

PDR Meeting Minutes

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Client: Idaho Scientific

November 15, 2017 3:30pm-5:00pm

Preliminary Design Review Report

The preliminary design review presented the initial route we are implementing in terms of algorithm, hardware, and antenna structure.

The bootcode is using the PetitFS filesystem under a custom bootcode base in order to ensure we can obtain all the different configurations correctly. Based on our tests and data captures, we will need to sample at least 200msps in order to record suitable data. In order to begin training our algorithm effectively and efficiently we plan to simulate waveforms that we can easily modify and alter in order to test various aspects of the analysis. With this we are able to introduce any instruction insertion, modification, and noise into our data. Once the algorithm is implemented and unit tested, we can begin feeding real data from the capture device.

Cross correlation is used on our sample EM data to first align the signal with the model by removing signal lag, and then using signal windows corresponding to configuration changes and valid boot waveforms, and detecting if any lag has been introduced into the sample. From there we can test the peak amplitudes in order to determine if they are within an acceptable range, which may be affected due to any hardware modifications and/or instruction changes.

Based on test calculations, the antenna plans to be centimeters in size. Originally the antenna's main operating frequency range was 1MHz, with a relatively small bandwidth in order to maximize efficiency.

This is merely where we are starting though; we believe that a wider bandwidth would provide us with signals surrounding the peaks, rather than a singular data point. Based on captures however it appears that the amplitude of the waveform matters more, as we believe it to be a gaussian curve based on the current draw of the device, which might not affect the surrounding signals as much, but only on the operating frequency of the device.

We also delivered the acceptance test plan draft which details how we plan to insert and test various items such as our analysis algorithm, antenna, and hardware modifications.

- * Key Decision: More information and design regarding the antenna.
- * Key Decision: Determine suitable capture method for next meeting.
- * Key Decision: Potential investment in ADC FMC->PCIe card for Linux-based processing.
- * Key Decision: More explanation on how we plan to use implement cross-correlation.
- * Key Decision: Reduce boot time in order to test analysis algorithms easier.

Action Items

- * Team: Complete initial implementation and testing of algorithm against capture data.
- * Team: Determine frequency response of antenna design.
- * Team: Find suitable capture device for reasonable cost.
- * Client: Any questions/comments/concerns and feedback on ATP as nessasary.