Payload for LoRaWAN Lidar People Counter WSLRW-LPC

- Payload WSLRW-LPC | Firmware 1.0

Payload WSLRW-LPC | Firmware 1.0

1. Payload document is applied for the following products

Item code	HW Version	Firmware Version	Remarks
WSLRW-LPC-11	1.0	1.0	

2. Changes information in this version v.s previous version

Item	Changes	Changed by	Changed Date	Approved by	Approved Date
1	Initial version	P.N.Diep	09-05-2022	N.V.Loc	28-05-2022

The approved date is also the release date of this document.

3. Payload for Uplink messages

When?	Purpose	Wait for Downlink?	LED color
This message will be sent in the pre-defined cycle OR when the resettable counter passes the threshold	To get the measured value from the device in the pre-defined cycle or when the counter passes the threshold	NO	Not applicable

Uplink Payload structure:

Payload	Sensor type	Battery level	Hw_erro	reserved	NRC_Peo	NRC_Peo	RC_Peop	RC_Peop	Dist_fron	Dist_bac
bits	8	2	2	4	16	16	8	8	16	16
Value	*yes*	*yes*	*yes*	*zeros*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*

4. Payload Fields of Uplink

The length of the uplink payload is 12 bytes. Please refer below for an explanation.

Data	Size (byte)	Bit	Format	Meaning
Sensor type	1	all	Uint8	Sensor type = 0x13 means LoRaWAN People Counter
Status: battery level	1	Bit 7 and 6	Uint8	Battery capacity in 04 levels
				11: battery level 4 (99%)
				10: battery level 3 (60%)
				01: battery level 2 (30%)

				00: battery level 1 (10%)
Status: sensor module error		Bit 5 and 4		Status
				01: sensor module error
				00: no error with sensor module
NRC_People_in	2	all	Uint16	Non-resettable counter
NRC_People_out	2	all	Uint16	Non-resettable counter
RC_People_in	1	all	Uint8	Reset to 0 after sending to Gateway
RC_People_out	1	all	Uint8	Reset to 0 after sending to Gateway
Dist_front_zone	2	all	Uint16	Distance of front zone
Dist_back_zone	2	all	Uint16	Distance of back zone

5. Payload for Downlink messages

Users can use a downlink message to change the configuration of the device. There are 02 types of downlink messages:

- **Downlink type = 0:** to write the configuration for the specific type of Sigfox-ready sensor. The format is fixed for each type of sensor. However, this FW version does not support type 0 configuration. It only supports type 5 as below.
- **Downlink type = 5:** to write a value to any address of configuration parameter of any Sigfox-ready sensor. This method is generic and can be applied to any type of Sigfox-ready sensor, the user just needs to know the memory map of the sensor.

5.1 Downlink type = 0

Not available in this FW version.

5.2 Downlink type = 5

With this downlink, the user can write the configuration to any address on the memory map of the device. Please refer to the memory map of the device to understand what parameters can be written.

> ⚠ The length of the configuration parameter can be 1, 2 bytes, or 4 bytes, but the total length of the Downlink payload must equal 64 bits (8 bytes). Please see below the downlink format for both types.

Downlink type 5 for the parameter of 2 bytes length:

Payload	PRM_ADDRESS	PRM_LENGTH	PRM_VALUE	reserved	DOWNLINK_TYPE
bits	**8**	**8**	**16**	**28**	**4**
Value	*yes*	*0x02 = 2*	*yes*	*zeros*	*0b0101 = 5*

Downlink type 5 for the parameter of 4 bytes length:

Payload	PRM_ADDRESS	PRM_LENGTH	PRM_VALUE	reserved	DOWNLINK_TYPE
bits	**8**	**8**	**32**	**12**	**4**
Value	*yes*	*0x04 = 4*	*yes*	*zeros*	*0b0101 = 5*

Where:

- PRM_ADDRESS: address of the configuration parameter in the memory map of the device;
- PRM_LENGTH: is the length of that parameter, in bytes;
- PRM_VALUE: is the value the user wants to write to that parameter;
- reserved: a series of bits of zero to fulfill the downlink so that it has the total length = 64 bits (8 bytes)

> ***EXAMPLE FOR DOWNLINK TYPE = 5***
>
> Here is the list of parameters of WSLRW-LPC that can be configured via Downlink type = 5, and the examples of the payload of downlink on the right-most side column. It is the example value, not the default value of the device. Please check the memory map of the device for more detail about the parameters.

> **Note: the total length of down link must be equal 8 bytes**

Parameter	PRM_ADDR	PRM_LENGT	PRM_VALUE	DOWNLINK_T	Downlink Payload
(bytes)	1	1	4	2	8
cycle_send_data	0x4E	0x04 = 4	0x00000E10 = 3600	0x0005	4E0400000E100005
sensor_sampling_rate	0x54	0x04 = 4	0x00000078 = 120	0x0005	5404000000780005
count_threshold	0x80	0x02 = 2	0x0014 = 20	0x0005	8002000000140005
dist_threshold	0x81	0x02 = 2	0x0640 = 1600	0x0005	8102000006400005
dist_hys	0x82	0x02 = 2	0x0064 = 100	0x0005	8202000000640005
inter_meas_period	0x83	0x02 = 2	0x0030 = 48	0x0005	8302000000300005

5.3 Free online data conversion tools

- To convert from Float to Hex and vice versa, users may use this free online tool: https://gregstoll.com/~gregstoll/floattohex/
- To convert a decimal number to Hex, the user may use this free online tool: https://www.binaryhexconverter.com/decimal-to-hex-converter

6. Reed switches

The Sigfox-ready sensor normally comes with at least 1 reed switch for user manipulation during commissioning or maintenance.

Some other versions come with 02 reed switches.

The WSSFC-AC comes with 1 reed switch, please find below the functions of this switch.

EVENT	PRE-CONDITION	ACTION	LED STATUS	ACTIVITIES	POST-CONDITION
FORCE_DATA	Any state	Move Magnet Key to the contact point of REED SWITCH. Led blink SKY BLUE, move Magnet Key away.	Blink SKY BLUE	the device will send the uplink message FORCE_DATA	Back to the previous state

PARAMETERS	Any state	Move Magnet Key to the contact point of REED SWITCH. Led blink SKY BLUE, hold Magnet Key 5s. Led blink PURPLE, move Magnet Key away.	Blink PURPLE	the device will send the uplink message PARAMETER_UPD and wait for a new downlink to get the new configuration	Back to the previous state