



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

# FCC ID: 2ALAY-SHELLY

### 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



## 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=0.2m

## TEST RESULTS

| Modulation | Channel Freq. (MHz) | Conduct ed power (dBm) | Tune-up power (dBm) | Max tune-up power (dBm) | Max tune-up power (mW) | Antenna Gain Numeric | Evaluation result (mW/cm2 ) | Power density Limits (mW/cm2) |
|------------|---------------------|------------------------|---------------------|-------------------------|------------------------|----------------------|-----------------------------|-------------------------------|
| 802.11b    | 2.412               | 8.86                   | 8±1                 | 9.00                    | 7.94                   | 1.26                 | 0.00199                     | 1                             |
|            | 2.437               | 8.13                   | 8±1                 | 9.00                    | 7.94                   | 1.26                 | 0.00199                     | 1                             |
|            | 2.462               | 8.61                   | 8±1                 | 9.00                    | 7.94                   | 1.26                 | 0.00199                     | 1                             |
| 802.11g    | 2.412               | 8.61                   | 8±1                 | 9.00                    | 7.94                   | 1.26                 | 0.00199                     | 1                             |
|            | 2.437               | 7.05                   | 7±1                 | 8.00                    | 6.31                   | 1.26                 | 0.00158                     | 1                             |
|            | 2.462               | 8.54                   | 8±1                 | 9.00                    | 7.94                   | 1.26                 | 0.00199                     | 1                             |
| 802.11n20  | 2.412               | 7.88                   | 7±1                 | 8.00                    | 6.31                   | 1.26                 | 0.00158                     | 1                             |
|            | 2.437               | 6.15                   | 6±1                 | 7.00                    | 5.01                   | 1.26                 | 0.00126                     | 1                             |
|            | 2.462               | 7.50                   | 7±1                 | 8.00                    | 6.31                   | 1.26                 | 0.00158                     | 1                             |

### Conclusion:

For the max result :  $0.00199 \leq 1.0$ , compliance with FCC's RF Exposure.

Summary: Since the ERP (effective radiated power) operated at < 1.5 GHz is less than 1.5 watts and > 1.5 GHz is less than 3 watts, the routine environmental evaluation is not required, and the MPE result calculated for this device complies with the MPE limit as specified in 47 CFR §1.1310.