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8/8/2024

HID Global Corporation (US) 6533 Flying Cloud Drive, Ste. 1000 Eden Prairie, MN 55344 USA

Dear Erik Ray,

Enclosed is the EMC test report for testing of the HID Global Corporation (US), HDP5000e tested to the requirements of FCC Part 2.1091, RSS-102 Issue 6 and IEC62311 Issue 2

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,

Mancy Labucque

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

Reference: WIRA130667 – MPE\_R6



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## RF Exposure Criteria Test Report Using Maximum Permissible Exposure (MPE) Calculations

for the

## HID Global Corporation (US) HDP5000e (Model: X002700)

**Tested under** 

FCC Part 2.1091, RSS-102 Issue 6 and IEC62311 Issue 2

# Report: WIRA130667 - MPE\_R6

8/8/2024

Bryan Taylor, Wireless Team Lead Electromagnetic Compatibility Lab

j da

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	5/21/2024	Initial Issue.			
1	7/15/2024	Reviewer Comments.			
2	7/23/2024	Reviewer Comments.			
3	8/5/2024	Reviewer Comments.			
4	8/6/2024	Reviewer Comments.			
5	8/7/2024	Reviewer Comments.			
6	8/8/2024	Reviewer Comments.			



Test Report FCC Part 2.1091, RSS-102 Issue 6 and IEC62311 Issue 2

# **Table of Contents**

Requirements Summary	8
Equipment Configuration	9
2.1 Overview	9
<b>2.2</b> Test Site	. 10
2.3 References	. 10
2.4 Description of Test Sample	. 10
2.5 Modifications	. 11
2.5.1 Modifications to EUT	. 11
2.5.2 Modifications to Test Standard	. 11
<b>2.6</b> Disposition of EUT	. 11
Transmitter Requirements	. 12
	Requirements Summary         Equipment Configuration         2.1 Overview         2.2 Test Site         2.3 References         2.4 Description of Test Sample         2.5 Modifications         2.5.1 Modifications to EUT         2.5.2 Modifications to Test Standard         2.6 Disposition of EUT         Transmitter Requirements



# **List of Tables**

Table 1. Summary of Test Results	8
Table 2. EUT Summary Table	9
Table 3. References	10



# List of Terms and Abbreviations

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



# 1.0 Requirements Summary

Page Number	Test Name	Result	
12	IEC62311: 2019 MPE Limits	Compliant	
12	(For General Public Exposure)	Compliant	
13	RSS-102 Issue 6 MPE Limits	Compliant	
	(For General Public Exposure)	Compliant	
13	FCC Part 2.1091 MPE Limits		
	(For General Public Exposure)	Compliant	

 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 HDP5000e, under HID Global Corporation (US)'s purchase order number 9HID0510R1.

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) HDP5000e.

Product Name:	HDP5000e			
Model(s) Tested:	X002700			
Model(s) Included by Similarity	RCS5510			
	Primary Power: 100 -	- 240VAC		
	Antenna Gain <sup>1</sup> :	1dB (HF RFID antenna part number 4090A11)		
EUT Specifications:	EUT Frequency	125kHz (LF RFID)		
	Ranges:	13.56MHz (HF RFID)		
Analysis:	The results obtained relate only to the item(s) tested.			
Environmental Test	Temperature: 15-35° C			
Conditions:	Relative Humidity: 30-60%			
Conditions:	Barometric Pressure: 860-1060 mbar			
Type of Filing:	Original			
Evaluated by:	Bryan Taylor			
Report Date(s):	3/4/2024 through 3/8	/2024		

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

 Table 2. EUT Summary Table

<sup>&</sup>lt;sup>1</sup> The antenna gain information was provided by HID Global Corporation (US) at the time of testing.



# HDP5000e

# 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

IEC62311 Edition 2.0 (2019-04)	Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz to 300 GHz)		
RSS-102: Issue 6	Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)		
FCC Part 2.1091	Radiofrequency radiation exposure evaluation: mobile devices.		

#### Table 3. References

# 2.4 Description of Test Sample

The HDP5000e, Model X002700 is a modular, high definition printer system designed to print and encode ID cards. The system can only use the following modules, there are no other configuration.

Configuration 2 (DVT3#4) = Single Input Hopper, Dual-Sided Printer, Flipper, Single Output Stacker. Encoders: Mag, OMNIKEY 5122, OMNIKEY 5127SI.



# 2.5 Mode of Operation

A laptop computer with a specific utility that allowed for controlling of each transmitter on board the HDP5000e was used during the testing. The following transmitters were tested:

Transmitter	Channel Frequencies Tested	Exercising Method		
Film RFID 13.56MHz		Test commands via laptop computer		
Ribbon RFID 13.56MHz		Test commands via laptop computer		
OMNIKEY 5122	13.56MHz	Test commands via laptop computer		
OMNIKEY 5127SI	13.56MHz	Test commands via laptop computer		
OMNIKEY 5127SI	125kHz	Test commands via laptop computer		

#### Table 4. Transmitters Onboard

### 2.6 Modifications

#### 2.6.1 Modifications to EUT

No modifications were made to the EUT.

#### 2.6.2 Modifications to Test Standard

No modifications were made to the test standard.

## 2.7 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.



#### 3.0 Maximum Permissible Exposure Results

#### 3.1 IEC62311 (ICNIRP) RF Exposure Limits

Table 7. Reference levels for general public exposure to time-varying electric and magnetic fields (unperturbed rms values).a

Frequency range	$\begin{array}{c} \text{E-field strength} \\ (\text{V } \text{m}^{-1}) \end{array}$	H-field strength (A m <sup>-1</sup> )	B-field (µT)	Equivalent plane wave power density $S_{eq}$ (W m <sup>-2</sup> )
up to 1 Hz	_	$3.2 \times 10^{4}$	$4 \times 10^4$	_
1-8 Hz	10,000	$3.2 \times 10^4 / f^2$	$4 \times 10^{4}/f^{2}$	_
8–25 Hz	10,000	4,000/f	5,000/f	_
0.025-0.8 kHz	250/f	4/f	5/f	_
0.8–3 kHz	250/f	5	6.25	_
3-150 kHz	87	5	6.25	_
0.15–1 MHz	87	0.73/f	0.92/f	_
1–10 MHz	87/f <sup>1/2</sup>	0.73/f	0.92/f	_
10-400 MHz	28	0.073	0.092	2
400-2,000 MHz	$1.375f^{1/2}$	$0.0037 f^{1/2}$	$0.0046f^{1/2}$	<i>f</i> /200
2-300 GHz	61	0.16	0.20	10

<sup>a</sup> Note:

1. f as indicated in the frequency range column.

2. Provided that basic restrictions are met and adverse indirect effects can be excluded, field strength values can be exceeded.

For frequencies between 100 kHz and 10 GHz, S<sub>eq</sub> E<sup>2</sup>, H<sup>2</sup>, and B<sup>2</sup> are to averaged over any 6-min period.
 For peak values at frequencies up to 100 kHz see Table 4, note 3.

 For peak values at frequencies up to 100 kHz see Figs. 1 and 2. Between 100 kHz and 10 MHz, peak values for the field strengths are obtained by interpolation from the 1.5-fold peak at 100 kHz to the 32-fold peak at 10 MHz. For frequencies exceeding 100 10 MHz it is suggested that the peak equivalent plane wave power density, as averaged over the pulse width does not exceed 1,000

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# 3.2 RSS-102 RF Exposure Limits

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m²)	Reference Period (minutes)
0.003-10 <u><sup>21</sup></u>	83	90	-	Instantaneous*
0.1-10	-	0.73/ f	-	6**
1.1-10	87/ f <sup>0.5</sup>	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ f <sup>0.25</sup>	0.1540/ f <sup>0.25</sup>	8.944/ f <sup>0.5</sup>	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 f <sup>0.3417</sup>	0.008335 f <sup>0.3417</sup>	0.02619 f <sup>0.6834</sup>	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ f <sup>1.2</sup>
150000-300000	0.158 f <sup>0.5</sup>	4.21 × 10 <sup>-4</sup> f <sup>0.5</sup>	6.67 x 10 <sup>-5</sup> f	616000/f <sup>1.2</sup>

\*\* Based on specific absorption rate (SAR).

# 3.3 FCC Exposure Limits

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
	(i) Lim	its for Occupational/Controlled Exposure		
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*(900/f <sup>2</sup> )	<6
30-300	61.4	0.163	1.0	<6
300-1,500			f/300	<6
1,500-100,000			5	<6
	(ii) Limits f	or General Population/Uncontrolled Exposure		
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	<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.



#### **Test Procedure:**

An MPE evaluation for was performed in order to show that the device was compliant with the general population exposure limits. The maximum power density was calculated for each transmitter band at a separation distance of 20cm using the maximum declared output power including tune up tolerance.

For each transmitter the maximum RF exposure at a 20 cm distance using the formula:

 $ConductedPower_{mW} = 10^{ConductedBwer(dBm)/10}$ 

 $PowerDensity = \frac{ConductedPower_{mW} \times Ant.Gain}{4\pi \times (20_{cm})^2}$ 

For transmitters that could operate simultaneously, the MPE to limit ratio for each was calculated and then summed. If the sum of the MPE to limit ratios was less than 1, that specific combination of transmitters was deemed to comply.

#### **Test Results:**

The HDP5000e was **compliant** with FCC Part 2.1091, RSS-102 Issue 6 and IEC62311 Issue 2. The calculated maximum power density at 20cm distance was equal to or less than the required limits for general population exposure for FCC Part 2.1091, RSS-102 Issue 6 and IEC62311 Issue 2.

None of the transmitters onboard transmit simultaneously so there is no calculation for simultaneous transmission included..

The 125kHz transmitters were exempt from demonstrating compliance to FCC RF exposure limits per clause 2.1.2 of KDB447498 D04, clause 2.1.2 since the available maximum power is less than 1mW. The exemption data for the 125kHz transmitters are included in the data as well.

Note: The conducted powers shown in the data tables were calculated from the worst-case field strengths for each transmitter measured during testing. These field strengths (in dBuV/m, measured at 3m) were then converted to radiated power in dBm using the procedures in ANSI C63.10. The conducted power was then calculated by subtracting the antenna gain of 1dB to arrive at the conducted power in dBm. This was converted to mW and used in the MPE calculations.

		Field	Measurement	Radiated		Conducted	Conducted
	Frequency	Strength	Distance	Power	Antenna	Power	Power
<b>Operating Mode</b>	(MHz)	(dBuV/m)	(Meters)	(dBm)	Gain (dB)	(dBm)	(mW)
Film RFID	13.56	62.44000	3	-32.81757	1	-33.81757	0.00042
OMINKEY 5122 RFID	13.56	62.39000	3	-32.86757	1	-33.86757	0.00041
OMNIKEY 5127SI RFID	13.56	69.60000	3	-25.65757	1	-26.65757	0.00216
Ribbon RFID	13.56	55.61000	3	-39.64757	1	-40.64757	0.00009

#### **Table 5. Conducted Power Calculations**



#### Test Data:

Duty Cycle	100 (%)					
Separation Dist.	20 (cm)					
Operating Mode	Frequency Output Power		Antenna Gain	MPE Value	MPE Limit	Margin to Limit
			(UD)			
Film RFID	13.56	0.00042	1	0.00000010	0.97893335	0.97893325
OMINKEY 5122 RFID	13.56	0.00041	1	0.0000010	0.97893335	0.97893325
OMNIKEY 5127SI RFID	13.56	0.00216	1	0.0000054	0.97893335	0.97893281
Ribbon RFID	13.56	0.00009	1	0.0000002	0.97893335	0.97893333
FOOLARE D.						

FCC MPE Data

Duty Cycle	100 (%)					
Separation Dist.	20 (cm)					
	Maximum Conducted		Antenna Gain	MPE Value	MPE Limit	Margin to
Operating Mode	(MHz)	(mW)	(dB)	(W/m <sup>2</sup> )	(W/m²)	Limit (W/m <sup>2</sup> )
Film RFID	13.56	0.00042	1	0.00000104	2.0000000	1.99999896
OMINKEY 5122 RFID	13.56	0.00041	1	0.0000103	2.0000000	1.99999897
OMNIKEY 5127SI RFID	13.56	0.00216	1	0.0000541	2.00000000	1.99999459
Ribbon RFID	13.56	0.00009	1	0.0000022	2.0000000	1.99999978

ISED MPE Data

Duty Cycle	100 (%)					
Separation Dist.	20 (cm)					
	Frequency	Maximum Conducted Output Power	Antenna Gain	MPE Value	MPE Limit	Margin to
Operating Mode	(MHz)	(mW)	(dB)	(W/m²)	(W/m²)	Limit (W/m <sup>2</sup> )
Film RFID	13.56	0.00042	1	0.0000104	2.0000000	1.99999896
OMINKEY 5122 RFID	13.56	0.00041	1	0.0000103	2.0000000	1.99999897
OMNIKEY 5127SI RFID	13.56	0.00216	1	0.0000541	2.0000000	1.99999459
Ribbon RFID	13.56	0.00009	1	0.0000022	2.0000000	1.99999978

IEC62311 MPE Data

			Measure					
		Field	ment				Exemption	
		Strength	Distance				Level	Exempt
Transmitter	Frequency	(dBuV/m)	(m)	EIRP (dBm)	ERP (dBm)	ERP (mW)	(mW)	(Yes / No)
OMNIKEY 5127SI	125kHz	72.58	3	-22.68	-24.83	0.00329	1	Yes

125kHz Exemption Calculation

**Test Engineer(s):** Bryan Taylor

**Test Date(s):** 3/4/2024 - 3/8/2024