

## FCC §15.247 (i) & §1.1307 (b) (3) & §2.1091- MPE-Based Exemption

### Applicable Standard

According to subpart 15.247 and subpart 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

#### Limits for General Population/Uncontrolled Exposure

| Limits for General Population/Uncontrolled Exposure |                               |                               |                                     |                          |
|-----------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| Frequency Range (MHz)                               | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm <sup>2</sup> ) | Averaging Time (Minutes) |
| 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                       |
| 300-1500                                            | /                             | /                             | f/1500                              | 30                       |
| 1500-100,000                                        | /                             | /                             | 1.0                                 | 30                       |

f = frequency in MHz

\* = Plane-wave equivalent power density

### Result

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)

P = power input to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

### Test result

| Mode  | Frequency (MHz) | Antenna Gain |           | Tune up conducted power |       | Evaluation Distance (cm) | Power Density (mW/cm <sup>2</sup> ) | MPE Limit (mW/cm <sup>2</sup> ) |
|-------|-----------------|--------------|-----------|-------------------------|-------|--------------------------|-------------------------------------|---------------------------------|
|       |                 | (dBi)        | (numeric) | (dBm)                   | (mW)  |                          |                                     |                                 |
| FHSS  | 2405-2478       | 0.85         | 1.22      | 8.0                     | 6.31  | 20                       | 0.002                               | 1                               |
| Wi-Fi | 5150-5250       | 2.0          | 1.58      | 9.5                     | 8.91  | 20                       | 0.003                               | 1                               |
|       | 5725-5850       | 2.0          | 1.58      | 11.5                    | 14.13 | 20                       | 0.004                               | 1                               |

Note 1: The tune-up power and antenna gain was declared by the applicant.

Note 2: The FHSS can transmit at same time with 5GHz Wi-Fi.

Simultaneous transmitting consideration:

The ratio= 0.002+0.004=0.006 < 1.0, so simultaneous exposure is compliant.

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

**Result: Compliant.**