

**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: U4A-WF1MRUS

EUT Device Category = General Population/Uncontrolled Exposure

EUT consists of one ISM band radio transmitting over a range of: **2402 MHz to 2480 MHz, 2412 MHz to 2462 MHz, and 5180 MHz to 5825 MHz**

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/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:

2.4 GHz Frequency Band								
BLE Transceiver								
Freq	Output Power (dBm)	Tune-up Tolerance (dB)	Max Antenna Gain (dBi)	Max EIRP (dBm)	Max EIRP (mW)	Power Density at 20 cm (mW/cm ²)	Limit (mW)	Margin (mW)
2402	3.410	0.5	2.000	5.910	3.899	0.001	1.000	0.999
2440	4.920	0.5	2.000	7.420	5.521	0.001	1.000	0.999
2480	3.520	0.5	2.000	6.020	3.999	0.001	1.000	0.999
802.11b								
2412	15.700	0.5	2.000	18.200	66.069	0.013	1.000	0.987
2437	15.400	0.5	2.000	17.900	61.660	0.012	1.000	0.988
2462	15.300	0.5	2.000	17.800	60.256	0.012	1.000	0.988
802.11g								
2412	16.200	0.5	2.000	18.700	74.131	0.015	1.000	0.985
2437	16.200	0.5	2.000	18.700	74.131	0.015	1.000	0.985
2462	15.800	0.5	2.000	18.300	67.608	0.013	1.000	0.987
802.11n								
2412	12.300	0.5	2.000	14.800	30.200	0.006	1.000	0.994
2437	12.300	0.5	2.000	14.800	30.200	0.006	1.000	0.994
2462	12.100	0.5	2.000	14.600	28.840	0.006	1.000	0.994
5 GHz Frequency Band								
UNII-1 band								
5180	14.200	0.5	2.500	17.200	52.481	0.010	1.000	0.990
5220	13.900	0.5	2.500	16.900	48.978	0.010	1.000	0.990
5240	13.700	0.5	2.500	16.700	46.774	0.009	1.000	0.991
UNII-2A								
5260	14.000	0.5	2.500	17.000	50.119	0.010	1.000	0.990
5280	14.100	0.5	2.500	17.100	51.286	0.010	1.000	0.990
5320	14.500	0.5	2.500	17.500	56.234	0.011	1.000	0.989
UNII-2C								
5500	13.700	0.5	2.500	16.700	46.774	0.009	1.000	0.991
5600	13.600	0.5	2.500	16.600	45.709	0.009	1.000	0.991
5700	13.500	0.5	2.500	16.500	44.668	0.009	1.000	0.991
UNII-3 band Antenna 0								
5745	19.500	0.5	2.500	22.500	177.828	0.035	1.000	0.965
5785	19.700	0.5	2.500	22.700	186.209	0.037	1.000	0.963
5825	19.500	0.5	2.500	22.500	177.828	0.035	1.000	0.965

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