

## RF-EXPOSURE REPORT

FCC 47 CFR Part 2.1093  
ISED RSS-102

RF-Exposure evaluation of portable RFID equipment

Report Reference No.....: G0M-1904-8167-TFC093PE-V02

Testing Laboratory .....: Eurofins Product Service GmbH

Address.....: Storkower Str. 38c  
15526 Reichenwalde  
Germany

Accreditation .....



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

Applicant's name .....: W.O.M. WORLD OF MEDICINE GmbH

Address.....: Salzufer 8  
10587 Berlin  
GERMANY

### Test specification:

Standard .....: FCC 47 CFR 2.1093  
FCC KDB 447498 D01 v06:2015-10-23  
ISED RSS-102, Issue 5:2015-03

### Equipment under test (EUT):

Product description                      customized Read / Write RFID module  
Model No.                                      TS-HW42  
Additional Model(s)                        None  
Brand Name(s)                                None  
Hardware version                            1430  
Firmware / Software version              PRV100  
FCC-ID: 2AS5K-TSHW42                  IC: 25004-TSHW42A

Test result                                    Passed

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Storkower Str. 38c, D-15526 Reichenwalde, Germany

**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 .....: 2019-04-10

Date (s) of assessment .....: 2019-05-02

Compiled by .....: Christian Weber

Assessed by (+ signature) .....: Burkhard Pudell  
(Responsible for Assessment)



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



Date of issue .....: 2019-07-11

Total number of pages .....: 14

**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	2019-05-09	Initial Release	
02	2019-07-11	<b>Replaced document</b> G0M-1904-8167-TFC093PE-V01 <b>Replaced by</b> G0M-1904-8167-TFC093PE-V02  <b>Reason</b> <ul style="list-style-type: none"><li>– Serial number added</li><li>– Editorial corrections</li></ul>	C. Weber

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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	7
1.3	Test Equipment Used	8
<b>2</b>	<b>RESULT SUMMARY</b>	<b>9</b>
<b>3</b>	<b>RADIATED FIELD MEASUREMENT</b>	<b>10</b>
3.1	Test Conditions and Results – Electric and magnetic field strength	10
<b>4</b>	<b>RF-EXPOSURE CLASSIFICATIONS</b>	<b>11</b>
<b>5</b>	<b>EVALUATION</b>	<b>12</b>
5.1	Evaluation Conditions – FCC 47 CFR 2.1093 / ISED RSS-102	12
5.2	Single-Transmitter Evaluation – FCC 47 CFR 2.1093 / ISED RSS-102	14

## 1 Equipment (Test item) Description

Description	customized Read / Write RFID module
Model	TS-HW42
Additional Model(s)	None
Brand Name(s)	None
Serial number	1430-V1.00#17399 10/18
Hardware version	1430
Software / Firmware version	PRV100
PMN	TS-HW42
HVIN	1430
FVIN	-/-
HMN	-/-
FCC-ID	2AS5K-TSHW42
IC	25004-TSHW42A
Equipment type	Radio module

## 1.1 Standalone Radiation Sources

Mode #	Description	
RFID	Frequency range [MHz]	13.5609
	Channel spacing	N/A
	Modulations	ASK
	Maximum electric field [V/m @ 0cm]	7.58
	Maximum magnetic field [A/m @ 0cm]	0.058

## 1.2 Multi-transmitter Modes

None

### 1.3 Test Equipment Used

Field Strength Measurement					
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
Magnetic field probe HF3061	Narda Safety Test Solutions	2402/05B	EF00999	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, ISED RSS-102			
Product Specific Standard Section	Requirement	Result	Remarks
FCC 47 CFR 2.1093	Maximum permissible exposure @ 0cm below field strength limit	PASS	
ISED RSS-102	Maximum permissible exposure @ 0cm below field strength limit	PASS	
Remarks:			

### 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 methode			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>	13.5609	Transmit	0.0*	7.58	0.058
Comments: *The field probe touches the EUT housing.					

#### 4 RF-Exposure Classifications

Device Types	
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)
Exposure Categories	
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 – FCC 47 CFR 2.1093 / ISED RSS-102

EVALUATION ACC. TO FCC 47 CFR 2.1093 / ISED RSS-102				VERDICT: PASS
Assessment according to reference		Reference Method		
		FCC KDB 447498 D01 / ISED RSS-102		
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 / <i>f</i>	-	6**
1.29-10	193 / <i>f</i> <sup>0.5</sup>	-	-	6**
10-20	61.4	0.163	-10	6
20-48	129.8 / <i>f</i> <sup>0.25</sup>	0.3444 / <i>f</i> <sup>0.25</sup>	44.72 / <i>f</i> <sup>0.5</sup>	6
48-100	49.33	0.1309	6.455	6
100-6000	15.60 <i>f</i> <sup>0.25</sup>	0.04138 <i>f</i> <sup>0.25</sup>	0.6455 <i>f</i> <sup>0.5</sup>	6
6000-15000	137	0.364	50	6
15000-150000	137	0.364	50	616000 / <i>f</i> <sup>1.2</sup>
150000-300000	0.354 <i>f</i> <sup>0.5</sup>	9.40 x 10 <sup>-4</sup> <i>f</i> <sup>0.5</sup>	3.33 x 10 <sup>-4</sup> <i>f</i>	616000 / <i>f</i> <sup>1.2</sup>
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 / <i>f</i>	-	6**
1.1-10	87 / <i>f</i> <sup>0.5</sup>	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07 / <i>f</i> <sup>0.25</sup>	0.1540 / <i>f</i> <sup>0.25</sup>	8.944 / <i>f</i> <sup>0.5</sup>	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 <i>f</i> <sup>0.3417</sup>	0.008335 <i>f</i> <sup>0.3417</sup>	0.02619 <i>f</i> <sup>0.6834</sup>	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000 / <i>f</i> <sup>1.2</sup>
150000-300000	0.158 <i>f</i> <sup>0.5</sup>	4.21 x 10 <sup>-4</sup> <i>f</i> <sup>0.5</sup>	6.67 x 10 <sup>-5</sup> <i>f</i>	616000 / <i>f</i> <sup>1.2</sup>
* = Based on nerve stimulation				
** = Bases on specific absorption rate				

FCC Limits – Occupational / Controlled Exposure				
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
FCC Limits – General Population / Uncontrolled Exposure				
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				
Assessment procedure				
<p>The evaluation is performed at a separation distance of 0 cm. The reference levels are taken from 47 CRF 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 – FCC 47 CFR 2.1093 / ISED RSS-102

Assessment results – RFID		
Transmission mode		
Operating mode frequency range [MHz]	13.5609	
Assessment frequency (f) [MHz]	13.5609	
Compliance separation distance to EUT [m]	0	
Electric Field		
Measured max. electric field strength [V/m]	7.58	
Reference level [V/m]	62.09 (FCC)	27.46 (ISED)
Verdict	PASS	
Magnetic Field		
Measured max. magnetic field strength [A/m]	0.058	
Reference level [A/m]	0.162 (FCC)	0.0728 (ISED)
Verdict	PASS	
Verdict		
The field strength level of the EUT are below the RF-Exposure reference level at the given compliance separation distance of 0 cm!		
Comments:		