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iOKE868 LoRaWAN®

AN029 - PowerConsumption

Version 1.0

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02.12.2020	1.0	all	• reviewed

Content

Power Consumption - Overview

In general, it is difficult to make a statement regarding the life time of a battery driven device. This applies especially to devices that operate within a radio network. The availability of the network has a significant influence on the radio settings and thus on the power consumption of the device.

For the iO881A device we therefore decribe and evaluate different operating scenarios. The calculation of the power consumption of the iO881A is based on several assumptions and is mainly influenced by the transmission period, the number of transmitted OBIS values and the radio settings of the device

It is assumed that a meter independently sends the required data every four seconds. From the received data, the values are extracted.The upload is handled by confirmed data transfers. For this consideration it is assumed that all data packets and confirmations are received. In addition, two further functions of the iO881A device are also considered. Firstly, the iO881A has the possibility to synchronize its local time with that of the LoRaWAN network. For this purpose a request is sent to the Network Server. It is assumed that the response from the Network Server is received, so that no retransmissions become necessary. Furthermore, for monitoring purposes the iO881A can send a confirmed Status Packet. It is assumed that this message is also received and acknowledge by the LoRaWAN network without retransmissions.

Within the following the different scenarios are decribed and the corresponding power consumptions are given.

Power Consumption - Electrical Characteristics / Assumptions

Unless otherwise specified, all characteristics are applied for T = 25°C, VDD = 4.5V and are typical consumption values.

Firmware Information	
Firmware	iOKE868_LoRaWAN
Version	V1.0
Build Count	79

Electrical Characteristics	
Power Supply (VDD)	Mignon alkaline batteries
	3x 1.5V, 2,5Ah, Size AA, in line
Current Consumption (typ.)	Transmit Mode: 35mA
	Receive Mode: 13mA ; 20mA during active packet reception
	Receive Infrared: 5mA
	Sleep Mode: 4µA (RTC on)

Assumptions	
Infrared	Data received after 5 seconds
	MeterID has a length of 8 byte
Mignon alkaline Battery	Effective usable capacity 80% of the battery
LoRaWAN	Confirmed Upload: No retransmissions necessary
	Confirmed Send Status: No retransmissions necessary
	Network Time Request:No retransmissions necessary

Power Consumption - Scenario 1

Description

In this scenario, the Wireless Infrared Reader is configured in single mode to receive the current energy value. In order to achieve a good relationship between power consumption and data actuality, the meter reading is transmitted every hour. To keep the amount of transmitted data as low as possible, only the energy value together with the MeterID, the timestamp and the current status is transmitted. The transmitted data has a size of 40 bytes and is immediately uploaded via LoRaWan.

For monitoring purpose the Wireless Infrared Reader transmits a Status Packet daily and the time from the LoRaWAN network is requested also once per week.

Configuration of the Calendar Events

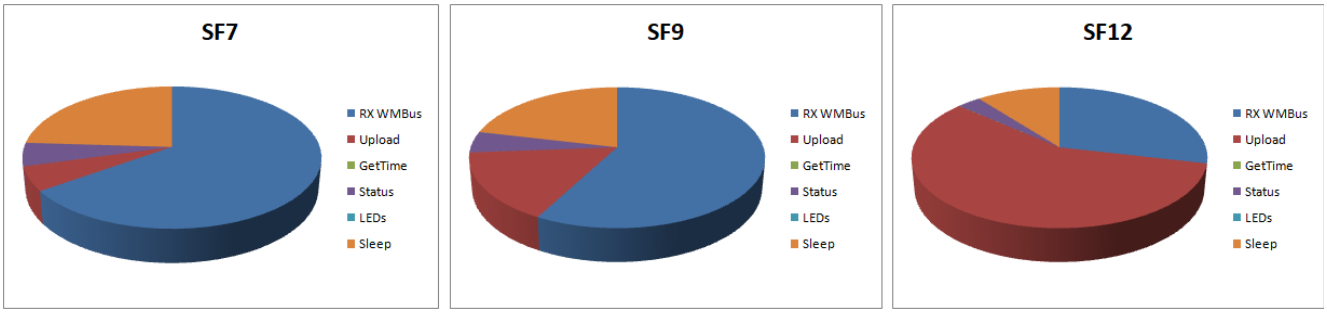
Calendar Event	Duration	Period
Single Mode (Filter on OBIS for energy)	until confirm is received	once per hour
Get & Synchronize Network Time over LoRaWAN®	until Wireless Infrared Reader received timestamp	once per week
Send Wireless Infrared Reader Status over LoRaWAN®	completed after Wireless Infrared Reader received acknowledge	once per day

Consumption

To evaluate the power consumption of the LoRaWAN communication three scenarios with different spreading factors are considered.

	SF7	SF9	SF12
Consumption per year	146 mAh	165 mAh	332 mAh
Life Time in years (AA Battery Capacity 2500 mA)	13,7	12,1	6

Distribution



Power Consumption - Scenario 2

Description

The second scenario is used to monitor the current consumption and current values. At the cost of increased power consumption, the current values are sent every 90 seconds. Since this is not possible with a spreading factor of 12 due to the duty cycle, it is not considered here.

Configuration of the Calendar Events

Calendar Event	Duration	Period
Single Mode (Filter on 5 OBIS values)	until confirm is received	once every 90 seconds
Get & Synchronize Network Time over LoRaWAN®	until Wireless Infrared Reader received timestamp	once per week
Send Wireless Infrared Reader Status over LoRaWAN®	completed after Wireless Infrared Reader received acknowledge	once per day

Consumption

To evaluate the power consumption of the LoRaWAN communication three scenarios with different spreading factors are considered.

	SF7	SF9
Consumption per year	5509 mAh	7609 mAh
Life Time in years	0,36	0,26

Distribution