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## *XSense CU* ***Service manual***

*Product version: 1.0.1*

*Last saved by:*

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## Summary of Changes

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Date	Document version	Comments	By
1 July 2008	1.0.0	Created	Yossi Pelech
2 September 2008	1.0.1	Modified	Yossi Pelech
2 July 2009	1.0.2	Modified	Shlomi Zait
20 July 2009	1.0.3	FCC updated	Yossi Pelech
5 August 5, 2009	1.0.4	Change FCC modem ID	Shlomi Zait

## 1 Abbreviations

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- CU – Control Unit
- GPRS – General Purpose Radio Service – TCP/IP package data over GSM Cellular
- DB – Database
- M&C – Monitor and Control.
- HW – Hardware.
- SW – Software.
- FW – Firmware.
- OS – Operating System.
- UI – User Interface.
- M2M – Machine to Machine

## 2 Package

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XSense CU package (P/N 12660) includes the following material:

1. XSense CU unit
2. RF Hub Unit
3. Lead acid Battery 6V-7.6Ah
4. Hunter GSM/GPS terminal
5. One GSM/GPS antenna
6. One RF antenna

### 2.1 Optional Accessories

Part	P/N
Rack mounted Chassis	<b>12803</b>
External Power supply	<b>12804</b>
Fixed CU adaptor	<b>12805</b>
WH/P Power supply	<b>12806</b>
Battery only connector	<b>12807</b>

### 3 General description

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Combining cellular and GPS technologies, **XSense™ CU** tracks in real-time the XSense™ tagged pallets as they are transported in trucks.

When **XSense™ CU** detects that temperature or relative humidity is out of the permissible range, an alert is sent to logistics managers and/or other interested parties via mobile phone, email or paging devices.

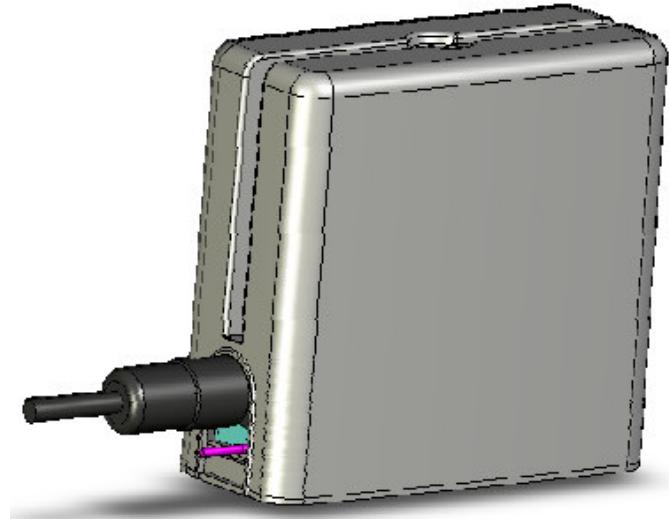


Fig2: XSense CU

#### 3.1 Opening the device

Remove the cover by opening two screws on the enclosure cover:

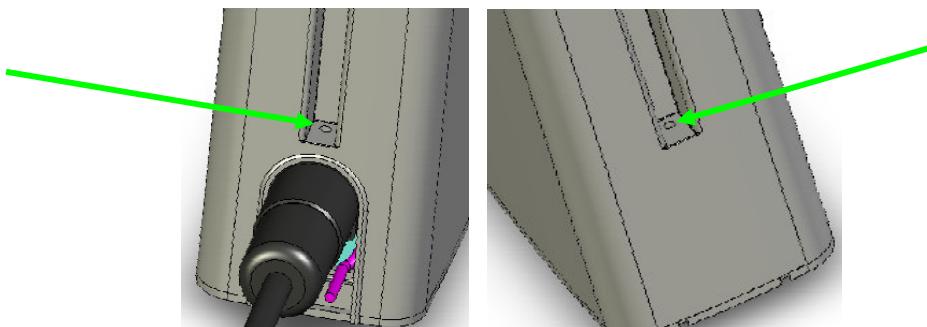


Fig3: Unlocking cover

Remove the cover to have access to the battery, SIM socket and other IOs.

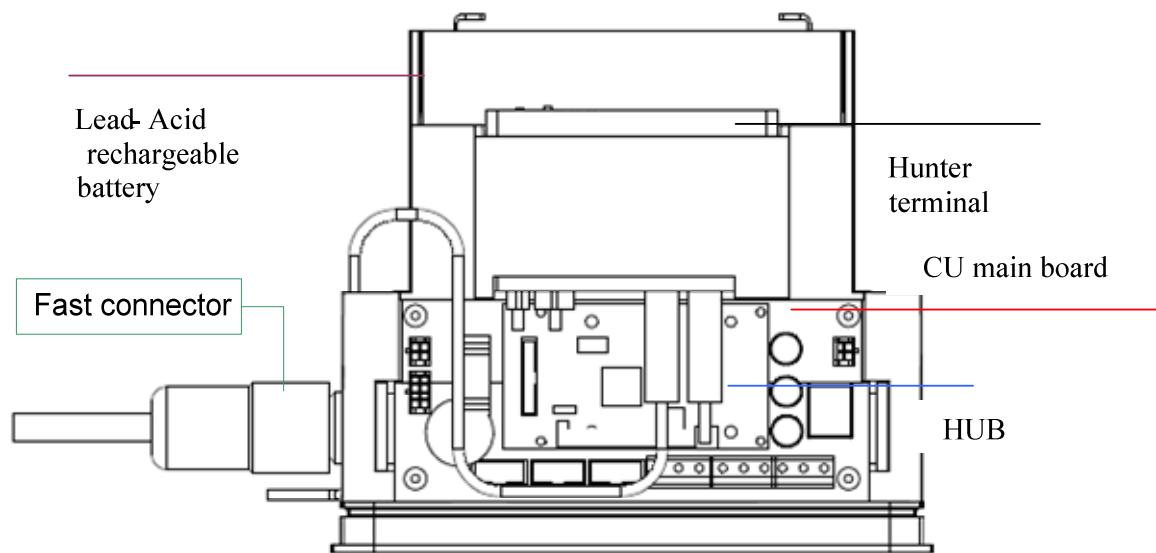


Fig4: XSense CU open cover

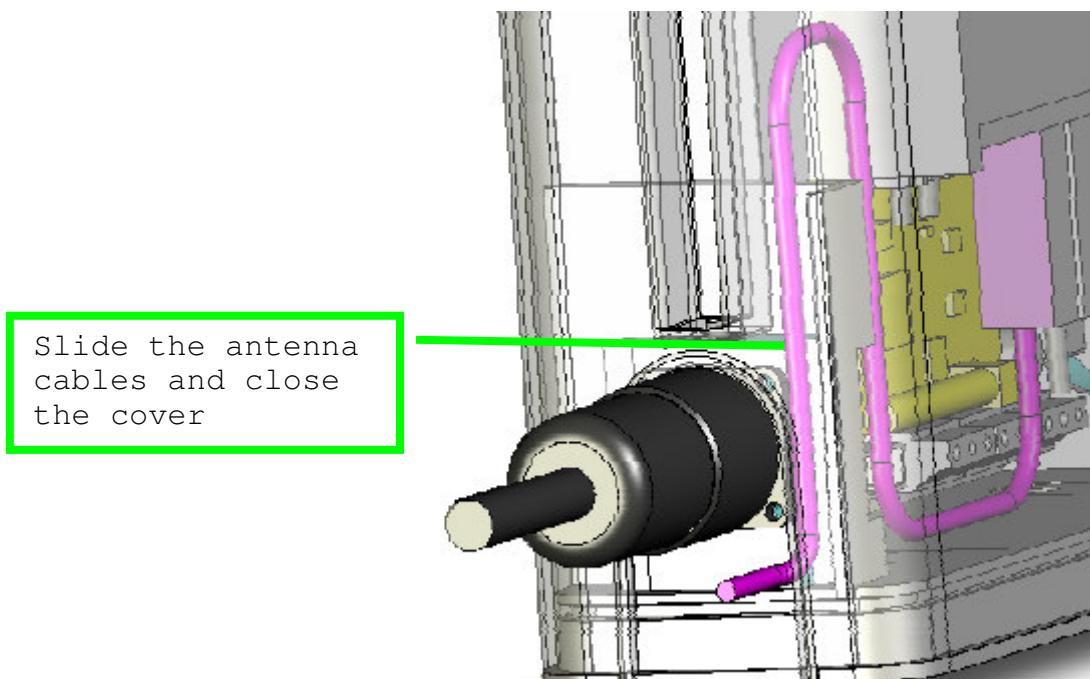


Fig5: XSense CU antenna

## 4 HW interfaces

### 4.1 SIM card

The SIM socket is located at:



Fig 6: SIM Socket

Put the SIM in the socket and make sure the SIM card contacts are turned upwards.

Before inserting the SIM card, make sure that the PIN code request is disabled. Otherwise, use any cellular phone to disable the PIN.

**Attention: All operation on the SIM card must be carried out only after powering off the device, both backup battery and external power MUST be disconnected**

### 4.2 Backup Battery

The battery is 6V 7.6Ah

Lead acid battery model:

- ROSTEC RC6-7.6(6V7.6AH)

XSense CU is supplied with a battery which is disconnected from the device. The battery is connected only when the fast connector is connected.

**Attention: REPLACE WITH THE SAME BATTERY PACK ONLY**

### 4.3 Real-time clock battery

The CU also holds a 3V Lithium CR250 battery for a real-time clock backup.

***WARNING:Risk of explosion if battery is replaced by an incorrect type.  
Dispose of used batteries according to the instructions***

### 4.4 External Power

External power is accessible thru the fast connector; please refer to appendix A hereunder for wiring information.

Approved power adaptors are specified in the data sheet section below.

### 4.5 GSM/GPS interface

The GSM/GPS interfaces are located on the hunter terminal (SMA connector); it is connected using external antenna.

### 4.6 Power

The XSense CU supports both 12VDC and 24VDC, inputs

IO name	Type	Notes/rating
Vin+	Positive DC	
Vin-	Ground/ (-)	
IGN	Ignition switch	Same as Vin+

### 4.7 LEDs

LD1 - RED, Error indication

one fast flash - During reset (power-up)

2Hz flash - Communication error with the hub

1Hz flash - Communication error with the Server

LD2 - Orange, ON when connected to server

LD3 - Green,

Standard mode - 1HZ flash when application is running

Economy mode - OFF, when in sleep

LD4 - Green, External power indication

## 5 Installation

The procedure for XSense CU installation is described below.

### 5.1 Recommendations

**IMPORTANT!** Check all the installation conditions as well as electrical features of the equipment you wish to interface before starting to install the device.

*Attention: StePac will disclaim all responsibility for any misuse not complying with the standards in force for the device*

*Attention: XSense CU uses the GSM standard for cellular telephony. As a consequence it can be used only in zone inside the system coverage area and with a SIM of a compatible network provider*

### 5.2 Testing

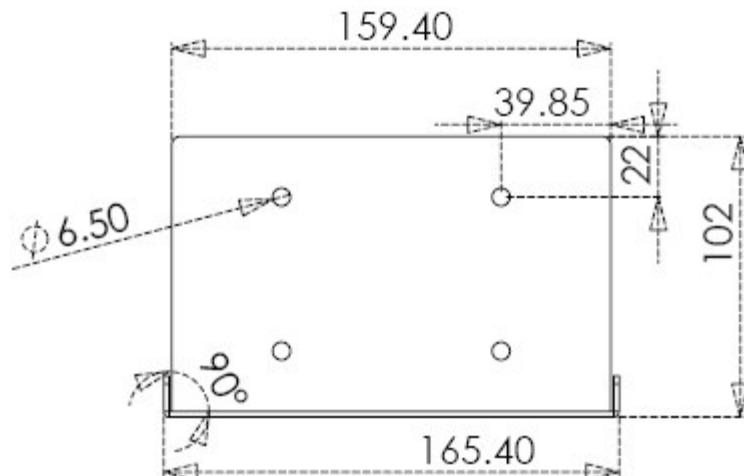
Prior to mechanical installation, open the enclosure cover, insert the SIM, connect to power, and run the following:

1. The Green LED "LD4": Will turn ON indicating external power is connected
2. The Green LED "LD3": will blink indicating XSense CU has started
3. After 5-6 minutes, the orange LED "LD2" will turn ON indicating connection to server successfully established

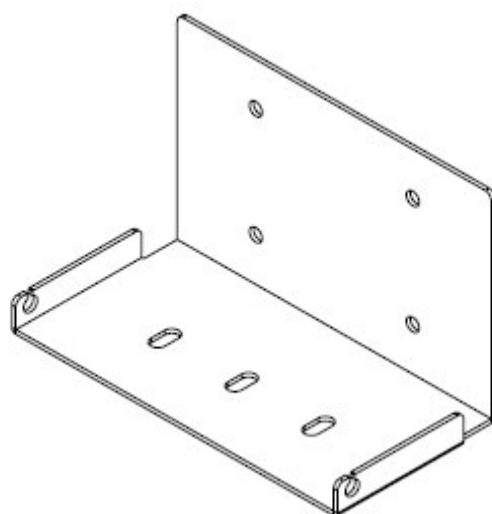
### 5.3 Fixed CU installation process

*Note: the installation hereunder is for fixed truck installation*

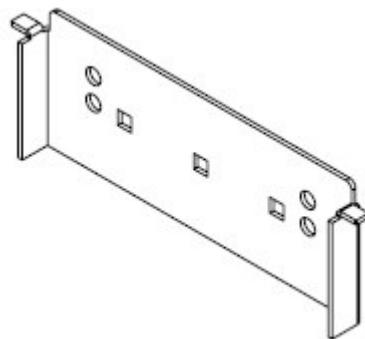
1. Locate a mounting place for the XSense CU chassis, normally under trailer on inside of main frame.



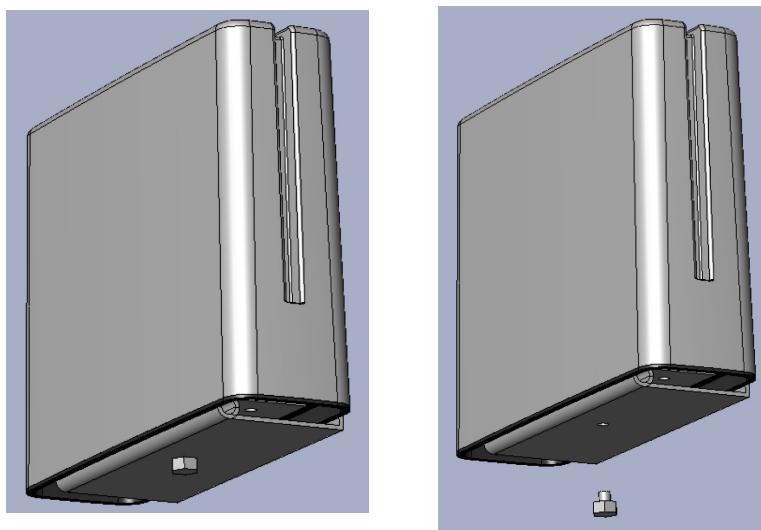
2. Mount the chassis to its location



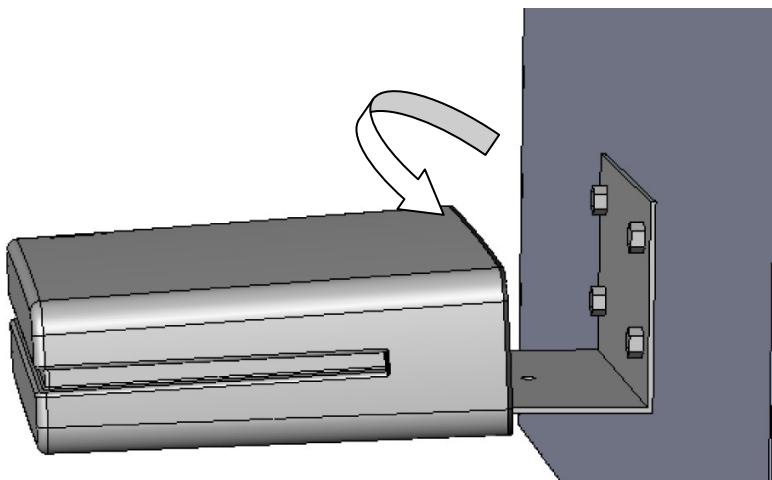
3. Locate the tray on the chassis



4. mount the XSense CU on the tray, If battery is removed, the unit is easier to handle during the installation:



5. The chassis allows easy opening of the cover as follow:



6. The GPS antenna MUST be fitted so that it has clear view to the sky. The antenna shall always be placed as high up as possible on the vehicle. The GPS antenna can be fitted invisible under curtain. Extend and secure the antenna into open air on an unobstructed high point.
7. Use the fast connector supplied with the device (P/N **12805**) to connect to the truck power and optional accessories as follow:

Connection	Color
Vin+	RED
Ignition	Yellow
Vin-	BLUE
GND - common	GREEN-YELLOW

## 5.4 Warehouse CU installation

- Prior to installation check for cellular service coverage in the site area.

***Note: XSense CU operate using radio signals and cellular networks. Because of this, connection cannot be guaranteed at all times under all conditions.***

1. Open the cover and install SIM as described in paragraph 4.1 above
2. Close the cover
3. install the CU antenna
4. Use the fast connector supplied with the device (P/N **12806**) to connect to power and optional accessories as follow:

Connection	Color
GND – common	GREEN-YELLOW

## 6 General information

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The product may employ only for the use for which it has been conceived and manufactured. Any other form of employment shall be considered on the user's sole responsibility.

Commissioning may only occur after the product has been correctly installed. As a consequence, the user shall carefully carry out all the operations described in the manual supplied.

StePac will disclaim all responsibility for any failure, breakdown, accident, etc. due to the lack of knowledge or observance of any instruction which may have been given. The same principle applies for any non-authorized change.

StePac reserves the right to change the product for any constructive or commercial need. It is not obliged to update reference manuals promptly.

XSense CU uses the GSM standard for cellular telephony. As a consequence it can be used only in zone inside the system coverage area and with a SIM of a compatible network provider. The user shall respect the regulations in force; in particular, it is forbidden to use the XSense CU:

- On the plane
- In hospitals and nursing centers.
- In proximity of fuel stations or in hazardous areas (where there is a risk of explosion).
- In places where chemical agents in general are in use and by paying special attention to the safety rules for environments saturated (or potentially saturated) with volatile gases or fumes.
- In places where detonation operations are carried out.
- In proximity of electro-medical devices, including personal auxiliary systems, such as: pacemakers and electro-acoustic devices (hearing aids).
- In places with a high degree of humidity

## 7 Technical specification

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### 7.1 GSM/GPS Terminal

- Siemens XT65 – GSM with built-in GPS module
- GSM features:
  - Quad band 850/900/1800/1900 MHz
  - Integrated SIM card reader for 1.8V or 3.3V
- GPS features:
  - Position accuracy: 2.5 m CEP, 5.0 m SEP; With DGPS/SBAS: 2.0 m CEP, 3.0 m SEP
  - Active antenna:
    - Acquisition sensitivity: -141dBm
    - Tracking sensitivity: -158dBm
  - At antenna connector:
    - Acquisition sensitivity: -139dBm
    - Tracking sensitivity: -156dBm

### 7.2 ISM/SRD band

<b>Assigned frequency range (Recommendation 70-03)</b>	From 260.MHz (FCC) to 470.....MHz (FCC)	from 433.05MHz to 434.79.....MHz(EN)
<b>Operating frequency range</b>	433.6-434.2.....MHz (FCC)	...433.6-434.2... (EN)
<b>Maximum rated output power</b>	At transmitter 50 $\Omega$ RF output connector	.....0....dBm
	Effective radiated power (for equipment with no RF connector)	.....-0....dBm
	continuous variable	
	stepped variable with step size	...~3....dB
	minimum RF power	...-20....dBm
	maximum RF power	...0.....dBm

### 7.3 Power supply

Supply voltage range: 8-30VDC

Backup battery:  
6V 7.6Ah

#### 7.3.1 External power supply ratings

Two models of power supply might be supplied with the CU.

##### 7.3.1.1 Model: HK-IP18-A12

###### 7.3.1.1.1 Input

Voltage Range: 100 (-10%)VAC to 240 (+10%)VAC

Frequency Range: 47 Hz to 63 Hz

Power Consumption at no-load: 0.5W MAX  
 In-rush Current: 50A Max  
 Current: 0.6A Max

### 7.3.1.2 Output

Voltage: +12V  
 Regulation: 11.4V-42.6V  
 Load Range: 0-1.5A

## 7.4 Dimension, enclosure

H: 203mm  
 W: 217mm  
 D: 87mm

## 7.5 Weight

Basic CU (No battery) - 1290gr  
 RC6-7.6 - 1175gr  
 Chassis - 640gr

## 7.6 Temperature

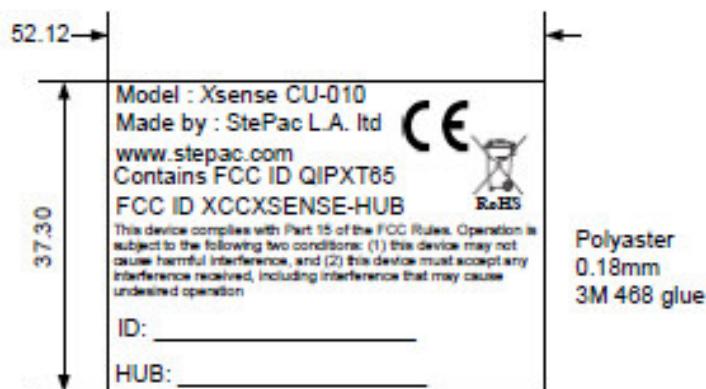
Normal operation -20°C to +50°C  
 Restricted operation -25°C to -20°C and +50°C to +60°C  
 Storage: -30°C to +65°C.

### 7.6.1 Battery Operating Temperature Range

The batteries can be used over a broad temperature range permitting considerable flexibility in system design and location.

Charge -15°C to 50°C  
 Discharge -20°C to 60°C  
 Storage -20°C to 50°C (fully charged battery)

## 7.7 Marking



## **CE - Declaration of conformity**

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StePac L.A.

Bldg 12, Tefen, Israel

Declares on its sole responsibility that the following product:

### **Xsense™ CU**

Complies with the regulations in force, with reference to the EC directive 89/336/EEC (Electromagnetic compatibility), including the latest amendments and, above all, with the following standards:

Health and Safety: **EN 60950**

EMC: **EN 301 489-1/-3/-7**

RF spectrum efficiency: **EN 300 220-1/-3**

## 8 FCC

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### Federal Communications Commission (FCC) Statement

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 into 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.

Operation is subject to the following two conditions:

- This device may not cause interference and
- This device must accept any interference, including interference that may cause undesired operation of the device.

Operation must be limited to commercial and industrial areas such as ports, rail terminals and warehouses.

To prevent interference to Federal Government radar systems, operation under the provisions of section 15.240 is not permitted within 40 kilometers of the following locations:

DoD Radar Site	Latitude	Longitude
Beale Air Force Base .....	39°08'10" N	121°21'04" W
Cape Cod Air Force Station	41°45'07" N	070°32'17" W
Clear Air Force Station ..	64°55'16" N	143°05'02" W
Cavalier Air Force Station ..	48°43'12" N	097°54'00" W
Eglin Air Force Base .....	30°43'12" N	086°12'36" W

**FCC RF Radiation Exposure Statement:**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

*Note: The end product shall has the words "Contains Transmitter Module  
FCC ID: QIPXT65"*

**Xsense CU FCC ID:** XCCXSENSE-HUB

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

## Appendix A – Fast connector

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