

## Fact Sheet: FMLR TrackerTwo GPS Tracker

### Key Benefits

- GPS with integrated antenna
- Various housing and mounting options
- Line-of-sight range of 100 km (62 miles) tested, more possible
- Accelerometer
- Runs customer specific apps and proprietary radio stacks on board
- Power Source: internal (Battery 1x AA 3.6V), other options possible
- 



FMLR TrackerTwo

### Sensors

- GPS with internal antenna
- LIS2DH (Accelerometer)
- SI7021 (Temperature and humidity), optional
- BMP280 (Barometric Pressure), optional

### Properties

- LoRa Alliance™ LoRaWAN™ certified
- Up to -143 dBm sensitivity (LNA Option)
- Up to 19 dBm output power
- 175+ dB Link budget in typical IoT applications using sector antennas
- Plenty of resources available for the integration of custom applications
- 868 and 915 MHz ISM band (configurable in software)
- Antenna options: integrated / external stub / external RP-SMA
- Integrated low power 32bit-ARM Cortex L0 micro controller
- Options: LNA, shielding and proprietary stacks
- Development kit available
- Certified for Europe (CE/ETSI/RED) and USA (FCC)

### Applications

GPS tracking, object/asset tracking, IoT, Telemetry, animal tracking, animal health monitoring, Development Kit, wireless sensing, remote data logging, industrial and home automation

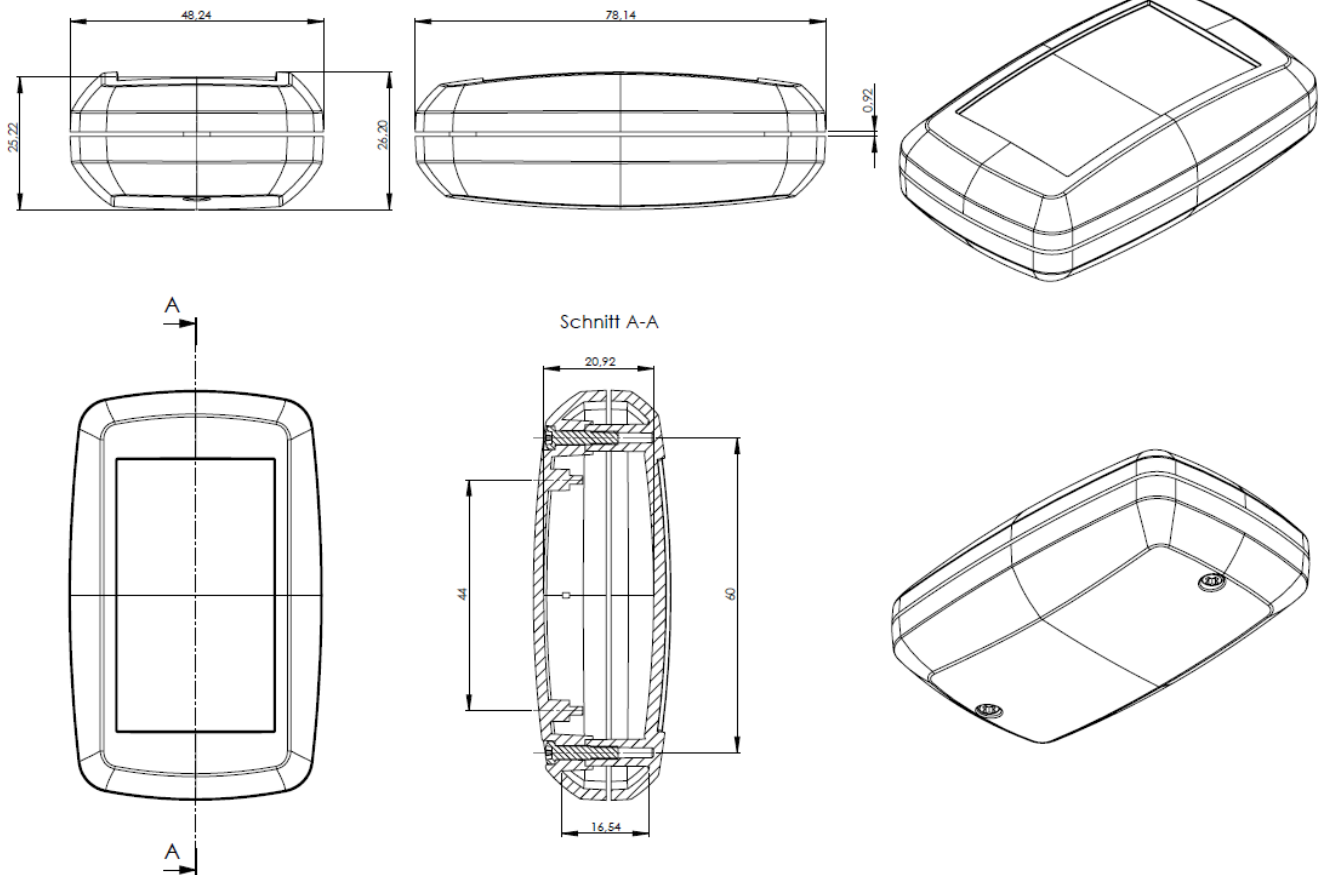
### Description

The FMLR TrackerTwo GPS Tracker integrates a GPS receiver with a 3 axis accelerometer and many optional sensors into one compact device. The standard housing offers various options, such as wrist or belt mounting. It provides an ideal platform for fast prototyping of IoT Sensor devices. The device can be commissioned using an USB to serial converter. Multiple options like IP67 water and dust protection, ABS or Polycarbonate housing, many external sensors, various types of batteries, USB powered are available. Please contact us for your specific requirements.

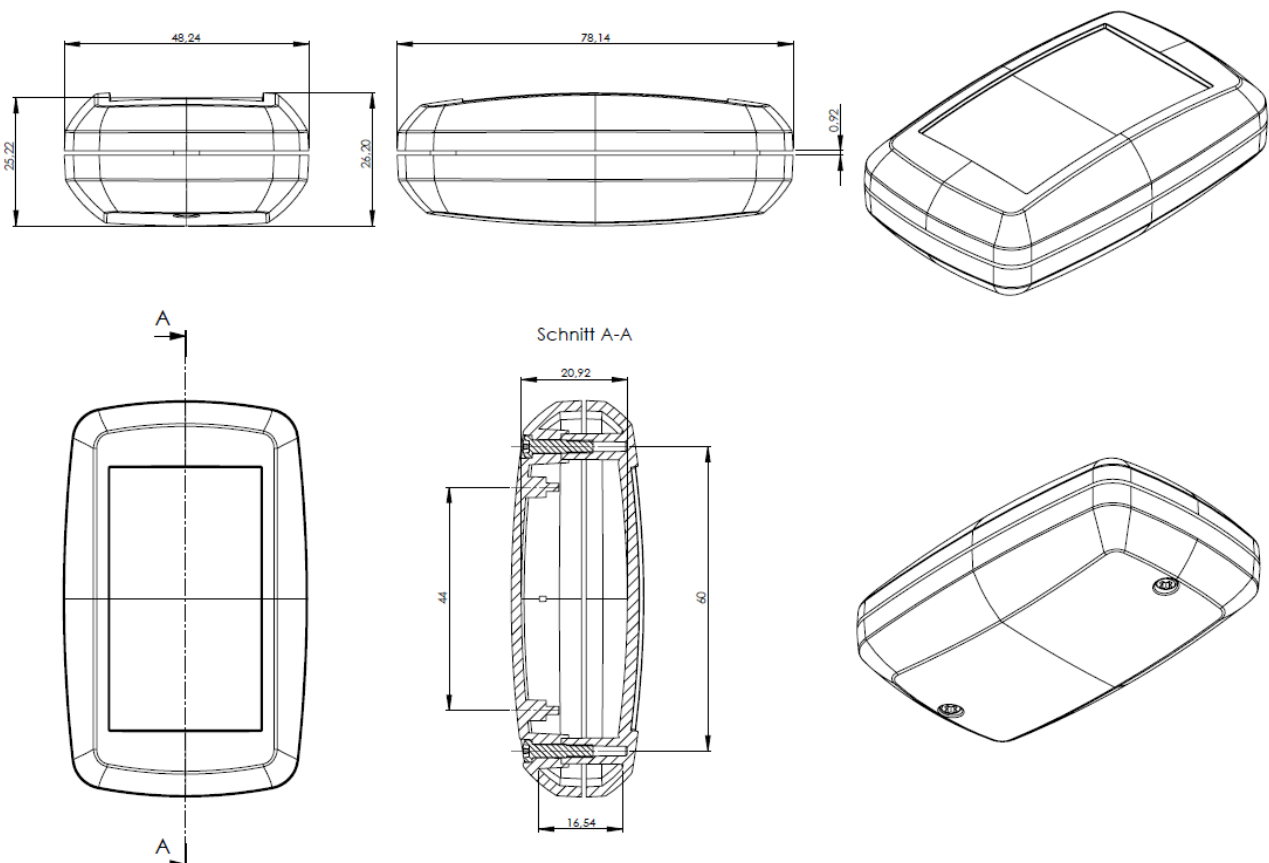
## Specifications

RF Standard	LoRaWAN™ certified for 868 MHz and 915 MHz
RF range	100 km (62 miles) LoS tested*
Data rates	0.6 – 500 kbps
RF output power	Max. +20 dBm
Receiver sensitivity FSK	-129 dBm at 1.2 kbps (LNA Option) -110 dBm at 38.4 kbps
Receiver sensitivity LoRa	SF12 125kHz: -143 dBm, SNR: -20 dB (LNA Option) SF12 125kHz: -137 dBm, SNR: -20 dB SF6 500 kHz: -111 dBm, SNR: -5 dB
LNA (Optional)	Improves sensitivity up to 6 dB (double the range)
Certifications	Europe 868 MHz (CE: ETSI/R&TTE) 915 MHz ISM version USA (FCC) upon request
Antenna	on board antenna / 50 Ohm RP-SMA / external stub antenna
Sensors	- GPS with internal antenna - LIS2DH (Accelerometer) - SI7021 (Temperature and humidity), optional - BMP280 (Barometric Pressure), optional
Power supply	- 2x AAA Batteries - other batteries, wireless charging on request
Battery Lifetime	Up to 10 years (depending on the application)
Temperature	-40 – 85°C
Housing Options	Size: 80mm x 50mm x 26mm - Various colors - Various mounting options

\* LoS (Line of Sight), range tested at 164 dB link budget (2.5+5 dBi antenna gain), ranges are highly depended on the application and environment



## Housing





*Various housing options available on request*

## Data formats

The Low Power Payload (LPP) allows the device to send multiple sensor data at one time. Additionally LPP allows the device to send different sensor data in different frames.

In order to do that, each sensor data is prefixed with two bytes:

- **Data Channel:** Uniquely identifies each sensor in the device
- **Data Type:** Identifies the data type, eg. a Temperature data.

## Payload Structure

In the payload the various channels are concatenated to a stream of bytes.

1 Byte	1 Byte	N Bytes	1 Byte	1 Byte	N Bytes	...
Data1 Ch.	Data1 Type	Data1	Data2 Ch.	Data2 Type	Data2	...

## Data Types

The data type field identifies the type and size of the sensor's payload data. Each data type can use one or more bytes to send the data according to the following table:

Type	LPP	Hex	Data Size	Data Resolution per bit
Digital Input	0	0	1	1
Digital Output	1	1	1	1
Analog Input	2	2	2	0.01 Signed
Analog Output	3	3	2	0.01 Signed
Illuminance Sensor	101	65	2	1 Lux Unsigned MSB
Presence Sensor	102	66	1	1
Temperature Sensor	103	67	2	0.1 °C Signed MSB
Humidity Sensor	104	68	1	0.5 % Unsigned
Accelerometer	113	71	6	0.001 G Signed MSB per axis
Barometer	115	73	2	0.1 hPa Unsigned MSB
Gyrometer	134	86	6	0.01 °/s Signed MSB per axis
GPS Location	136	88	3	Latitude: 0.0001 ° Signed MSB
			3	Longitude: 0.0001 ° Signed MSB
			3	Altitude: 0.01 meter Signed MSB

## Examples

Temperature sensors

<b>Payload (Hex)</b>	<b>03 67 01 10 05 67 00 FF</b>	
Data Channel	Type	Value
Sensor 0x03	0x67 ⇒ Temperature	0x0110 = 272 ⇒ 27.2°C
Sensor 0x05	0x67 ⇒ Temperature	0x00FF = 255 ⇒ 25.5°C

Temperature + Accelerometer

<b>Payload (Hex)</b>	<b>01 67 FF D7 06 71 04 D2 FB 2E 00 00</b>	
Data Channel	Type	Value
Sensor 0x01	0x67 ⇒ Temperature	0xFFD7 = -41 ⇒ -4.1°C
Sensor 0x06	0x71 ⇒ Accelerometer	X: 0x04D2 = 1234 ⇒ 1.234G
		Y: 0xFB2E = -1234 ⇒ -1.234G
		Z: 0x0000 = 0 ⇒ 0G

GPS

<b>Payload (Hex)</b>	<b>01 88 06 76 5F F2 96 0A 00 03 E8</b>	
Data Channel	Type	Value
Sensor 0x01	0x88 ⇒ GPS	Latitude: 0x06765F ⇒ 42.3519
		Longitude: 0xF2960A ⇒ -87.9094
		Altitude: 0x0003E8 ⇒ 10 meters