

* RF Exposure

1. Regulation

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this Chapter.

Limits for Maximum Permissible Exposure: RF exposure is calculated.

Frequency Range	Electric Field Strength [V/m]	Magnetic Field Strength [A/m]	Power Density [mW/cm ²]	Averaging Time [minute]
Limits for General Population / Uncontrolled Exposure				
0.3 ~ 1.34	614	1.63	*(100)	30
1.34 ~ 30	824/f	2.19/f	*(180/f ²)	30
30 ~ 300	27.5	0.073	0.2	30
300 ~ 1 500	/	/	f/1 500	30
1 500 ~ 15 000	/	/	1.0	30

f=frequency in MHz, *= plane-wave equivalent power density

MPE (Maximum Permissible Exposure) Prediction

Predication of MPE limit at a given distance: Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2 \quad (\Rightarrow R = \sqrt{PG/4\pi S})$$

S = power density [mW/cm²]

P = Power input to antenna [mW]

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 [cm]

2. RF Exposure Compliance Issue

The information should be included in the user's manual:

This appliance and its antenna must not be co-located or operation in conjunction with any other antenna or transmitter. A minimum separation distance of 20 cm must be maintained between the antenna and the person for this appliance to satisfy the RF exposure requirements.

3. Calculation Result of RF Exposure

Channel	Target power [dB]	Tune up tolerance [dB]	Max tune up power [dB]	Max tune up power [mW]	Ant Gain [dBm]	Ant Gain [mW]	Power Density at 20 cm [mW/cm ²]	Limit [mW/cm ²]
2.4 GHz_n HT20 MIMO	19.00	±2.0	21.00	125.89	3.10	2.04	0.051 14	1.000 00
5.0 GHz_n HT20 MIMO	19.00	±2.0	21.00	125.89	2.80	1.91	0.047 72	1.000 00

4. Target power and tolerance, Max tuneup power

Wifi 2.4 GHz

Channel	Target power	tolerance	Max tune up power
802.11b_Lowest	17.00	±2	19.00
802.11b_Middle	17.00	±2	19.00
802.11b_Highest	17.00	±2	19.00
802.11g_Lowest	16.00	±2	18.00
802.11g_Middle	16.00	±2	18.00
802.11g_Highest	16.00	±2	18.00
802.11n_HT20_Lowest	16.00	±2	18.00
802.11n_HT20_Middle	16.00	±2	18.00
802.11n_HT20_Highest	16.00	±2	18.00
802.11n_HT20_MIMO_Lowest	19.00	±2	21.00
802.11n_HT20_MIMO_Middle	19.00	±2	21.00
802.11n_HT20_MIMO_Highest	17.00	±2	19.00

Wifi 5.0 GHz_5 150 Band

Mode	Target power	tolerance	Max tuneup power
802.11a_Lowest	16.00	± 2	18.00
802.11a_Middle	16.00	± 2	18.00
802.11a_Highest	16.00	± 2	18.00
802.11n HT20_Lowest	16.00	± 2	18.00
802.11n HT20_Middle	16.00	± 2	18.00
802.11n HT20_Highest	16.00	± 2	18.00
802.11n HT20_MIMO_Lowest	19.00	± 2	21.00
802.11n HT20_MIMO_Middle	19.00	± 2	21.00
802.11n HT20_MIMO_Highest	19.00	± 2	21.00

Wifi 5.0 GHz_5 250 Band

Mode	Target power	tolerance	Max tuneup power
802.11a_Lowest	17.00	± 2	19.00
802.11a_Middle	17.00	± 2	19.00
802.11a_Highest	17.00	± 2	19.00
802.11n HT20_Lowest	17.00	± 2	19.00
802.11n HT20_Middle	17.00	± 2	19.00
802.11n HT20_Highest	17.00	± 2	19.00
802.11n HT20_MIMO_Lowest	19.00	± 2	21.00
802.11n HT20_MIMO_Middle	19.00	± 2	21.00
802.11n HT20_MIMO_Highest	19.00	± 2	21.00

Wifi 5.0 GHz_5 470 Band

Mode	Target power	tolerance	Max tuneup power
802.11a_Lowest	17.00	± 2	19.00
802.11a_Middle	17.00	± 2	19.00
802.11a_Highest	17.00	± 2	19.00
802.11n HT20_Lowest	17.00	± 2	19.00
802.11n HT20_Middle	17.00	± 2	19.00
802.11n HT20_Highest	17.00	± 2	19.00
802.11n HT20_MIMO_Lowest	19.00	± 2	21.00
802.11n HT20_MIMO_Middle	19.00	± 2	21.00
802.11n HT20_MIMO_Highest	19.00	± 2	21.00

Wifi 5.0 GHz_5 720 Band

Mode	Target power	tolerance	Max tuneup power
802.11a_Lowest	14.00	± 2	16.00
802.11a_Middle	14.00	± 2	16.00
802.11a_Highest	15.00	± 2	17.00
802.11n HT20_Lowest	15.00	± 2	17.00
802.11n HT20_Middle	15.00	± 2	17.00
802.11n HT20_Highest	15.00	± 2	17.00
802.11n HT20_MIMO_Lowest	17.00	± 2	19.00
802.11n HT20_MIMO_Middle	17.00	± 2	19.00
802.11n HT20_MIMO_Highest	17.00	± 2	19.00