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RF Exposure

EUT Name: Personal Massager

EUT Model: F2

FCC ID: 2AEL4-FA4H2

IC ID: 20435-FA4H2

FCC Title 47, Part 2.1093, RSS-102 Issue 5

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Report/Issue Date: 20 November 2015
Report Number: Supplement to 31560782.001 - RF Exposure

1 RF Exposure

1.1 Exposure Requirements – FCC KDB # 447498 DO1 and RSS-102 Issue 5

FCC KDB # 447498 DO1 V05r02 - Mobile and Portable Device RF Exposure and Procedures and Equipment, Appendix A shows that the SAR Text Exclusion Threshold for a device with a separation distance of 5 mm at 2450 MHz is 10 mW

RSS-102 section 2.5.1 states that a device is exempt from SAR evaluation if the frequency is "above 2.2 GHz and up to 3 GHz inclusively, and with output power (i.e. the higher of the conducted or radiated (EiRP.) source-based, time-averaged output power) that is less than or equal to 20 mW for general public use…".

1.1.1 Test Procedure

If the antenna is located > 20cm from the user, then an MPE calculation is acceptable.

If the antenna is located < 20cm (portable / mobile / hand-held device) from the user, then SAR evaluation is required.

1.1.2 Evaluation

The EUT will be used as a portable device where the antenna will be located less than 20cm from the user, therefore SAR evaluation is required.

1.1.2.1 Evaluation for FCC

FCC 447498 DO1 Mobile Portable RF Exposure V05r02, Appendix A shows that the SAR Text Exclusion Threshold for a device with a worst-case separation distance of 5mm at 2450 MHz is 10 mW.

The minimum power that requires SAR testing with a separation distance of 5mm at 2.445 GHz is 10 mW.

The maximum EiRP peak power output of the EUT is: 0.247 mW (See calculation next page).

The 0.247 mW EiRP of the EUT is well below the 10 mW power level that requires SAR Testing.

1.1.2.2 Evaluation for Industry Canada

Pre RSS-102, Issue 5, Table 1: The level for exemption limits for Routine SAR Evaluation at a separation distance of ≤ 5mm at 2450 MHz is 4 mW.

The maximum EiRP power output of the EUT is: 0.247 mW (See calculation next page).

The EUT is well below the 4 mW power level that requires SAR Testing.

1.1.3 Conclusion

SAR data is not required for either FCC or Industry Canada.

Note: The 0.865 mW power level includes the measured 22.6% Duty Cycle factor.
This is considered to be the absolute worst case.

1.1.4 Calculated EiRP Level

Notes: The EUT does not have a means to make direct measurements.

This EiRP calculation was made using the maximum Peak value in section 4.1.4.1 of this report (Page 10) which is 102.07 dBµV/m at 3m.

The Duty Cycle was measured at 22.58% which when applied to 102.07 dBµV, would be **89.15 dBµV**.

Per the equation in section 1.3.1 of FCC Document # 412172 D01 Determining ERP and EiRP v01;

$$\mathbf{EiRP = p_t \times g_t = (E \times d)^2 / 30},$$

where:

$\mathbf{p_t}$ = transmitter output power in watts,

$\mathbf{g_t}$ = Numeric gain of transmitting antenna (unit-less),

E = electric field strength in V/m; $E = 10^{(89.15/20)} / 10^6 = 0.02468$ V/m,

d = measurement distance in meters; d = 3m,

EiRP = $(0.02468 \times 3)^2 / 30$ = 0.000247 Watts or <u>0.247 mW or -6.08 dBm</u>

1.1.5 Antenna Gain:

The antenna used in the EUT is an Inverted-F antenna which is etched onto the PCB.

According to the manufacturer, the antenna has a theoretical gain of 0 dBi or numeric gain of 1 (unity gain).

The stated Maximum EiRP power of the EUT is 0.251 mW or -6 dBm. (with Duty Cycle)

The Gain theoretical gain of the antenna is 0 dBi or numeric gain of 1 (unity gain).