

RF-EXPOSURE REPORT FCC 47 CFR Part 2.1091 ISED RSS-102 RF-Exposure evaluation of mobile equipment	
Report Reference No.	G0M-1904-8167-TFC091ME-V02
Testing Laboratory	Eurofins Product Service GmbH
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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 2.1091 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

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: 2019-05-09

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:

Version History

Version	Issue Date	Remarks	Revised by
01	2019-05-09	Initial Release	
02	2019-07-11	Replaced document G0M-1904-8167-TFC091ME-V01 Replaced by G0M-1904-8167-TFC091ME-V02 Reason – Serial number added – Editorial corrections	C. Weber

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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 @ 20cm]	0.5
	Maximum magnetic field [A/m @ 20cm]	0.017

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 2.1091, ISED RSS-102			
Product Specific Standard Section	Requirement	Result	Remarks
FCC 47 CFR 2.1091	Maximum permissible exposure @ 20cm below limit	PASS	
ISED RSS-102	Maximum permissible exposure @ 20cm below 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 _{MID}		
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 _{MID}	13.5609	Transmit	0.2*	0.5	0.017
Comments: *from centre of probe					

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 MPE Evaluation Conditions – FCC 47 CFR 2.1091 / ISED RSS-102

MPE EVALUATION ACC. TO FCC 47 CFR 2.1091 / ISED RSS-102				VERDICT: PASS
Assessment according to reference		Reference Method		
		FCC KDB 447498 D01 / ISED RSS-102		
Device type		mobile		
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 ²]	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> ^{0.5}	-	-	6**
10-20	61.4	0.163	-10	6
20-48	129.8 / <i>f</i> ^{0.25}	0.3444 / <i>f</i> ^{0.25}	44.72 / <i>f</i> ^{0.5}	6
48-100	49.33	0.1309	6.455	6
100-6000	15.60 <i>f</i> ^{0.25}	0.04138 <i>f</i> ^{0.25}	0.6455 <i>f</i> ^{0.5}	6
6000-15000	137	0.364	50	6
15000-150000	137	0.364	50	616000 / <i>f</i> ^{1.2}
150000-300000	0.354 <i>f</i> ^{0.5}	9.40 x 10 ⁻⁴ <i>f</i> ^{0.5}	3.33 x 10 ⁻⁴ <i>f</i>	616000 / <i>f</i> ^{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 ²]	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> ^{0.5}	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07 / <i>f</i> ^{0.25}	0.1540 / <i>f</i> ^{0.25}	8.944 / <i>f</i> ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 <i>f</i> ^{0.3417}	0.008335 <i>f</i> ^{0.3417}	0.02619 <i>f</i> ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000 / <i>f</i> ^{1.2}
150000-300000	0.158 <i>f</i> ^{0.5}	4.21 x 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 x 10 ⁻⁵ <i>f</i>	616000 / <i>f</i> ^{1.2}
* = 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 ²]	Averaging time [min]
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 - 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 ²]	Averaging time [min]
0.3 – 1.34	614	1.63	(100)*	30
1.34 - 30	842 / f	2.19 / f	(180 / f ²)*	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				
The evaluation is performed at a separation distance of 20 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. 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.				

5.2 Single-Transmitter Evaluation – FCC 47 CFR 2.1091 / 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]	0.2	
Electric Field		
Measured max. electric field strength [V/m]	0.5	
Reference level [V/m]	62.09 (FCC)	27.46 (ISED)
Verdict	PASS	
Magnetic Field		
Measured max. magnetic field strength [A/m]	0.017	
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!		
Comments:		