



RF - TEST REPORT

- Human Exposure -

Type / Model Name : RR21

Product Description : UHF RFID Reader

Applicant : race result AG

Address : Joseph-von-Fraunhofer-Str. 11

76327 PFINZTAL, GERMANY

Manufacturer : race result AG

Address : Joseph-von-Fraunhofer-Str. 11

76327 PFINZTAL, GERMANY

Test Result according to the standards
listed in clause 1 test standards:

POSITIVE

Test Report No. : **80240901-10 Rev_0**

25. July 2025

Date of issue



Deutsche
Akkreditierungsstelle
D-PL-12030-01-00

FCC ID: SZO-RR21

IC ID: 20465-RR21

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ATTACHMENT A as separate supplement

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.

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1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 1, Subpart I - Procedures Implementing the National Environmental Policy Act of 1969

Part 1, Subpart I, Section 1.1310 Radiofrequency radiation exposure limits

Part 1, Subpart 2, Section 2.1091 Radiofrequency radiation exposure evaluation: **mobile devices**.

Part 1, Subpart 2, Section 2.1093 Radiofrequency radiation exposure evaluation: **portable devices**.

KDB 447498 D04 RF Exposure procedures and equipment authorisation policies for mobile and portable devices, April 20, 2021.

ANSI C95.1: 2005 IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz

ETSI TR 100 028 V1.3.1: 2001-03, Electromagnetic Compatibility and Radio Spectrum Matters (ERM);
Uncertainties in the Measurement of Mobile Radio Equipment
Characteristics—Part 1 and Part 2

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2 EQUIPMENT UNDER TEST

2.1 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.

2.2 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.

2.3 Photo documentation of the EUT – See ATTACHMENT A

2.4 Equipment type, category

UHF-RFID Reader, FHSS, mobile equipment.

2.5 Short description of the equipment under test (EUT)

The UHF RFID Reader (Ultra High Frequency Radio Frequency Identification) is designed to read information stored on RFID tags. The device is DC powered and managed by an external controller via a CAN Bus (Controller Area Network).

Number of tested samples: ---
Serial number: ---
Firmware version: ---

2.6 Variants of the EUT

There are no variants.

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2.7 Operation frequency and channel plan

The operating frequency is 902 MHz to 928 MHz.

Channel plan:

Channel No.	Frequency (MHZ)	Channel No.	Frequency (MHZ)	Channel No.	Frequency (MHZ)
1	902.75	21	912.75	41	922.75
2	903.25	22	913.25	42	923.25
3	903.75	23	913.75	43	923.75
4	904.25	24	914.25	44	924.25
5	904.75	25	914.75	45	924.75
6	905.25	26	915.25	46	925.25
7	905.75	27	915.75	47	925.75
8	906.25	28	916.25	48	926.25
9	906.75	29	916.75	49	926.75
10	907.25	30	917.25	50	927.25
11	907.75	31	917.75		
12	908.25	32	918.25		
13	908.75	33	918.75		
14	909.25	34	919.25		
15	909.75	35	919.75		
16	910.25	36	920.25		
17	910.75	37	920.75		
18	911.25	38	921.25		
19	911.75	39	921.75		
20	912.25	40	922.25		

2.8 Transmit operating modes

The EUT uses ASK modulation.

2.9 Antennas

The following antennas shall be used with the EUT:

Number	Characteristic	Model number	Plug	Frequency range (MHz)	Peak Gain (dBi)
1	omni	RR21 internal antenna	PCB	902 - 928	3.7

2.10 Power supply system utilised

Power supply voltage, V_{nom} : 14.4 V DC

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3 TEST RESULT SUMMARY

FCC Rule Part	RSS Rule Part	Description	Result
KDB 447498, 2.1.3	RSS-102, 6.3	SAR exclusion consideration	passed
KDB 447498, 2.2	RSS-102, 8.2	Co-location, Co-transmission	passed

The mentioned RSS Rule Parts in the above table are related to:
RSS-102, Issue 6, December 2023

3.1 Revision history of test report

Test report No	Rev.	Issue Date	Changes
80240901-07	0	25 July 2025	Initial test report

The test report with the highest revision number replaces the previous test reports.

3.2 Final assessment

The equipment under test fulfills the requirements cited in clause 1 test standards.

Date of receipt of test sample : acc. to storage records

Testing commenced on : ---

Testing concluded on : ---

Checked by:



Klaus Gegenfurtner
I confirm the correctness
and integrity of this
document
2025.07.25 10:23:05
+02'00'

Klaus Gegenfurtner
Teamleader Radio

Tested by:



I am the author of
this document
2025.07.25 10:20:26
+02'00'

Franz-Xaver Schrettenbrunner
Radio Team

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4 TEST ENVIRONMENT

4.1 Address of the test laboratory

**CSA Group Bayern GmbH
Straubinger Straße 100
94447 PLATTILING
GERMANY**

4.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15 - 35 °C

Humidity: 30 - 60 %

Atmospheric pressure: 86 - 106 kPa

4.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. It is noted that the expanded measurement uncertainty corresponds to the measurement results from the standard measurement uncertainty multiplied by the coverage factor $k = 2$. The true value is located in the corresponding interval with a probability of 95 %. The measurement uncertainty was calculated for all measurements listed in this test report on basis of the ETSI Technical Report TR 100 028 Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1 and Part 2. The results are documented in the quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

4.4 Conformity Decision Rule

The applied conformity decision rule is based on ILAC G8:09/2019 clause 4.2.1 Binary Statement for Simple Acceptance Rule ($w = 0$).

Details can be found in the procedure CSA_B_V50_29.

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5 HUMAN EXPOSURE

5.1 RF output power

5.1.1 Description of the test location

Test location: NONE

5.1.2 Description of Determination

The maximum conducted peak output power and the maximum duty cycle of the device is taken from the test report 80240901-06 Rev_0 measured by accredited test laboratory CSA Group Bayern GmbH, Straubinger Strasse 100, 94447 Plattling, Germany.

EIRP (peak)	33.0 dBm = 1995 mW
max duty cycle	3.73 %
correction factor	-28.6 dB
EIRP (average)	4.4 dBm = 2.75 mW

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5.2 SAR exemption consideration according to FCC

5.2.1 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).

5.2.2 SAR-Based Exemption

	Condition for exemption	EUT	Result
frequency	300 - 6000 MHz	902 - 928 MHz	passed
Separation distance	0.5 – 40 cm	0.5 cm	passed
Pth	7.97 mW	2.75 mW	passed

Calculation of Pth

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

f: frequency in GHz

d: separation distance in cm

The requirements are **FULFILLED**.

Remarks: None.

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5.3 SAR exemption consideration according to ISED

5.3.1 Applicable standard

According to RSS-102, item 6.3:

Devices operating at or below the applicable output power levels (adjusted for tune-up tolerance) specified in table 11, based on the separation distance, are exempt from SAR evaluation. The separation distance, defined as the distance between the user and/or bystander and the antenna and/or radiating element of the device or the outer surface of the device, shall be less than or equal to 20 cm for these exemption limits to apply.

Table 11: Power limits for exemption from routine SAR evaluation based on the separation distance

Frequency (MHz)	≤ 5 mm (mW)	10 mm (mW)	15 mm (mW)	20 mm (mW)	25 mm (mW)	30 mm (mW)	35 mm (mW)	40 mm (mW)	45 mm (mW)	> 50 mm (mW)
≤ 300	45	116	139	163	189	216	246	280	319	362
450	32	71	87	104	124	147	175	208	248	296
835	21	32	41	54	72	96	129	172	228	298
1900	6	10	18	33	57	92	138	194	257	323
2450	3	7	16	32	56	89	128	170	209	245
3500	2	6	15	29	50	72	94	114	134	158
5800	1	5	13	23	32	41	54	74	102	128

For limb-worn devices where the 10 gram of tissue applies, the exemption limits for routine evaluation in table 11 are multiplied by a factor of 2.5.

For controlled-use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in table 11 are multiplied by a factor of 5.

5.3.2 Conclusion according to RSS-102.

Exemption limit at 902 MHz and distance 0.5 cm 19.97 mW (linear interpolated)

Maximum average output power at 902 MHz 2.75 mW

The EUT qualifies for SAR exemption.

The requirements are **FULFILLED**.

Remarks: None.