

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 Range (MHz)	Electric Strength (V/m)	Field Magnetic Strength (A/m)	Field 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

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

$$0.00004 + 0.01580 = 0.01584 \leq 1$$

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.