RF – TEST REPORT

- Human Exposure -

Type / Model Name	:	KNX-T6.1-1.2 / High-Capacity X-Tag
Product Description	:	Tracking Tag
Applicant	:	KINEXON Inc.
Address	:	200 S Wacker Dr Suite 3100
		CHICAGO, IL 60606, U.S.A.
Manufacturer	:	Kinexon GmbH
Address	:	Schellingstraße 35
		80799 MÜNCHEN, GERMANY

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

Test Report No. : 80115860-04 Rev2	22. September 2022 Date of issue

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

CSA Group Bayern GmbH
Ohmstrasse 1-4 · 94342 STRASSKIRCHEN · GERMANY
Tel.: +49(0)9424-94810 · Fax: +49(0)9424-9481440

FCC ID: 2ALC5-KNX-HCTAG1 IC: 25557-KNXHCTAG1

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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 D01	RF Exposure procedures and equipment authorisation policies for mobile and portable devices, November 29, 2021.
RSS-102, issue 5, March 2015, incl. Amendment 1, February 2021	Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
Health Canada Notice, January 2021	Localized human exposure limits for radiofrequency fields in the range of 6 GHz to 300 GHz
ISED Notice 2016-DRS0001 September 20, 2016, updated July 2020	Applicability of Latest FCC RF Exposure KDB Procedures and Other Procedures
ISED Notice 2021-DRS0005 July 20, 2021	Introduction of an interim exemption limit for routine localized power density evaluations of transmitters operating in the 6 – 30 GHz frequency range
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

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

portable UWB device

2.5 Short description of the equipment under test (EUT)

The KINEXON tracking tag facilitates tracking of objects with a KINEXON RTLS system (Real Time Locating System).

Number of tested samples:	1
Serial number:	255036
Firmware version:	production_tate_xtag_workertag_v5

2.6 Variants of the EUT

There are no variants.

2.7 Operation frequency and channel plan

Operating range 1: 5925 MHz to 7250 MHz

2.8 Transmit operating modes

Modulation: variable pulse position modulation (PPM) in combination with binary phase shift keying (BPSK)

Data rate: 6.8 Mbit/s

2.9 Antennas

The following antenna shall be used with the EUT:

Number	Characteristic	Model number	Plug	f-range (GHz)	Gain at 6.5 GHz (dBi)
1	Omni	Decawave WB001	None (PCB)	3.5 – 7.0	3.7

2.10 Power supply system utilised

Power supply voltage (operating) : 3.1 V DC (internal battery)
Power supply voltage (nominal) 3.0 V DC

3 TEST RESULT SUMMARY

FCC Rule Part	RSS Rule Part	Description	Result
KDB 447498, 7.1	RSS 102, 2.5.2	MPE	not applicable
KDB 447498, 4.3.1	RSS 102, 2.5.1	SAR exclusion consideration	passed
KDB 447498, 7.2	RSS102, 3.2	Co-location, Co-transmission	not applicable

3.1 Revision history of test report

Test report No	Rev.	Issue Date	Changes
80115860-04	0	09 September 2022	Initial test report
80115860-04	1	19 September 2022	Applicant changed on page 1 of 12
80115860-04	2	22 September 2022	Correction of IC Certification Number in heading line

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 : 08 August 2022

Testing concluded on : 08 August 2022

Checked by:

Klaus Gegenfurtner
I confirm the correctness and integrity of this document
2022.09.22 13:55:25 +02'00'

Klaus Gegenfurtner
Teamleader Radio

Tested by:

I am the author of this document
2022.09.22 13:45:23 +02'00'

Franz-Xaver Schrettenbrunner
Radio Team

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.

5 HUMAN EXPOSURE

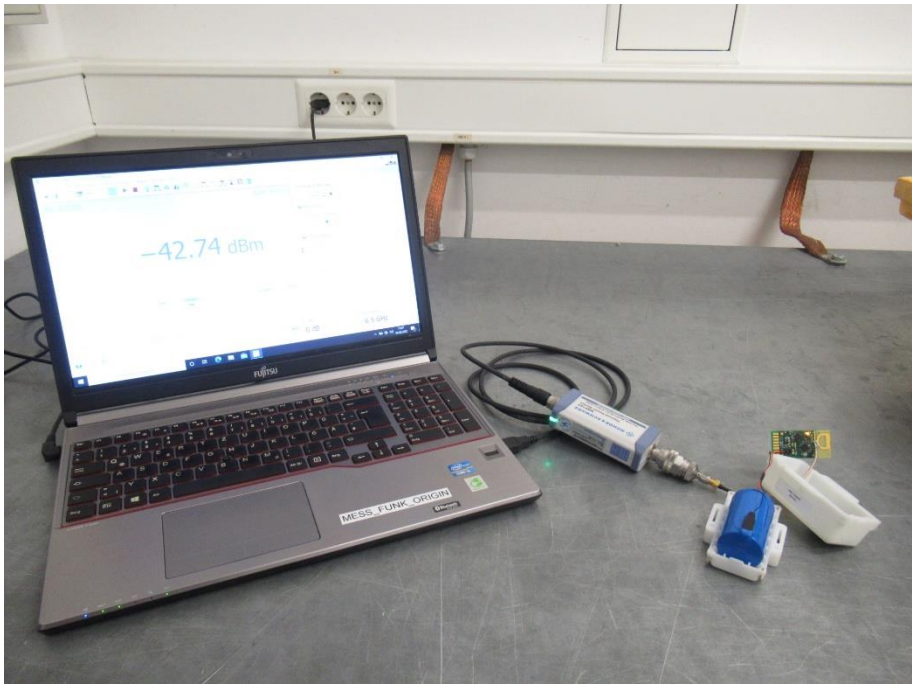
5.1 SAR test exclusion considerations

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

5.1.1 Applicable standard

According to RF exposure guidance:
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.

5.1.2 Photo documentation of the test set-up



5.1.3 Determination of the standalone SAR test exclusion threshold

The max conducted average power of the EUT is measured with a power meter.

Averaged conducted power:	-42.7 dBm	0.054 µW
Tune-up tolerance:	+ 2.0 dB	
Antenna gain:	+ 3.7 dB	
EIRP:	-37.0 dBm	0.20 µW

According to KDB 447498D04 Interim, clause 2.1.2: 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.

Conclusion: The EUT meets the SAR test exclusion criterion in a standalone configuration.

The requirements are **FULFILLED.**

Remarks: None.

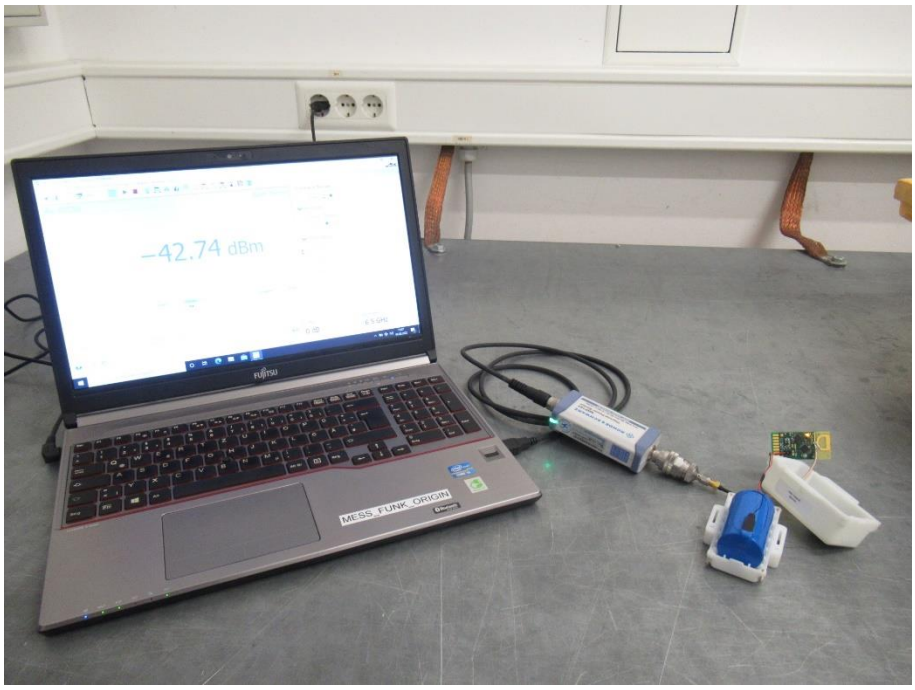
5.2 Exemption limits for routine evaluation - SAR evaluation

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

5.2.1 Applicable standard

Notice 2021-DRS0005 – “Introduction of an interim exemption limit for routine localized power density evaluations of transmitters operating in the 6 –30 GHz frequency range”, published on July 20, 2021.

5.2.2 Photo documentation of the test set-up



5.2.3 Cunclusion according to RSS-102.

The max conducted average power of the EUT is measured with a power meter.

Averaged conducted power:	-42.7 dBm	0.054 µW
Tune-up tolerance:	+ 2.0 dB	
Antenna gain:	+ 3.7 dB	
EIRP:	-37.0 dBm	0.20 µW

According to Notice 2021-DRS0005, July 20, 2021 (Introduction of an interim exemption limit for routine localized power density evaluations of transmitters operating in the 6 –30 GHz frequency range):

“A transmitter producing emissions in the 6 –30 GHz frequency range, i.e. where the occupied bandwidth (99% emission bandwidth) is fully contained within this range, is exempt from routine LPD evaluation if the higher of the maximum six-minute time-averaged conducted power or equivalent isotropic radiated power (EIRP), adjusted for tune-up tolerance, is 1 mW (0 dBm) or lower.”

Conclusion: The EUT meets the SAR test exclusion criterion in a standalone configuration.

The requirements are **FULFILLED.**

Remarks: None.

6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used are calibrated and verified regularly. The calibration history is available on request.

Test ID	Model Type	Equipment No.	Next Calib.	Last Calib.	Next Verif.	Last Verif.
HE	NRP18T	02-02/07-19-001	28/10/2022	28/10/2021		