Tantalus

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To Whom It May Concern:

To investigate the RF exposure of the Tantalus Systems Corp. DA-1710 bridge modem (FCC ID: OZFDA1710) 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:

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

The highest EIRP using the 5dBi antenna was measured to be 3.55W

However the maximum total transmit bandwidth available on a time averaged basis is only 27.5% of this number.
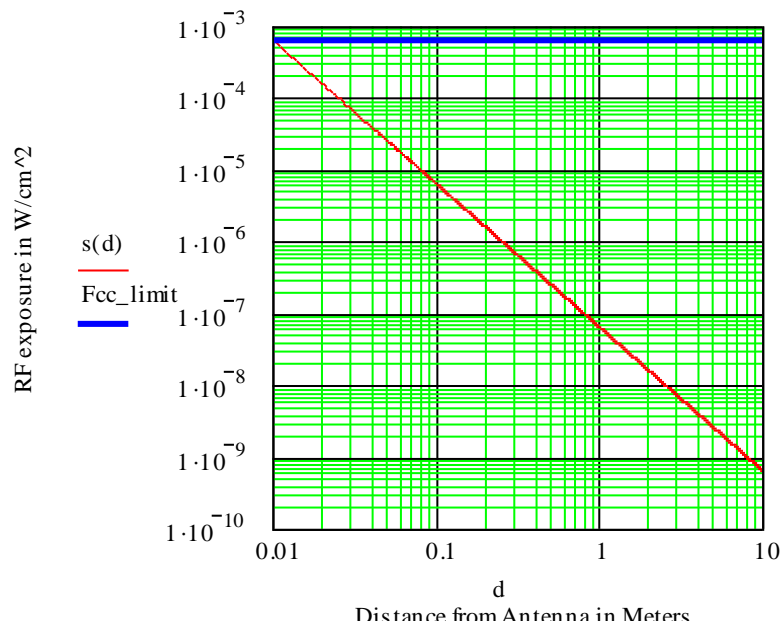
The average EIRP is therefore:

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

$$EIRP_{(average)} = 3.55W * 0.275 = 0.976W$$

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

$Eirp := 0.0279$ $Duty\_cycle := 0.275$ $Eirp\_avg := Eirp \cdot Duty\_cycle$ $Freq\_Mhz := 902$

$d := 0.01, 0.011 .. 10$ (Distance in meters) $\qquad Fcc\_limit := \dfrac{Freq\_Mhz}{1500 \cdot 1000}$ (Fcc Limit in W /cm ^{2})

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

From the graph, it can be observed that the distance at which the RF exposure would exceed the limit would be approx. 10.9cm. The far field distance for a large antenna is given by any distance greater than 2 D^2 / λ (where D is the largest dimension of the antenna); this equates to a minimum distance of 36cm, therefore this calculation is not valid.

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:-

Max. Power (mW) Allowed at 50mm* + (test separation distance–50 mm) x $F_{(MHz)}$/150

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

As in the previous analysis the maximum time averaged sourced based output power is 0.976W and the closest distance from the antenna to any body part must be 18.3cm, to satisfy the limit.

Result:

"The antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons during normal operation."

Mark Fairburn
RF Design Engineer
Tantalus Systems Corp.