



**Attachment B**  
- RF exposure evaluation -

**Type / Model Name** : ARU 2401

**Product Description** : UHF-RFID-Reader 902-928 MHz

**Applicant** : Kathrein Sachsen GmbH

**Address** : Lindenstrasse 3

09241 Mühlau, Germany

**Manufacturer** : Kathrein Sachsen GmbH

**Address** : Lindenstrasse 3

09241 Mühlau, Germany

according to

<b>Test Report No:</b>	<b>80120797-00 Rev_0</b>	20. June 2022
	<b>80120797-01 Rev_0</b>	Date of issue

# Contents

<b>1</b>	<b><u>EQUIPMENT UNDER TEST</u></b>	<b>3</b>
1.1	Information provided by the Client	3
1.2	Sampling	3
<b>2</b>	<b><u>RF exposure evaluation</u></b>	<b>4</b>
2.1	Description of the test location	4
2.2	Applicable standard	4
2.3	Description of Determination	4
2.4	Determination of MPE according FCC	5
2.5	Determination of MPE according ISED	5

# **1 EQUIPMENT UNDER TEST**

## **1.1 Information provided by the Client**

Please note, we do not take any responsibility for information provided by the client or his representative which may have an influence on the validity of the test results.

## **1.2 Sampling**

The customer is responsible for the choice of sample. Sample configuration, start-up and operation is carried out by the customer or according his/her instructions.

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

## 2 RF exposure evaluation

### 2.1 Description of the test location

Test location: NONE

### 2.2 Applicable standard

According to FCC Part 15, Section 15.247(i):

Systems operating under the provisions of this section shall be operated in a manner that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

The test methods used comply with ANSI/IEEE C95.1, "IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz".

This test report shows the compliance with the limits for Maximum Permissible Exposure (MPE) specified in FCC Part 1, Section 1.1310 and the criteria to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in FCC Part 1, Section 1.1307(b).

### 2.3 Description of Determination

The maximum rated output power conducted included the tune up tolerance is used to calculate the EIRP. Through the Friis transmission formula, the known maximum gain of the antenna and the maximum power, can be calculated the MPE in a defined distance away from the product.

Friis transmission formula:

$$P_d = \frac{P_{out} * G}{4 * \pi * r^2}$$

Where:

$P_d$  = power density (mW/cm<sup>2</sup>)

$P_{out}$  = output power to antenna (mW)

$G$  = gain of antenna (linear scale)

$r$  = distance between antenna and observation point (cm)

According to FCC Rules 47CFR 2.1093(b) the EUT is not a portable device. The EUT is designed to be used that radiating structures are 20 cm outside of the body of the user. ( $r = 30$  cm)

## 2.4 Determination of MPE according FCC

Channel No.	Frequency (MHz)	Max power output to antenna		Antenna gain (dBi)	Linear Ant. Gain (dBi)	Power density (W/cm <sup>2</sup> )	Limit of power density (W/cm <sup>2</sup> )	Result
		(dBm)	(W)					
1	902.25	28.65	0.733	2.5	1.778	0.115	0.602	PASS
25	914.75	28.80	0.759	2.5	1.778	0.119	0.610	PASS
52	927.75	28.74	0.748	2.5	1.778	0.118	0.619	PASS

Limits for maximum permissible exposure (MPE):

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(B) Limits for General Population / Uncontrolled Exposure</b>				
<b>300-1500</b>	---	---	<b>#1500</b>	30
1500-100000	---	---	1.0	30

$f$  = Frequency in MHz

## 2.5 Determination of MPE according ISED

Channel No.	Frequency (MHz)	Max power output to antenna		Antenna gain (dBi)	Linear Ant. Gain (dBi)	Power density (W/m <sup>2</sup> )	Limit of power density (W/m <sup>2</sup> )	Result
		(dBm)	(W)					
1	902.25	28.65	0.733	2.5	1.778	1.152	2.740	PASS
25	914.75	28.80	0.759	2.5	1.778	1.193	2.766	PASS
52	927.75	28.74	0.748	2.5	1.778	1.176	2.793	PASS

RF exposure Limits according RSS102, 4 (Table 4):

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power density (W/m <sup>2</sup> )	Reference Period (minutes)
<b>RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)</b>				
<b>300-6000</b>	$3.142 f^{0.3417}$	$0.008335 f^{0.3417}$	<b><math>0.02619 f^{0.6834}</math></b>	6
6000-15000	61.4	0.163	10	6

$f$  = Frequency in MHz

The requirements are **FULFILLED**.

**Remarks:** The distance between antenna and observation point was calculated with 30 cm.