± 1.0
IEEE 802.11ac VHT80	Mid	5210	18.73	18.5 ± 1.0

Band 3:

Test Mode	Channel	Frequency (MHz)	Power (dBm, AV)	Power Tune Up (dBm)
802.11a	Low	5745	16.22	17.0 ± 1.0
	Middle	5785	16.99	17.0 ± 1.0
	High	5825	17.55	17.0 ± 1.0
802.11n(HT20)	Low	5745	17.96	18.0 ± 1.0
	Middle	5785	17.87	18.0 ± 1.0
	High	5825	18.32	18.0 ± 1.0
802.11n(HT40)	Low	5755	17.89	18.0 ± 1.0
	High	5795	18.49	18.0 ± 1.0
IEEE 802.11ac VHT20	Low	5745	17.93	18.0 ± 1.0
	Middle	5785	18.57	18.0 ± 1.0
	High	5825	18.30	18.0 ± 1.0
IEEE 802.11ac VHT40	Low	5755	17.73	18.0 ± 1.0
	High	5795	18.74	18.0 ± 1.0
IEEE 802.11ac VHT80	Mid	5775	18.55	18.0 ± 1.0

9.2 Test Results

Band 1:

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	20.0	100.00	3.16	0.0629	1.00
	Middle	20.0	100.00	3.16	0.0629	1.00
	High	20.0	100.00	3.16	0.0629	1.00
802.11n(HT20)	Low	20.0	100.00	3.16	0.0629	1.00
	Middle	20.0	100.00	3.16	0.0629	1.00
	High	20.0	100.00	3.16	0.0629	1.00
802.11n(HT40)	Low	20.0	100.00	3.16	0.0629	1.00
	High	20.0	100.00	3.16	0.0629	1.00
IEEE 802.11ac VHT20	Low	20.0	100.00	3.16	0.0629	1.00
	Middle	20.0	100.00	3.16	0.0629	1.00
	High	20.0	100.00	3.16	0.0629	1.00
IEEE 802.11ac VHT40	Low	19.5	89.13	3.16	0.0561	1.00
	High	19.5	89.13	3.16	0.0561	1.00
IEEE 802.11ac VHT80	Mid	19.5	89.13	3.16	0.0561	1.00

Band 3:

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	18.0	63.10	3.16	0.0397	1.00
	Middle	18.0	63.10	3.16	0.0397	1.00
	High	18.0	63.10	3.16	0.0397	1.00
802.11n(HT20)	Low	19.0	79.43	3.16	0.0500	1.00
	Middle	19.0	79.43	3.16	0.0500	1.00
	High	19.0	79.43	3.16	0.0500	1.00
802.11n(HT40)	Low	19.0	79.43	3.16	0.0500	1.00
	High	19.0	79.43	3.16	0.0500	1.00
IEEE 802.11ac VHT20	Low	19.0	79.43	3.16	0.0500	1.00
	Middle	19.0	79.43	3.16	0.0500	1.00
	High	19.0	79.43	3.16	0.0500	1.00
IEEE 802.11ac VHT40	Low	19.0	79.43	3.16	0.0500	1.00
	High	19.0	79.43	3.16	0.0500	1.00
IEEE 802.11ac VHT80	Mid	19.0	79.43	3.16	0.0500	1.00

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

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

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