

3/13/2025

HID Global Corporation (US)  
611 Center Ridge Dr.  
Austin, TX 78753  
USA

Dear Nic Holmes,

Enclosed is the EMC test report for testing of the HID Global Corporation (US), HID Signo PIV Contact Reader tested to the requirements of FCC Part 2.1093

Thank you for using the services of Eurofins E&E North America. If you have any questions regarding these results or if MET can be of further service to you, please do feel free to contact me.

Sincerely,



Nancy LaBrecque  
Documentation Department  
Eurofins Electrical and Electronic Testing NA, Inc.

Reference: WIRA133283\_SAR Exemption\_R1



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**RF Exposure Criteria  
Test Report  
Using SAR Exemption Calculations**

for the

**HID Global Corporation (US)  
HID Signo PIV Contact Reader (Model: 40TC)**

**Tested under**

**FCC Part 2.1093**

**Report: WIRA133283\_SAR Exemption\_R1**

3/13/2025



Bryan Taylor, Wireless Team Lead  
Electromagnetic Compatibility Lab



Nancy LaBrecque  
Documentation Department

**Engineering Statement:** The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.



Matthew Hinojosa  
EMC Manager, Austin Electromagnetic Compatibility Lab

## Report Status Sheet

Revision	Report Date	Reason for Revision
0	3/10/2025	Initial Issue.
1	3/13/2025	Reviewer comments

## List of Terms and Abbreviations

<b>AC</b>	<b>Alternating Current</b>
<b>ACF</b>	<b>Antenna Correction Factor</b>
<b>Cal</b>	<b>Calibration</b>
<b><i>d</i></b>	<b>Measurement Distance</b>
<b>dB</b>	<b>Decibels</b>
<b>dBμA</b>	<b>Decibels above one microamp</b>
<b>dBμV</b>	<b>Decibels above one microvolt</b>
<b>dBμA/m</b>	<b>Decibels above one microamp per meter</b>
<b>dBμV/m</b>	<b>Decibels above one microvolt per meter</b>
<b>DC</b>	<b>Direct Current</b>
<b>E</b>	<b>Electric Field</b>
<b>DSL</b>	<b>Digital Subscriber Line</b>
<b>ESD</b>	<b>Electrostatic Discharge</b>
<b>EUT</b>	<b>Equipment Under Test</b>
<b><i>f</i></b>	<b>Frequency</b>
<b>CISPR</b>	<b>Comite International Special des Perturbations Radioelectriques (International Special Committee on Radio Interference)</b>
<b>GRP</b>	<b>Ground Reference Plane</b>
<b>H</b>	<b>Magnetic Field</b>
<b>HCP</b>	<b>Horizontal Coupling Plane</b>
<b>Hz</b>	<b>Hertz</b>
<b>IEC</b>	<b>International Electrotechnical Commission</b>
<b>kHz</b>	<b>kiloHertz</b>
<b>kPa</b>	<b>kiloPascal</b>
<b>kV</b>	<b>kilovolt</b>
<b>LISN</b>	<b>Line Impedance Stabilization Network</b>
<b>MHz</b>	<b>MegaHertz</b>
<b>μH</b>	<b>microHenry</b>
<b>μF</b>	<b>microFarad</b>
<b>μs</b>	<b>microseconds</b>
<b>PRF</b>	<b>Pulse Repetition Frequency</b>
<b>RF</b>	<b>Radio Frequency</b>
<b>RMS</b>	<b>Root-Mean-Square</b>
<b>V/m</b>	<b>Volts per meter</b>
<b>VCP</b>	<b>Vertical Coupling Plane</b>

## 1.0 Requirements Summary

Page Number	Test Name	Result
9	FCC Part 2.1093 SAR Limits (For General Public Exposure)	Exempt

Table 1. Summary of Test Results

## 2.0 Equipment Configuration

### 2.1 Overview

Eurofins MET Labs was contracted by HID Global Corporation (US) to perform testing on the HID Signo PIV Contact Reader, under HID Global Corporation (US)'s purchase order number HID022810.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the HID Global Corporation (US) HID Signo PIV Contact Reader.

The results obtained relate only to the item(s) tested.

<b>Product Name:</b>	HID Signo PIV Contact Reader	
<b>Model(s) Tested:</b>	40TC	
<b>FCCID:</b>	JQ6-SIGNO40TC	
<b>Equipment Specifications:</b>	Primary Power:	12VDC
	EUT Frequency Ranges:	BLE: 2402MHz – 2480MHz HF RFID: 13.56MHz LF RFID: 125kHz
	Peak RF Output Power Including Tune-Up Tolerance:	BLE: 6.97dBm HF RFID: -9.35dBm (ERP) LF RFID: -29.46dBm (ERP)
	Antenna Gain <sup>1</sup> :	BLE: -1.9dBi HF RFID: 1dB LF RFID: 1dB
<b>Analysis:</b>	The results obtained relate only to the item(s) tested.	
<b>Environmental Test Conditions:</b>	Temperature: 15-35° C	
	Relative Humidity: 30-60%	
	Barometric Pressure: 860-1060 mbar	
<b>Evaluated by:</b>	Bryan Taylor, Sergio Gutierrez	
<b>Test Date(s):</b>	8/26/2024 through 8/31/2024	

**Table 2. EUT Summary Table**

<sup>1</sup> The antenna gain information was provided by HID Global Corporation (US) and may affect compliance.

## 2.2 Test Site

All testing was performed at Eurofins E&E North America, Austin, TX. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

## 2.3 References

<b>FCC Part 2.1093</b>	Radiofrequency radiation exposure evaluation: portable devices.
<b>KDB447498 D01 v06</b>	RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices; October 23, 2015

**Table 3. References**

## 2.4 Description of Test Sample

HID Signo PIV Contact Reader is a Access Control credential reader that is equipped with LF, HF, BLE and Contact card read ability.

The intended use of the product is for gaining secure access into building, sites or places via the use of a secure credential in the form of a LF credential card, HF credential card, NFC enabled smart phone, BLE Mobile credential or Contact chip credential.

## 2.5 Modifications

### 2.5.1 Modifications to EUT

No modifications were made to the EUT.

### 2.5.2 Modifications to Test Standard

No modifications were made to the test standard.

## 2.6 Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to HID Global Corporation (US) upon completion of testing.

## 2.7 FCC SAR Exemption Criteria

In order to demonstrate stand-alone SAR exemption for the FCC the formulas from KDB47498 D01 v06 Section 4.3.1 were used.

### **BLE SAR Exemption Method:**

#### 4.3.1 General SAR Test Exclusion Guidance

- a) For 100 MHz to 6 GHz and *test separation distances*  $\leq 50$  mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$$\left[ \frac{(\text{max. power of channel, including tune-up tolerance, mW})}{(\text{min. test separation distance, mm})} \right] \cdot \sqrt{f(\text{GHz})} \leq 3.0 \text{ for 1-g SAR, and } \leq 7.5 \text{ for 10-g extremity SAR}$$

Where,

- $f(\text{GHz})$  is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation<sup>31</sup>
- The result is rounded to one decimal place for comparison

### **125kHz and 13.56MHz SAR Exemption Method:**

For 100 MHz to 6 GHz and *test separation distances*  $\leq 50$  mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

#### 4.3.1 General SAR Test Exclusion Guidance

- c) For frequencies below 100 MHz, the following may be considered for SAR test exclusion:

- 1) For *test separation distances*  $> 50$  mm and  $< 200$  mm, the power threshold at the corresponding test separation distance at 100 MHz in step b) is multiplied by  $[1 + \log(100/f(\text{MHz}))]$
- 2) For *test separation distances*  $\leq 50$  mm, the power threshold determined by the equation in c) 1) for 50 mm and 100 MHz is multiplied by  $\frac{1}{2}$
- 3) SAR measurement procedures are not established below 100 MHz.



### Test Procedure:

For the 125kHz and 13.56MHz transmitters where field strength was measured at a specific distance, the manufacturers tolerance was added and the radiated power was calculated via the formula from ANSI C63.10 shown below:

$$EIRP = E_{Meas} + 20 \log(d_{Meas}) - 104.7$$

where

EIRP	is the equivalent isotropically radiated power, in dBm
$E_{Meas}$	is the field strength of the emission at the measurement distance, in dBuV/m
$d_{Meas}$	is the measurement distance, in m

The EIRP was then converted to ERP via the formula:

$$ERP = EIRP - 2.15dB$$

For the BLE transmitter the output power was measured and the manufacturers tolerance was applied. Since the antenna gain was actually negative, the conducted power was used in the SAR exemption calculations.

## Test Results:

The HID Signo PIV Contact Reader was **exempt** from FCC SAR with per KDB447498 D01 v06. Each individual transmitter met the limits for Standalone SAR exclusion. Additionally, the Sum of the estimated SAR values was less than the applicable SAR limit indicating that the HID Signo PIV Contact Reader was also exempt from simultaneous SAR.

## BLE Power / Exemption Calculation:

The BLE radio had a measured conducted power of 4.97dBm. The manufacturer has a 2dB tune up tolerance which equates to a worst-case power of 6.97dBm (4.977mW) which was used in the SAR Exemption calculation.

100 MHz to 6 GHz and separation distance $\leq$ 50 mm KDB 447498 D01 v06 4.3.1.a			
Description	Value	Unit	Comments
Max Power of Channel	4.977	mW	Worst case output power of 6.97dBm converted to mW
Minimum Separation Distance	5	mm	
Frequency	2.402	GHz	
Max Power of Channel (Rounded)	5	mW	Rounded to nearest mW
Minimum Separation Distance (Rounded)	5	mm	Rounded to nearest mm, limited to 5 mm
SAR Exclusion Threshold Calculation (Numeric)	1.550		Max power (rounded), mW / min. separation distance (rounded), mm x $\sqrt{\text{frequency, GHz}}$
Excluded from 1-g SAR?	Yes		Threshold $\leq$ 3.0
Excluded from 10-g extremity SAR?	Yes		Threshold $\leq$ 7.5

**Figure 1: BLE Transmitter SAR Exemption Calculation**

The BLE Transmitter was exempt from demonstrating compliance to FCC RF exposure limits per clause 4.3.1 (a) of KDB447498 D01 v06 since the calculated SAR Exclusion was less than 3 (for 1-g SAR Exclusion) and less than 7.5 (for 10-g SAR exclusion).

### 125kHz Power / Exemption Calculation:

The Field strength at 3m was measured (67.43dBuV/m) and according to the manufacturer has a 5% tune up tolerance from the measured value which equates to 67.85dBuV/m. 67.85dBuV/m was converted to EIRP using the equations from ANSI C63.10 Section 9.5:

$$EIRP = E_{Meas} + 20 \log(d_{Meas}) - 104.7 \quad (22)$$

where

$E_{Meas}$  is the equivalent isotropically radiated power, in dBm  
 $E_{Meas}$  is the field strength of the emission at the measurement distance, in dBuV/m  
 $d_{Meas}$  is the measurement distance, in m

NOTE—Because this equation yields the identical result whether the field strength is extrapolated using the default 20 dB/decade of distance extrapolation factor, or the field strength is not extrapolated for distance, this equation can generally be applied directly (with no further correction) to determine EIRP. In some cases, a different distance correction factor may be required; see 9.1.

$$EIRP = 67.85\text{dBuV/m} + 20\log(3\text{m}) - 104.7 = -27.31\text{dBm}$$

- The EIRP was converted to ERP by subtracting 2.15dB

$$ERP = -27.31\text{dBm} - 2.15 = -29.46\text{dBm}$$

- ERP in mW was then calculated by applying the formula  $\text{Power}_{\text{mW}} = 10^{(\text{Power}_{\text{dBm}} / 10)}$

$$\text{Power}_{\text{mW}} = 10^{(-29.46/10)} = 0.0011\text{mW}$$

< 100 MHz and separation distance ≤ 50 mm KDB 447498 D01 v06 4.3.1.c.2			
Description	Value	Unit	Comments
1-g or 10-g extremity SAR?	1-g		
Max Power of Channel	0.0011	mW	
Minimum Separation Distance	5	mm	
Frequency	0.125	MHz	
SAR Numeric Threshold	3.0		3.0 for 1-g SAR, 7.5 for 10-g extremity SAR
SAR Exclusion Threshold at 100 MHz, 50 mm	474	mW	SAR numeric threshold x 50 mm / √(0.1 GHz)
Frequency Correction Factor	3.903		1+log(100/frequency, MHz)
Sar Exclusion Threshold	926	mW	
Excluded from SAR?	Yes		

Figure 2: 125kHz Transmitter SAR Exemption Calculation

The 125kHz Transmitter was exempt from demonstrating compliance to FCC RF exposure limits per clause 4.3.1 (c) of KDB447498 D01 v06 since its output power is less than the SAR exemption threshold. The 1-g SAR exclusion calculation is shown above. The 10-g SAR exclusion threshold is higher and easier to meet.

### 13.56MHz Power / Exemption Calculation:

The 13.56MHz Transmitter had a measured field strength of 87.54dBuV/m. The manufacturer has a 5% tune-up tolerance from the measured value which equates to 87.96dBuV/m. The 87.96dBuV/m field strength was converted to ERP using the equations from ANSI C63.10 Section 9.5:

$$EIRP = E_{Meas} + 20 \log(d_{Meas}) - 104.7 \quad (22)$$

where

$EIRP$  is the equivalent isotropically radiated power, in dBm  
 $E_{Meas}$  is the field strength of the emission at the measurement distance, in dBuV/m  
 $d_{Meas}$  is the measurement distance, in m

NOTE—Because this equation yields the identical result whether the field strength is extrapolated using the default 20 dB/decade of distance extrapolation factor, or the field strength is not extrapolated for distance, this equation can generally be applied directly (with no further correction) to determine EIRP. In some cases, a different distance correction factor may be required; see 9.1.

$$EIRP = 87.96\text{dBuV/m} + 20\log(3\text{m}) - 104.7 = -7.2\text{dBm}$$

- The EIRP was converted to ERP by subtracting 2.15dB

$$ERP = -7.2\text{dBm} - 2.15 = -9.35\text{dBm}$$

- ERP in mW was then calculated by applying the formula  $\text{Power}_{\text{mW}} = 10^{(\text{Power}_{\text{dBm}} / 10)}$

$$\text{Power}_{\text{mW}} = 10^{(-9.35/10)} = 0.1162\text{mW}$$

< 100 MHz and separation distance ≤ 50 mm KDB 447498 D01 v06 4.3.1.c.2			
Description	Value	Unit	Comments
1-g or 10-g extremity SAR?	1-g		
Max Power of Channel	0.1162	mW	
Minimum Separation Distance	5	mm	
Frequency	13.56	MHz	
SAR Numeric Threshold	3.0		3.0 for 1-g SAR, 7.5 for 10-g extremity SAR
SAR Exclusion Threshold at 100 MHz, 50 mm	474	mW	SAR numeric threshold x 50 mm / √(0.1 GHz)
Frequency Correction Factor	1.868		1+log(100/frequency, MHz)
Sar Exclusion Threshold	443	mW	
Excluded from SAR?	Yes		

Figure 3: 13.56MHz Transmitter SAR Exemption Calculation

The 13.56MHz Transmitter was exempt from demonstrating compliance to FCC RF exposure limits per clause 4.3.1 (c) of KDB447498 D01 v06 since its output power is less than the SAR exemption threshold. The 1-g SAR exclusion calculation is shown above. The 10-g SAR exclusion threshold is higher and easier to meet.

### Estimated SAR and Simultaneous SAR Exemption Calculations:

The SAR must be estimated in order to determine if the device is exempt from the simultaneous SAR criteria. KDB447498 D01 v06 section 4.3.2 (b) was used to estimate the SAR from each individual transmitter onboard.

When an antenna qualifies for the standalone SAR test exclusion of 4.3.1 and also transmits simultaneously with other antennas, the standalone SAR value must be estimated according to the following to determine the simultaneous transmission SAR test exclusion criteria:

- 1)  $[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}/x]$  W/kg, for test separation distances  $\leq 50$  mm; where  $x = 7.5$  for 1-g SAR and  $x = 18.75$  for 10-g SAR.
- 2) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the *test separation distance* is  $> 50$  mm.

Estimated SAR for distance $\leq 50$ mm KDB 447498 D01 v06 4.3.2.b.1			
Description	Value	Unit	Comments
Max Power of Channel	4.977	mW	
Minimum Separation Distance	5	mm	
Frequency	2.48	GHz	
1-g Estimated SAR	0.20900767	mW/cm <sup>2</sup>	x = 7.5 for 1-g SAR
10-g Estimated SAR	0.08360307	mW/cm <sup>2</sup>	x=18.75 for 10-g SAR

Figure 4: BLE Transmitter Estimated SAR Calculation

Estimated SAR for distance $\leq 50$ mm KDB 447498 D01 v06 4.3.2.b.1			
Description	Value	Unit	Comments
Max Power of Channel	0.1162	mW	
Minimum Separation Distance	5	mm	
Frequency	0.01356	GHz	
1-g Estimated SAR	0.00036083	mW/cm <sup>2</sup>	x = 7.5 for 1-g SAR
10-g Estimated SAR	0.00014433	mW/cm <sup>2</sup>	x=18.75 for 10-g SAR

Figure 5: 13.56MHz Transmitter Estimated SAR Calculation

Estimated SAR for distance $\leq 50$ mm KDB 447498 D01 v06 4.3.2.b.1			
Description	Value	Unit	Comments
Max Power of Channel	0.0011	mW	
Minimum Separation Distance	5	mm	
Frequency	0.000125	GHz	
1-g Estimated SAR	0.00000033	mW/cm <sup>2</sup>	x = 7.5 for 1-g SAR
10-g Estimated SAR	0.00000013	mW/cm <sup>2</sup>	x=18.75 for 10-g SAR

Figure 6: 125kHz Transmitter Estimated SAR Calculation

Per KDB447498 D01 v06 when the sum of the 1-g or 10-g SAR of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit, SAR test exclusion applies. The FCC SAR limit for 1-g is 1.6mW/g. The FCC SAR limit for 10-g is 2mW/g. The sum of all of the estimated SAR values for each transmitter onboard are less than these values:

Transmitter	1-g SAR Values (mW/g)	10-g SAR Values (mW/g)
BLE Estimated SAR	0.20900767	0.08360307
13.56MHz Estimated SAR	0.00036083	0.00014433
125kHz Estimated SAR	0.00000033	0.00000013
SUM	0.20936882	0.08374753
Limit	1.6	4.0

**Figure 7: Simultaneous Transmission Calculation**

Therefore, the HID Signo PIV Contact Reader has demonstrated compliance with the simultaneous transmission exposure criteria.