EFR32 – 106


Quick Access
Single-Node
Multi-Node
Scope View
Paused
Recording
706.71 s
48.18 mW
14.52 mA
9.46 mWh
60.84 s
1.80 mW
542.33 µA
30.41 µWh
Display Node
Sort by
Search
Current
Voltage
Avg
IRQ
RX/TX
Bookmarks
J-Link Silicon Labs (440250558)
2196 mA
1000 mA
100 mA
10 mA
1 mA
100 µA
10 µA
1 µA
100 nA
10 nA
1 nA
Current
6.25 s

Delta Time Calculations:

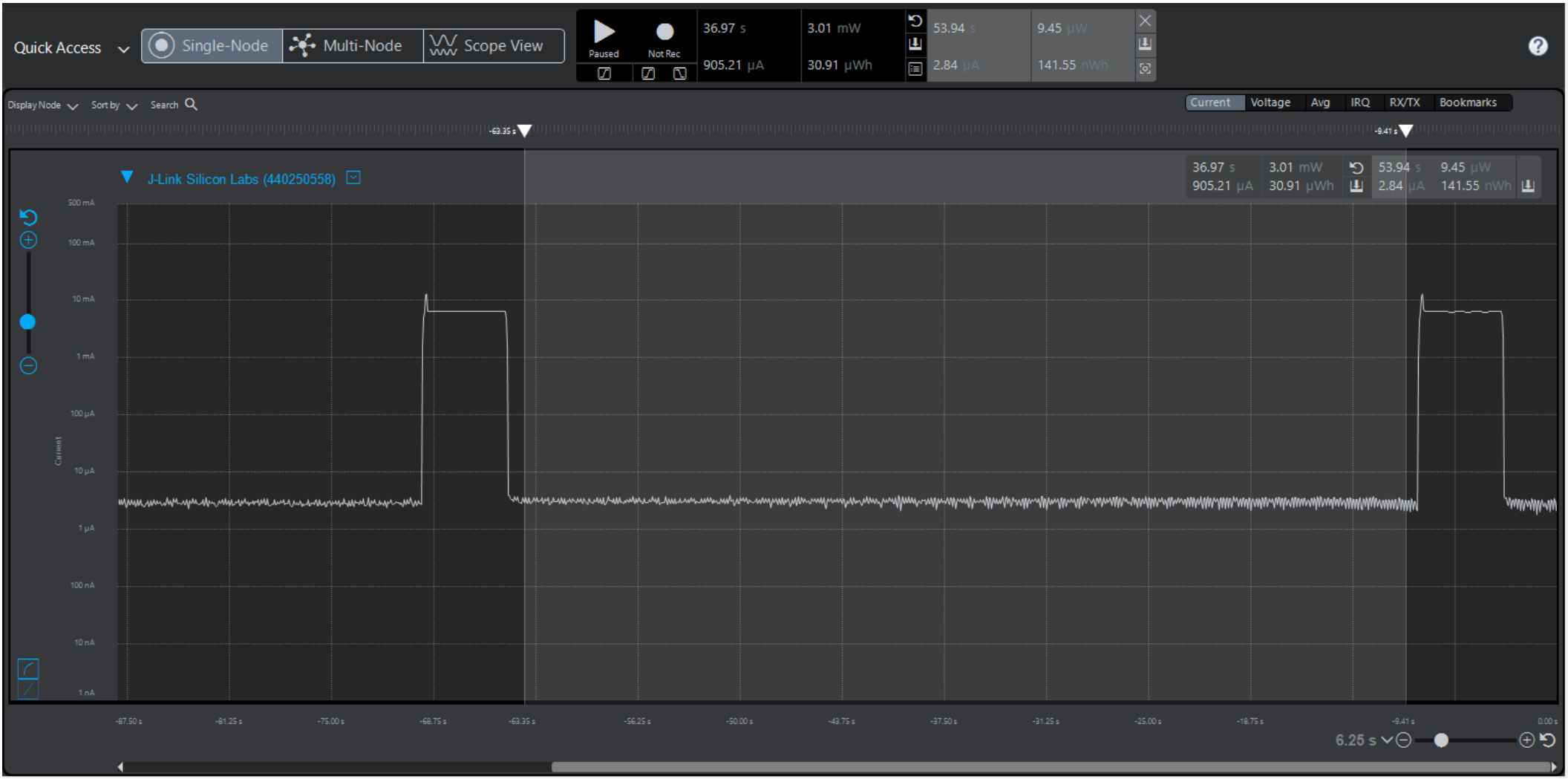
Packet Number	Start Time	End Time	Delta Time (seconds)
1	05:51.4	06:52.2	60.828
2	06:52.2	07:53.1	60.839
3	07:53.1	08:53.9	60.825
4	08:53.9	09:54.7	60.826
5	09:54.7	10:55.6	60.827
6	10:55.6	11:56.4	60.821
7	11:56.4	12:57.2	60.817
8	12:57.2	13:58.0	60.812
9	13:58.0	14:58.8	60.816

Average Delta Time Calculation:

Average Delta Time=60.828+60.839+60.825+60.826+60.827+60.821+60.817+60.812+60.8169
Average Delta Time≈60.8246 seconds

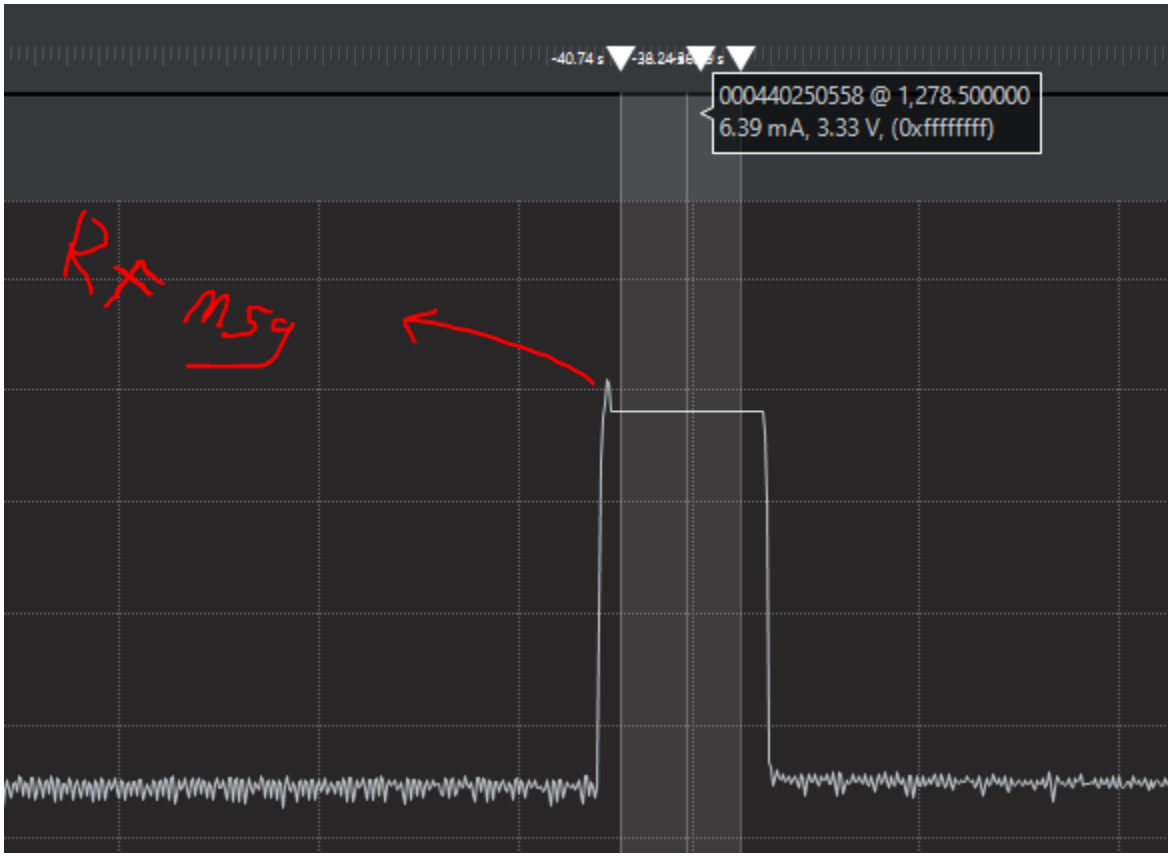
So, the average delta time between each "RF message" message is approximately 60.8246.

EM4 current consumption:



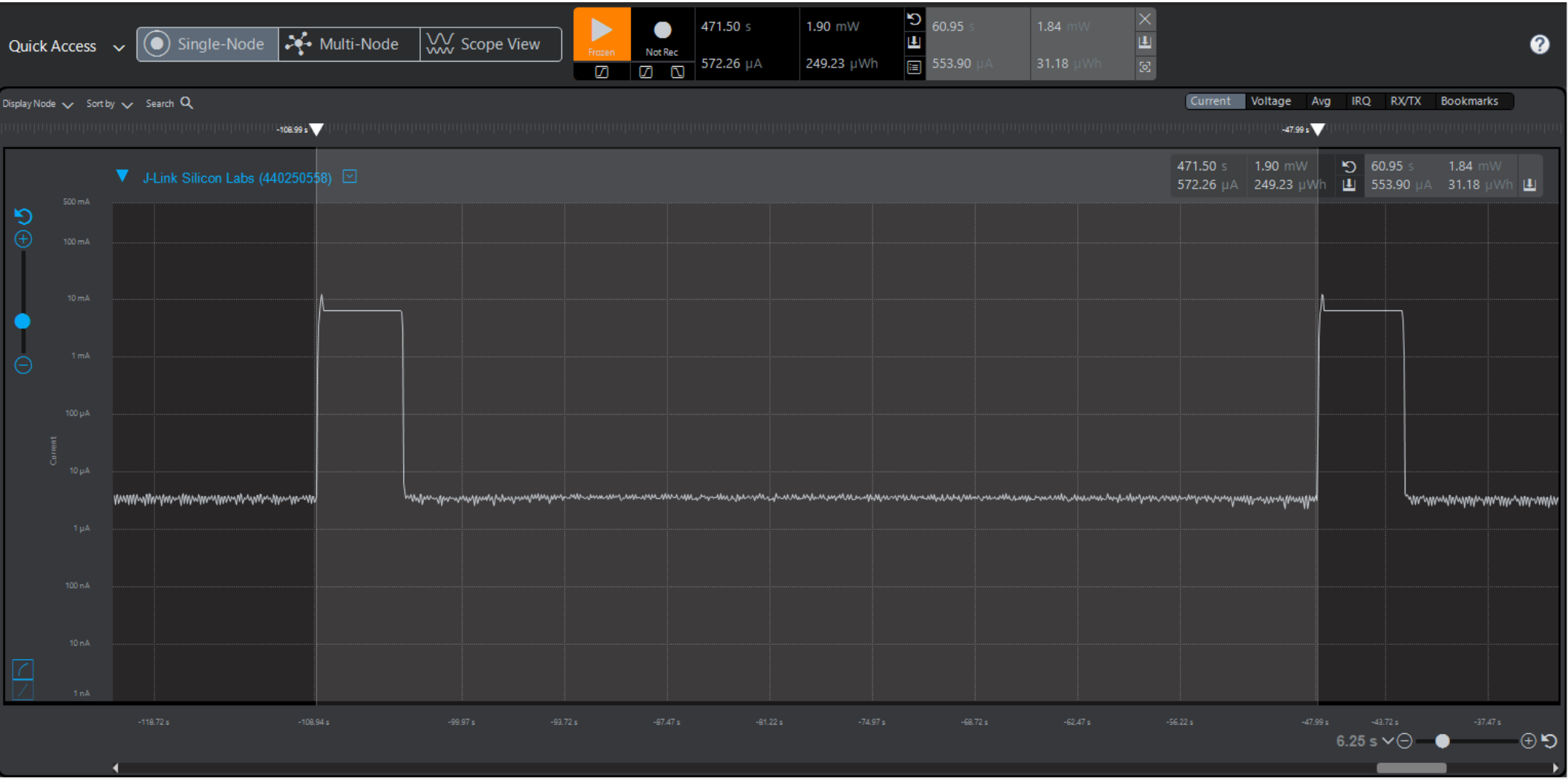
The EFR32 106, when operating in Energy Mode 4 (EM4), exhibits a current consumption of 2.84 µA. This low-power mode is crucial for applications necessitating minimal energy consumption to prolong battery life, ensuring optimal performance and efficiency in energy-constrained environments.

EM0 – RX mode



When the EFR32 106 is operating in Energy Mode 0 (EM0) with the radio in receive (RX) mode, it exhibits a current consumption of 6.39 mA. This mode is essential for active processing and communication, allowing the device to receive incoming signals while maintaining a balance between performance and power consumption.

Battery lifetime



1. Convert average current to mA:
   555.87µA=0.55587mA

2. Calculate total energy consumption per period:
   Energy = Current × Time
   Energy = 0.55587mA x 61s = 33.90827mAs

3. Convert energy consumption to mAh:
   33.90827mAs × $\frac{1h}{3600s}$ = 0.009419mA·h

4. Calculate total battery capacity:
   Since the batteries are in series, the voltage increases but the capacity remains the same. So, the total capacity is still 8,000mAh.

5. Calculate battery life:
   Battery Life = $\frac{Total\ Battery\ Capacity}{Energy\ Consumption\ per\ Period}$
   Battery Life = $\frac{8000mAh}{0.009419mAh} \approx 848{,}717\ periods$

6. Convert battery life from periods to hours:
   Total Time = Battery Life × Period Time
   Total Time=848,717periods × 61s × $\frac{1h}{3600s} \approx 14{,}383.6\ hours$

Given the average current draw of 555.87 uA for a period of 61 seconds, the two Energizer Alkaline Type C batteries connected in series should last approximately 14,383.6 hours or 1.64 years.

Note: The current consumption provided from the Energy Profiler of Simplicity Studio, which is Silicon Labs' IDE. This might represent the current consumption of only the EFR or perhaps more components on the PCB. It's essential to ensure that the entire PCB's current consumption is accounted for when estimating battery life.

EFR32 – 106 Energy Analysis Summary:

The EFR32 – 106 was evaluated for its transmission intervals of battery voltage measurements via its ADC. Over nine intervals, the average delta time between transmissions was found to be approximately 60.8246 seconds, indicating consistent and regular intervals driven by the ULFRCO (internal RC clock) for RF transmissions.

In terms of energy efficiency:

- In Energy Mode 4 (EM4), designed for optimal power conservation, the EFR32 – 106 consumes a minimal 2.84 µA. This mode is pivotal for applications where extended battery life is essential.
- Conversely, in Energy Mode 0 (EM0) with the radio in receive (RX) mode, the device consumes 6.39 mA. This mode ensures the device remains responsive to incoming signals, balancing performance with power consumption.
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Given an average current draw of 555.87 µA over a 61-second period and using two Energizer Alkaline Type C batteries in series, the estimated battery life is approximately 14,383.6 hours or 1.64 years.

In conclusion, the EFR32 – 106 offers a balanced combination of consistent RF transmissions and efficient energy consumption, making it suitable for various battery-operated applications.