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To Whom It May Concern:

To investigate the RF exposure of the Tantalus Systems Corp. VC-910 versatile collector the FCC OET Bulletin 65 and the Health Canada Safety Code 6 (as specified in RSS-102) have been used as guidelines to determine compliance with the FCC and IC RF exposure limit.

In addition the FCC has allowed omitting SAR evaluation if the source-based time-averaged output powers are below the levels defined in the KDB publication 447487 D01 General RF Exposure Guidance v05.

Analysis:

As per OET Bulletin 65 and Health Canada Safety Code 6 guidelines:

The EUT is classed to meet the RF exposure that it subjects to the “General Population/Uncontrolled Environment”. Under this class the limit is calculated by:

$$S = f/1500$$

Where S is the Power Density in mW/cm^2 .

F is the frequency of operation in MHz.

The EUT operates in the 902 to 928 MHz band, the lower exposure limit would be obtained by using a frequency at the lower edge of the band, therefore:

$$S = 902 / 1500 = 0.601 \text{ mW}/\text{cm}^2$$

The maximum EIRP was measured to be 0.759W

However the maximum total transmit bandwidth available on a time averaged basis is 25%.

The average EIRP is therefore:

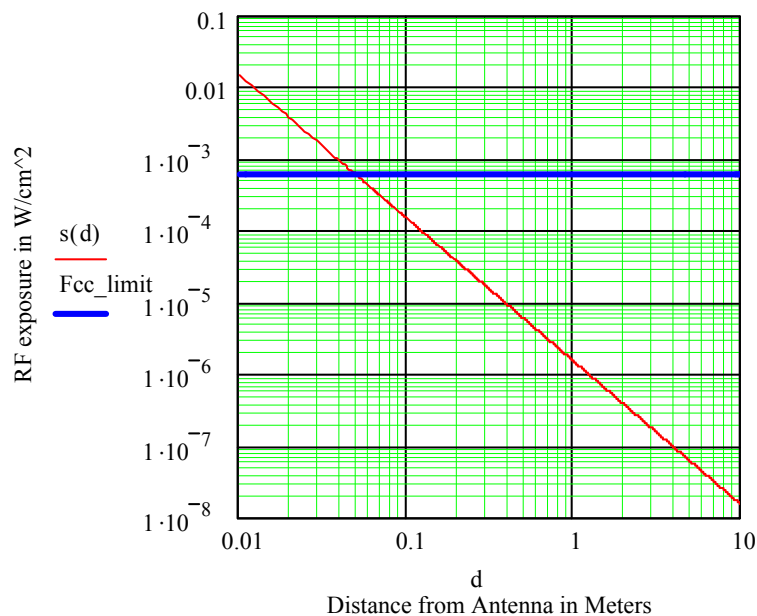
$$\text{EIRP}_{(\text{average})} = \text{EIRP}_{(\text{continuous})} * \text{duty cycle}$$

$$\text{EIRP}_{(\text{average})} = 0.759\text{W} * 0.25 = 0.190\text{ W}$$

The predicted power density at a distance d, in the same horizontal plane as the elevation of the antenna is calculated and graphed below:

$$\begin{aligned} \text{Eirp} &:= 0.759 & \text{Duty_cycle} &:= 0.25 & \text{Eirp_avg} &:= \text{Eirp} \cdot \text{Duty_cycle} & \text{Freq_Mhz} &:= 902 \\ d &:= 0.01, 0.011..10 & (\text{Distance in meters}) & & \text{Fcc_limit} &:= \frac{\text{Freq_Mhz}}{15001000} & (\text{Fcc Limit in W/cm}^2) \end{aligned}$$

$$s(d) := \frac{\text{Eirp_avg}}{4 \cdot \pi \cdot (d \cdot 100)^2} \quad (\text{Power in W/cm}^2)$$



From the graph, it can be observed that the distance at which the RF exposure would exceed the limit would be 6.2cm. The far field distance for a small antenna is given by any distance greater than $\lambda/2\pi$; this equates to a minimum distance of 5.3cm, therefore this calculation is valid.

As per the FCC KDB publication 447487 D01 General RF Exposure Guidance v05, SAR tests are not required if the RF power does not exceed the following formula:-

$$(f_{\text{GHz}})^{0.5} \times \text{Time averaged power (mW)} / \text{distance(mm)} \leq 3.0$$

or

$$(0.928)^{0.5} \times \text{Time averaged power (mW)} / \text{distance(mm)} \leq 3.0$$

For a fixed or mobile device the minimum separation is dictated to be 20cm. Using this distance in the above formula gives a numerical value of 0.915 therefore a SAR evaluation is **not required**.

Result:

“The antenna used for this transmitter must be fixed-mounted in a permanent structure providing a separation distance of at least 20 cm from all persons during normal operation.”

A handwritten signature in black ink, appearing to read 'M. Fairburn', with a horizontal line extending to the right.

Mark Fairburn
RF Design Engineer
Tantalus Systems Corp.