# KINEXON Mesh Tag (Model-No.: T070001) - User Manual

Product Management

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# Table of Contents

The KINEXON Mesh Tag is a sensor for indoor localization in industrial and logistics environments. By mounting or embedding the tag on the object, it enables precise and robust localization of all assets on the shop floor.

Table of Content

# 1 KINEXON Mesh Tag

**Cost-efficient and precise real-time localization & motion sensing.**

The Mesh Tag provides the basis for searching and finding objects, workflow monitoring, and process automation.

Due to its small size, low weight, robustness, long battery life, replaceable battery option and the low cost, the Mesh Tag meets all requirements for areawide usage in industrial environments.

The Mesh Tag works best with the KINEXON platform, KINEXON OS: the open Industrial-Internet-of-things (IIoT) platform for real-time localization and analysis.

The Mesh Tag comes with an optionally available tag holder, providing permanent and non-permanent mounting options, for agile use cases.

**Use cases**

Search & Find and optimized material handling of moving assets in industrial environments such as:

- Material & Goods
- Load Carrier (Barred box, pallet etc.)
- Manufactured products

Real-time location data is the enabler for improved process reliability and efficiency through process automation and optimization such as:

- Instant Search & Find
- Storage Automation
- Elimination of manual scanning
- Full transparency over material flow (cycle times, idle times etc.)

TAG HOLDER

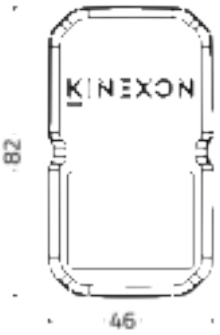
A tag holder for non-permanent attachment solutions to assets offers high flexibility. Tags can either be mounted directly to assets permanently using:

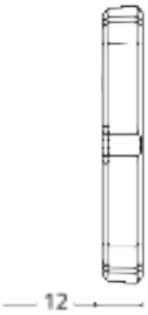
- Double-sided tape
- Zip tie

Or non-permanently with the tag holder, which itself can be mounted with:

- M4 screws
- Double-sided tape
- Zip tie

**DIMENSIONS [mm]**




# 2 Key facts

## 2.1 RF specification

| **RF Specification** | |
|---|---|
| Positioning Principle | Real Time Location System (RTLS), Radio-based, Ultra-wideband (UWB) |
| Positioning Update rate | Configurable, typically 1x / minute in motion, 1x / 15 min in standstill |
| Frequency range | • Bluetooth low energy (BLE5, IEEE 802.15): 2.4 GHz<br>• UWB (IEEE 802.15.4a):<br>  • Channel 3: 4.25 GHz – 4.75 GHz (only EU/US)<br>  • Channel 5: 6.25 GHz - 6.75 GHz |
| Positioning Data | 2D (x, y) |
| Measuring precision | < 50cm - depending on the used technology and environment |

## 2.2 Physical specification

| **Physical Specification** | |
|---|---|
| Indicators | Status RGB LED |
| Inertial Measurement Unit (Accelerometer) | 3-axis, +/- 2g to +/-16g |
| Battery | Internal replaceable Li primary-cell battery (1200 mAh) |

| **Physical Specification** | |
|---|---|
| Battery lifetime | Up to 4 years (depending on update rate) |
| Weight | ~35g |
| Dimensions | (82 x 46 x 12) mm |
| Mounting options | M4 screws, Velcro, zip tie, double side tape |

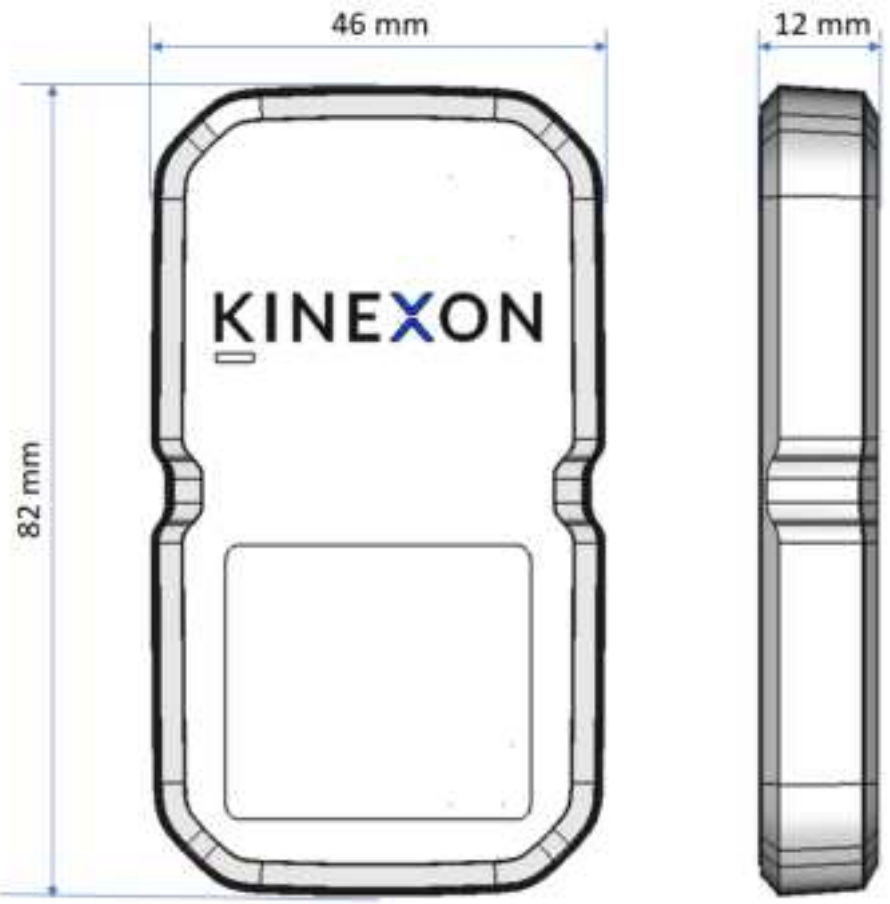
## 2.3 Environmental specification

| **Environmental Specifications** | |
|---|---|
| Operating Temperature | -20°C to 55°C incl. battery |
| Storage Temperature | -20 °C to +30°C incl. battery |
| Protection Class | IP65 |

| **Environmental Specifications** | |
|---|---|
| Regulatory Compliance | **EU:**<br>• EN 301 489-33 V2.2.1 (2019)<br>• EN 301 489-17 V3.2.4 (2020)<br>• EN 301 489-1 V2.2.3 (2019)<br>• ETSI EN 302 065-1 V2.1.1 (2016)<br>• ETSI EN 303 883 V1.1.1 (2016)<br>• ETSI TS 103 361 V1.1.1 (2016)<br>• ETSI EN 300 328 V2.2.2 (2019)<br>• EN 62479 (2010)<br>• EN62311 (2008)<br>• 1999/519/EC (1999)<br>• EN 61000-4-2 (2009)<br>• EN 61000-4-3 (2006 + A1: 2008 + A2: 2010)<br>• **FCC/ISED:**<br>• Part 15, Subpart A, Section 15.31<br>• Part 15, Subpart A, Section 15.33<br>• Part 15, Subpart A, Section 15.35<br>• Part 15, Subpart C, Section 15.203<br>• Part 15, Subpart C, Section 15.204<br>• Part 15, Subpart C, Section 15.205<br>• Part 15, Subpart C, Section 15.207<br>• Part 15, Subpart C, Section 15.209<br>• Part 15, Subpart C, Section 15.247<br>• ANSI C63.10:2013<br>• ETSI TR 100 028 V1.3.1: 2001-03<br>• KDB 558074 D01 v05r02<br>• Part 15, Subpart F, Section 15.517<br>• Part 15, Subpart F, Section 15.521<br>• KDB 393764 D01 v02r01 (April 25, 2022)<br>• RSS-Gen, Issue 5 + A1 + A2, March 2019<br>• RSS-220, Issue 1 + A1, July 2018<br>**Safety:**<br>IEC 62368-1 |

# 3 Specification

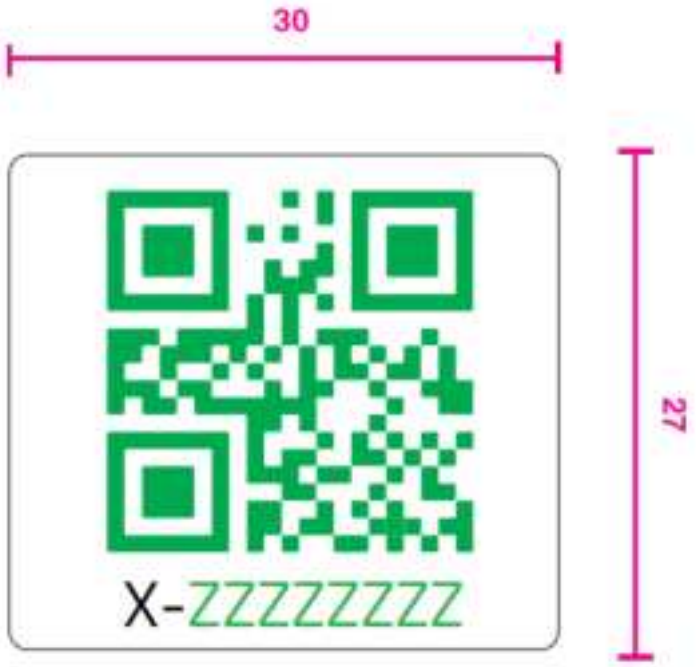
## 3.1 Mechanical drawing



# 3.2 Label

## 3.2.1 Label size

### 3.2.1.1 Frontlabel




30 mm x 27 mm

Label content:

- QR code
- EUI64

Position:


KINEXON
X-ZZZZZZZZ

### 3.2.1.2 Back label:


35 mm x 19 mm

Content:

- Trademark / Brand
- Model-No.
- KINEXON-No
- Certification marks and IDs
- Recycling mark

Position:


## 3.3 External interfaces

**Wireless interfaces**

- Bluetooth low energy (BLE) according to IEEE 802.15
- Ultrawideband (UWB) according to IEEE 802.15.4

**LED**

- One RGB LED is implemented
- Refer to this table for more detailed information about the LED states:

| Tag State | LED |
|---|---|
| Boot | “white”<br>2s solid |
| Storage Mode | “green”<br>10ms every 60s |
| Provisioning<br>• Scanning for beacons<br>• Wirepas provisioning | “purple”<br>Blink twice for 10ms every 500ms |
| Low Battery | “red”<br>3x 10ms every 10s |
| Fatal Error | “yellow”<br>15x 10ms every 100ms |
| Recovery app | “cyan”<br>10ms every 10s |

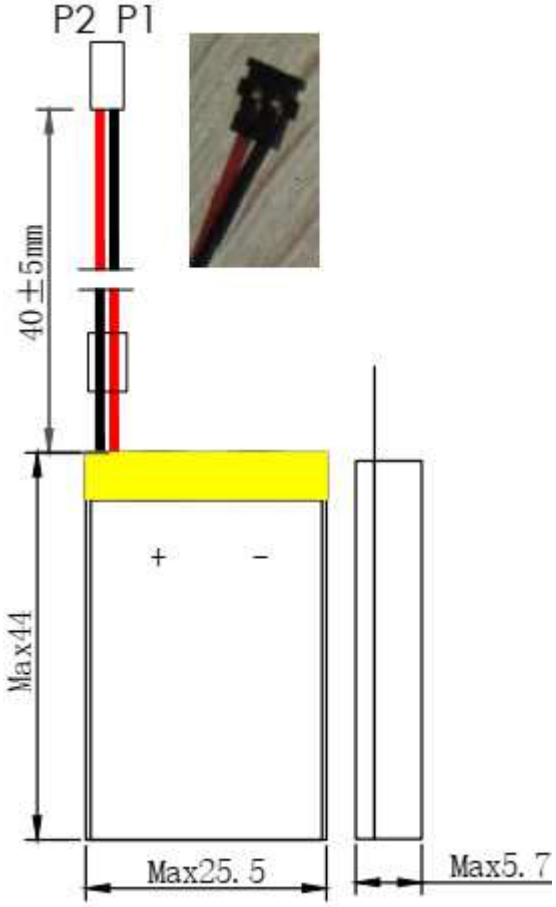
## 3.4 Electrical Parameter

| Interface | Parameter [ Unit] | Min | Typ | Max | Comment |
|---|---|---|---|---|---|
| Power supply | Input voltage [V] | | 3.0 | | |
| | Input current [mA] | | | 250 | UWB receive |

# 3.5 Battery

## 3.5.1 Battery - technical parameter

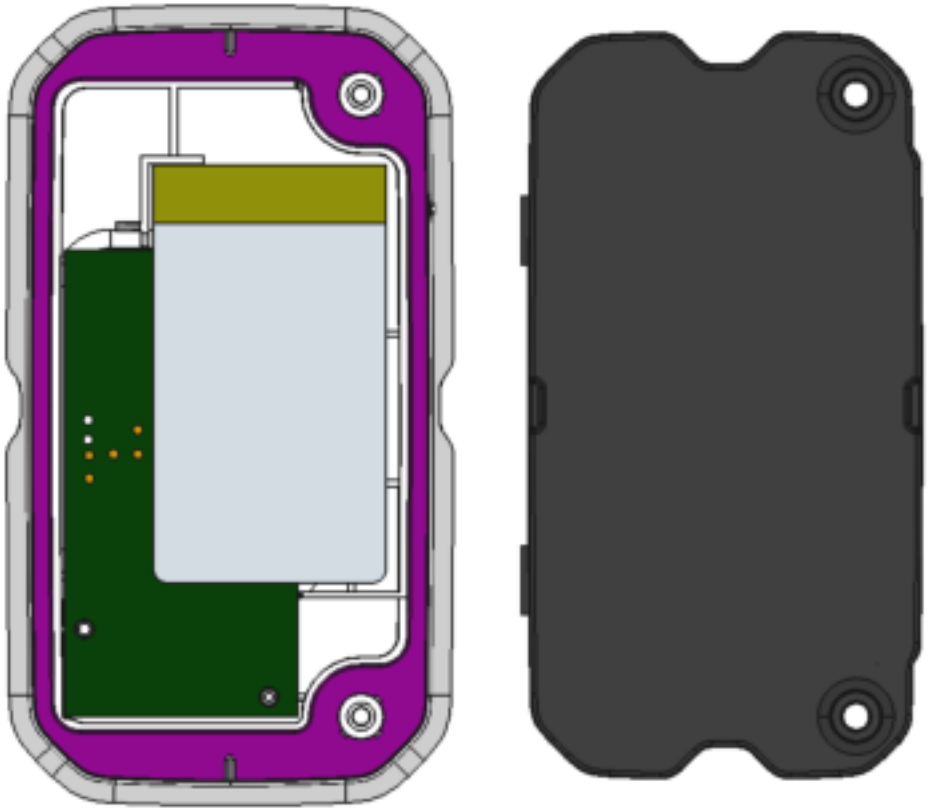
| | |
|---|---|
| **Type** | CP502440 |
| **Nominal voltage** | 3.0V |
| **Capacity** | 1200mAh |
| **Max. cont. discharge current** | 120mA |
| **Operating temperature discharge** | -20°C to +60°C |

| | |
|---|---|
| **Size** | • Cell only: 40.5mm +/-0.5mm x 24.0mm +/- 0.5mm x 5.0mm +/- 0.2mm<br>• Battery incl. assembled cable: 44mm x 25.5mm x 5.7mm<br>Cable length: 40mm +/-5mm<br>  |

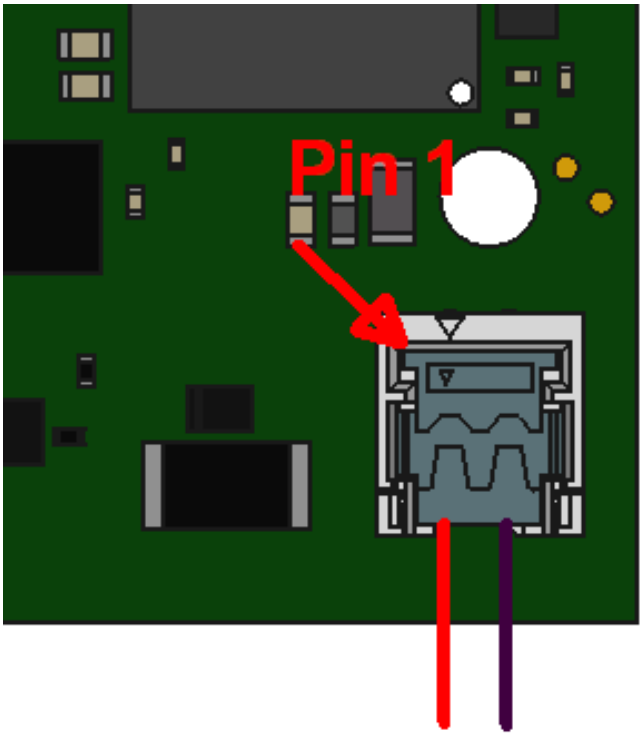
### 3.5.2 Battery exchange


- Unscrew the 2 x M2.5x8 screws

- Remove base-plate/lid



- Remove connected battery with PCBA
- Disconnect empty battery
- Connect new battery; ensure the connector snapped-in completely
  ⚠️Pay attention to the correct polarity ⚠️



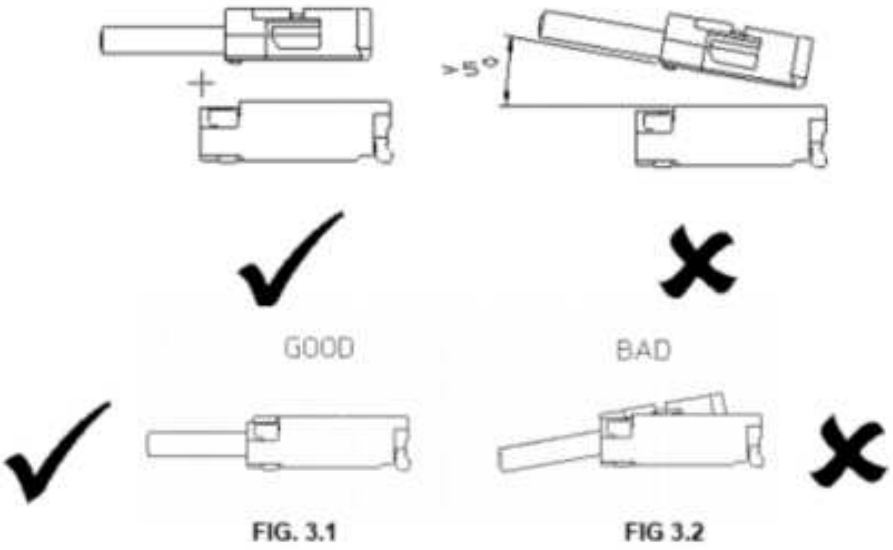
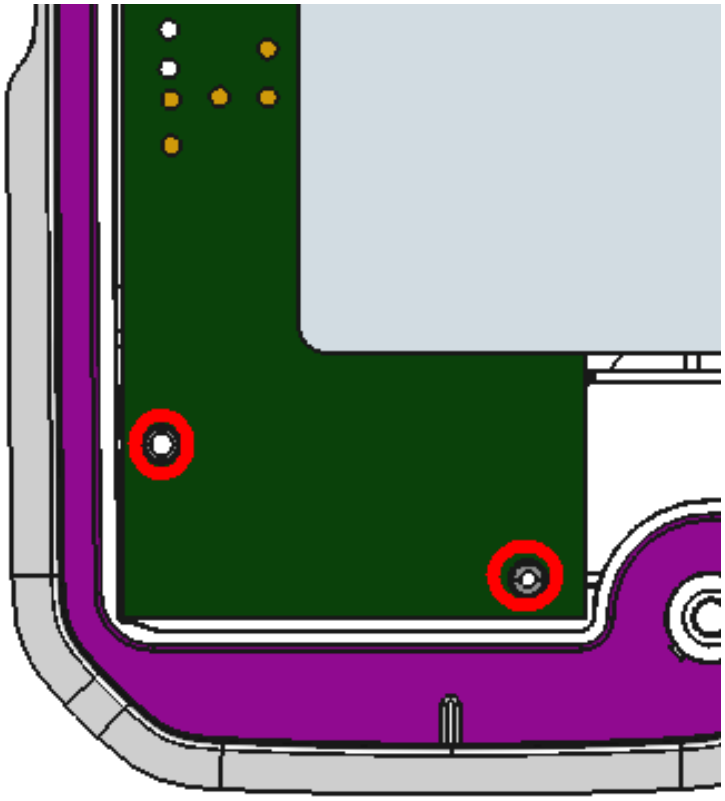




FIG. 3.1 FIG 3.2

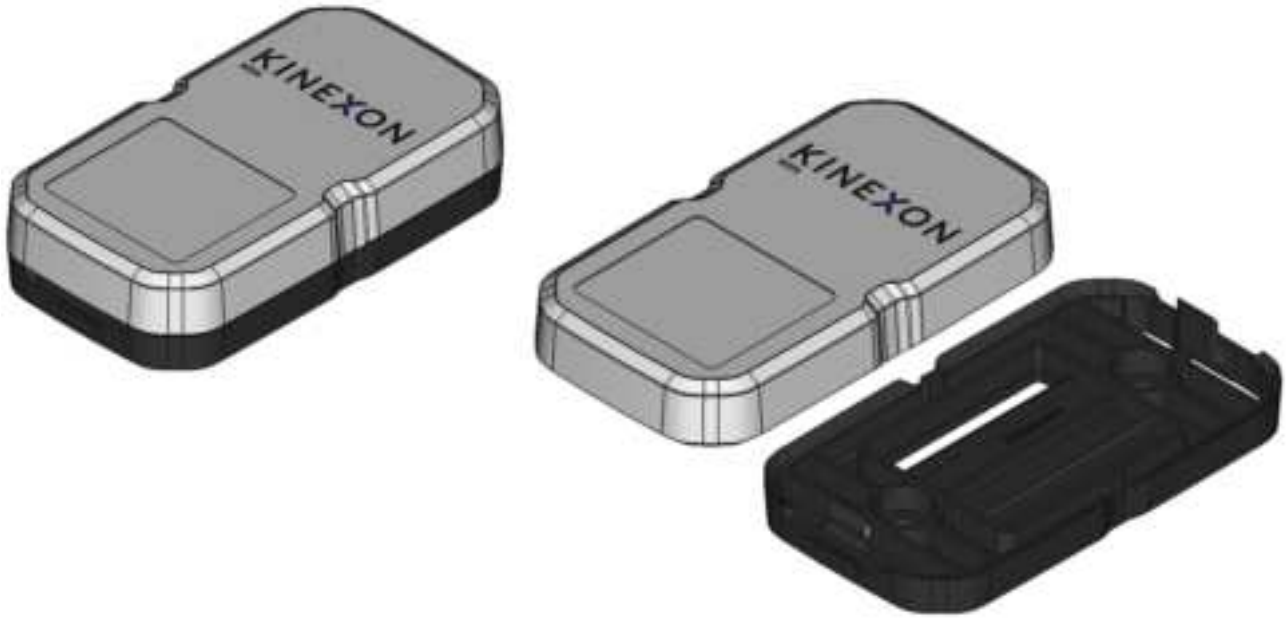
- Insert PCBA (with connected battery) into the top cover - have a look at center points



- Place battery into top cover - have a look at the correct routing of the battery cables
- Close the enclosure
- Tighten 2 x M2.5x8 screws

# 4 Accessories

## 4.1 Holder:

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# 5 Regulatory and legal information

The KINEXON Mesh Tag has been designed to comply with both the U.S. FCC Part 15 subpart F regulations, section 15.247, and with the European Union ETSI EN 302 065 standards.

## 5.1 Disclaimer

The information in this document is subject to change without notice. KINEXON GmbH assumes no responsibility for inaccuracies or omissions and specifically disclaims any liabilities, losses, or risks, personal or otherwise, incurred as a consequence, directly or indirectly, of the use or application of any of the contents of this document. For the latest documentation, contact KINEXON GmbH.

## 5.2 Intended Use

This manual describes the setup and use of the KINEXON Mesh Tag. Use this product only for the purpose it was designed for.

## 5.3 FCC compliance

This device complies with 47 CFR Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. The user is cautioned that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This device may not be employed for the operation of toys. Operation onboard an aircraft, a ship or a satellite is prohibited. The use of this device mounted on outdoor structures, e.g., on the outside of a building or on a telephone pole, or any fixed outdoors infrastructure is prohibited.

Moreover, the following statements apply:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

User information according to FCC 15.19

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause interference.
(2) This device must accept any interference, including interference that may cause undesired operation.

User information according to FCC 15.21

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This equipment may only be operated indoors. Operation[1] outdoors is in violation of 47 U.S.C. 301[2] and could subject the operator to serious legal penalties.

## 5.4 ISED caution

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:
(1) This device may not cause interference
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

These devices are not permitted for operation on board aircraft or satellites and shall also not be used for operating toys. The use this device mounted on a fixed outdoor infrastructure, including antennas mounted on outdoor structures such as poles or buildings, is not permitted, except for operation on board ships or land vehicles.

Cet appareil contient des émetteurs / récepteurs exemptés de licence conformes aux RSS (RSS) d'Innovation, Sciences et Développement économique Canada. Le fonctionnement est soumis aux deux conditions suivantes:
(1) Cet appareil ne doit pas causer d'interférences
(2) Cet appareil doit accepter toutes les interférences, y compris celles susceptibles de provoquer un fonctionnement indésirable de l'appareil.

Les appareils ne peuvent pas être utilisés à bord d'aéronefs ou de satellites et ils ne peuvent pas être utilisés pour faire fonctionner des jouets. L'utilisation de cet appareil monté sur une infrastructure fixe d'extérieur, comprenant les antennes montées sur des structures externes telles que des poteaux ou des bâtiments, n'est pas autorisée, sauf lorsque les structures en question sont des bateaux ou des véhicules terrestres.

## 5.5 Safety information

- Read and follow all instructions before using the KINEXONX Mesh Tag.
- Do not use the KINEXON Mesh Tag if it has been damaged.

1 https://www.law.cornell.edu/definitions/index.php?width=840&height=800&iframe=true&def_id=ec0f841baebb6ddab3bb9ff7e69ad5e9&term_occur=999&term_src=Title:47:Chapter:I:Subchapter:A:Part:15:Subpart:F:15.517
2 https://www.law.cornell.edu/uscode/text/47/301