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 @ WiFi 2412 – 2462 MHz, **Limit for Uncontrolled exposure: 1 mW/cm^2 or 10 W/m^2**

LTE Cell Bands 663 – 1910 MHz; **Limit for Uncontrolled exposure: Varies from 0.44 to 1.0 mW/cm^2 or 4.42 to 10 W/m^2**

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

$$S = PG / 4\pi R^2 \qquad \text{or} \qquad R = \int(PG / 4\pi S)$$

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

Test Results:

	FCC									
Frequency (MHz)	Con. Pwr. (dBm)	Con. Pwr. (mW)	Ant. Gain (dBi)	Ant. Gain numeric	Pwr. Density (mW/cm^2)	Limit (mW/cm^2)	Margin	Ratio (Note 1)	Distance (cm)	Result
2422*	26.76	476.24	4	2.61	0.11	1.0	-0.89	0.11	30	Pass
824 – 849* (Note 2)	23.2	208.93	8.7	7.41	0.14	0.55	-0.41	0.25	30	Pass
*Simultaneous Transmission (Worse case):					0.25	0.55	0.41	0.45	30	Pass

The safe distance for SWX-UMRID where Power Density is less than the MPE Limit listed above was found to be 30 cm. Any tune-up tolerances were taken in to consideration in the MPE calculation.

Note 1: Ratio = Pdensity/Limit

Note 2: Band 5 of the LTE Module was deemed worse case based on the RF output power as listed on the FCC Grant of the Sierra Wireless Module