

ED308

LoRaWAN Smart Badges Payload

Document Revision Record

Version	Time	Description	Remark
V1.0.0	2019-05-11	Preliminary version	Ming
V1.1.1	2019-11-27	Optimized compression algorithm	Ming

Introduction

The goal of this document is to detail the messages sent between ED308 sensor and a LoRa Network server.

1. Sensor -To- Server Message

1.1 Frame structure

Item	Header	Transmit code	Msg Typ	Msg Length	Device EUI	Data	CRC	Tail
Type	Uint8_t	Uint8_t	Uint8_t	Uint8_t	Uint8_t	Uint8_t	Uint8_t	Uint8_t
Byte	1	1	1	1	8	n	1	1

1.2 Payload description

1. Header

Head of frame, started with 0xAA

2. Transmit code

The identification symbol of the communication between the node and the server, Use one byte to identify.

The functions represented by each bit of the byte are as follows, all links must upload device code

Bit	Bit7, Bit6	Bit5, Bit4	Bit3, Bit2, Bit1, Bit0
Function	Reserved	Data transmission direction	Indicates the current protocol framework version
Data	Fill 00	Uplink (node->server): 01 Downlink (server->node): 10	Bit3, Bit2 represent the integer part; Bit1, Bit0 represent the fractional part; For example, 0100 means that the version is 1.0.

3. Msg Type

Reserved value for functional status representation.

Msg Typ	Description	Remark
0x01	Outdoor location data upload	Sensor to server
0x02	Indoor location data upload	Sensor to server
0x03	Alarm message	Sensor to Server
0x04	Sensor information report	Sensor to Server
0x05	Login Platform	Sensor to Server
0x06	Heartbeat report	Sensor to Server
0x07	Vehicle breakdown alarm	Sensor to Server
0x08	Send confirmation frame	Sensor to Server

0x11	Setting sensor parameters	Server to sensor
0x15	Downlink voice, vibration and LED flashing instructions	Server to sensor
0x16	Sync sensor time	Server to sensor
0x17	Request to upload local positioning data	Server to sensor
0x19	Reset	Server to sensor
0x1C	Request to send sensor information	Server to sensor
0x1D	Downlink Bluetooth UUID	Server to sensor
0x1E	Downlink broadcasting language switching command	Server to Sensor
Reserved		

4. Msg Length

Record the data length, from 0x00 to 0xFF. If the data length is 0, the data is empty.

5. Device EUI

Contain 8 bytes (if less than 8 bytes, fill with 00)

Example:

Device EUI: 75 63 8A 61 9C 43

Uplink: 00 00 75 63 8A 61 9C 43

6. Data

Store the content of message type in bytes, the length is controlled by the message length.

7. CRC

The CRC value is the check code and is the sum of all bytes from UTC to RFU.

8. Tail

Expressed with a fixed byte of 0xBB, representing the end of a data frame.

1.3 Example

Sensor to server message, device enter inspection mode

Data frame: AA 14 07 01 24 C5 D9 E6 32 57 F5 80 01 C4 BB

Payload:

Header AA,

Transmit code 14 (Version1.0) ,

Msg Typ 07,

Msg Length 01,

DeviceEUI 24 C5 D9 E6 32 57 F5 80,

Data 01,

CRC C4,

Tail BB

2. Sensor -to- server Command list

2.1 Outdoor location data report

Data frame	Data	Type	Unit	Remark
Msg Typ	0x01	Uint8_t		
Msg Length	0x17	Uint8_t		
Data	UTC	Uint32_t	S	Universal Time Coordinated, world standard time, such as: 1505285997(0x59B8D76D). The corresponding Beijing time is 2017/9/13 14:59:57. http://tool.chinaz.com/Tools/unixtime.aspx
	Latitude	Uint32_t	dgree*100000	The latitude value obtained by GPS is in ddd°mm.mmm' format, need to convert into ddd.ddddd ° format, the hexadecimal obtained by multiplying 1000000 represents the protocol latitude value. eg: ddd°mm.mmm' format 2235.10896 convert into ddd.ddddd ° format is 22.585149. $22.585149 * 1000000 = 22585149$, Convert to hexadecimal is 0x1589F3D
	Longitude	Uint32_t	degree*100000	The longitude value obtained by GPS is in ddd ° mm.mmm' format , need to convert into ddd.ddddd ° format , the hexadecimal obtained by multiplying 1000000 represents the protocol longitude value. eg : ddd°mm.mmm' format 11354.79188 convert into ddd.ddddd ° format is 113.913198 , $113.913198 * 1000000 = 113913198$, Convert to hexadecimal is 0x6CA2D6E
	Speed	Uint8_t	Km/h	Express the speed in one byte, range 0---255;
	Direction	Uint16_t	Degree	Range: from 0 to 359. For example: 138 (0x8a).
	Altitude	Uint16_t	Meter	GPS Altitude
	PDOP	Uint16_t	0.1	Position accuracy
	HDOP	Uint16_t	0.1	Horizontal accuracy
	HACC	Uint16_t	0.1	Some customers need this indicator
	Steps	Uint16_t	Step	
	Power	Uint8_t	%	Power percentage

2.2 Indoor location data report

Data frame	Data	Type	Unit	Remark
Msg Typ	0x02	Uint8_t		
Msg Length	N	Uint8_t		

Data	UTC	Uin32_t		Universal Time Coordinated, world standard time, such as: 1505285997(0x59B8D76D). The corresponding Beijing time is 2017/9/13 14:59:57.
	Beacon number	Uin8_t		Number of beacons with the best signal, up to 5.
	Beacon ID	Uin24_t		The ID of different beacons is different (3 bytes in total, 1 byte represent Major, 2 bytes represent Minor)
	Distance	Uin16_t	0.1m	The distance between the receive Terminal and the Beacon. Such as: 0x000a represents 1.0m
	...			
	Beacon ID	Uin24_t		
	Distance	Uin16_t	0.1m	
	Steps	Uin16_t	Step	
	Power	Uin8_t	%	Power percentage

2.3 Alarm Message

Data frame	Data	Type	Unit	Remark
Msg Typ	0x03	Uin8_t		
Msg Length	5	Uin8_t		
	UTC	Uin32_t	S	Universal Time Coordinated, world standard time, such as: 1505285997(0x59B8D76D). The corresponding Beijing time is 2017/9/13 14:59:57.
Data	Alert ID	Uin8_t		8 Bits represent 8 types of alarms, Bit 1 represent alarm , Bit 0 represent there is no alarm. Bit0: SOS alarm; Bit1: Low power alarm; Bit2: Insert in the charging s Bit3: Pull out from the charging slot; Other: reserved. For example: 0x03 means both SOS alarm and low Power alarm...

2.4 Sensor information report (Closed by default)

Data frame	Data	Type	Unit	Remark
Msg Type	0x04	Uin8_t		

Msg Length	0x05	Uint8_t		
Data	Power supply	Uint8_t	0.1V	
	Cumulative steps	Uint16_t	Step	The number of steps since power on the device
	Increased number of steps	Uint16_t	Step	The number of steps between each report.

2.5 Login Platform (Reserved)

Data frame	Data	Type	Unit	Remark
Msg Typ	0x05	Uint8_t		
Msg Length	0x03	Uint8_t		
Data	Type	Uint8_t	S	0x01 Smart badges 0x02 Bluetooth Beacon
	Id	Uint16_t		Id of smart badges

2.6 Heartbeats report (Time interval, Reserved)

Data frame	Data	Type	Unit	Remark
Msg Typ	0x06	Uint8_t		
Msg Length	0x03	Uint8_t		
Data	Id	Uint16_t		ID of Smart Badges

2.7 Vehicle breakdown alarm

Data frame	Data	Type	Unit	Remark
Msg Typ	0x07	Uint8_t		
Msg Length	0x01	Uint8_t		
Data	Vehicle breakdown alarm	Uint8_t		01represent enter inspection mode

2.8 Sent confirmation frame

Data frame	Data	Type	Unit	Remark
Msg Typ	0x08	Uint8_t		
Msg Length	16	Uint8_t		
Data		Uint8_t		The content of the data is the Msg typ sent by

			the platform
	Uint8_t		01: GPS、02: BD、03: GPS+BD
	Uint8_t	Positioning switch	01: GPS on, 02: Bluetooth on, 03: Bluetooth and GPS both on
	Uint16_t	GPS positioning interval	
	Uint16_t	Bluetooth positioning interval	
	Uint16_t	GPS reporting interval	
	Uint16_t	Bluetooth reporting interval	
	Uint8_t	Data Uplink Switch	0x01 enable 0x00 disable
	Uint32_t	UTC	Universal Time Coordinated, world standard time, such as: 1505285997(0x59B8D76D). The corresponding Beijing time is 2017/9/13 14:59:57.

3. Server to Sensor command list

3.1 Setting sensor parameters

Data frame	Data	Type	Unit	Remark
Msg Typ	0x11	Uint8_t		
Msg Length	12	Uint8_t		
Data	Positioning mode	Uint8_t		0x01 GPS 0x02 BD 0x03 GPS+ BD
	BLE positioning interval	Uint16_t	s	set Bluetooth positioning interval
	GPS positioning interval	Uint16_t	s	Set the GPS positioning interval, The platform issues a command to change the GPS acquisition time to 00, and the GPS acquisition mode is restored to adaptive mode
	BLE reporting interval	Uint16_t	S	Set BLE reporting interval
	GPS reporting interval	Uint16_t	S	Set GPS reporting interval
	GPS positioning switch	Uint8_t		0x01 on 0x02 off
	BLE positioning switch	Uint8_t		0x01 on 0x02 off
	Data uplink switch	Uint8_t		0x01 on 0x02 off

3.2 Downlink voice, vibration and LED flashing instructions

Data frame	Data	Type	Unit	Remark
Msg Typ	0x15	Uint8_t		
Msg Length	0x01	Uint8_t		
Data	Msg type of downlink voice message	Uint8_t	type	0x01 It's an emergency, please evacuate immediately 0x02 You have entered a dangerous area, please pay attention to your safety 0x03 You have left the work area 0x04 Attendance successful 0x05 Attendance failed 0x06 Successful inspection (motor vibration) 0x07 Successful inspection (voice) 0x08 Enter inspection mode 0x09 Inspection time is up 0x0A Time to work 0x0B Time for a meeting

				<p>0x0C You have deviated from your route</p> <p>0x0D You have deviated from the active area</p> <p>0x0E Your smart ID badges was expired, please renew</p> <p>0x0F GPS location failed</p> <p>0x10 read label successfully</p> <p>0x11 Failed to read label</p> <p>0x12 Inspection failed</p> <p>0x13 You are prohibited from entering the activity area, please pay attention</p> <p>0x14 You are not wearing safety protection equipment, please pay attention</p> <p>0x15 Your job operation does not meet the standard specification, please pay attention</p> <p>0x16 fire alarm</p> <p>0x17 ringtone to looking for the ID badges</p> <p>0x18 There is an emergency nearby, please search and rescue immediately</p> <p>0x19 SOS alarm has been lifted</p> <p>0x1A Please stay where you are, someone is looking for you</p> <p>0x1B Pls contact the monitoring center</p> <p>0x1C You have left the camp</p> <p>0x1D Welcome back to camp</p> <p>0x1E you have entered the work area</p> <p>0x1F You have left the work area</p> <p>0x20 Help signal received</p> <p>0x21 Support signal received</p>
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3.3 Sync sensor time

Data frame	Data	Type	Unit	Remark
Msg Typ	0x16	Uint8_t		
Msg Length	0x04	Uint8_t		
Data	Time	Uint32_t		Universal Time Coordinated, world standard time, such as: 1505285997(0x59B8D76D). The corresponding Beijing time is 2017/9/13 14:59:57.

3.4 Request to upload local positioning data (upload all unreported local information)

Data frame	Data	Type	Unit	Remark
Msg Typ	0x17	Uint8_t		

Msg Length	2	UInt8_t		
Data	time	UInt32_t		Universal Time Coordinated, world standard time, such as: 1505285997(0x59B8D76D). The corresponding Beijing time is 2017/9/13 14:59:57.

3.5 Reset

Data frame	Data	Type	Unit	Remark
Msg Typ	0x19	UInt8_t		
Msg Length	0	UInt8_t		
Data				

3.6 Request to send sensor information

Data frame	Data	Type	Unit	Remark
Msg Typ	0x1C	UInt8_t		
Msg Length	01	UInt8_t		
Data	01	UInt8_t		

3.7 Downlink Bluetooth UUID

Data frame	Data	Type	Unit	Remark
Msg Typ	0x1D	UInt8_t		
Msg Length	16	UInt8_t		
Data		UInt8_t		16 bytes UUID

3.8 Downlink broadcasting language switching command

Data frame	Data	Type	Unit	Remark
Msg Typ	0x1E	UInt8_t		
Msg Length	1	UInt8_t		
Data		UInt8_t		0 for Chinese, 1 for English