





<b>RF-EXPOSURE REPORT</b> <b>FCC 47 CFR Part 2.1093</b> <b>ISED RSS-102</b> <b>RF-Exposure evaluation of portable RFID equipment</b>	
<b>Report Reference No.</b> .....	G0M-1808-7604-TFC093ME-V01
<b>Testing Laboratory</b> .....	Eurofins Product Service GmbH
Address.....	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation .....	<div style="display: flex; justify-content: space-around; align-items: center;">     </div> <p style="text-align: center; margin-top: 5px;">           DAKKS - Registration number : D-PL-12092-01-03 (ISED)            ISED Testing Laboratory site: 3470A-2            DAKKS - Registration number : D-PL-12092-01-04 (FCC)            FCC Filed Test Laboratory, Reg.-No.: 96970         </p>
<b>Applicant's name</b> .....	Dräger Safety AG & Co. KGaA
Address.....	Revalstraße 1 23560 Lübeck GERMANY
<b>Test specification:</b>	
Standard .....	47 CFR 2.1093 KDB 447498 D01 v06:2015-10-23 RSS-102, Issue 5:2015-03
<b>Equipment under test (EUT):</b>	
Product description	Handheld gas measurement tool
Model No.	X-act 7000
Additional Model(s)	None
Brand Name(s)	None
Hardware version	8610820
Firmware / Software version	v0.0.1102
	<span>FCC-ID: X6O-RF001</span> <span>IC: 5895F-RF001</span>
<b>Test result</b>	<b>Passed</b>

**Possible test case verdicts:**

- neither assessed nor tested .....: N/N
- required by standard but not appl. to test object.....: N/A
- required by standard but not tested.....: N/T
- not required by standard for the test object .....: N/R
- test object does meet the requirement.....: P (Pass)
- test object does not meet the requirement.....: F (Fail)

**Testing:**

Test Lab Temperature .....: 20 – 23 °C

Test Lab Humidity .....: 32 – 38 %

Date of receipt of test item .....:

Date (s) of assessment .....: 2019-04-04

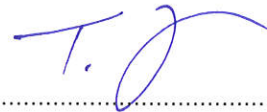
Compiled by .....: Toralf Jahn

Assessed by (+ signature) .....: Toralf Jahn  
(Responsible for Assessment)

Approved by (+ signature) .....: Christian Weber  
(Head of Lab)

Date of issue .....: 2019-04-04

Total number of pages .....: 13



**General remarks:**

**The test results presented in this report relate only to the object tested.**

**The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.**

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

**Additional comments:**

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## Version History

Version	Issue Date	Remarks	Revised by
01	2019-04-04	Initial Release	

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**REPORT INDEX**

<b>1</b>	<b>EQUIPMENT (TEST ITEM) DESCRIPTION</b>	<b>5</b>
1.1	Standalone Radiation Sources	6
1.2	Multi-transmitter Modes	6
1.3	Test Equipment Used	7
<b>2</b>	<b>RESULT SUMMARY</b>	<b>8</b>
<b>3</b>	<b>RADIATED FIELD MEASUREMENT</b>	<b>9</b>
3.1	Test Conditions and Results – Electric and magnetic field strength	9
<b>4</b>	<b>RF-EXPOSURE CLASSIFICATIONS</b>	<b>10</b>
<b>5</b>	<b>EVALUATION</b>	<b>11</b>
5.1	Evaluation Conditions – 47 CFR 2.1093 / RSS-102	11
5.2	Single-Transmitter Evaluation – 47 CFR 2.1093 / RSS-102	13

**1 Equipment (Test item) Description**

<b>Description</b>	Handheld gas measurement tool
<b>Model</b>	X-act 7000
<b>Additional Model(s)</b>	None
<b>Brand Name(s)</b>	None
<b>Serial number</b>	None
<b>Hardware version</b>	8610820
<b>Software / Firmware version</b>	v0.0.1102
<b>PMN</b>	None
<b>HVIN</b>	X-act 7000
<b>FVIN</b>	None
<b>HMN</b>	None
<b>FCC-ID</b>	X6O-RF001
<b>IC</b>	5895F-RF001
<b>Equipment type</b>	End product

### 1.1 Standalone Radiation Sources

Mode #	Description	
RFID	Frequency range [MHz]	13.56
	Channel spacing	None
	Modulations	OOK
	Maximum electric field [V/m @ 0cm]	3.51
	Maximum magnetic field [A/m @ 0cm]	0.037

### 1.2 Multi-transmitter Modes

None

**1.3 Test Equipment Used**

<b>Field Strength Measurement</b>					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic chamber	Frankonia	AC 2	EF00198	-	-
Broadband Field Meter NBM-550	Narda Safety Test Solutions	2401/01B	EF00998	2018-08	2019-08
EM Radiation Monitor	Narda Safety Test Solutions	EMR-02	EF00058	2018-08	2019-08

**2 Result Summary**

FCC 47 CFR Part 2.1093, IC RSS-102			
Product Specific Standard Section	Requirement	Result	Remarks
47 CFR 2.1093	Maximum permissible exposure @ 0cm below field strength limit	PASS	
RSS-102	Maximum permissible exposure @ 0cm below field strength limit	PASS	
<b>Remarks:</b>			



### 3 Radiated Field Measurement

#### 3.1 Test Conditions and Results – Electric and magnetic field strength

ELECTRIC AND MAGNETIC FIELD STRENGTH					
Test frequency range		Tested frequencies			
		F <sub>MID</sub>			
EUT test mode		RFID			
Measurement method		radiated only			
Test procedure					
1. EUT transmitter is activated in test mode under normal conditions 2. The perimeter of the EUT is scanned with an electric and magnetic field probe at a fixed distance 3. The electric and magnetic field strength is measured 4. The maximum field strength values are recorded					
Test results					
Channel	Frequency [MHz]	Mode	Distance [m]	Max. electric field strength [V/m]	Max. magnetic field strength [A/m]
F <sub>MID</sub>	13.56	Tx	0.0	3.51	0.037
Comments: The field probe touches the EUT housing.					

#### 4 RF-Exposure Classifications

<b>Device Types</b>	
Fixed	A fixed device is defined as a device physically secured at one fixed location and cannot be easily re-located.
Mobile	A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. (47 CFR 2.1091)
Portable	A portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user. (47 CFR 2.1093)
<b>Exposure Categories</b>	
Occupational / Controlled	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 an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.
General population / uncontrolled	Exposures apply in situations in which the general public may be exposed, or in which persons that 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.

## 5 Evaluation

### 5.1 Evaluation Conditions – 47 CFR 2.1093 / RSS-102

EVALUATION ACC. TO 47 CFR 2.1093 / ISED RSS-102				VERDICT: PASS
Assessment according to reference		Reference Method		
		KDB 447498 D01 / RSS-102 & Safety Code 6		
Device type		portable		
Exposure category		General public		
ISED Limits – Occupational / Controlled Exposure				
Frequency range [MHz]	Electric field strength [V/m]	Magnetic field strength [A/m]	Power density [W/m <sup>2</sup> ]	Averaging time [min]
0.003-10*	170	180	-	Instantaneous*
0.1-10	-	1.6 / $f$	-	6**
1.29-10	193 / $f^{0.5}$	-	-	6**
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 x 10 <sup>-4</sup> $f^{0.5}$	3.33 x 10 <sup>-4</sup> $f$	616000 / $f^{1.2}$
ISED Limits – General Population / Uncontrolled Exposure				
Frequency range [MHz]	Electric field strength [V/m]	Magnetic field strength [A/m]	Power density [W/m <sup>2</sup> ]	Averaging time [min]
0.003-10*	83	90	-	Instantaneous*
0.1-10	-	0.73 / $f$	-	6**
1.1-10	87 / $f^{0.5}$	-	-	6**
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 x 10 <sup>-4</sup> $f^{0.5}$	6.67 x 10 <sup>-5</sup> $f$	616000 / $f^{1.2}$
* = Based on nerve stimulation				
** = Bases on specific absorption rate				

<b>FCC Limits – Occupational / Controlled Exposure</b>				
Frequency range [MHz]	Electric field strength [V/m]	Magnetic field strength [A/m]	Power density [mW/cm <sup>2</sup> ]	Averaging time [min]
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 - 1500	N/A	N/A	f / 300	6
1500 - 100000	N/A	N/A	5.0	6
<b>FCC Limits – General Population / Uncontrolled Exposure</b>				
Frequency range [MHz]	Electric field strength [V/m]	Magnetic field strength [A/m]	Power density [mW/cm <sup>2</sup> ]	Averaging time [min]
0.3 – 1.34	614	1.63	(100)*	30
1.34 - 30	842 / f	2.19 / f	(180 / f <sup>2</sup> )*	30
30 - 300	27.5	0.073	0.2	30
300 - 1500	N/A	N/A	f / 1500	30
1500 - 100000	N/A	N/A	1.0	30
* = Plane wave equivalent power density; f in MHz				
<b>Assessment procedure</b>				
<p>The evaluation is performed at a separation distance of 0 cm. The reference levels are taken from 47 CFR 1.1310 for FCC and RSS-102 for ISED according to the exposure category declared by customer.</p> <p>For each radio and frequency band the worst case transmission mode with the highest output power is activated and the surrounding area around the EUT is scanned using an electric and a magnetic field probe at the distance given in the test report. The maximum electric and magnetic field strength values measured are compared to the corresponding reference levels. If both measured field strength values are below the reference levels the EUT has passed the RF-Exposure requirements.</p>				

**5.2 Single-Transmitter Evaluation – 47 CFR 2.1093 / RSS-102**

<b>Assessment results – RFID</b>		
Transmission mode		
Operating mode frequency range [MHz]	13.56	
Assessment frequency (f) [MHz]	13.56	
Compliance separation distance to EUT [m]	0.0	
Electric Field		
Measured max. electric field strength [V/m]	3.51	
Reference level [V/m]	27.46 (IC)	62.09 (FCC)
Verdict	PASS	
Magnetic Field		
Measured max. magnetic field strength [A/m]	0.037	
Reference level [A/m]	0.0728 (IC)	0.161 (FCC)
Verdict	PASS	
Verdict		
<b>The field strength level of the EUT are below the RF-Exposure reference level at the given compliance separation distance of 0 cm!</b>		
Comments:		