

FCC §1.1310 & §2.1091 –MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart §2.1091 and subpart §1.1310, 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 Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

| (B) Limits for General Population/Uncontrolled Exposure | | | | |
|----------------------------------------------------------------|--------------------------------------|--------------------------------------|------------------------------------------|---------------------------------|
| Frequency Range (MHz) | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm²) | Averaging Time (minutes) |
| 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 |
| 300-1500 | / | / | f/1500 | 30 |
| 1500-100,000 | / | / | 1.0 | 30 |

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

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:

Predication of MPE limit at a given distance

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

| Mode | Frequency Range (MHz) | Antenna Gain | | Tune up Conducted Power | | Evaluation Distance (cm) | Power Density (mW/cm ²) | MPE Limit (mW/cm ²) |
|--------------|-----------------------|--------------|-----------|-------------------------|--------|--------------------------|-------------------------------------|---------------------------------|
| | | (dBi) | (numeric) | (dBm) | (mW) | | | |
| 802.11b | 2412~2462 | 2.33 | 1.71 | 24.50 | 281.84 | 20 | 0.0959 | 1.0 |
| 802.11g | | 2.33 | 1.71 | 24.00 | 251.19 | 20 | 0.0854 | 1.0 |
| 802.11n-HT20 | | 2.33 | 1.71 | 23.50 | 223.87 | 20 | 0.0761 | 1.0 |
| 802.11n-HT40 | 2422~2452 | 2.33 | 1.71 | 21.50 | 141.25 | 20 | 0.0480 | 1.0 |
| BLE | 2402~2480 | 2.33 | 1.71 | 5.0 | 3.16 | 20 | 0.0011 | 1.0 |
| BT3.0 | 2402~2480 | 2.33 | 1.71 | 8.0 | 6.31 | 20 | 0.0021 | 1.0 |

Note: 1. Wi-Fi and BT/BLE can't transmit simultaneously.

2. The tune up conducted power was declared by the manufacturer.

Conclusion: The EUT meets exemption requirement - RF exposure evaluation greater than 20cm distance specified in § 2.1091. If the device built into a host as a portable usage, the additional RF exposure evaluation may be required as specified by § 2.1093.