

INTRODUCTION

The attached excel file can be used for estimating the battery consumption of WS2 devices according to 4 inputs:

- Messages per day
- Scans Wi-Fi per day
- Parameterization request and ADD
- Accelerometer data rate

The following instructions describe how to find the value of all 4 inputs according to the device's parameterization and use case.

MESSAGES PER DAY

One important factor that impacts battery lifetime is the number of messages sent per day. WS2 devices send three different types of messages:

- Log messages
- Event messages
- Location

LOG

To calculate the number of messages sent with a log period, it is important to know the type of log in the feature that you are using:

Temperature log

One sigfox message is sent every 10 periods, this log is available for **Sample, Minimum value and Maximum value** parametrizations of **Temperature log type** feature.

Example:

- **Configuration:**
 - Temperature log period: 30 minutes
- **Calculation:**
 - 30 minutes x 10 periods: 300 minutes
 - 300 minutes: 5 hours
 - $24h \div 5 \text{ hours} : 4,8$ messages per day

4,8 messages per day is the number that will be used in the calculation of battery estimation, **it is not necessary to round numbers.**

Temperature log when ADD is enabled

When ADD is enabled, one sigfox message is sent every 6 periods (instead of the usual 10), also, we can estimate the number of messages lost that will be sent through ADD. A good percentage of estimated messages losts (due to lack of sigfox signal) is 10%, but it can be also configured according to each application.

Example:

- **Configuration:**
 - Temperature log period: 30 minutes

- **Calculation of the temperature log if ADD is enabled:**
 - 30 minutes x 6 periods: 180 minutes
 - 180 minutes: 3 hours
 - $24h \div 3 \text{ hours} : 8 \text{ messages per day}$
- **Calculation of the messages send through ADD using the previous value:**
 - 8 messages per day x 10% of messages lost due to lack of sigfox signal: 0,8 messages that will be sent through ADD

Out of range log

One sigfox message is sent every 40 periods in this parametrization available in **Temperature log type** feature.

Example:

- **Configuration:**
 - Temperature log period: 30 minutes
- **Calculation:**
 - Temperature log period: 30 minutes
 - 30 minutes x 40: 1200 minutes
 - 1200 minutes: 20 hours
 - $24 \div 20 \text{ hours} : 1,2 \text{ messages per day}$

1,2 messages per day is the number that will be used in the calculation of battery estimation, it is not necessary to round numbers.

Motion count log

One sigfox message is sent every 10 periods in this feature.

Example:

- **Configuration:**
 - Temperature log period: 30 minutes
- **Calculation:**
 - 30 minutes x 10: 300 minutes
 - 300 minutes: 5 hours
 - $24 \div 5 \text{ hours} : 4,8 \text{ messages per day}$

4,8 messages per day is the number that will be used in the calculation of battery estimation, it is not necessary to round numbers.

Motion occurrence log

One sigfox message is sent every 80 periods in this feature.

Example:

- **Configuration:**
 - Temperature log period: 15 minutes
- **Calculation:**
 - 15 minutes x 80 periods: 1200 minutes
 - 1200 minutes: 20 hours
 - $24 \div 20 \text{ hours} : 1,2 \text{ messages per day}$

1,2 messages per day is the number that will be used in the calculation of battery estimation, it is not necessary to round numbers.

PARAMETRIZATION REQUEST AND ADD

The calculation of Parametrization request and ADD is the same as Log, but are calculated separately because they have different battery consumptions.

Example:

- **Configuration:**
 - Custom period: 6 hours
 - ADD: Enabled
 - Parametrization request: Enabled
- **Calculation**
 - ADD messages per day: $24h \div 6 \text{ hours} = 4$ messages per day
 - Parametrization request per day: $24 \div 6 = 4$ messages per day
 - PARAMETRIZATION REQUEST AND ADD = ADD messages per day + Parametrization request per day
 - PARAMETRIZATION REQUEST AND ADD = 4 ADD messages per day + 4 Parametrization request per day
 - PARAMETRIZATION REQUEST AND ADD = 8 messages per day



NOTE: Parametrization request and ADD are independent of each other despite using the same custom period.

EVENT

Events only happen when there is some value out of specified parameters or changes in the device state of motion, thus the value of messages is relative and must be estimated according to your device expected behavior.

Example 1:

- On motion event: 15 minutes
- Device moves for 59 minutes a day

Once **On motion event** parameter is 15 minutes, When the motion starts WACS sends 2 event messages, after that, 2 events messages are sent every 15 minutes. So:

- Minute 1: 1° event is sent
- Minute 15: 2° event is sent
- Minute 30: 3° event is sent
- Minute 45: 4° event is sent
- Total: 8 event messages

LOCATION MESSAGES

WS2 sends the number of location messages according to the chosen period and the Number of Macs/ RSSI that are being used. It is possible to visualize the influence of these factors according to the following table:

Number of MACs	Messages
2 MACs	1
2 MACs + RSSI	2
4 MACs	2
4 MACs + RSSI	3

Example 1:

- **Configuration:**
 - Location: Every 1 hour
 - Number os MACs: 4 MACs
 - Increased location with RSSI: Enabled
- **Calculation:**
 - 4 MACS + RSSI: 3 messages per period (1 hour)
 - $24h \div 1h$: 24 periods
 - 24×3 messages per period: 72 messages per day
 - Total: 72 messages per day

Example 2:

- **Configuration:**
 - Location: Every 2 hours
 - Number os MACs: 2 MACs
 - Increased location with RSSI: Enabled
- **Calculation:**
 - 4 MACS + RSSI: 2 messages per period (2 hours)
 - $24h \div 2h$: 12 periods
 - 12×3 messages per period: 36 messages per day
 - Total: 36 messages per day



NOTE: The same rules apply to location on motion, but this feature is enabled only when the device is on motion.

SCANS WI-FI

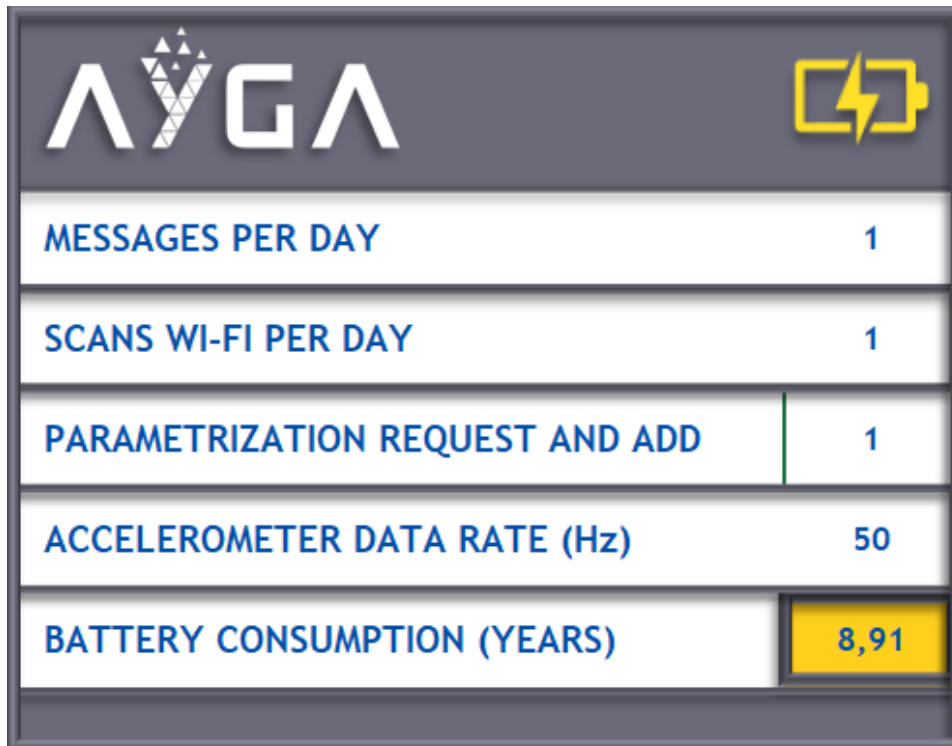
Location estimation is based on the number of Scans wi-fi made by WACS, so to calculate the number of Scans wi-fi use the period defined in Location.


For example:

- Period: 6 hours
- $24 \div 6$: 4 scans per day

BATTERY ESTIMATION:

After calculating the number of messages and scan wi-fi, chose the accelerometer data rate (according to the instructions in the tooltips available in ayga dots), and fill the data in the table available in the document annex:



AYGA		
MESSAGES PER DAY	1	
SCANS WI-FI PER DAY	1	
PARAMETRIZATION REQUEST AND ADD	1	
ACCELEROMETER DATA RATE (Hz)	50	
BATTERY CONSUMPTION (YEARS)	8,91	



SUCCESS! Now you have the battery lifetime estimation!

Related Articles

The following Technical Characteristics document has detailed instructions for all the features described in this announcement.

They are all available in: <https://en.ayga.com.br/suporte>

Code	Name	Language
TC-WS2-EN	WS2 Technical Characteristics	