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

# FCC ID:LNQSBWD100B

**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/ $cm^2$) | Averaging Time $\|E\|^2$,$\|H\|^2$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/ $cm^2$) | Averaging Time $\|E\|^2$,$\|H\|^2$ 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

**TEST RESULTS**

**2.4G:**

| Test Channe | Frequency | Maximum output power. Antenna port | | | | Total Power | | Maximum output power (AV) |
|---|---|---|---|---|---|---|---|---|
| | | (PK) (dBm) | | (AV) (dBm) | | (PK) | (AV) | |
| | (MHz) | ANT A | ANT B | ANT A | ANT B | dBm | dBm | mW |
| **TX 802.11b Mode** | | | | | | | | |
| CH01 | 2412 | 15.31 | 14.64 | 12.08 | 11.14 | 18.00 | 14.65 | 29.17 |
| CH06 | 2437 | 15.23 | 14.73 | 12.15 | 11.15 | 18.04 | 14.65 | 29.17 |
| CH11 | 2462 | 15.41 | 14.47 | 12.42 | 11.28 | 17.98 | 14.90 | 30.90 |
| **TX 802.11g Mode** | | | | | | | | |
| CH01 | 2412 | 13.25 | 12.32 | 10.12 | 9.21 | 15.82 | 12.70 | 18.62 |
| CH06 | 2437 | 13.42 | 12.41 | 10.09 | 9.41 | 15.86 | 12.79 | 19.01 |
| CH11 | 2462 | 13.31 | 12.52 | 10.24 | 9.32 | 15.94 | 12.81 | 19.10 |
| **TX 802.11n/20M Mode** | | | | | | | | |
| CH01 | 2412 | 12.11 | 11.21 | 9.04 | 8.34 | 14.69 | 11.71 | 14.83 |
| CH06 | 2437 | 12.23 | 11.32 | 9.13 | 8.15 | 14.74 | 11.63 | 14.55 |
| CH11 | 2462 | 12.09 | 11.07 | 9.21 | 8.02 | 14.62 | 11.67 | 14.69 |
| **TX 802.11n/40M Mode** | | | | | | | | |
| CH03 | 2422 | 10.13 | 9.46 | 6.37 | 5.18 | 12.82 | 8.83 | 7.64 |
| CH06 | 2437 | 10.47 | 9.34 | 6.75 | 5.53 | 12.76 | 8.98 | 7.91 |
| CH09 | 2452 | 10.14 | 9.42 | 6.42 | 5.58 | 12.81 | 9.03 | 8.00 |

| Mode | Range | Maximum peak output power (dBm) | Output power (mW) | Antenna Gain (numeric) | Power Density (S) (mW/ $cm^2$) | Limit of Power Density (S) (mW/ $cm^2$) | Result |
|---|---|---|---|---|---|---|---|
| 802.11b | 13~15 | 15 | 31.62 | 3.6dBi( 2.29) | 0.0144 | 1 | Pass |
| 802.11g | 11~13 | 13 | 19.95 | 3.6dBi( 2.29) | 0.0091 | 1 | Pass |
| 802.11n-HT20 | 10~12 | 12 | 15.85 | 3.6dBi( 2.29) | 0.0072 | 1 | Pass |
| 802.11n-HT40 | 8~10 | 10 | 10.00 | 3.6dBi( 2.29) | 0.0046 | 1 | Pass |

**5.8G:**

| Test Channe | Frequency | Maximum output power. Antenna port | | | | Total Power | | LIMIT |
|---|---|---|---|---|---|---|---|---|
| | | (PK) (dBm) | | (AV) (dBm) | | (PK) | (AV) | |
| | (MHz) | ANT A | ANT B | ANT A | ANT B | dBm | dBm | dBm |
| **TX 802.11a Mode** | | | | | | | | |
| CH149 | 5745 | 17.54 | 17.13 | 15.26 | 14.31 | 20.35 | 17.82 | 30.00 |
| CH157 | 5785 | 17.05 | 17.35 | 14.62 | 14.69 | 20.21 | 17.67 | 30.00 |
| CH165 | 5825 | 16.65 | 17.12 | 14.71 | 14.36 | 19.90 | 17.55 | 30.00 |
| **TX 802.11 n20M Mode** | | | | | | | | |
| CH149 | 5745 | 17.34 | 17.62 | 14.85 | 14.92 | 20.49 | 17.90 | 30.00 |
| CH157 | 5785 | 17.02 | 17.19 | 14.44 | 14.60 | 20.12 | 17.53 | 30.00 |
| CH165 | 5825 | 17.08 | 17.04 | 14.42 | 14.31 | 20.07 | 17.38 | 30.00 |
| **TX 802.11 n40M Mode** | | | | | | | | |
| CH151 | 5755 | 17.44 | 17.40 | 14.75 | 14.67 | 20.43 | 17.72 | 30.00 |
| CH155 | 5775 | 17.83 | 17.41 | 15.03 | 14.98 | 20.64 | 18.02 | 30.00 |
| CH163 | 5815 | 17.23 | 17.16 | 14.68 | 14.21 | 20.21 | 17.46 | 30.00 |

| Mode | Range | Maximum peak output power (dBm) | Output power (mW) | Antenna Gain (numeric) | Power Density (S) (mW/ $cm^2$) | Limit of Power Density (S) (mW/ $cm^2$) | Result |
|---|---|---|---|---|---|---|---|
| 802.11a | 16~18 | 18 | 63.10 | 3.6dBi( 2.29) | 0.0287 | 1 | Pass |
| 802.11n (20) | 16~18 | 18 | 63.10 | 3.6dBi( 2.29) | 0.0287 | 1 | Pass |
| 802.11n(40) | 16~18 | 18 | 63.10 | 3.6dBi( 2.29) | 0.0287 | 1 | Pass |

5.2G

| Test Channe | Frequency | Maximum output power. Antenna port | | | | Total Power | | Maximum output power (AV) |
|---|---|---|---|---|---|---|---|---|
| | | (PK) (dBm) | | (AV) (dBm) | | (PK) | (AV) | |
| | (MHz) | ANT A | ANT B | mW | ANT B | dBm | dBm | mW |
| **TX 802.11a Mode** | | | | | | | | |
| CH36 | 5180 | 11.09 | 10.12 | 7.84 | 6.62 | 13.64 | 10.28 | 10.67 |
| CH40 | 5200 | 11.23 | 10.09 | 7.94 | 6.71 | 13.63 | 10.32 | 10.76 |
| CH48 | 5240 | 11.78 | 10.76 | 7.81 | 6.54 | 14.31 | 10.23 | 10.54 |
| **TX 802.11 n20M Mode** | | | | | | | | |
| CH36 | 5180 | 10.12 | 9.71 | 6.54 | 5.35 | 12.93 | 9.00 | 7.94 |
| CH40 | 5200 | 10.43 | 9.49 | 6.89 | 5.17 | 12.83 | 8.92 | 7.80 |
| CH48 | 5240 | 10.63 | 9.57 | 6.35 | 5.39 | 13.14 | 8.91 | 7.78 |
| **TX 802.11 n40M Mode** | | | | | | | | |
| CH38 | 5190 | 9.98 | 8.88 | 5.89 | 5.12 | 12.48 | 8.53 | 7.13 |
| CH46 | 5230 | 10.12 | 8.93 | 5.92 | 5.19 | 12.50 | 8.56 | 7.18 |

| Mode | Range | Maximum peak output power (dBm) | Output power (mW) | Antenna Gain (numeric) | Power Density (S) (mW/ $cm^2$) | Limit of Power Density (S) (mW/ $cm^2$) | Result |
|---|---|---|---|---|---|---|---|
| 802.11a | 9~11 | 11 | 12.59 | 3.6dBi( 2.29) | 0.0057 | 1 | Pass |
| 802.11n (20) | 8~10 | 10 | 10.00 | 3.6dBi( 2.29) | 0.0046 | 1 | Pass |
| 802.11n(40) | 8~10 | 10 | 10.00 | 3.6dBi( 2.29) | 0.0046 | 1 | Pass |

Note：This device 5GHz and 2.4GHz can not transmit simultaneously，don't have to assess exposure when transmit simultaneously.