RF EXPOSURE REPORT

Report Number: R15701621-E3b

Applicant	:	HID Global Corporation 611 Center Ridge Dr Austin, TX 78753 USA
Model	:	20KV2
FCC ID	:	JQ6-SIGNO20KV2
IC	:	2236B-SIGNO20KV2
EUT Description	:	Smartcard Reader
Test Standard(s)	:	FCC Part 1 Subpart I FCC Part 2 Subpart J RSS 102 ISSUE 6

Date Of Issue:
2025-07-02

Prepared by:
UL LLC
12 Laboratory Dr.
Research Triangle Park, NC 27709 U.S.A.
TEL: (919) 549-1400

ACCREDITED
CERT #0751.06

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2025-06-09	Initial Issue	Noah Bennett
V2	2025-07-02	Revised Ratios in Section 7	Charles Moody

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: HID Global Corporation
611 Center Ridge Dr
Austin, TX USA

EUT DESCRIPTION: Smartcard Reader

MODEL: 20KV2

SERIAL NUMBER: FL0P0U00N0WO20KTKF8087

SAMPLE RECEIPT DATE: 2025-03-10

DATE TESTED: 2025-03-11 thru 2025-05-02

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 1 SUBPART I & PART 2 SUBPART J	Complies
RSS 102 ISSUE 6	Complies

UL LLC. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL LLC. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC. will constitute fraud and shall nullify the document.

Approved & Released For
UL LLC By:

Michael Antola
Senior Staff Engineer
Consumer, Medical and IT Segment
UL LLC

Prepared By:

Noah Bennett
Engineer Project Associate
Consumer, Medical and IT Segment
UL LLC

2. TEST METHODOLOGY

All calculations were made in accordance with FCC Parts 1.1310, 2.1091, 2.1093, KDB 447498 D01 v06, KDB 447498 D03 V01, IEEE Std C95.1-2005, and IEEE Std C95.3-2002, IC Safety Code 6 and RSS 102 Issue 6.

3. REFERENCES

Refer to UL report R15701621-E5b for the 13.56 MHz test results, R15701621-E20b for the 125 kHz test results, and R15701621-E1b for the BLE test results.

4. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, certification # 0751.06, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☐	Building: 12 Laboratory Dr RTP, NC 27709, U.S.A	US0067	2180C	825374
☒	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A		27265	

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

5.2. DECISION RULES

For all tests where the applicable U_{LAB} <= U_{MAX} the Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4: 2012 Clause 8.2, where U_{MAX} = 30% (0.3) for RF Exposure evaluations. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

For all tests where the applicable U_{LAB} > U_{MAX} the Decision Rule is based on Guarded Acceptance in accordance with ISO Guide 98-4: 2012 Clause 8.3.2, with a guard band equal to (U_{LAB} – U_{MAX}), where U_{MAX} = 30% (0.3) for RF Exposure evaluations. (Test results are adjusted by the value of the guard band to determine conformity with a specified requirement.)

6. MAXIMUM PERMISSIBLE EXPOSURE (LIMITS AND EQUATIONS)

6.1. FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f^2	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f^2	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

Notes:

(1) Occupational/controlled exposure limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when a person is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

(2) General population/uncontrolled exposure limits apply in situations in which the general public may be exposed, or in which persons who are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure

6.2. ISED RULES

For the purpose of this standard, Innovation, Science and Economic Development (ISED) has adopted the SAR and RF field strength limits established in Health Canada's RF exposure guideline, Safety Code 6.

Table 7: RF field strength and power density limits for devices used by the general public (uncontrolled environment)

Frequency range (MHz)	Electric field (V_{RMS}/m)	Magnetic field (A_{RMS}/m)	Power density (W/m^2)	Reference period (minutes)
10-20	27.46	0.0728	2	6
20-48	$58.07 / f^{0.25}$	$0.1540 / f^{0.25}$	$8.944 / f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	$3.142 f^{0.3417}$	$0.008335 f^{0.3417}$	$0.02619 f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	$616000/ f^{1.2}$
150000-300000	$0.158 f^{0.5}$	$4.21\times10^{-4} f^{0.5}$	$6.67\times10^{-5} f$	$616000/ f^{1.2}$

Note: f is frequency in MHz.

Table 8: RF field strength and power density limits for controlled-use devices (controlled environment)

Frequency range (MHz)	Electric field (V_{RMS}/m)	Magnetic field (A_{RMS}/m)	Power density (W/m^2)	Reference period (minutes)
10-20	61.4	0.163	10	6
20-48	$129.8 / f^{0.25}$	$0.3444 / f^{0.25}$	$44.72 / f^{0.5}$	6
48-100	49.33	0.1309	6.455	6
100-6000	$15.60 f^{0.25}$	$0.04138 f^{0.25}$	$0.6455 f^{0.5}$	6
6000-15000	137	0.364	50	6
15000-150000	137	0.364	50	$616000 / f^{1.2}$
150000-300000	$0.354 f^{0.5}$	$9.40\times10^{-4} f^{0.5}$	$3.33\times10^{-4} f$	$616000 / f^{1.2}$

Note: f is frequency in MHz.

6.3. EQUATIONS

POWER DENSITY

Power density is given by:

S = EIRP / (4 * Pi * D^2)

Where

S = Power density in mW/cm^2
EIRP = Equivalent Isotropic Radiated Power in mW
D = Separation distance in cm

Power density in units of mW/cm^2 is converted to units of W/m^2 by multiplying by 10.

DISTANCE

Distance is given by:

D = SQRT (EIRP / (4 * Pi * S))

Where

D = Separation distance in cm
EIRP = Equivalent Isotropic Radiated Power in mW
S = Power density in mW/cm^2

SOURCE-BASED DUTY CYCLE

Where applicable (for example, multi-slot cell phone applications) a duty cycle factor may be applied.

Source-based time-averaged EIRP = (DC / 100) * EIRP

Where

DC = Duty Cycle in %, as applicable
EIRP = Equivalent Isotropic Radiated Power in mW

DISTANCE CORRECTION

Distance correction factor to scale E-field reading from x meters to y meters is as follows:

Correction Factor = 20log(x/y)

Where x is the initial measurement distance and y is the desired distance.

MAXIMUM E-FIELD STRENGTH (dBuV/m to V/m)

To convert from dBuV/m to V/m, the following equation was used:

V/m = 10^[(dBuv/m -120) / 20].

MIMO AND COLOCATED TRANSMITTERS (IDENTICAL LIMIT FOR ALL TRANSMITTERS)

For multiple chain devices, and colocated transmitters operating simultaneously in frequency bands where the limit is identical, the total power density is calculated using the total EIRP obtained by summing the EIRP (in linear units) of each transmitter.

Total EIRP = (EIRP1) + (EIRP2) + ... + (EIRPn)

where

EIRPx = Source-based time-averaged EIRP of chain x or transmitter x

The total EIRP is then used to calculate the Power Density or the Distance as applicable.

MIMO AND COLOCATED TRANSMITTERS (NON-IDENTICAL LIMIT FOR ALL TRANSMITTERS)

For multiple colocated transmitters operating simultaneously in frequency bands where different limits apply:

The Power Density at the specified separation distance is calculated for each transmitter chain or transmitter.

The fraction of the exposure limit is calculated for each chain or transmitter as
(Power Density of chain or transmitter) / (Limit applicable to that chain or transmitter).

The fractions are summed.

Compliance is established if the sum of the fractions is less than or equal to one.

PD Ratio Sample Calculation:

PD Ratio Radio A (%) = (100 * PD Radio A / PD Limit Radio A)
PD Ratio [All Radios] (%) = PD Ratio Radio A + PD Ratio Radio B + PD Ratio Radio c/d/e/etc.

Ex:
BLE FCC PD: 0.00027 mW/cm^2.
BLE FCC PD Limit 1 mW/cm^2

BLE FCC PD Ratio (%) = 100 * 0.00027 / 1 = 0.027%

Total PD Radio (%) = 0.027% [BLE] + 3.07 % [125 kHz] + 12.5% [13.56 MHz] = 15.597 %

7. RF EXPOSURE RESULTS

This report contains data provided by the customer which can impact the validity of results. UL LLC is only responsible for the validity of results after the integration of the data provided by the customer.

Below is a list of the data provided by the customer:

1.) Antenna gain and type (See section 3)
2.) Maximum output power (See section 3)

Single Chain and non-colocated transmitters

Band	Mode	Separ. Dist. (cm)	Output AVG Power (dBm)	Ant. Gain (dBi)	EIRP (dBm)	Duty Cycle (%)	EIRP (mW)	FCC PD (mW/cm^2)	ISED PD (W/m^2)	FCC PD Limit (mW/cm^2)	ISED PD Limit (W/m^2)
2.4 GHz	BLE	20	0.75	1.05	1.80	100.00	1.514	0.000	0.003	1.000	5.350

Multiple chain or colocated transmitters

Band	Mode	Separ. Dist. (cm)	FCC PD Ratio (%)	ISED PD Ratio (%)	FCC PD Limit (%)	ISED PD Limit (%)
2.4 GHz	BLE		0.030	0.056		
125 kHz	NFC		4.908	4.330		
13.56 MHz	NFC		22.938	50.412		
TER		20	27.876	54.798	100.000	100.000

Notes:

1. Maximum measured E-Field strength at 3 meters was converted to EIRP and compared to the FCC and ISED PD limits for 13.56MHz radios. The calculated PDs for FCC and ISED are significantly below the PD limits.
2. EIRP (dBm) = E (dBuV/m) + 20log(D) - 104.8 = 65.63 + 20log(3) – 104.8 = -29.628
3. 100% duty cycle for BLE was used to represent the absolute worst-case.
4. Simultaneous transmit was investigated additionally as a worst-case scenario.

END OF TEST REPORT