

47 C.F.R. Part 1, Subpart I, Section 1.1310
47 C.F.R. Part 2, Subpart J, Section 2.1091
Maximum Permissible Exposure Calculations

For FCC ID: 2BF5N-SENS247

EUT Device Category = General Population/Uncontrolled Exposure

MPE Summary:

According subpart 1.1307 (b)(1) and 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

| Limits for General Population/Uncontrolled Exposure | | | | | | | |
|--|-------|-------------------------|--------|-------------------------|------------------------|-------------------------------------|--------------------------|
| Frequency (MHz) | Range | Electric Strength (V/m) | Field | Magnetic Strength (A/m) | Field | Power Density (mW/cm ²) | 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

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm²)

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

PG = EIRP

MPE and Limit are calculated for this device as follows:

| BLE Transceiver Antenna Gain 2.00 dBi | | | | | | |
|--|-----------------------|------------|-----------|--|-----------------------------|-------------|
| Freq | Conducted Power (dBm) | EIRP (dBm) | EIRP (mW) | Power Density at 20 cm (mW/cm ²) | Limit (mW/cm ²) | Margin (mW) |
| 2402 | -9.28 | -7.28 | 0.187 | 0.00004 | 1.000 | 0.99996 |
| 2440 | -10.50 | -8.50 | 0.141 | 0.00003 | 1.000 | 0.99997 |
| 2480 | -8.98 | --6.98 | 0.200 | 0.00004 | 1.000 | 0.99996 |

| WiFi Module, Antenna Gain 2.00 dBi | | | | | | |
|---|----------------------|------------|-----------|--|-----------------------------|-------------|
| Protocol | Channel at Peak EIRP | EIRP (dBm) | EIRP (mW) | Power Density at 20 cm (mW/cm ²) | Limit (mW/cm ²) | Margin (mW) |
| 802.11b | 2462 | 14.00 | 25.119 | 0.00500 | 1.00 | 0.99500 |
| 802.11g | 2437 | 19.00 | 79.433 | 0.01580 | 1.00 | 0.98420 |
| 802.11n20 | 2462 | 18.00 | 63.096 | 0.01255 | 1.00 | 0.98745 |
| 802.11n40 | 2437 | 17.00 | 50.119 | 0.00997 | 1.00 | 0.99003 |

Multi Transmitter Ratio Evaluation:

Worst Case BLE MPE Ratio = 0.00004

Worst Case Module MPE Ratio = 0.01580

0.00004 + 0.01580 = 0.01584 ≤ 1

Result: The device meets FCC MPE limit at 20 cm for General Population/Uncontrolled Exposure as specified in 47 CRF §1.1310 and §2.1091.