



## Maximum Permissible Exposure

### FCC Part 2 Sections §2.1091 and §2.1093

**Test Requirement(s):** §15.407(f): U-NII devices are subject to the radio frequency radiation exposure requirements specified in §1.1307(b), §2.1091 and §2.1093 of this chapter, as appropriate. All equipment shall be considered to operate in a “general population/uncontrolled” environment.

**RF Exposure Requirements:** §1.1307(b)(1) and §1.1307(b)(2): 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 levels in excess of the Commission’s guidelines.

**RF Radiation Exposure Limit:** §1.1310: As specified in this section, the Maximum Permissible Exposure (MPE) Limit shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in Sec. 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of Sec. 2.1093 of this chapter.

MPE Limit: EUT’s operating frequencies @ BLE 2402 – 2480 MHz, LTE 704 – 1915 MHz; **Limit for Uncontrolled exposure: 0.47 mW/cm<sup>2</sup> or 4.69 W/m<sup>2</sup>**

Equation from page 18 of OET 65, Edition 97-01

$$S = PG / 4\pi R^2 \quad \text{or} \quad R = \sqrt{PG / 4\pi S}$$

where, S = Power Density (mW/cm<sup>2</sup>)  
 P = Power Input to antenna (mW)  
 G = Antenna Gain (numeric value)  
 R = Distance (cm)

**Test Results:**

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Frequency (MHz)	Con. Pwr. (dBm)	Con. Pwr. (mW)	Ant. Gain (dBi)	Ant. Gain numeric	Pwr. Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Margin	Distance (cm)	Result
2480*	6.31	4.28	3.2	2.09	0.002	1.0	-0.998	20	Pass
704 – 1915*	23.0	199.53	6.0	3.98	0.158	0.47	-0.312	20	Pass
*Simultaneous Transmission (Worse case):					0.160	0.47	-0.310	20	Pass

The separation of the Bluetooth antenna and the LTE antenna is 6.3 cm. Since the low power of the Bluetooth transmitter only requires a separation distance of 1.14 cm, co-location of the two antennas have been evaluated to show no interference between to two.

The safe distance for SWX-UMT where Power Density is less than the MPE Limit listed above was found to be 20 cm.