




Exhibit: RF Exposure – FCC

FCC ID: XEY-ZX-HV
IC: 8410A-ZXHV

Client	Verdant Environmental Technologies Inc	
Product	High Voltage Thermostat	
Standard(s)	FCC Part 15 Subpart 15.247:2016 FCC KDB 447498:2015	

SAR Calculations: 902.8 – 927.7 MHz FHSS transmitter

The EUT contains a 902 MHz – 928MHz FHSS transmitters. The firmware guarantees simultaneous operation will not occur and therefore antenna co-location testing is not applicable. This device is designed to be operated handheld and for the purpose of demonstrating compliance with MPE requirements and SAR exemption; we present for a worst case 5mm distance and 100 % duty cycle.

FCC Requirements: SAR test exclusion guidance

As per FCC KDB 447498 D01 Section 4.3.1 a), the 1-g extremity SAR Test Exclusion Threshold for 100 MHz to 6 GHz at test separation distances ≤ 50 mm is determined by:

$$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] [\sqrt{f(\text{GHz})}] \leq 3.0$$

Performing the calculation, of the worst case mentioned above, using the maximum power measured of 4.64mW (see page Table 21 in TR-7169005898-FCC_ISED_XEYZX-HV_8401A-ZXHV.pdf) yields to:

$$\frac{4.64}{5} \cdot \sqrt{0.927525} = 0.89,$$


0.89 is below the 3.0 worst case limit, so this device complies with FCC requirements

ISED Requirements: SAR test exclusion guidance

As per Table 1 in RSS-102, Section 2.5.1 the interpolated limits between 835MHz (17mW) and 1900MHz (7mW) at 5mm (or less) is 16.37mW. The device is not head/body-worn therefore $2.5 \times 16.37\text{mW} = 40.93\text{mW}$ limit applies.

The peak value of EIRP measurements (worst case scenario) was found 99.9dB μ V/m at 3m distance, see for instance, page 95 in TR-7169005571-FCC_ISED_XEY-ZX-HV_8401A-ZXHV Rev1.pdf). Applying the conversion factor to convert to EIRP at 3m (95.2) yields to 99.9-95.2=4.7dBm or 3mW

- 3mW is less than 40.93mW limit as per section 2.5.1 on RS-102, thus the device meets the exception rules.

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Standard(s)	FCC Part 15 Subpart 15.247:2016 FCC KDB 447498:2015	

SAR Calculations: 2412 – 2462 MHz DTS transmitter

FCC Requirements: SAR test exclusion guidance

As per FCC KDB 447498 D01 Section 4.3.1 a), the 1-g extremity SAR Test Exclusion Threshold for 100 MHz to 6 GHz at test separation distances ≤ 50 mm is determined by:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] [\sqrt{f(\text{GHz})}] \leq 3.0.$$

Performing the calculation, of the worst-case (at the antenna output) of 4.56mW (see page 50 on TR-7169005898-FCC_ISED_XEYZX-HV_8401A-ZXHV Rev1.pdf) yields to:

$$\frac{4.56}{5} \cdot \sqrt{2.402} = 1.41,$$

1.41 is below the 3.0 worst case limit, so this device complies with FCC requirements

ISED Requirements: SAR test exclusion guidance

As per Table 1 in RSS-102, Section 2.5.1 the power limit at 2450MHz at 5mm or less is 4mW.

As per Table 1 in RSS-102, Section 2.5.1, the limit of 4.24mW has been calculated based on the interpolation between the limit of 1900MHz is 7mW and 2450MHz is 4mW at 5mm or less. The device is not head/body-worn therefore $2.5 \times 4.24\text{mW} = 11\text{mW}$ limit applies.

This device has effective isotropic radiated power with a peak value of $101.3 \text{ dB}\mu\text{V}/\text{m}^2 - 95.2$ (factor to convert to EIRP at 3 meters) of 6.1dBm, or 4.1mW.

- 1.51mW is less than 11mW limit as per section 2.5.1 on RS-102, thus the device meets the SAR exclusion criterion.

ⁱ See in page 96 in TR-7169005898-FCC_ISED_XEYZX-HV_8401A-ZXHV Rev2.pdf