

## § 15.247, § 15.407, UNII-1, UNII-3, UNII-5, UNII-6, UNII-7, UNII-8

### § 15.407(f)

### Maximum Permissible Exposure

#### 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 15.247 Bluetooth @ 2402 – 2480 MHz; 15.247 Wi-Fi @ 2412 – 2462 MHz; 15.407 UNII-1 @ 5180 – 5240 MHz; 15.407 UNII-3 @ 5745 – 5825 MHz; 15.407 UNII-5 @ 6115 – 6415 MHz, 15.407 UNII-6 @ 6435 – 6515 MHz, 15.407 UNII-7 @ 6535 – 6875 MHz, 15.407 UNII-8 @ 6895 – 7115 MHz

**Limit for Uncontrolled exposure: 1 mW/cm<sup>2</sup> or 10 W/m<sup>2</sup>**

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

$$\text{UNII-5 } S = PG / 4\pi R^2 \quad \text{or} \quad R =$$

$\sqrt{(PG / 4\pi S)}$  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:

| FCC             |                 |                |                 |                   |                                    |                             |        |               |        |
|-----------------|-----------------|----------------|-----------------|-------------------|------------------------------------|-----------------------------|--------|---------------|--------|
| 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 |
| 2402            | 12.5            | 17.78 *        | 4.0             | 2.51              | 0.01                               | 1.0                         | -0.99  | 20            | Pass   |
| 2442            | 24.46           | 279.25 *       | 4.0             | 2.51              | 0.14                               | 1.0                         | -0.86  | 20            | Pass   |
| 5240            | 28.99           | 792.50 *       | 5.8             | 3.8               | 0.60                               | 1.0                         | -0.40  | 20            | Pass   |
| 5775            | 28.01           | 632.41         | 5.8             | 3.8               | 0.48                               | 1.0                         | -0.52  | 20            | Pass   |
| 6325            | 23.57           | 227.51         | 5.8             | 3.8               | 0.17                               | 1.0                         | -0.83  | 20            | Pass   |
| 6505            | 23.74           | 236.59*        | 5.8             | 3.8               | 0.18                               | 1.0                         | -0.82  | 20            | pass   |
| 6825            | 23.66           | 232.27         | 5.8             | 3.8               | 0.18                               | 1.0                         | -0.82  | 20            | pass   |
| 6985            | 23.22           | 209.89         | 5.8             | 3.8               | 0.16                               | 1.0                         | -0.84  | 20            | pass   |

\* The U6-Enterprise-IW may have simultaneously transmission of the 15.247 Bluetooth, 15.247 2.4 GHz WiFi, 15.407 UNII-1, UNII-3, UNII-5, UNII-6, UNII-7 or UNII-8 and. Asterisk notes the worst case of the possible simultaneously transmitter combinations.

Simultaneously Transmitters Summed:

0.01 (Bluetooth)  
+ 0.14 (2.4 GHz WiFi)  
+ 0.60 (UNII-1)  
+ 0.18 (UNII-6)  
= 0.93

Limit of 1.0 – 0.93 (summed value) = -0.07 Margin

The safe distance for SWX-U6EPIW where Power Density is less than the MPE Limit listed above was found to be 20 cm.