* 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 Permissive Exposure: RF exposure is calculated.

Frequency Range	Electric Field Strength [V/m]	Magnetic Field Strength [A/m]	Power Density [㎽/㎠]	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 ㎒, *= plane-wave equivalent power density*

MPE (Maximum Permissive Exposure) Prediction

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

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

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 [㎝]

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 ㎝ must be maintained between the antenna and the person for this appliance to satisfy the RF exposure requirements.

3. Calculation Result of RF Exposure

V	Mode	Target power [dBm]	Tune up tolerance [dB]	Max tune up power [dBm]	Max tune up power [㎽]	Ant Gain [dBi]	Ant Gain [㎽]	Power Density at 20 ㎝ [㎽/㎠]	Limit [㎽/㎠]
3.7	WiFi_802.11b_ANT 1	15.0	±2	17.0	50.12	1.7	1.48	0.014 75	1.000 00
	WiFi_802.11g_ANT 1	12.0	±2	14.0	25.12	1.7	1.48	0.007 39	1.000 00
	WiFi_802.11b_ANT 2	14.5	±2	16.5	44.67	-0.8	0.83	0.007 39	1.000 00
	WiFi_802.11g_ANT 2	11.0	±2	13.0	19.95	-0.8	0.83	0.003 30	1.000 00
	WiFi_802.11n HT20 _MIMO_(ANT 1+2)	10.0	±2	12.0	15.85	4.71	2.96	0.00 933	1.000 00
9	WiFi_802.11b_ANT 1	15.0	±2	17.0	50.12	1.7	1.48	0.014 75	1.000 00
	WiFi_802.11g_ANT 1	12.0	±2	14.0	25.12	1.7	1.48	0.007 39	1.000 00
	WiFi_802.11b_ANT 2	14.5	±2	16.5	44.67	-0.8	0.83	0.007 39	1.000 00
	WiFi_802.11g_ANT 2	11.0	±2	13.0	19.95	-0.8	0.83	0.003 30	1.000 00
	WiFi_802.11n HT20 _MIMO_(ANT 1+2)	9.6	±2	11.6	14.45	4.71	2.96	0.008 51	1.000 00

4. Target power and tolerance, Max tuneup power

V	Mode	Target power [dBm]	Tolerance [dB]	Max tuneup power [dBm]	Average Power [dBm]
3.7	WiFi_802.11b_ANT 1 _Lowest	15.0	±2	17.0	15.66
	WiFi_802.11b_ANT 1 _Middle	15.0	±2	17.0	15.62
	WiFi_802.11b_ANT 1 _Highest	15.0	±2	17.0	15.81
	WiFi_802.11g_ANT 1 _Lowest	12.0	±2	14.0	12.75
	WiFi_802.11g_ANT 1 _Middle	12.0	±2	14.0	12.53
	WiFi_802.11g_ANT 1 _Highest	12.0	±2	14.0	12.19
	WiFi_802.11b_ANT 2 _Lowest	14.5	±2	16.5	14.61
	WiFi_802.11b_ANT 2 _Middle	14.5	±2	16.5	14.84
	WiFi_802.11b_ANT 2 _Highest	14.5	±2	16.5	16.05

3.7	WiFi_802.11g_ANT 2 _Lowest	11.0	±2	13.0	11.45
	WiFi_802.11g_ANT 2 _Middle	11.0	±2	13.0	12.03
	WiFi_802.11g_ANT 2 _Highest	11.0	±2	13.0	12.53
	WiFi_802.11n HT20 _MIMO_(ANT 1+2) _Lowest	10.0	±2	12.0	10.63
	WiFi_802.11n HT20 _MIMO_(ANT 1+2) _Middle	10.0	±2	12.0	11.71
	WiFi_802.11n HT20 _MIMO_(ANT 1+2) _Highest	10.0	±2	12.0	10.17
9	WiFi_802.11b_ANT 1 _Lowest	15.0	±2	17.0	16.40
	WiFi_802.11b_ANT 1 _Middle	15.0	±2	17.0	15.83
	WiFi_802.11b_ANT 1 _Highest	15.0	±2	17.0	15.76
	WiFi_802.11g_ANT 1 _Lowest	12.0	±2	14.0	13.17
	WiFi_802.11g_ANT 1 _Middle	12.0	±2	14.0	12.94
	WiFi_802.11g_ANT 1 _Highest	12.0	±2	14.0	12.51
	WiFi_802.11b_ANT 2 _Lowest	14.5	±2	16.5	14.67
	WiFi_802.11b_ANT 2 _Middle	14.5	±2	16.5	14.90
	WiFi_802.11b_ANT 2 _Highest	14.5	±2	16.5	16.13
	WiFi_802.11g_ANT 2 _Lowest	11.0	±2	13.0	11.55
	WiFi_802.11g_ANT 2 _Middle	11.0	±2	13.0	12.11
	WiFi_802.11g_ANT 2 _Highest	11.0	±2	13.0	12.61
	WiFi_802.11n HT20 _MIMO_(ANT 1+2) _Lowest	9.6	±2	11.6	11.55
	WiFi_802.11n HT20 _MIMO_(ANT 1+2) _Middle	9.6	±2	11.6	9.61
	WiFi_802.11n HT20 _MIMO_(ANT 1+2) _Highest	9.6	±2	11.6	10.15