

## FCC §15.247 (i) & §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

### Applicable Standard

According to §15.247(i) and §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/cm <sup>2</sup> ) | Averaging Time (minutes) |
| 0.3–1.34                                                | 614                           | 1.63                          | *(100)                              | 30                       |
| 1.34–30                                                 | 824/f                         | 2.19/f                        | *(180/f <sup>2</sup> )              | 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/cm<sup>2</sup>);

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:

| Modes             | Frequency (MHz) | Antenna Gain |           | Conducted output power including Tune-up Tolerance |        | Evaluation Distance (cm) | Power Density (mW/cm <sup>2</sup> ) | MPE Limit (mW/cm <sup>2</sup> ) |
|-------------------|-----------------|--------------|-----------|----------------------------------------------------|--------|--------------------------|-------------------------------------|---------------------------------|
|                   |                 | (dBi)        | (numeric) | (dBm)                                              | (mW)   |                          |                                     |                                 |
| 2.4G Wifi         | 2412-2462       | 2.8          | 1.91      | 22                                                 | 158.49 | 20.00                    | 0.0601                              | 1.0                             |
| Bluetooth BDR/EDR | 2402-2480       | 2.8          | 1.91      | 4                                                  | 2.51   | 20.00                    | 0.0010                              | 1.0                             |
| Bluetooth LE      | 2402-2480       | 2.8          | 1.91      | 5                                                  | 3.16   | 20.00                    | 0.0012                              | 1.0                             |
| 5G Wifi           | 5180-5825       | 6.5          | 4.47      | 12                                                 | 15.85  | 20.00                    | 0.0141                              | 1.0                             |

Note: The WLAN 2.4G, 5G or Bluetooth can't transmit simultaneously.

**Result:** The device meet FCC MPE at 20 cm distance