

## \* 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/cm <sup>2</sup> ] | 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 <sup>2</sup> )              | 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

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

S = power density [mW/cm<sup>2</sup>]

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

| Mode                 | 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 <sup>2</sup> ] | Limit [mW/cm <sup>2</sup> ] |
|----------------------|-------------------|------------------------|------------------------|------------------------|----------------|---------------|--|-----------------------------|
| WiFi 2.4 GHz_802.11b | 14.00             | ± 1.50                 | 15.50                  | 35.48                  | 5.03           | 3.18          | 0.022 48                                     | 1.000 00                    |
| 802.11n HT20         | 4.50              | ± 1.50                 | 6.00                   | 3.98                   | 4.88           | 3.08          | 0.002 44                                     | 1.000 00                    |

## 4. Target power and tolerance, Max tuneup power

### - WiFi 2.4 GHz

|              | Target Power [dB] | Tune up Tolerance [dB] | Max tune up Power [dB] | measurd power [dBm] |
|--------------|-------------------|------------------------|------------------------|---------------------|
| 802.11b      | 14.00             | ± 1.50                 | 15.50                  | 14.47               |
| 802.11g      | 12.00             | ± 1.50                 | 13.50                  | 14.46               |
| 802.11n HT20 | 12.00             | ± 1.50                 | 13.50                  | 14.51               |

### - Bluetooth

|       | Target Power [dB] | Tune up Tolerance [dB] | Max tune up Power [dB] | measurd power [dBm] |
|-------|-------------------|------------------------|------------------------|---------------------|
| GFSK  | 4.50              | ± 1.50                 | 6.00                   | 5.80                |
| 8DPSK | -0.50             | ± 1.50                 | 1.00                   | 0.75                |