

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

FCC ID: 2ADUM-OPL001

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

| Test Channel | 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 802.11b Mode | | | | | | | | |
| CH01 | 2412 | 9.95 | 8.92 | 9.79 | 8.72 | 12.48 | 12.30 | 28.0 |
| CH06 | 2437 | 9.89 | 8.91 | 9.64 | 8.63 | 12.44 | 12.17 | 28.0 |
| CH11 | 2462 | 9.83 | 8.93 | 9.63 | 8.66 | 12.41 | 12.18 | 28.0 |
| TX 802.11g Mode | | | | | | | | |
| CH01 | 2412 | 9.85 | 8.75 | 9.53 | 8.66 | 12.35 | 12.13 | 28.0 |
| CH06 | 2437 | 9.83 | 8.85 | 9.61 | 8.47 | 12.38 | 12.09 | 28.0 |
| CH11 | 2462 | 9.92 | 8.94 | 9.44 | 8.66 | 12.47 | 12.08 | 28.0 |
| TX 802.11n/20M Mode | | | | | | | | |
| CH01 | 2412 | 9.56 | 8.66 | 8.99 | 8.09 | 12.14 | 11.57 | 28.0 |
| CH06 | 2437 | 9.72 | 8.78 | 9.02 | 8.11 | 12.29 | 11.60 | 28.0 |
| CH11 | 2462 | 9.53 | 8.51 | 9.05 | 8.06 | 12.06 | 11.59 | 28.0 |

| 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 | 11~13 | 13 | 19.95 | 5dBi(3.16) | 0.0125 | 1 | Pass |
| 802.11g | 11~13 | 13 | 19.95 | 5dBi(3.16) | 0.0125 | 1 | Pass |
| 802.11n-HT20 | 11~13 | 13 | 19.95 | 5dBi(3.16) | 0.0125 | 1 | Pass |

| Frequency MHz | 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 |
|---------------|-------|---------------------------------|-------------------|------------------------|--|---|--------|
| 2412-2462 | 11~13 | 13 | 19.95 | 5dBi(3.16) | 0.0125 | 1 | Pass |