* 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 [㎝]

EUT: Maximum peak output power = 124.74 [㎽] (20.96 ㏈m) Antenna gain = 2.28 [㎽] (3.57 ㏈i)	
100 ㎽, at 20 cm from an antenna 6 [㏈i]	S = PG/4πR² = 100 × 3.98 / (4 × π × 400) = 0.079 18 [㎽/㎠] < 1.0 [㎽/㎠]
124.74 ㎽, at 20 cm from an antenna 3.57 [㏈i]	S = PG/4πR² = 0.056 46[㎽/㎠] < 1.0 [㎽/㎠]

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

*** 802.11b**

Channel	Frequency [㎒]	Ant Gain [dBi]	power [dBm]	power [㎽]	Power Density at 20 ㎝ [㎽/㎠]
Lowest	2 412	3.57	13.85	24.27	0.010 98
Middle	2 437	3.57	14.15	26.00	0.011 77
Highest	2 462	3.57	14.25	26.61	0.012 04

*** 802.11g**

Channel	Frequency [㎒]	Ant Gain [dBi]	power [dBm]	power [㎽]	Power Density at 20 ㎝ [㎽/㎠]
Lowest	2 412	3.57	20.16	103.75	0.046 96
Middle	2 437	3.57	20.46	111.17	0.050 32
Highest	2 462	3.57	20.76	119.12	0.053 92

*** 802.11n HT20**

Channel	Frequency [㎒]	Ant Gain [dBi]	power [dBm]	power [㎽]	Power Density at 20 ㎝ [㎽/㎠]
Lowest	2 412	3.57	19.76	94.62	0.042 83
Middle	2 437	3.57	19.96	99.08	0.044 85
Highest	2 462	3.57	20.06	101.39	0.045 89

*** 802.11n HT40**

Channel	Frequency [㎒]	Ant Gain [dBi]	power [dBm]	power [㎽]	Power Density at 20 ㎝ [㎽/㎠]
Lowest	2 422	3.57	20.56	113.76	0.051 49
Middle	2 437	3.57	20.76	119.12	0.053 92
Highest	2 452	3.57	20.96	124.74	0.056 46