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### RS485 RFID Reader (EUT) RF Exposure calculation:-

FCC ID: **2BD8H-HIGHWAY1**

The **HIGHWAY1** Instrument contains **13.56MHz RFID** and is intended as a mobile device, typically used at 30cm distance. However, a user's hand may be within 30mm of the RFID transmitter for several seconds whilst inserting the sample tube/syringe, for the purposes of this exclusion calculation a distance of 5mm has been used as the absolute worst case, and the power used is the maximum field strength measured from the unit. The device is a 13.56MHz RFID transmitter.

Maximum measured PK power from the module RFID device was 51.84dBuV/m @3m. This equates to 0.0002 mW (-37.1dBm) absolute power level.

FCC Evaluation is for exposure potential against the Exclusion limits given in **KDB447498 D01** v06 section 4.3.1.

Exclusion requirements are based upon 10g SAR exclusion for extremities.

Equation of 4.3.1. part 1A Transposed is:

$$\text{Exclusion in mW} = ((\text{Threshold} / (\sqrt{F}) * D$$

where: Threshold = 7.5 for 10g SAR Extremities  
F = Frequency in GHz (0.01356 GHz)  
D = Separation distance in mm (5mm)

Threshold in mW for 13.56MHz is based on equation above and 4.3.1. part b)1) (using 100MHz and 50mm distance)

$$= 1186 \text{ mW}$$

Further modified by 4.3.1. part c)1) (using 100MHz and 50mm distance)

$$= 2215 \text{ mW} \text{ (at 50mm)}$$

And further modified by part 4.3.1. part c)2) (<50mm distance under 100MHz)

$$= 2215 / 2 \quad (50\text{mm exclusion value divided by 2})$$

Therefore, exclusion for 13.56MHz and 5mm separation distance is

$$= 1107.5\text{mW.}$$

As measured values for the HIGHWAY1 EUT were: 51.84dBuV/m @3m which is -37.1 dBm (or 0.0002 mW) absolute level and any antenna gain is included in the field strength measurement, the EUT is excluded from RF Exposure / SAR testing requirements.



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This Exclusion Calculation has been performed by Daniel Sims, Radio Approvals Manager at Kiwa Electrical Compliance.

8<sup>th</sup> February 2024:

A handwritten signature in black ink, appearing to read 'Daniel Sims'.