



Canada

Exhibit: RF Exposure – FCC

Report File #: -000

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Client	Utility Associates, Inc.	 Canada
Product	Smart Holster Sensor (Model: HS01)	
Standard(s)	FCC KDB 447498:2015	

RF Exposure – FCC

The device is intended for use on extremities (wrists) and the minimum separation distance from the radiating structure to any part of the body or extremity of a user is 5 mm as stated by the manufacturer during normal operation.

The EUT contains a 1.363 MHz transmitter and a modularly certified 2400 – 2483.5 MHz DTS transmitter.

General SAR test exclusion guidance:

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

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

Where:

$f_{(\text{GHz})}$ is the RF channel transmit frequency in GHz

As per FCC KDB 447498 Section 4.3.1b) For 100 MHz to 6 GHz and *test separation distances* > 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following

$$\{[\text{Power allowed at numeric threshold for 50 mm in step a)}] + [(\text{test separation distance} - 50 \text{ mm}) \cdot (f_{(\text{MHz})}/150)]\} \text{ mW, for 100 MHz to 1500 MHz}$$

As per FCC KDB 447498 Section 4.3.1 c) the Threshold for frequencies below 100 MHz, at test separation distances ≤ 50 mm is determined by:

$$\frac{1}{2} [1 + \log(100/f_{(\text{MHz})})] * \text{Threshold in Section 4.3.1 b) 1)}$$

SAR Calculations: 1.363 MHz transmitter

The EUT does not have an antenna port. The field was measured at 1 m with a loop antenna; the fundamental frequency falls to the noise floor when measured with a large distance. The raw measure value is 37.58 dBuV.

The final field strength is given by

$$\begin{aligned} E (\text{dBuV/m}) &= \text{Received Signal} + \text{Antenna Factor} + \text{Cable Loss} - \text{Pre-Amp Gain} + 51.5 \\ &= 37.58 \text{ dBuV} - 6.65 + 0.118 - 33.74 + 51.5 \\ &= 48.81 \text{ dBuV/m} \end{aligned}$$

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The Effective Isotropic Radiate Power in dBm is given by:

$$E.I.R.P \text{ (dBm)} = E \text{ (dBuV/m)} - 104.77 + 20\log(d)$$

where d is in meter.

Therefore, for a 1 m measurement distance:

$$E.I.R.P \text{ (dBm)} = 48.81 - 104.77 + 20\log(1) = -55.96 \text{ dBm} (2.53 \times 10^{-6} \text{ mW})$$

Peak E.I.R.P was measured to be 2.53×10^{-6} mW.

As per FCC KDB 447498 Section 4.3.1 a) the power allowed with numerical threshold of 3 and at a separation distance of 50 mm and 100 MHz is:

$$[P \text{ (mW)} / 50 \text{ mm}] * [\sqrt{0.1 \text{ GHz}}] = 3.0$$

$$P(@50 \text{ mm}) = 474.3 \text{ mW}$$

As per FCC KDB 447498 Section 4.3.1 c)2) the power allowed is

$$\frac{1}{2} [1 + \log(100/1.363)] * 474.3 = 679.6 \text{ mW}$$

The measured peak E.I.R.P of 2.53×10^{-6} mW is below the power allowed for a 1.363 MHz transmitter. SAR Exclusion Threshold condition is met with peak E.I.R.P.

Simultaneous Transmission SAR Calculations

As per FCC 2.1093 (d)(2): The SAR limits for general population/uncontrolled exposure are 0.08 W/kg, as averaged over the whole body.

Simultaneous transmission is evaluated as per FCC KDB 447498 Section 4.3.2. The equation used is:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] * [\sqrt{f_{\text{GHz}}/x}] \text{ W/kg, for test separation distances} \leq 50 \text{ mm};$$

where $x = 7.5$ for 1-g SAR.

The 1.363 MHz transmitter have a Peak E.I.R.P of 2.53×10^{-6} mW and the 2.4 GHz transmitter (FCC ID: HSW2832) have a maximum power of 1.216 mW.

For 1.363 MHz Transmitter

$$(2.53 \times 10^{-6} \text{ mW} / 5 \text{ mm}) * (\sqrt{0.001363/7.5}) = 2.5 \times 10^{-9} \text{ W/kg}$$

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For 2.4 GHz transmitter

$$(1.216 \text{ mW}/5) * (\sqrt{2.4835}/7.5) = 0.05 \text{ W/kg}$$

The sum of the 1-g SAR $0.05 \text{ W/kg} + 2.5 \times 10^{-9} \text{ W/kg} = 0.05 \text{ W/kg}$ which is less than 0.08 W/kg .