

Test report

Applicant:

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Test report no.:

200490-AU01+W02

for:

Elatec GmbH
RFID reader / writer module
TWN4 Mini Reader Mifare NFC



Industry
Canada

according to:

RSS 102

Accreditation:



Recognized on March 14th, 2019 by the
Department of Innovation, Science and Economic Development (ISED) Canada
as a wireless testing laboratory
CAB identifier: DE0011
ISED#: 3472A

Location of Testing:



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The technical accuracy is guaranteed through the quality management of the
EMV **TESTHAUS** GmbH.



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1 Test regulations

<i>Standard</i>	<i>Title</i>
RSS-102 Issue 5 March 2015	Spectrum Management and Telecommunications Radio Standards Specification Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands)
SPR-002 Issue 1 September 2016	Spectrum Management and Telecommunications Supplementary Procedure Supplementary Procedure for Assessing Compliance with RSS-102 Nerve Stimulation Exposure Limits
Safety Code 6 (2015)	Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3 kHz to 300 GHz
IEEE C95.3-2002 (R2008) Approved December 11, 2002 Reaffirmed June 12, 2008	IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to Such Fields, 100 kHz–300 GHz
ANSI C63.10 June 2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
OET Bulletin 65, 65A, 65B Edition 97-01, August 1997	Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields

2 Summary of test results

Standard	Result	Remark
RSS-102 Issue 5	Passed	---

Straubing, August 19, 2020



Andreas Menacher
Test engineer
EMV **TESTHAUS** GmbH



Konrad Graßl
Head of Radio department
EMV **TESTHAUS** GmbH

3 Equipment under test (EUT)

Product type: RFID reader / writer module
Model Name: TWN4 Mini Reader Mifare NFC
HVIN: EL20205
Manufacturer: Elatec GmbH
Serial number: Serial prototype
Version: Hardware: B
Software: B1.05/MCF1.64/PRS1.04
Short description: EUT is a RFID reader / writer module operating at the frequency 13.56 MHz.
FCC ID: WP5TWN4F15
IC certification number: 7948A-TWN4F15
Application frequency band: 13.110 MHz – 14.010 MHz
Operating frequency: 13.56 MHz
Number of RF channels: 1
Modulation: ASK
Antenna types: PCB antenna
 detachable not detachable
Power supply: DC supply
nominal voltage: 5.00 V
Exposure to: Head
 Body
 Limbs
 other
Separation distance: ≤ 20 cm
 > 20 cm
Evaluated against exposure limits: General public use
 Controlled use

4 Photographs of EUT

See Annex B of test report 200490-AU01+W01 of test laboratory EMV Testhaus GmbH.

5 Test results

This clause gives details about the test results as collected on page 5.

The climatic conditions are recorded during the tests. It is ensured that the climatic conditions are within the following ranges:

<i>Ambient temperature</i>	<i>Ambient humidity</i>	<i>Ambient pressure</i>
15°C to 35°C	30 % to 75 %	86 kPa to 106 kPa

5.1 Canada

5.1.1 Evaluation for separation distance ≤ 20 cm, except 3 khz -10 MHz

Reference: RSS 102 clause 2.5.1

Basic standard: n/a

Performed by: Andreas Menacher Date of test: August 19, 2020

Result: Limits kept Limits not kept

5.1.1.1 Data of equipment under test (EUT)

Note: The data for the RF technology 1 is taken out of the Test report 200490-AU01+W01 of the test laboratory EMV Testhaus GmbH

RF technology 1:

Application: RFID

Operation frequency: 13.56 MHz

Antenna model PCB loop antenna

Antenna connector: none

Antenna type: internal

not detachable

Maximum field strength: 39.61 dB μ V/m at 30 m

Tune-up tolerance: ± 1 dB

5.1.1.2 Exemption Limits for Routine Evaluation – SAR Evaluation

According to RSS 102 clause 2.5.1:

SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in Table 1.

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of ≥50 mm
≤300	223 mW	254 mW	284 mW	315 mW	345 mW
450	141 mW	159 mW	177 mW	195 mW	213 mW
835	80 mW	92 mW	105 mW	117 mW	130 mW
1900	99 mW	153 mW	225 mW	316 mW	431 mW
2450	83 mW	123 mW	173 mW	235 mW	309 mW
3500	86 mW	124 mW	170 mW	225 mW	290 mW
5800	56 mW	71 mW	85 mW	97 mW	106 mW

⁴ The exemption limits in Table 1 are based on measurements and simulations of half-wave dipole antennas at separation distances of 5 mm to 25 mm from a flat phantom, providing a SAR value of approximately 0.4 W/kg for 1 g of tissue. For low frequencies (300 MHz to 835 MHz), the exemption limits are derived from a linear fit. For high frequencies (1900 MHz and above), the exemption limits are derived from a third order polynomial fit.

⁵ Transmitters operating between 0.003-10 MHz, meeting the exemption from routine SAR evaluation, shall demonstrate compliance to the instantaneous limits in Section 4.

Output power level shall be the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time-averaged output power. For controlled use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in Table 1 are multiplied by a factor of 5. For limb-worn devices where the 10 gram value applies, the exemption limits for routine evaluation in Table 1 are multiplied by a factor of 2.5. If the operating frequency of the device is between two frequencies located in Table 1, linear interpolation shall be applied for the applicable separation distance. For test separation distance less than 5 mm, the exemption limits for a separation distance of 5 mm can be applied to determine if a routine evaluation is required. For medical implants devices, the exemption limit for routine evaluation is set at 1 mW. The output power of a medical implants device is defined as the higher of the conducted or e.i.r.p to determine whether the device is exempt from the SAR evaluation.

5.1.1.3 Results

RF technology:

Information related to Exposure:

Antenna model PCB loop antenna
 Separation distance: 0 mm
 Exposure tier: general public
 Power averaging over time: Not applied

Exposure to the head

Separation distance (mm)	Channel Frequency (MHz)	EIRP + tolerance (dBm)	EIRP + tolerance (mW)	Limit 1-g SAR (mW)	Fraction of limit (%)
0	13.560000	-34.54	0.0003	71	0.0004

EIRP is calculated using the formula of ANSI C63.10-2013 clause 9.5:

$$EIRP = E + 20\log(d) - 104.7$$

Where: EIRP = equivalent isotropically radiated power in dBm
 E = electric field strength in dBµV/m
 d = measurement distance in meters (m)

6 Revision history

<i>Revision</i>	<i>Date</i>	<i>Issued by</i>	<i>Description of modifications</i>
0	2020-08-19	Andreas Menacher	First edition

Template: Part 2_RSS-102_V1.00



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