# FCC ID: 2AEPW-LIW-1

## RF EXPOSURE EVALUATION

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency(RF) Radiation as specified in §1.1307(b)

Limits for Maximum Permissible Exposure (MPE)

| Frequency range (MHz) | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm$^2$) | Averaging time (minutes) |
|---|---|---|---|---|
| **(A) Limits for Occupational/Controlled Exposure** | | | | |
| 0.3-3.0 | 614 | 1.63 | *100 | 6 |
| 3.0-30 | 1842/f | 4.89/f | *900/f$^2$ | 6 |
| 30-300 | 61.4 | 0.163 | 1.0 | 6 |
| 300-1,500 | | | f/300 | 6 |
| 1,500-100,000 | | | 5 | 6 |
| **(B) 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/1500 | 30 |
| 1,500-100,000 | | | 1.0 | 30 |

f = frequency in MHz * = Plane-wave equivalent power density

### MPE Calculation Method

E (V/m) = $\frac{\sqrt{30 * P * G}}{d}$ Power Density: *Pd* (W/m²) = $\frac{E^2}{377}$

E = Electric field (V/m)

P = Average RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 * P * G}{377 * D^2}$$

From the EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

## Measurement Result

Operation Frequency: 2412-2462MHz for 802.11b/g/11n(HT20);2422-2452MHz for 802.11n(HT40)
Power density limited: 1mW/ $cm^2$
Antenna Type: External monopole Antenna
Antenna gain: 2.0 dBi
R=20cm
WIFI:

| Channel Freq. (MHz) | modulation | conducted power | Tune-up power (dBm) | Max | | Antenna | | Evaluation result | Power density Limits |
|---|---|---|---|---|---|---|---|---|---|
| | | (dBm) | | tune-up power | | Gain | | (mW/cm2 ) | (mW/cm2) |
| | | | | (dBm) | (mW) | (dBi) | Numeric | | |
| 2412 | 802.11b | 12.59 | 12±1 | 12 | 15.849 | 2.00 | 1.58 | 0.0050 | 1 |
| 2437 | | 12.28 | 12±1 | 12 | 15.849 | 2.00 | 1.58 | 0.0050 | 1 |
| 2462 | | 12.21 | 12±1 | 12 | 15.849 | 2.00 | 1.58 | 0.0050 | 1 |
| 2412 | 802.11g | 11.42 | 11±1 | 11 | 12.589 | 2.00 | 1.58 | 0.0040 | 1 |
| 2437 | | 11.25 | 11±1 | 11 | 12.589 | 2.00 | 1.58 | 0.0040 | 1 |
| 2462 | | 11.47 | 11±1 | 11 | 12.589 | 2.00 | 1.58 | 0.0040 | 1 |
| 2412 | 802.11n HT20 | 12.05 | 12±1 | 12 | 15.849 | 2.00 | 1.58 | 0.0050 | 1 |
| 2437 | | 11.62 | 12±1 | 12 | 15.849 | 2.00 | 1.58 | 0.0050 | 1 |
| 2462 | | 10.78 | 12±1 | 12 | 15.849 | 2.00 | 1.58 | 0.0050 | 1 |
| 2422 | 802.11n HT40 | 9.81 | 10±1 | 10 | 10.000 | 2.00 | 1.58 | 0.0032 | 1 |
| 2437 | | 9.53 | 10±1 | 10 | 10.000 | 2.00 | 1.58 | 0.0032 | 1 |
| 2452 | | 10.35 | 10±1 | 10 | 10.000 | 2.00 | 1.58 | 0.0032 | 1 |

**Conclusion:**
For the max result : 0.0050 ≤ 1.0 for Max Power Density, compliance RF exposure..

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