

# **LoRaWAN protocol FPort & FRMPayload protocol specification --For LoRa+GPS tracker**

## 1. OVERVIEW

This document is the protocol specification for Fport and FRMPayload in the LoRaWAN protocol.

## 2. FRMPAYLOAD PROTOCOL SPECIFICATION

Based on the data format of FRMPayload, this protocol is made according to FPort number of LoRaWAN. Since each LoRaWAN message after the node is in the network will have the FPort field, you can use the value of the FPort field to distinguish the data format in FRMPayload. The range 1 ~ 222 can be used. If there are more than 222 types in the future, 223 can be used to represent the type data bigger than 222. When FPort equals 223, the first two bytes in Payload represent more than 222 FPort, followed by corresponding data format. 224 ~ 255 is reserved for LoRaWAN protocol.

Note: UP/DOWN is for Uplink/Downlink

Fport	UP/DOWN	Payload format	Description
33	UP	LoRa+GPS tracker	<p>Occupy 10 bytes.</p> <p><b>The 1<sup>st</sup> byte:</b> means anti-dismantled state, among them, 1 for dismantled state, 0 for normal status;</p> <p><b>The 2<sup>nd</sup> byte:</b> means G-sensor state, among them, 1 for moving state, 0 for static state;</p> <p><b>The 3<sup>rd</sup> byte:</b> means charging state, among them, 1 for charging state, 0 for non-charging state;</p> <p><b>The 4<sup>th</sup> byte:</b>            When the top digit is 0, it means normal voltage;            When the top digit is 1, it means low voltage;            Low 7-digit means voltage value, the actual value should be divided by 10, for example, 0x21 means 3.3V, normal voltage; 0x9F means 3.1V, low voltage</p> <p><b>The rest 6 bytes:</b>            It consists of latitude (3Byte) and longitude (3Byte). We use signed 24 bits for latitude, when the value is <math>-2^{23}</math>, it's accordingly south latitude <math>90^\circ</math>; when the value is <math>2^{23}-1</math>, it's accordingly north latitude <math>90^\circ</math>; when the value is 0, it's accordingly equator;</p> <p>We use signed 24 bits for longitude, when the value is <math>-2^{23}</math>, it's</p>

			<p>accordingly west longitude <math>180^\circ</math>; when the value is <math>2^{23}-1</math>, it's accordingly east longitude <math>180^\circ</math>; when the value is 0, it's accordingly Greenwich meridian.</p> <p>For example, when the rest 6 bytes is: 2020e8510e16(hex), here 2020e8 is for latitude, and we convert it to decimal, that's 2105576, then the latitude is: <math>2105576 \times 90 \div (2^{23}-1) = 22.59</math> north latitude; Here 510e16(hex), we convert it to decimal, that's 5312022, the longitude is: <math>5312022 \times 180 \div (2^{23}-1) = 113.98</math> east longitude.</p>
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