Case 1: Softdevice flashed, no app flashed



per data sheet

KX022 high power mode 145 uA @2.5V

low power mode 10 uA

standby 0.9 uA

SHT3 idle state 0.2 uA (max 2 uA)

Average 2 uA while measuring w/lowest repeat.+single shot)

Case 2: Softdevice, just go to idle mode



Case 3: Softdevice, init bsp (led off), and just go to idle mode



Case 3b (one led on)

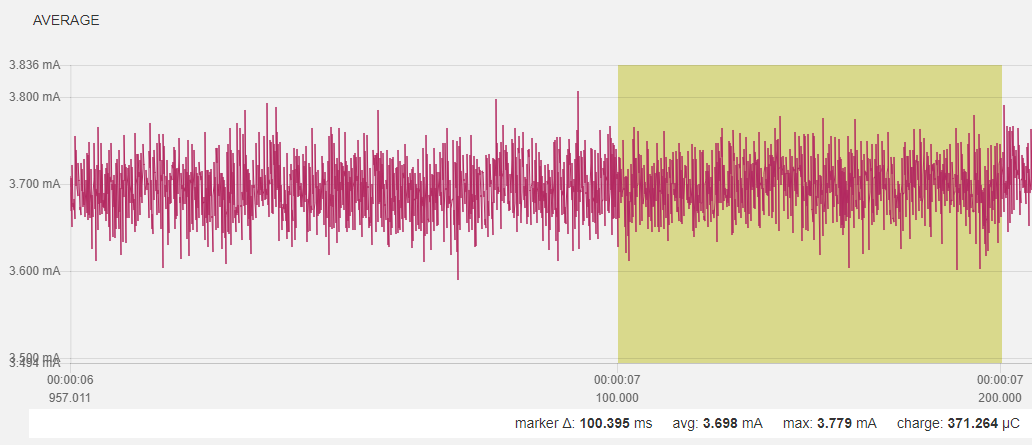


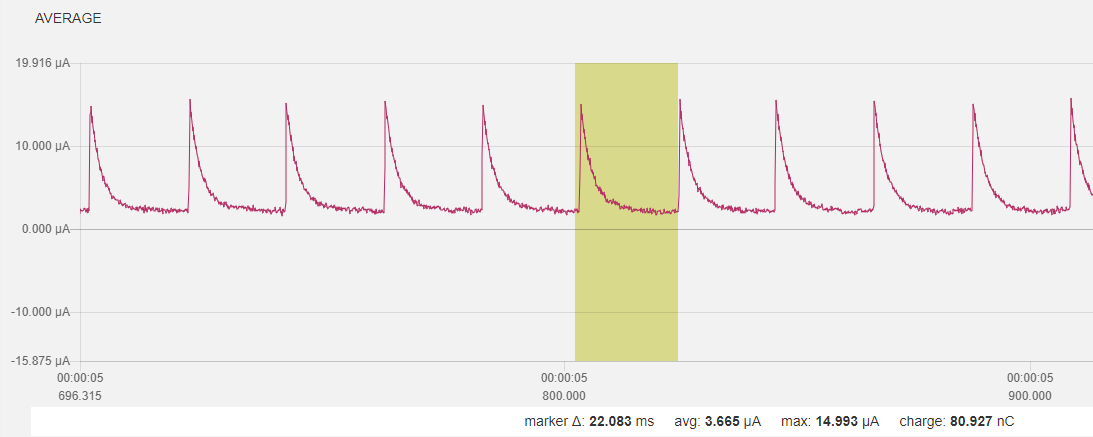
Case 4: (led off=3 + twi\_config + (both) sensor\_init)

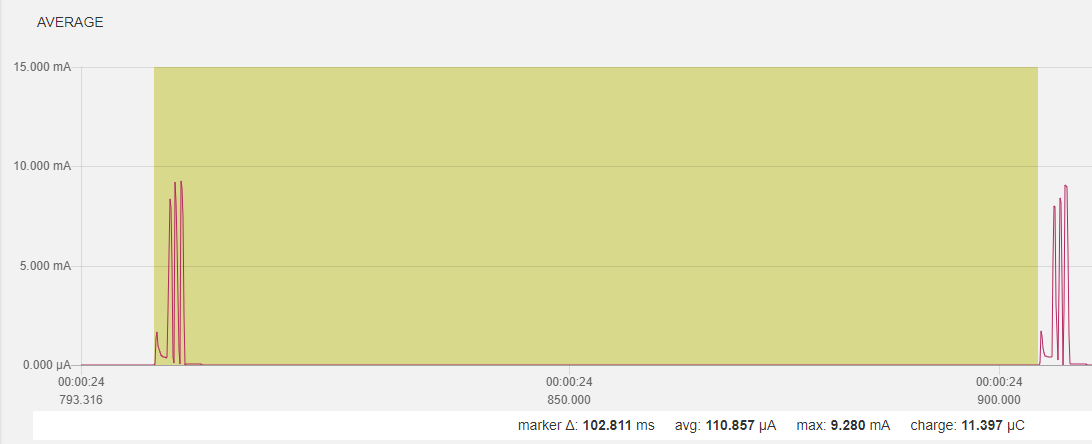


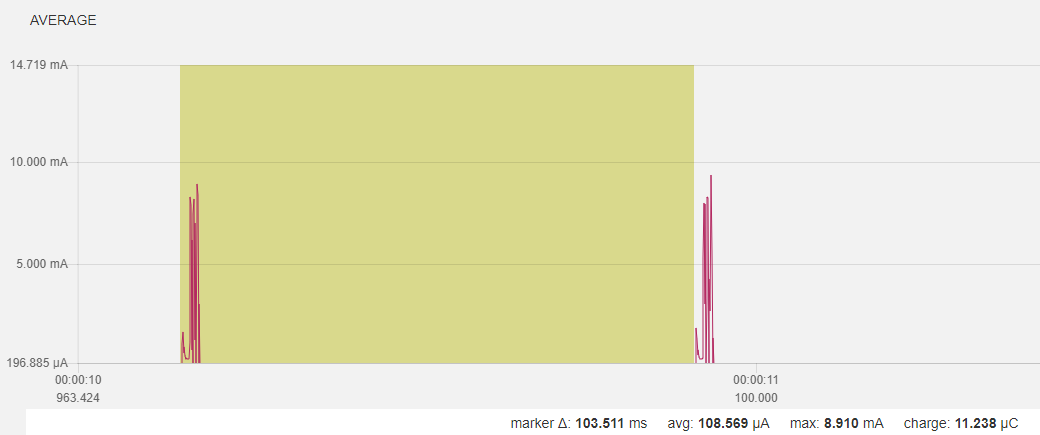
Case 4a: = 4 but no sensor\_init

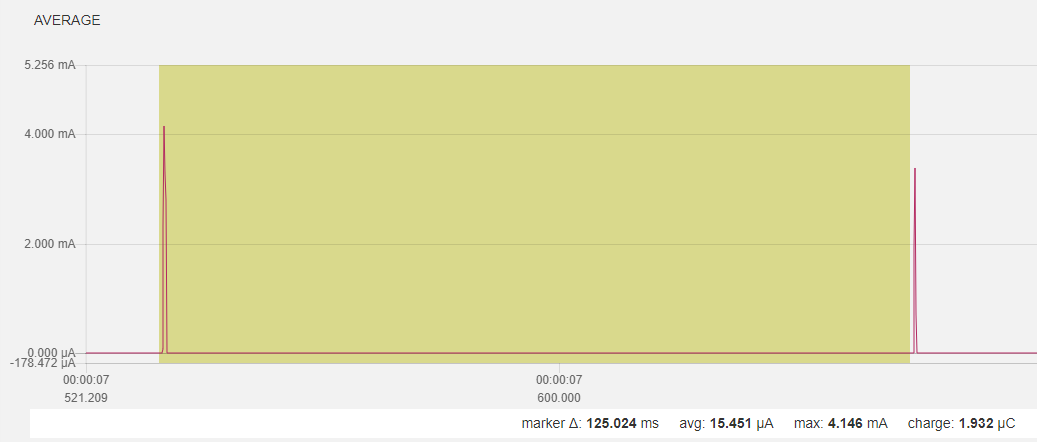


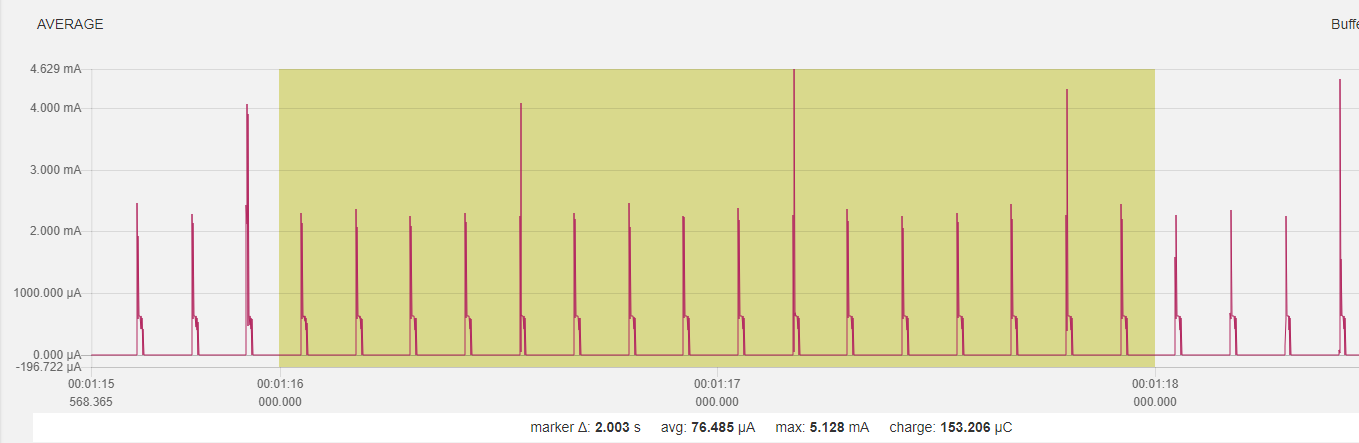
Case 4b: only kx022 init

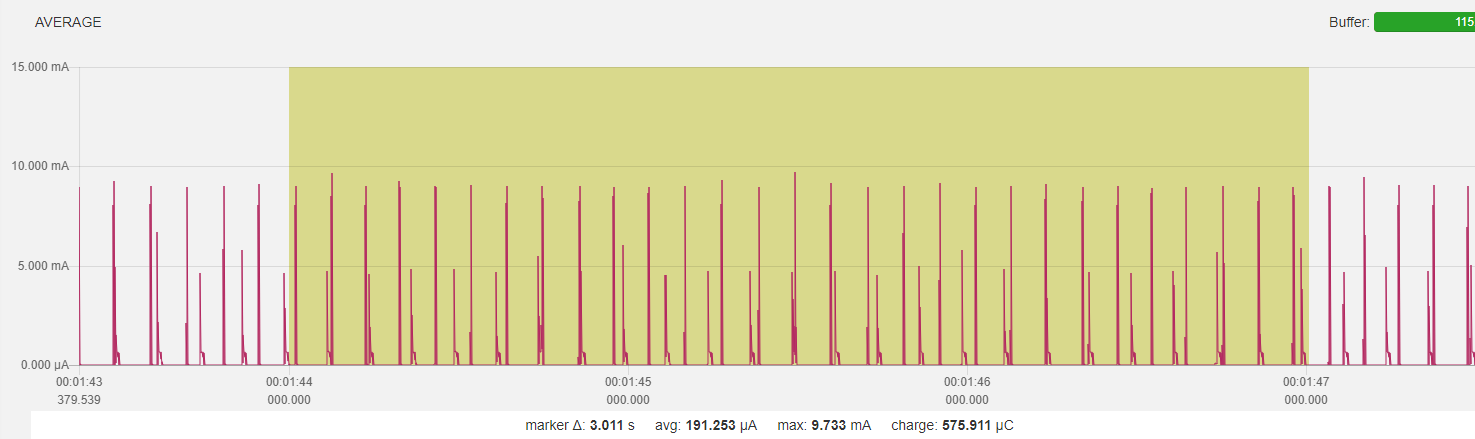
Case 4c: only SHT3 init 

Case 5 (case 4c/SHT but no KX022, no sensor data + BLE adv)  


Case 6 (case5+ saadc measurement)

Case 6a (case 6 w/o BLE init/adv)  


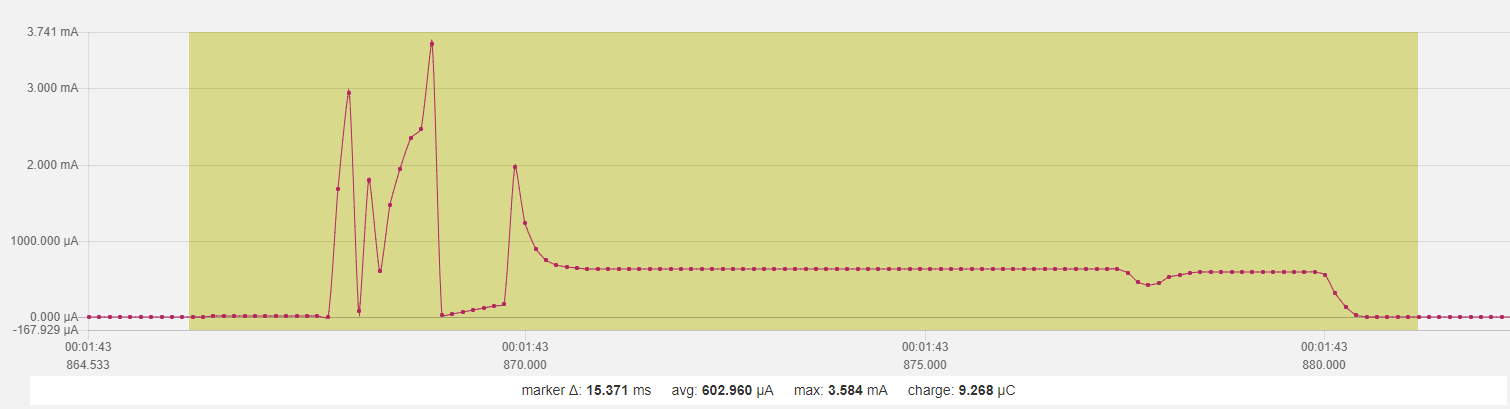
Case 7 (case 5 + SHT measurement) 

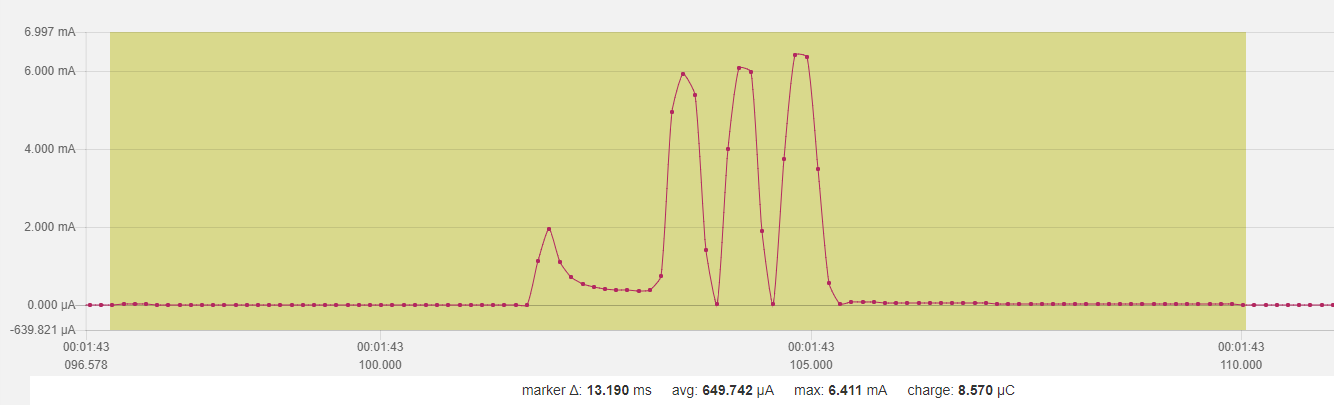
Case 8 (all but KX022 measurement, 1/8 data acquisition for SHT and SAADC)  


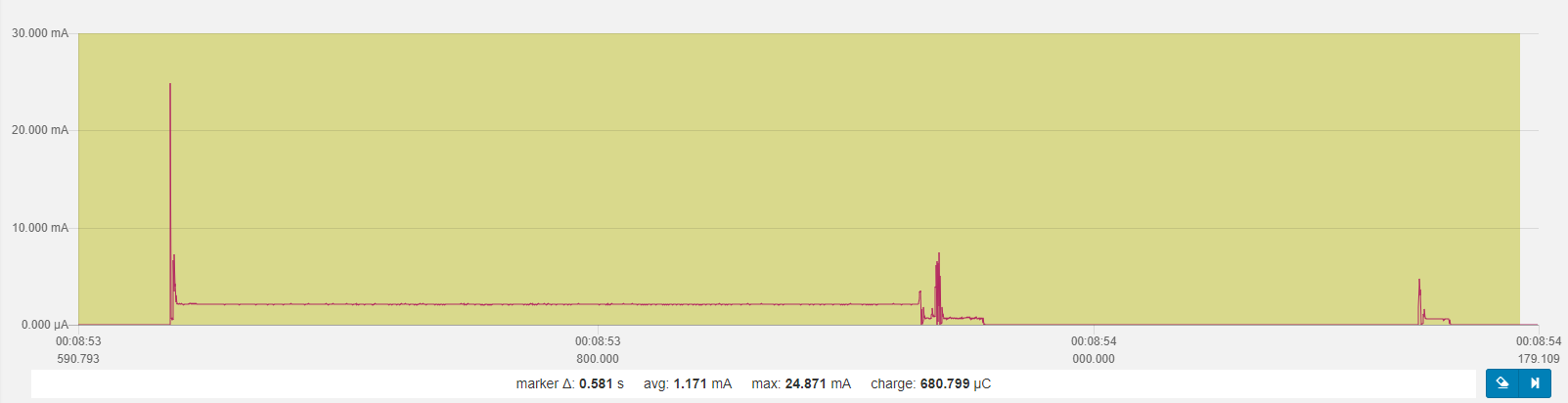
Case 8a

* reduce transmit power to 0dBm from +4dBm
* adv int to 1 sec from 1/10 sec
* SHT update int to 5 sec from 1/8 sec
* SADC update int to 10 sec from 1/8 sec



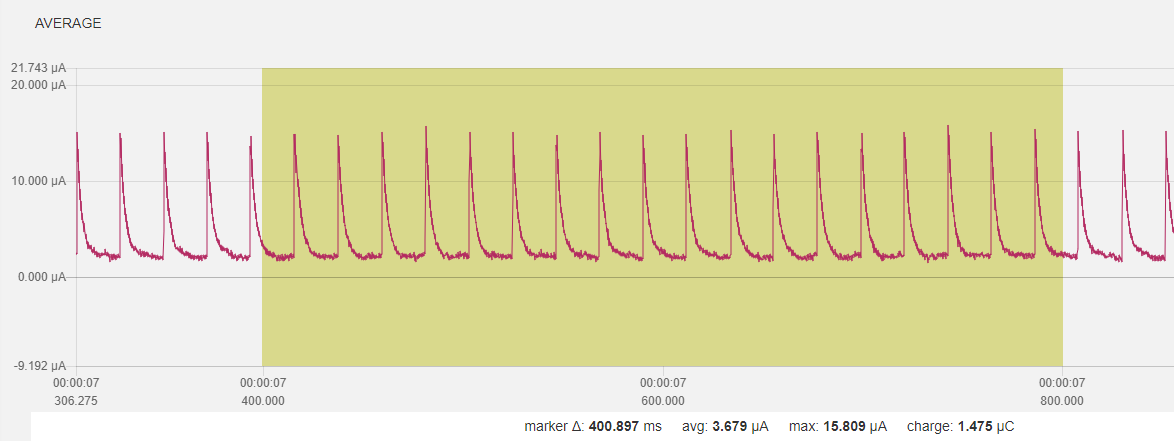
Sensor update (all 5 sec)

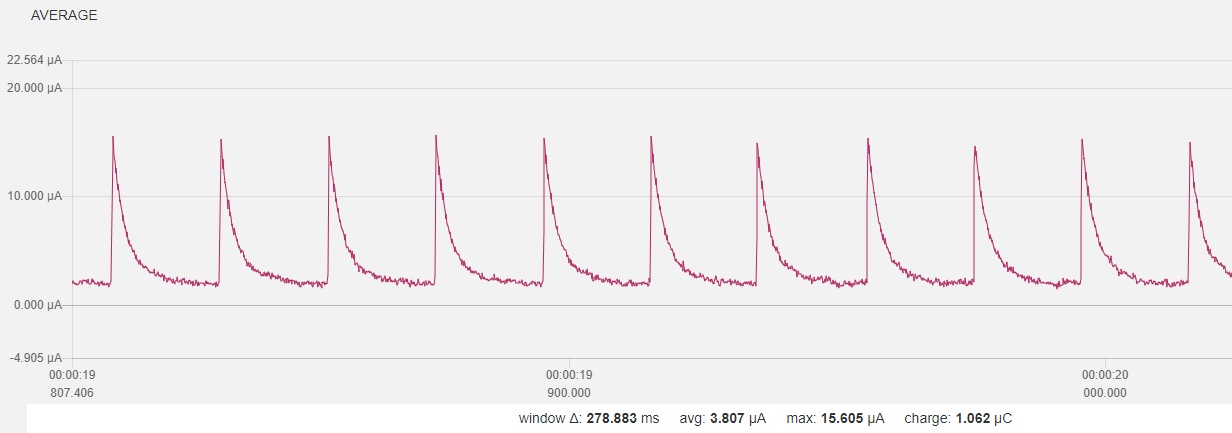
Adv (all 1 sec)

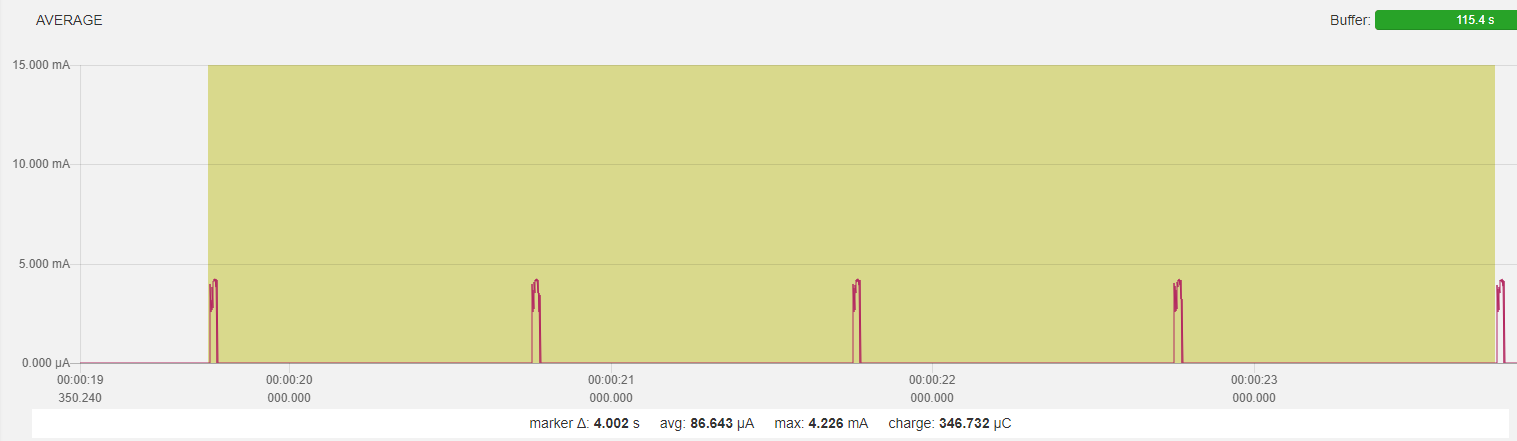
Startup

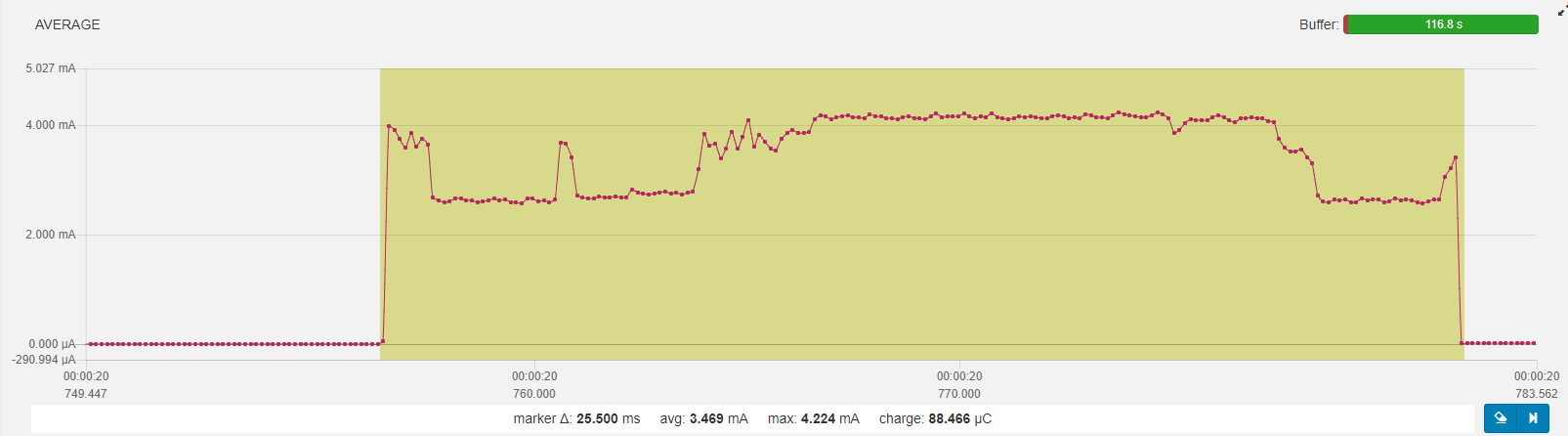
* Peaks
  + Power on peak
  + First adv
  + First sensor acquisition

# Part 2 – Power Optimization KX022 Accelerometer

Baseline, no BLE, no sensor init

Change to TWI without transaction manager, SHT3 init and KX022 init to standby

With KX022 and SHT3 “one shot” measurement, 1 Hz

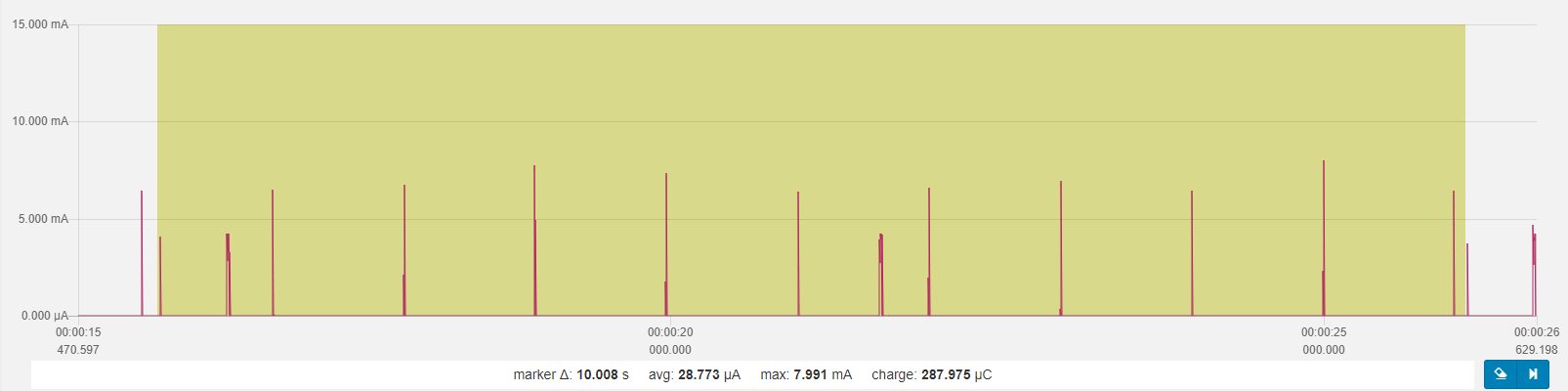
One measurement 

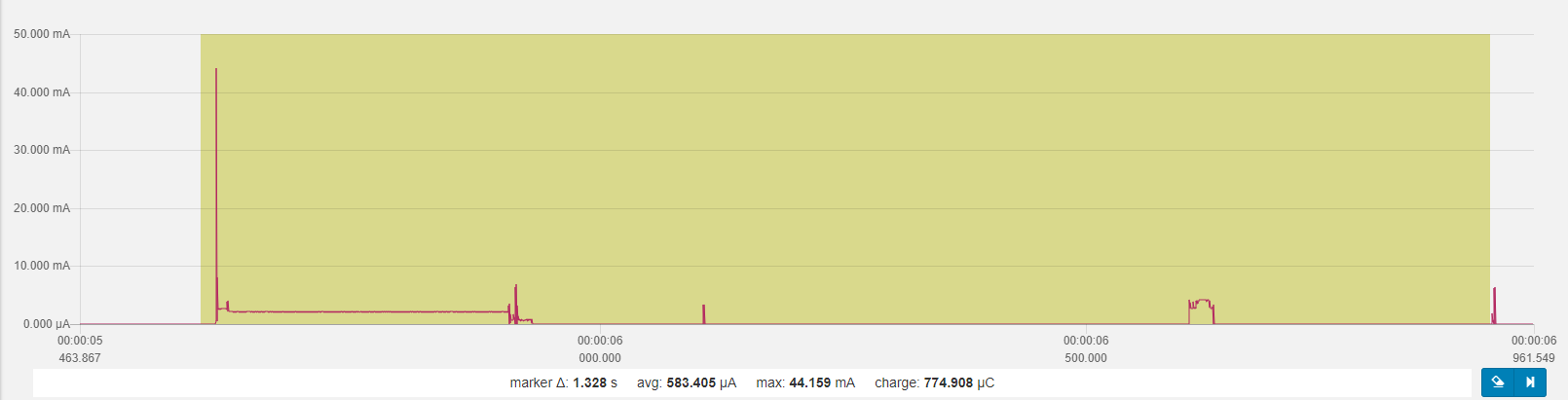
Init KX022, Standby 1,2ms  
wait 1.2/ODR 3ms  
set to operate 0,5ms  
wait 1.2/ODR for value 3ms  
read accel values …  
SUM ~8ms

Set SHT3 to SHT3\_MEAS\_HIGHREP\_STRETCH  
wait clock stretch 12,5ms  
read temperature and humidity 2,8ms  
SUM ~15ms

Process data and sleep again…  
Overall cycle 25ms, avg. power consumption 3,5mA, idle < 4uA

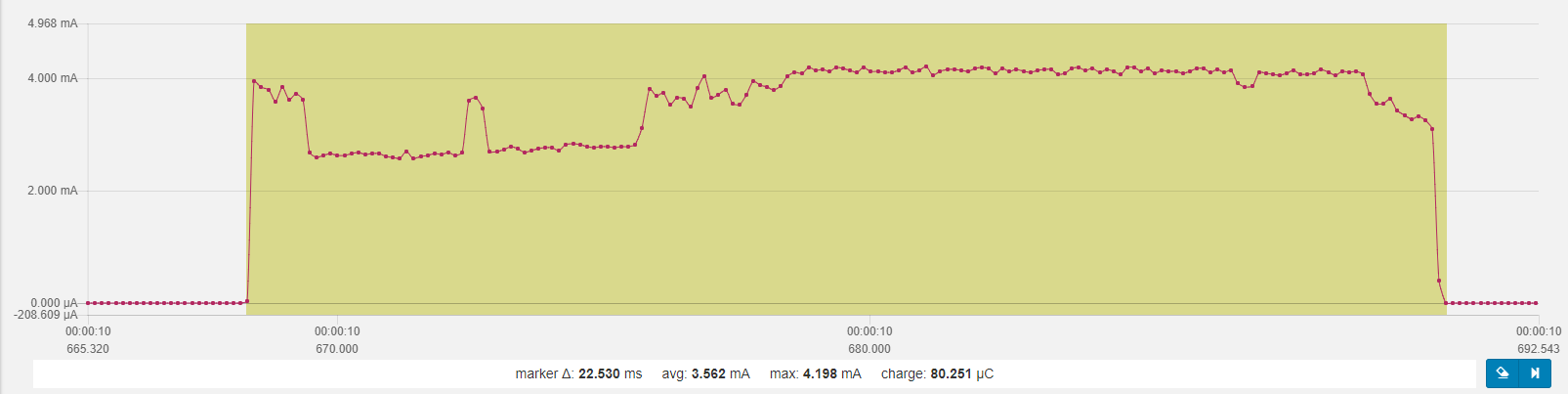
# Part 3 – Overall

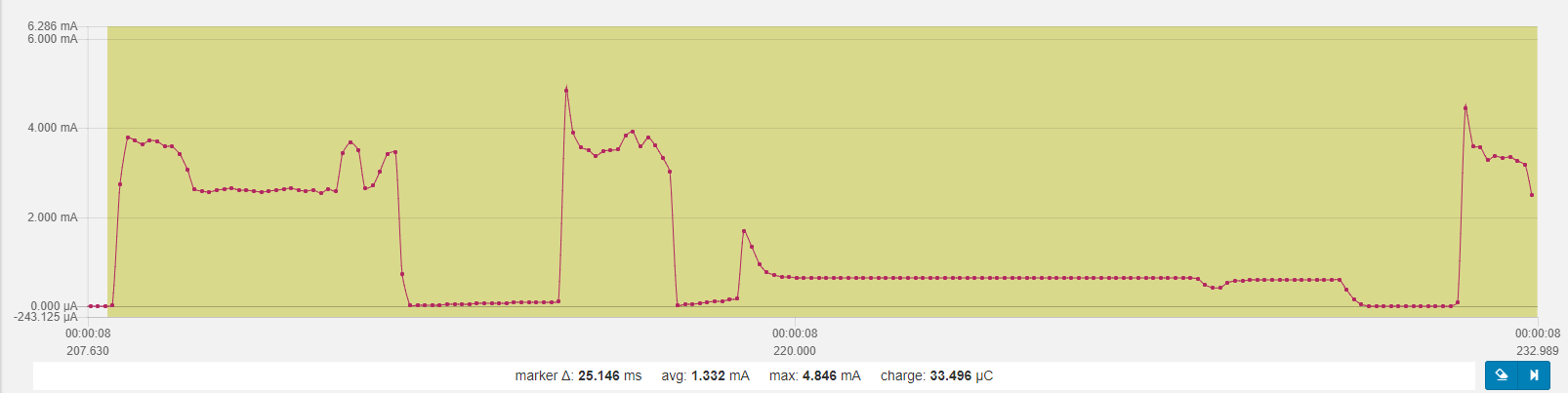
One 10sec cycle 

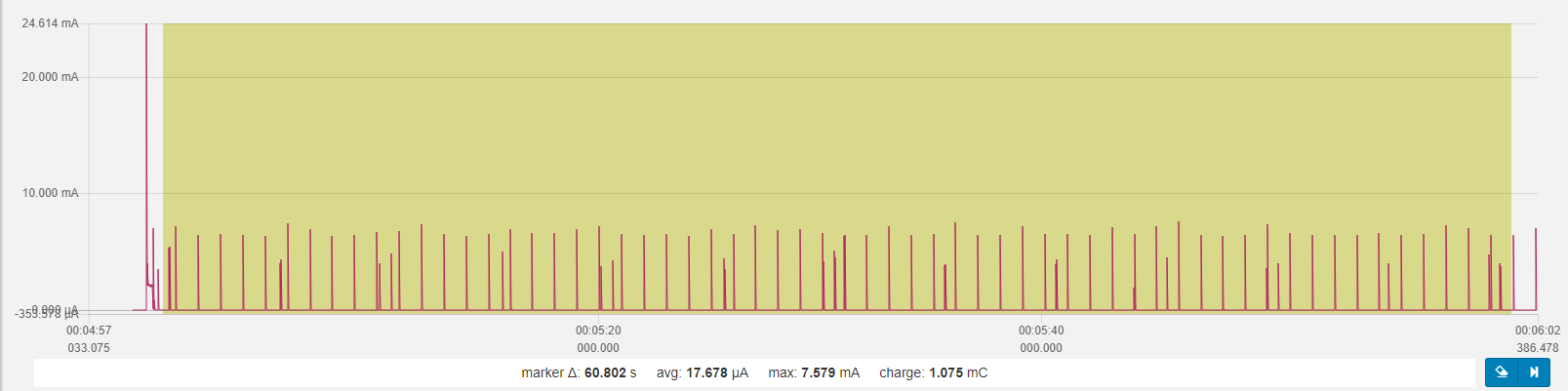
cycle 

BLE 0 dBm, adv. interval 1s  
sensor (SHT3 and KX022) interval 5s  
SAADC (battery level) interval 10s  
overall power consumption ~30uA (28,77uA)  
idle power consumption 3,5uA

# Part 4 – Use RTC INT for while waiting for accel data

Baseline  


Use RTC counter (freq 1/256) for KX022 “put to operation”, “wait for accel data”, and during SHT3 temp/hum measurement (w/max. 15ms time)  


one minute, analog to Part 3 overall 

Optimization summary (Part 3 🡪 Part 4)  
BLE 0 dBm, adv. interval 1s  
sensor (SHT3 and KX022) interval 5s  
SAADC (battery level) interval 10s  
overall power consumption ~30uA (28,77uA) 🡪 17,68uA   
idle power consumption 3,5uA 🡪 3,5 uA