



## FCC §15.247 (i), §2.1091 – RF Exposure

### FCC ID: 2ABC5AIO-1502

#### Applied procedures / limit

According to FCC §15.247(i) and §1.1307(b)(1), 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 level in excess of the Commission's guidelines.

#### Limits for Occupational / Controlled Exposure

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/ cm <sup>2</sup> ) | Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|------------------------------------------|------------------------------------------------------------------|
| 0.3-3.0               | 614                               | 1.63                              | (100)*                                   | 6                                                                |
| 3.0-30                | 1842 / f                          | 4.89 / f                          | (900 / f)*                               | 6                                                                |
| 30-300                | 61.4                              | 0.163                             | 1.0                                      | 6                                                                |
| 300-1500              |                                   |                                   | F/300                                    | 6                                                                |
| 1500-100,000          |                                   |                                   | 5                                        | 6                                                                |

Note: f is frequency in MHz

\* = Power density limit is applicable at frequencies greater than 100 MHz

#### Limits for General Population / Uncontrolled Exposure

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/ cm <sup>2</sup> ) | Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|------------------------------------------|------------------------------------------------------------------|
| 0.3-1.34              | 614                               | 1.63                              | (100)*                                   | 30                                                               |
| 1.34-30               | 824/f                             | 2.19/f                            | (180/f)*                                 | 30                                                               |
| 30-300                | 27.5                              | 0.073                             | 0.2                                      | 30                                                               |
| 300-1500              |                                   |                                   | F/1500                                   | 30                                                               |
| 1500-100,000          |                                   |                                   | 1.0                                      | 30                                                               |

Note: f = frequency in MHz

\* = Plane-wave equivalent power density



## 2.4G WIFI

*IEEE 802.11b*

*max possible output power (PK,conducted) : 15.36±1dbm*

*IEEE 802.11g*

*max possible output power (PK,conducted) : 13.85±1dbm*

*IEEE 802.11N(HT20)*

*max possible output power (PK,conducted) : 12.73±1dbm*

*IEEE 802.11N(HT40)*

*max possible output power (PK,conducted) : 11.68±1dbm*

*The max possible output power (PK,conducted) of All (IEEE 802.11b , IEEE 802.11g, IEEE 802.11n(20), IEEE 802.11n(40)) is IEEE 802.11b.*

| 802.11b Mode      |           |                                    |       |
|-------------------|-----------|------------------------------------|-------|
| Test Channel      | Frequency | Maximum Conducted Output Power(PK) | LIMIT |
|                   | (MHz)     | (dBm)                              | dBm   |
| CH01              | 2412      | 15.36                              | 30    |
| CH06              | 2437      | 15.27                              | 30    |
| CH11              | 2462      | 15.31                              | 30    |
| 802.11g Mode      |           |                                    |       |
| CH01              | 2412      | 13.85                              | 30    |
| CH06              | 2437      | 13.54                              | 30    |
| CH11              | 2462      | 13.61                              | 30    |
| 802.11n-HT20 Mode |           |                                    |       |
| CH01              | 2412      | 12.64                              | 30    |
| CH06              | 2437      | 12.73                              | 30    |
| CH11              | 2462      | 12.57                              | 30    |
| 802.11n-HT40 Mode |           |                                    |       |
| CH03              | 2422      | 11.17                              | 30    |
| CH06              | 2437      | 11.68                              | 30    |
| CH09              | 2452      | 11.35                              | 30    |



## MPE PREDICTION

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

$$S = PG/4\pi R^2$$

Where: 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, R=20cm

## Test Result of RF Exposure Evaluation

|                  | Target power<br>W/ tolerance<br>(dBm) | Max tune<br>up power<br>tolerance<br>(dBm) | Output power<br>to antenna<br>(mW) | Antenna<br>Gain(dBi) | Power<br>Density at<br>R=20cm<br>(mW/cm <sup>2</sup> ) | Limit<br>(mW/cm <sup>2</sup> ) | Result |
|------------------|---------------------------------------|--------------------------------------------|------------------------------------|----------------------|--------------------------------------------------------|--------------------------------|--------|
| 802.11b          | 15.36±1.0                             | 16.36                                      | 43.25                              | 1.62<br>(2.1dBi)     | 0.013946                                               | 1.0                            | Pass   |
| 802.11g          | 13.85±1.0                             | 14.85                                      | 30.55                              | 1.62<br>(2.1dBi)     | 0.009850                                               | 1.0                            | Pass   |
| 802.11n20M<br>Hz | 12.73±1.0                             | 13.73                                      | 23.60                              | 1.62<br>(2.1dBi)     | 0.007610                                               | 1.0                            | Pass   |
| 802.11n40M<br>Hz | 11.68±1.0                             | 12.68                                      | 18.54                              | 1.62<br>(2.1dBi)     | 0.005978                                               | 1.0                            | Pass   |