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 [mW/cm²]	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/f²)	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 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 [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]

KCTL
http://www.kctl.co.kr

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

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 [㎽/㎠]
ANT0 802.11b_Lowest	12.0	±2.0	14.0	25.12	1.9	1.55	0.007 74	1.000 00
MIMO_ANT 0+1 802.11n_HT20_Lowest	13.0	±2.0	15.0	31.62	1.9	1.55	0.009 74	1.000 00
Total	-						-	-

4. Target power and tolerance, Max tuneup power

- WiFi (ANT 0)

Mode	Target power [dBm]	Tolerance [dB]	Max tuneup power [dBm]	Average Power [dBm]
WiFi_802.11b_Lowest	12.0	±2.0	14.0	13.20
WiFi_802.11b_Middle	12.0	±2.0	14.0	12.79
WiFi_802.11b_Highest	12.0	±2.0	14.0	12.80
WiFi_802.11g_Lowest	10.0	±2.0	12.0	11.52
WiFi_802.11g_Middle	10.0	±2.0	12.0	10.99
WiFi_802.11g_Highest	10.0	±2.0	12.0	10.96
WiFi_802.11n_HT20_Lowest	10.0	±2.0	12.0	11.57
WiFi_802.11n_HT20_Middle	10.0	±2.0	12.0	10.87
WiFi_802.11n_HT20_Highest	10.0	±2.0	12.0	10.99
WiFi_802.11n_HT40_Lowest	9.0	±2.0	11.0	10.18
WiFi_802.11n_HT40_Middle	9.0	±2.0	11.0	9.88
WiFi_802.11n_HT40_Highest	9.0	±2.0	11.0	9.72

- WiFi MIMO (ANT 0+1)

Mode	Target power [dBm]	Tolerance [dB]	Max tuneup power [dBm]	Average Power [dBm]
WiFi_802.11n_HT20 _ Lowest	13.0	±2.0	15.0	14.37
WiFi_802.11n_HT20 _Middle	13.0	±2.0	15.0	13.96
WiFi_802.11n_HT20 _Highest	13.0	±2.0	15.0	14.03
WiFi_802.11n_HT40 _Lowest	12.0	±2.0	14.0	13.24
WiFi_802.11n_HT40 _Middle	12.0	±2.0	14.0	12.82
WiFi_802.11n_HT40 _Highest	12.0	±2.0	14.0	12.90