RF – TEST REPORT

- Human Exposure -

Type / Model Name	:	KAP-R
Product Description	:	Kion Access Permission (access device)
Applicant	:	TQ-Systems GmbH
Address	:	Gut Delling
		Mühlstrasse 2
		82229 Seefeld, Germany
Manufacturer	:	TQ-Systems GmbH
Address	:	Gut Delling
		Mühlstrasse 2
		82229 Seefeld, Germany

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

Test Report No. : 80153542-08 Rev_0	06. October 2023 Date of issue

Deutsche Akkreditierungsstelle
D-PL-12030-01-03
D-PL-12030-01-04

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.

Contents

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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 v01	RF Exposure procedures and equipment authorisation policies for mobile and portable devices, November 29, 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 – Detailed photos see ATTACHMENT A

2.4 Equipment type, category

mobile equipment

2.5 Short description of the equipment under test (EUT)

KAP-R is a component to be built in a forklift for key access permission.

KAP-R (Kion Access Permission) is used in a vehicle as an access device. The KAP-R can be used as a standalone version (without fleet management) or in combination (with fleet management) with the radio unit KCU (Kion Communication Unit).

Number of tested samples:	1
Serial number:	Prototype (test sample)
HVIN:	KAP-R
PMN:	KAPR20

2.6 EUT operation mode

The equipment under test was operated during the measurement under the following conditions:

- Only modulation LF (125 kHz); Modulation Type ASK [command r7]

- Only modulation HF (13.56 MHz), Modulation Type ASK [command r8]

EUT configuration:

The following peripheral devices and interface cables were connected during the measurements:

- Test boxes — Model: AE12-TS / AE12-LB
- Laptop DELL — Model: SN: 7QL1S32
- Power supply — Model: CSA-ID.: 02-02/50-20-008

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2.7 Power supply system utilised

Power supply voltage is: 6.0 – 36.0 V DC (EUT)

All tests were carried out with a supply voltage of 24.0 V DC (test box “AE12-TS”, supply EUT over test box), unless otherwise stated. Exceptions are described in the detailed test conditions.

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3 TEST RESULT SUMMARY

FCC Rule Part	Description	Result
KDB 447498, 2.1.2	1-mW Test Exemption	passed

3.1 Revision history of test report

Test report No	Rev.	Issue Date	Changes
80153542-08	0	06 October 2023	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 : 28 March 2023

Testing concluded on : 28 March 2023

Checked by:

Klaus Gegenfurtner
I confirm the correctness and integrity of this document
2023.10.09 13:00:32 +02'00'

Klaus Gegenfurtner
Team Lead Radio

Tested by:

Markus Friedl
I am the author of this document.
2023.10.06 13:51:58 +02'00'

Markus Friedl
Radio Team

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4 TEST ENVIRONMENT

4.1 Address of the test laboratory

CSA Group Bayern GmbH
Ohmstrasse 1-4
94342 STRASSKIRCHEN
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 Exposure Test Exemptions for Single Source

For test instruments and accessories used see section 6 Part **RF**.

5.1.1 Photo documentation of the test set-up

See ATTACHMENT B to this test report. (Location of measurement points)

5.1.2 Applicable standard

RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices

5.1.3 1-mW Test Exemption

Per § 1.1307(b)(3)(i)(A), a single RF source is exempt RF device (from the requirement to show data demonstrating compliance to RF exposure limits, as previously mentioned) if the available maximum time-averaged power is no more than 1 mW, regardless of separation distance.
This exemption applies to all operating configurations and exposure conditions, for the frequency range 100 kHz to 100 GHz, regardless of fixed, mobile, or portable device exposure conditions. This is a standalone exemption, and it cannot be applied in conjunction with any other test exemption.

Only modulation LF (125 kHz); Modulation Type ASK [command r7]:

Frequency [kHz]	Distance / Position	0 cm EIRP [dBm]	Calculated EIRP [mw]	RF Exposure Limit [mW]	Result
125	1	-33	0.00050	1	passed
125	2	-33	0.00050	1	passed
125	3	-32.5	0.00056	1	passed
125	4	-33	0.00050	1	passed
125	Top	-30.0	0.00100	1	passed
125	Bottom	-30.5	0.00089	1	passed

Only modulation HF (13.56 MHz), Modulation Type ASK [command r8]:

Frequency [MHz]	Distance / Position	0 cm EIRP [dBm]	Calculated EIRP [mw]	RF Exposure Limit [mW]	Result
13.56	1	-34	0.00040	1	passed
13.56	2	-34	0.00040	1	passed
13.56	3	-33	0.00050	1	passed
13.56	4	-34	0.00040	1	passed
13.56	Top	-30.5	0.00089	1	passed
13.56	Bottom	-31	0.00079	1	passed

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The requirements are **FULFILLED.**

Remarks: None

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6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used, in addition to the test accessories, are calibrated and verified regularly.

Test ID	Model Type	Equipment No.	Next Calib.	Last Calib.	Next Verif.	Last Verif.
RF	ESW26 HFRAE 5161	02-02/03-17-002 02-02/24-11-004	08/03/2024	08/03/2023		

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