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| **MEETING MINUTES – Sponsor Meeting** |
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| OWNER: Julia Kim |

Time: 5:00 p.m. – 6:00 p.m.

Present: Joshua Cushion, Julia Kim, Patrick Delallana

We went over the testing results with Pete. Josh had sent him an updated file with the results adding the three chain dB pads at the input of the detector. We will explain why we have drop the dB at the input of the detector and how those values relate to our design in our analysis and calculations. We can explain the square law that the detector uses.

The PMOD output is not really a high speed where integrity is controlled. The quality didn’t look as good with the PMOD. The other connector has a series of differential signal ports as it has a plus and a minus and ground. Every pin on the FPGA board has a name and you have to program that name to the output signal. You can reprogram the PMOD connection over to the other connector and measure the response and see how that compares to the PMOD. A pulse can be sent to both of the pins and see which one looks better.

The pulse works on the oscilloscope, and the pulse width changes as it should. Maybe the pulse can be changed to where the edge doesn’t look like it has a distortion, such as 200 ns instead of 20 ns for now, in order to drive the switch and see if the switch actually switches. With the A/D converter code, there’s like an offset. When it’s at 0 V, it says it’s at 1.5 V. There may be something off with the pin assignment or such.

We’re only using the DC component as it’s easier. When you have a sinc function, it’s made up of spectral components, there are the DC components and the components at 16.7 MHz and 33.4 MHz. Each of those have different amplitudes according to the sinc function. Think of the signal made up of different frequencies and think of each of the different frequencies as a separate sine wave that has a certain amount of power. The total power in the spectrum is the sum of all the sine waves. The power in a sine wave is the voltage squared over the resistance. You make the DC equal to 1, the center equal to 1 volt, so the amplitude of the sinc function as it goes down. The 16 MHz is equivalent to having a sine wave at an estimate of 0.7 V, which is the RMS value of the 16 MHz signal. The power of that signal is basically the 0.7 squared. You don’t have to divide it by the load as it is common for all. If we go to the 33 MHz, then say that’s 0.2 and 0.2 squared the energy of that signal. So the total energy in the spectrum is the square each of the components and sum them up. The path is made up of all the frequency components and you can treat them all separately. So map out the amplitudes of all the frequencies and then square them and add them together. There are some loads that go out, so just take the first few going out each side since they can get really low and don’t add anything. So take the first five on either side of the DC, sum those together and then along with the DC and that’s the total power. What we’re getting rid of all the components except the DC when we’re doing the processing. The total power we’re going to receive is just the DC component. So that divided by the total power of that spectrum, and 10 log of that is the loss, the ratio. So the ratio of the power that we’re going to measure divided by the total power. We want to see how much of a hit we’re knocking the signal down in dB relative to just the DC components.