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To Whom It May Concern:

To investigate the RF exposure of the Tantalus Systems Corp. LC-23NICA network interface card for a smart streetlight controller (FCC ID: OZFLC2300, IC ID: 3669A-LC2300) the FCC KDB publication 447498 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.

Analysis per Health Canada Safety Code 6 guidelines:

As per 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 highest EIRP measured was 1.202W

However the maximum total transmit bandwidth available on a time averaged basis is only 12.25% of this number (this number is based on the worst case time of occupancy of 0.049 seconds for a maximum of 0.4 seconds for the low data rate mode).

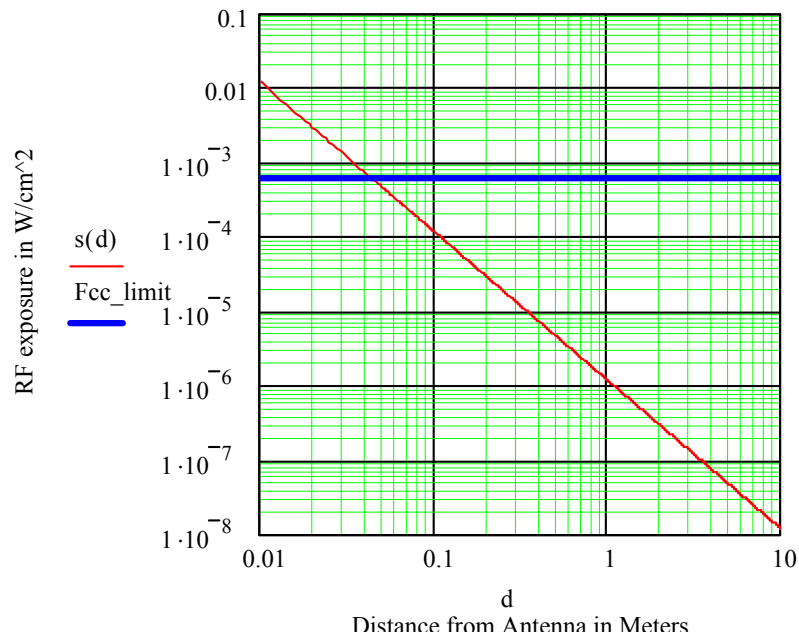
The average EIRP is therefore:

$$\begin{aligned} \text{EIRP}_{(\text{average})} &= \text{EIRP}_{(\text{continuous})} * \text{duty cycle} \\ \text{EIRP}_{(\text{average})} &= 1.202\text{W} * 0.1225 = 147.2 \text{ mW} \end{aligned}$$

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

$$\begin{aligned} \text{Eirp} &:= 1.202 \quad \text{Duty_cycle} := 0.1225 \quad \text{Eirp_avg} := \text{Eirp} * \text{Duty_cycle} \quad \text{Freq_Mhz} := 902 \\ d &:= 0.01, 0.011..10 \quad (\text{Distance in meters}) \quad \text{Fcc_limit} := \frac{\text{Freq_Mhz}}{1500000} \quad (\text{Fcc Limit in W/cm}^2) \end{aligned}$$

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



From the graph, it can be observed that the distance at which the RF exposure would exceed the limit would be approx. 5.5cm. 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 and so the minimum distance must be 5.5cm.

Analysis as per the FCC KDB publication 447498:

As per the FCC KDB publication 447498 D06 General RF Exposure Guidance, 4.3.1(b) states that SAR tests are not required if the RF power does not exceed the following formula:-

The maximum time averaged power (mW) must not exceed:-

$$\text{Max. Power (mW) Allowed at 50mm}^* + (\text{test separation distance} - 50 \text{ mm}) \times F_{(\text{MHz})}/150$$

$$*\text{Where Max. Power (mW) Allowed at 50mm} = 3 \times 50 / \sqrt{F_{(\text{GHz})}} = 155\text{mW}$$

In the previous analysis the maximum time averaged sourced based output power is 147.2mW.

This power is less than the power at 5cm (50mm)..

As in the previous analysis this distance does not exceed the far field calculation and so the minimum distance must be 5.5cm.

Result:

SAR tests are not required for this product and the antenna used for this transmitter must be installed to provide a separation distance of at least 5.5cm from the general public during normal operation.



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