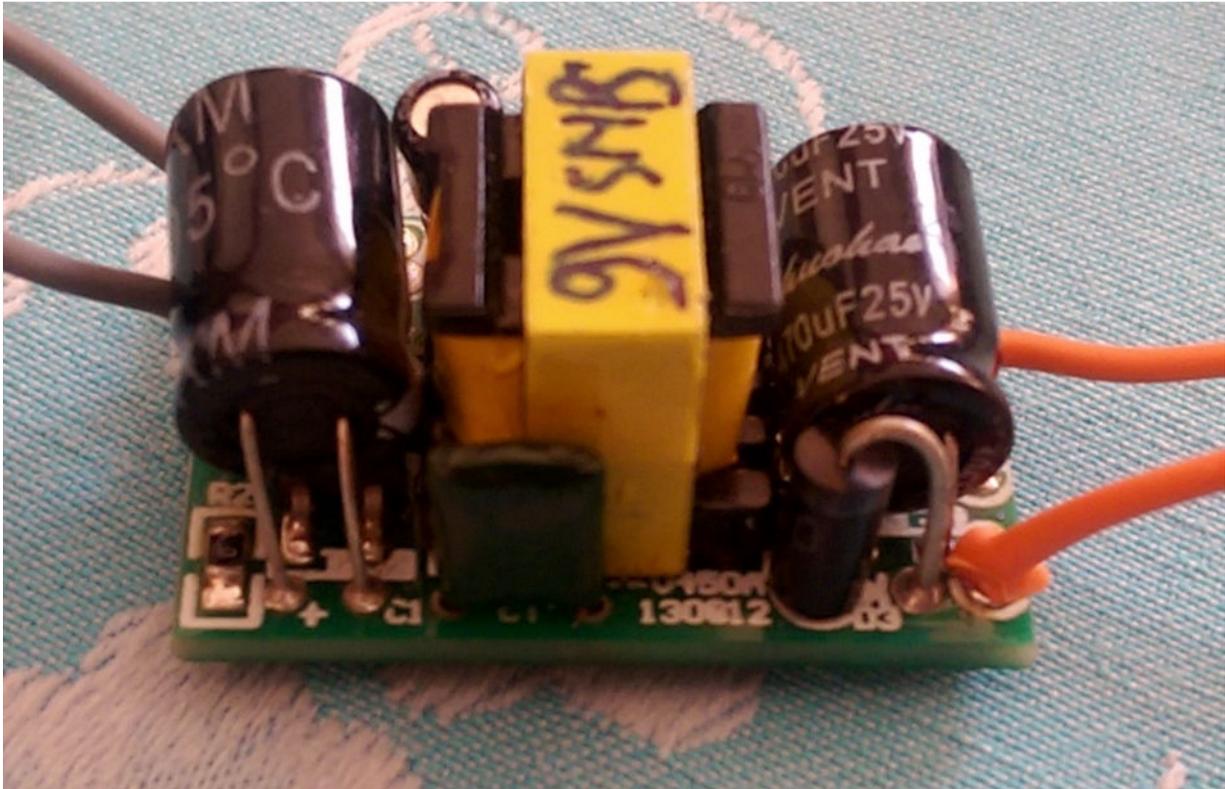


This document describes the measurements I took related to the noise generated by a 9V SMPS ebay module I purchased.

Here is a photo of the SMPS module I purchased. It is a small one around 2 cm x 3 cm. The gray wires connect to the AC source, and the orange wires are the 9V DC output.



*Figure 1 - 9V SMPS ebay Module*

The DC output was connected to two resistors in series 2K Ohm and 5 Ohm. The voltage across the 50hm to ground was 20mV. The test was setup this way to match an issue that I am facing with the ADC of an STM32 while trying to measure the same signal accurately.

Following is the first test circuit showing the noise super imposed on the 20mV signal.

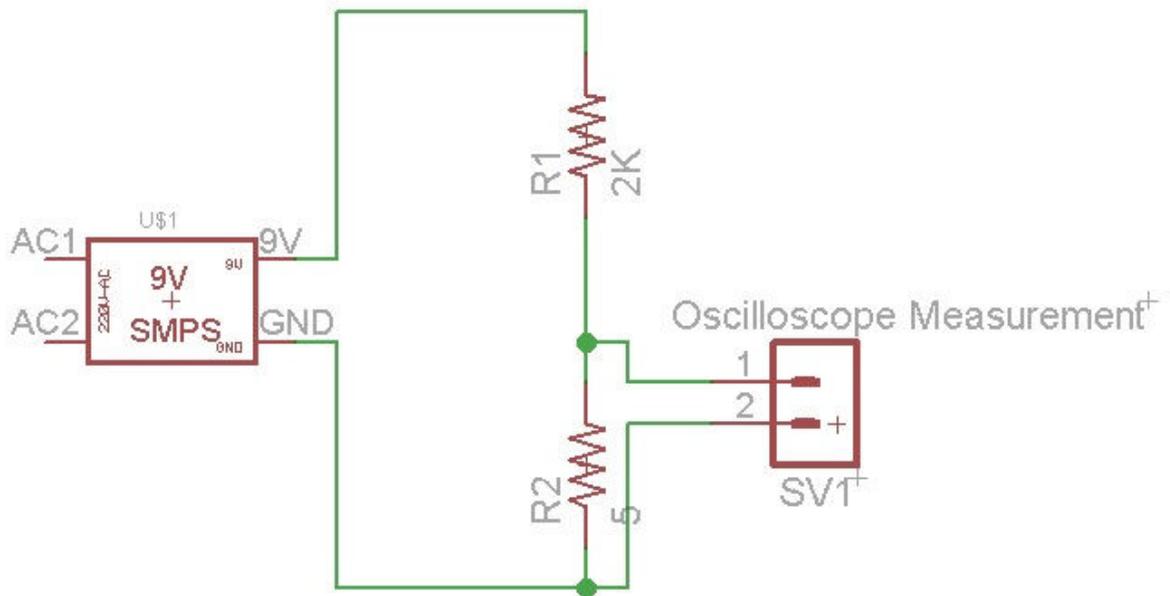


Figure 2 - Test Circuit demonstrating the noise

The noise generated around the original 20mV signal (thick yellow line in the below photo) was around 330mV as per the oscilloscope measurements.



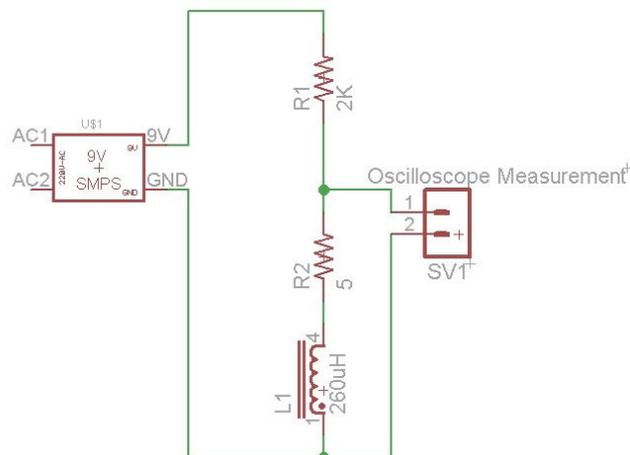
Zooming into the noise showed that it consists of a spike of 15MHz frequency repeated around each 200 micro second (5KHz).



I tried the normal RC filter at the 9V side of the SMPS before the teste circuit, but did not get any improvement.

Then I tried an inductor of 260 micro Henry on the 9V side of the SMPS module but again with no improvement.

Then I tried the same inductor on the ground side, and here I found an improvement. Here is the new test circuit, and the associate noise measurement.





The noise has decreased peak to peak to 90mV compared to 330mV, and when zooming into the noise, it still repeats itself every 200 microseconds (5kHz), but the amplitude of the spike is reduced as shown below.

