Energytrace results

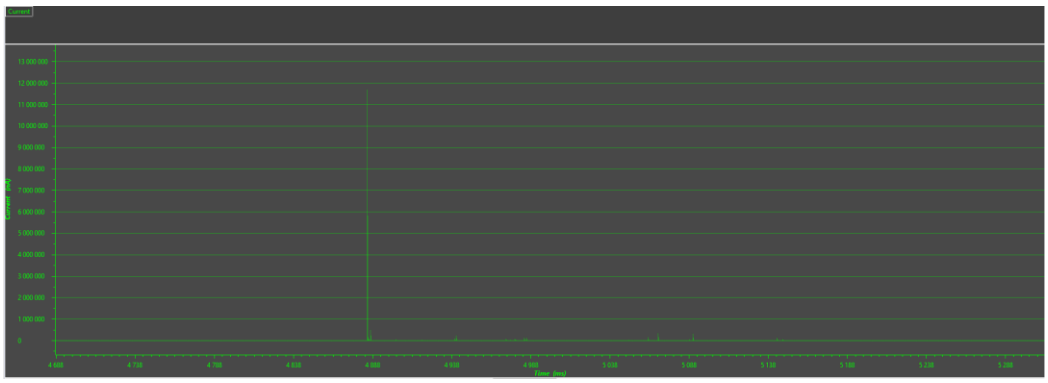
The jumpers on the LAUNCHXL-CC1312R launchpad and ULP sensor Boosterpack looks like this:

If testing the micreedlightnodefinal project, the light sensor power and adc sel light needs a jumper between the pin like the reed sensor power pins in the picture above.

The different test were, no Reed Switch interrupt and no ack packet, 1 Reed Switch interrupt and no ack packet, 1 Reed Switch interrupt and 1 ack packet.

The results from the wakeonreednodefinal project

Measuring the low power capabilities when there is no interrupt from the reed switch:



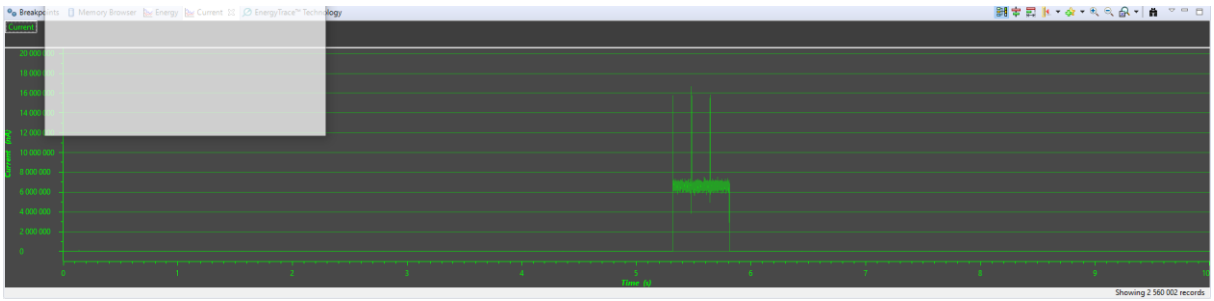
EnergyTrace™ Technology

EnergyTrace™ Profile

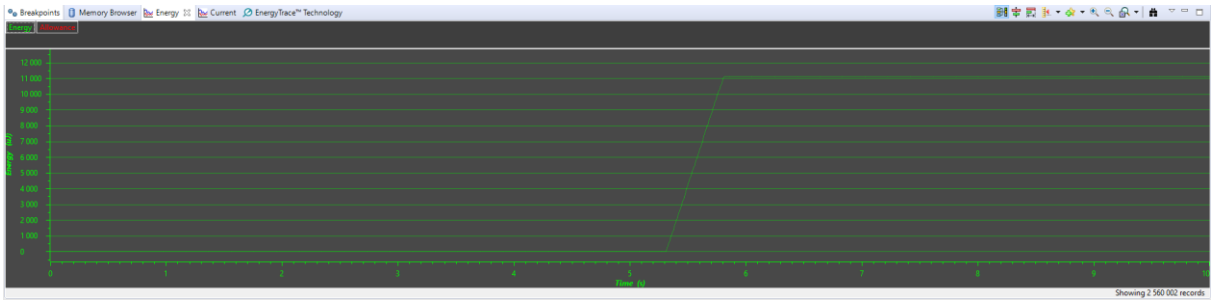
Name	Live
System	
Time	10 sec
Energy	0,033 mJ
Power	
Mean	0,0033 mW
Min	0,0000 mW
Max	39,8218 mW
Voltage	
Mean	3,3000 V
Current	
Mean	0,0010 mA
Min	0,0000 mA
Max	12,0672 mA
Battery Life	CR2032: 22 year 8 month (est.)

Results with 1 CPU wakeup in the 10 second timer, no ack packet from the gateway:

nA/Time



microjoules/Time:

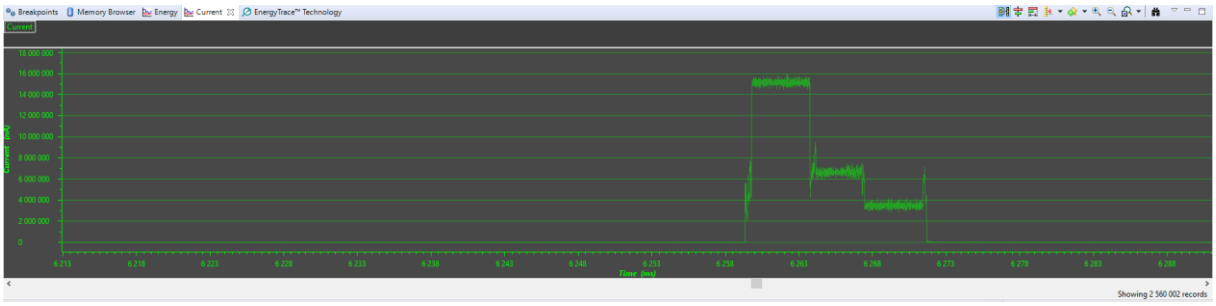


Energytrace profile:

EnergyTrace™ Profile

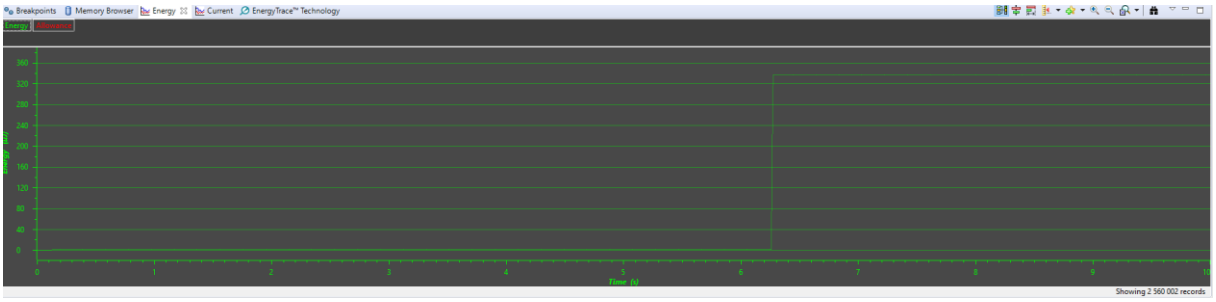
Name	Live
System	
Time	10 sec
Energy	11,137 mJ
Power	
Mean	1,1137 mW
Min	0,0000 mW
Max	58,6544 mW
Voltage	
Mean	3,3000 V
Current	
Mean	0,3375 mA
Min	0,0000 mA
Max	17,7741 mA
Battery Life	CR2032: 24 day 16 hour (est.)

Results with 1 interrupt and 1 immediate ack packet from the gateway. This can be made possible having another launchpad running the wakeonreedgatewayfinal code:

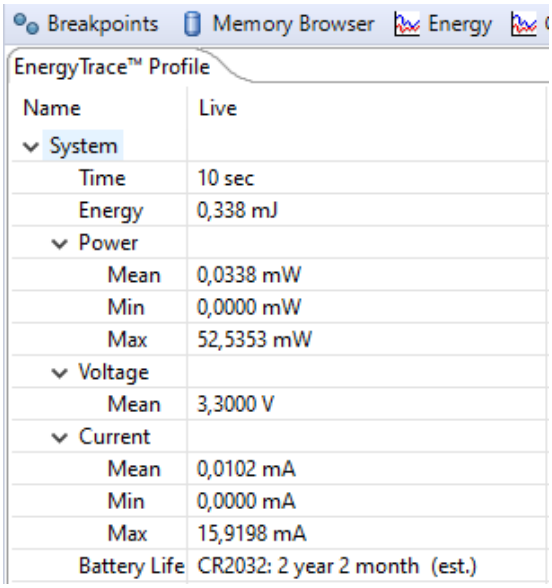


Notice the power surge when the Reed switch is closed, and the CPU woken.

microjoules/Time:



The statistics:



Breakpoints | Memory Browser | Energy

EnergyTrace™ Profile

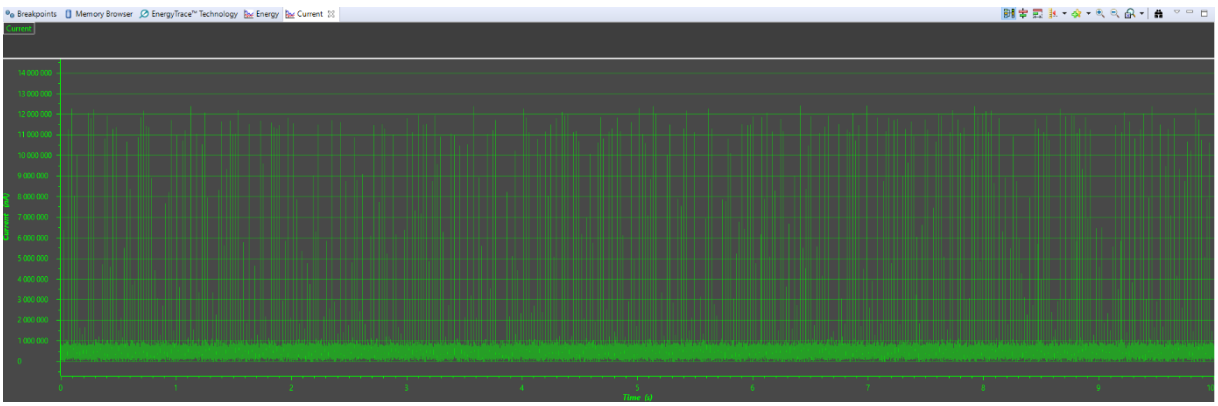
Name	Live
System	
Time	10 sec
Energy	0,338 mJ
Power	
Mean	0,0338 mW
Min	0,0000 mW
Max	52,5353 mW
Voltage	
Mean	3,3000 V
Current	
Mean	0,0102 mA
Min	0,0000 mA
Max	15,9198 mA
Battery Life	CR2032: 2 year 2 month (est.)

This means that if the reed switch is toggled with a period of 10 seconds and an ack packet is received, the node will live for about 2 years and 2 months.

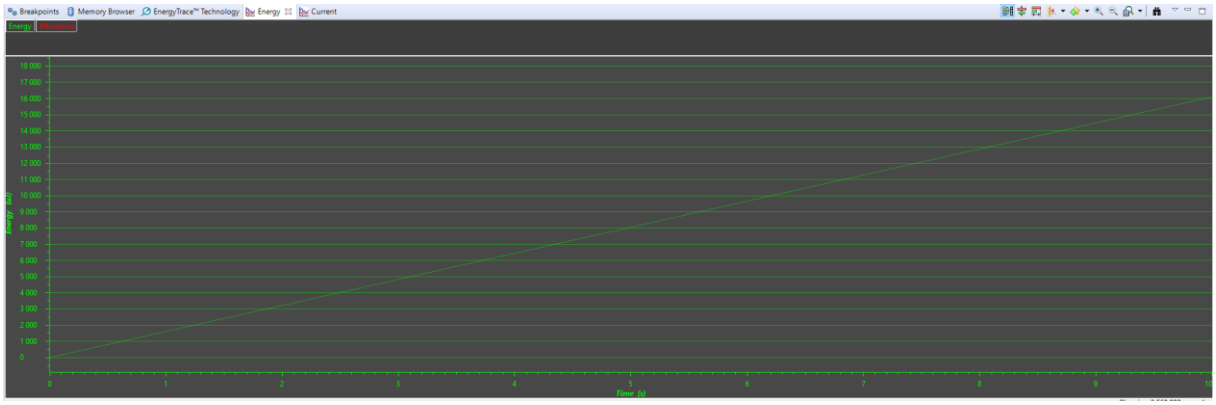
Energytrace results from the node running the micreedlightnodefinal project:

Measuring the low power capabilities when there is no wakeup of the CPU:

nA/Time:



Microjoules/time:



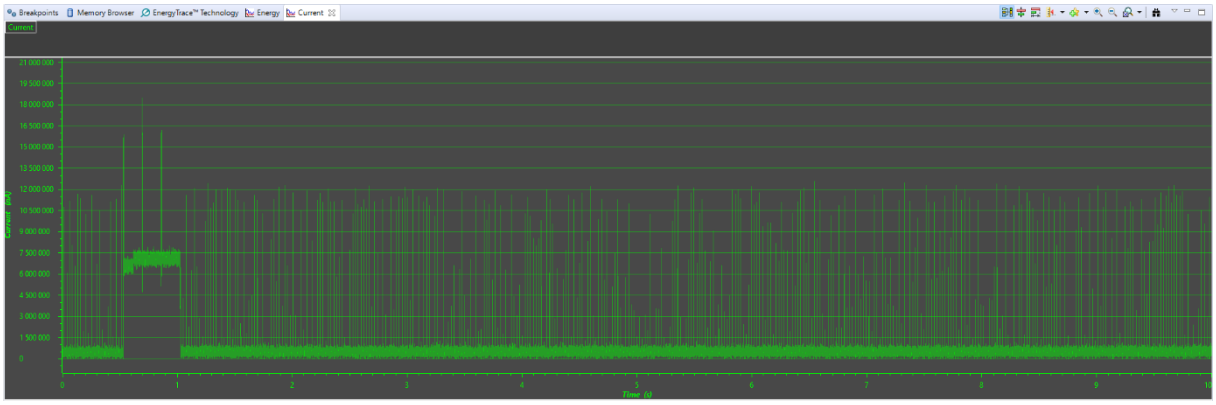
Energytrace profile:

EnergyTrace™ Profile

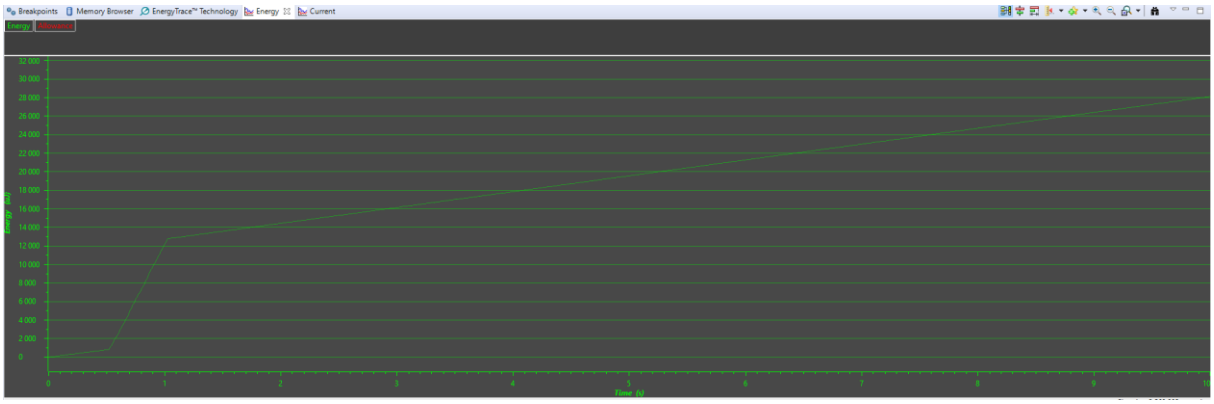
Name	Live
System	
Time	10 sec
Energy	16,104 mJ
Power	
Mean	1,6104 mW
Min	0,0000 mW
Max	41,9461 mW
Voltage	
Mean	3,3000 V
Current	
Mean	0,4880 mA
Min	0,0000 mA
Max	12,7109 mA
Battery Life	CR2032: 17 day 1 hour (est.)

Results with 1 wakeup of the CPU in the 10 second timer, no ack packet from the gateway:

nA/Time



microjoules/Time



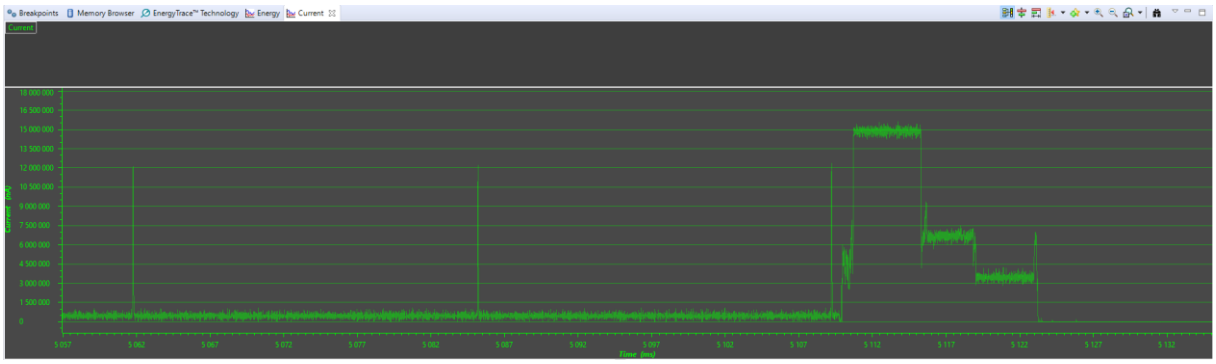
Energytrace profile:

EnergyTrace™ Profile

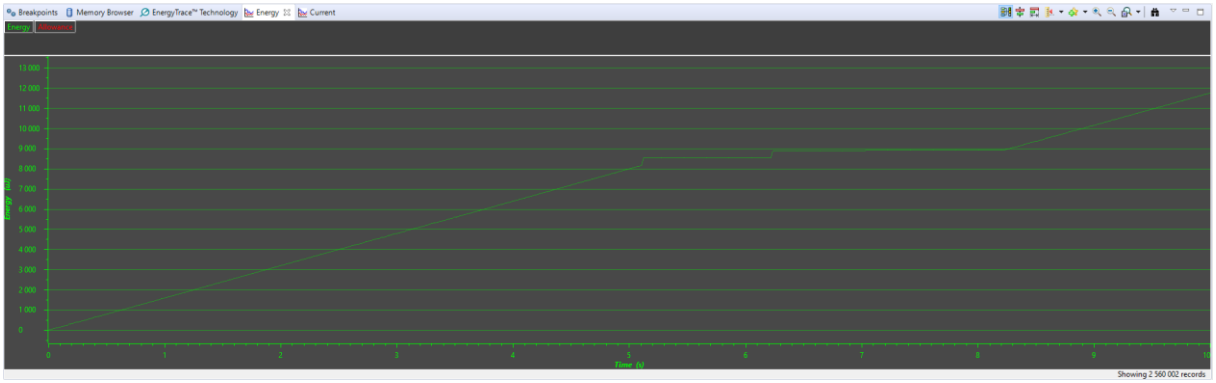
Name	Live
System	
Time	10 sec
Energy	28,115 mJ
Power	
Mean	2,8115 mW
Min	0,0000 mW
Max	60,9554 mW
Voltage	
Mean	3,3000 V
Current	
Mean	0,8520 mA
Min	0,0000 mA
Max	18,4713 mA
Battery Life	CR2032: 9 day 18 hour (est.)

Results with 1 wakeup of the CPU and 1 immediate ack packet from the gateway. This can be made possible having the gateway running the micreedlightgatewayfinal code:

nA/Time:



microjoules/Time:



Energytrace profile:

EnergyTrace™ Profile

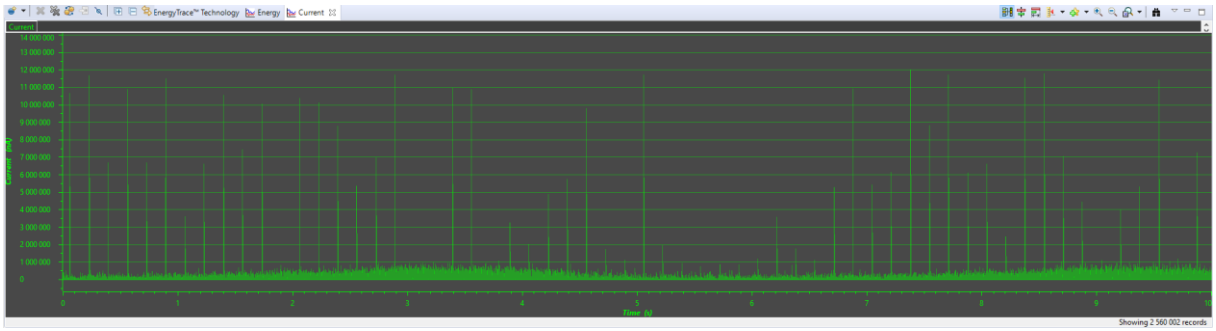
Name	Live
System	
Time	10 sec
Energy	11,769 mJ
Power	
Mean	1,1769 mW
Min	0,0000 mW
Max	52,1629 mW
Voltage	
Mean	3,3000 V
Current	
Mean	0,3566 mA
Min	0,0000 mA
Max	15,8069 mA
Battery Life	CR2032: 23 day 8 hour (est.)

Modified micreedlightnodefinal project:

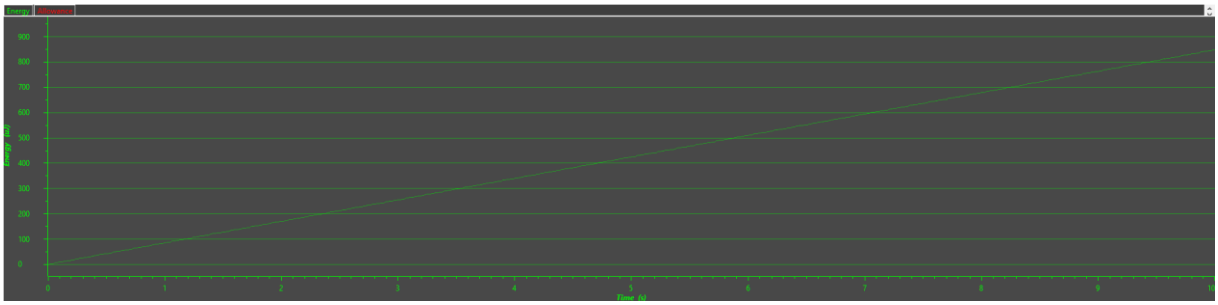
The energy used is a bit too much and therefore we took out the timer, meaning that the adc and light sensor would only be sampled if the reed switch was toggled.

Measuring the low power capabilities when there is no wakeup of the CPU:

nA/Time:



Microjoules/time:



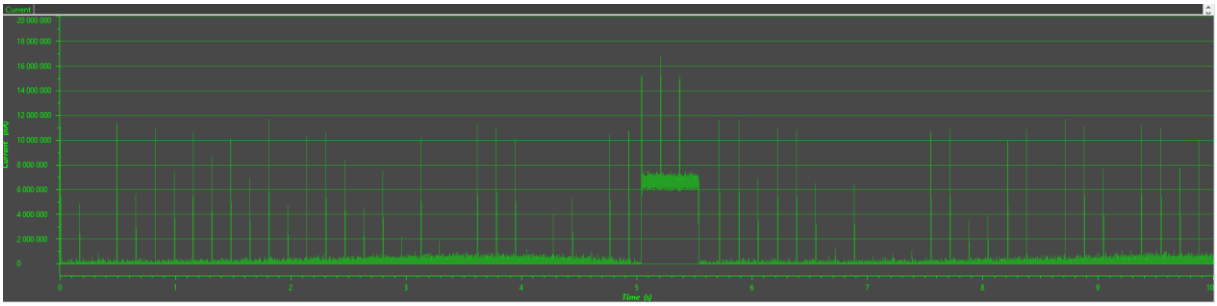
Energytrace profile:

EnergyTrace™ Profile

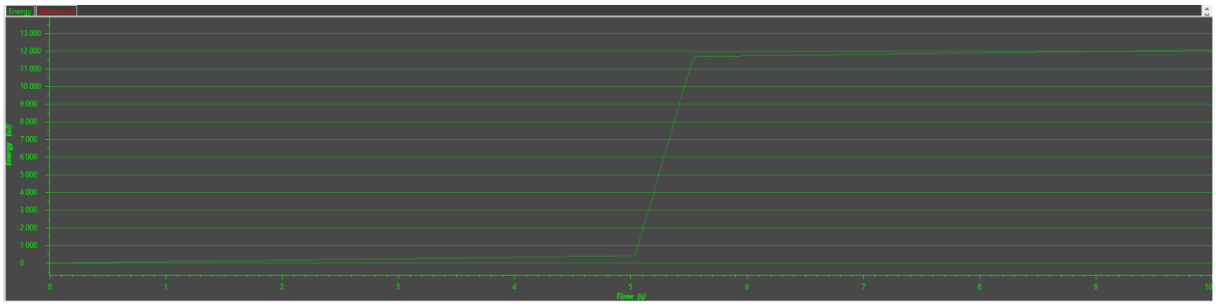
Name	Live
System	
Time	10 sec
Energy	0,848 mJ
Power	
Mean	0,0848 mW
Min	0,0000 mW
Max	40,3707 mW
Voltage	
Mean	3,3000 V
Current	
Mean	0,0257 mA
Min	0,0000 mA
Max	12,2335 mA
Battery Life	CR2032: 10 month 19 day (est.)

Results with 1 wakeup of the CPU in the 10 second timer, no ack packet from the gateway:

nA/Time



microjoules/Time



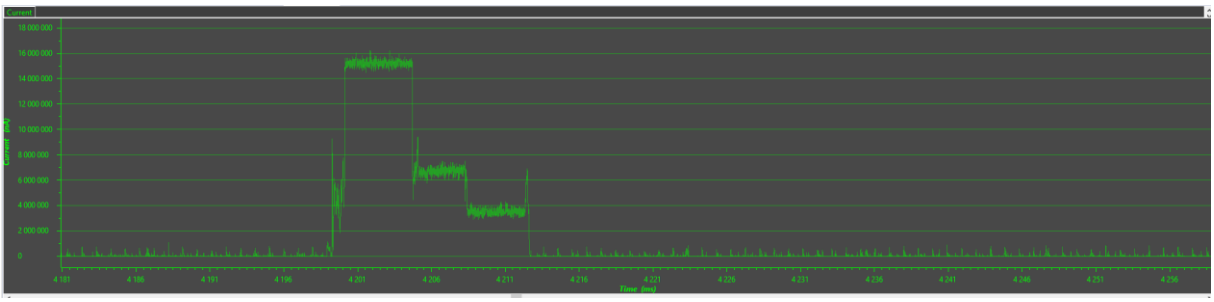
Energytrace profile:

EnergyTrace™ Profile

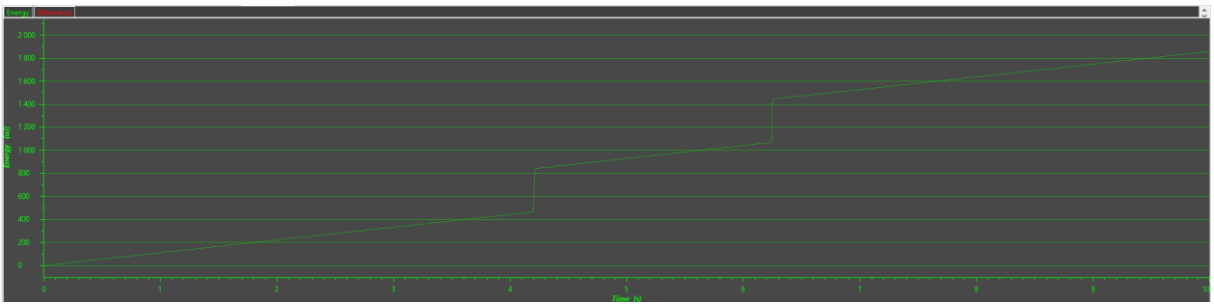
Name	Live
System	
Time	10 sec
Energy	12,060 mJ
Power	
Mean	1,2060 mW
Min	0,0000 mW
Max	57,4273 mW
Voltage	
Mean	3,3000 V
Current	
Mean	0,3654 mA
Min	0,0000 mA
Max	17,4022 mA
Battery Life	CR2032: 22 day 19 hour (est.)

Results with 1 wakeup of the CPU and 1 immediate ack packet from the gateway, there were two packets sent during this 10 second recording in Energytrace.

nA/Time:



microjoules/Time:



Energytrace profile:

EnergyTrace™ Profile

Name	Live
System	
Time	10 sec
Energy	1,858 mJ
Power	
Mean	0,1858 mW
Min	0,0000 mW
Max	53,6094 mW
Voltage	
Mean	3,3000 V
Current	
Mean	0,0563 mA
Min	0,0000 mA
Max	16,2453 mA
Battery Life	CR2032: 4 month 26 day (est.)

Much better lifetime of 4 months and 26 days if the reed switch was toggled, a packet sent and an ack received. This means that we can send 2 packets every 10 seconds and still have a battery life of almost 5 months.