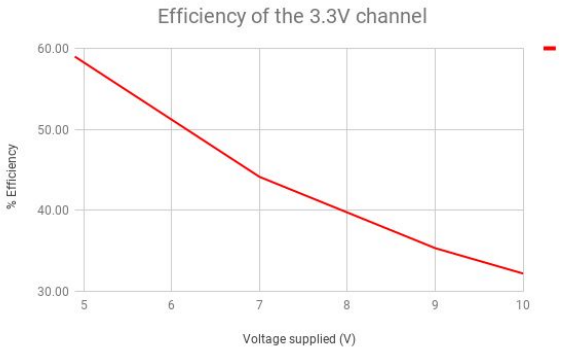
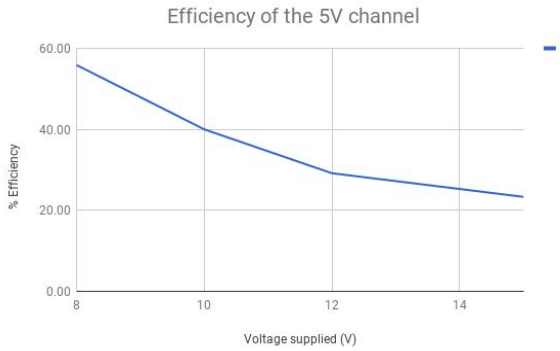
Input and output current vs input voltage for nominal current test graph:

Questions:

1: Discuss the efficiency of the 3.3V vs. the 5V power supply for the nominal currents. Are there times when using each one makes more sense?





While it is by slight margins, the 3.3V supply is obviously more efficient. The current that it draws is almost directly proportional to the current which it outputs. Furthermore, it requires a mere 7V input in order to consistently supply 3.09V (an efficiency of 44.14%). The 5V supply performed well with an input of 8V, giving an output of 4.47V (an efficiency of 55.88%). At this voltage its input current was pretty close to the output (1.49 and 1.96, respectively); however, as the input voltage increased, the current output seemed to increase. It appears that the supply takes the extra supply voltage, and uses it to up the output current. This is demonstrated via my final 5V measurement, where an input of 15V and 0.75A output 3.5V at 2.06A. So, if the power supply is being used to supply a lower voltage and current, the 3.3V supply should definitely be used. But, if either the voltage has to be over 3.3, or the current needs to supply over 1A, the 5V supply should be used.

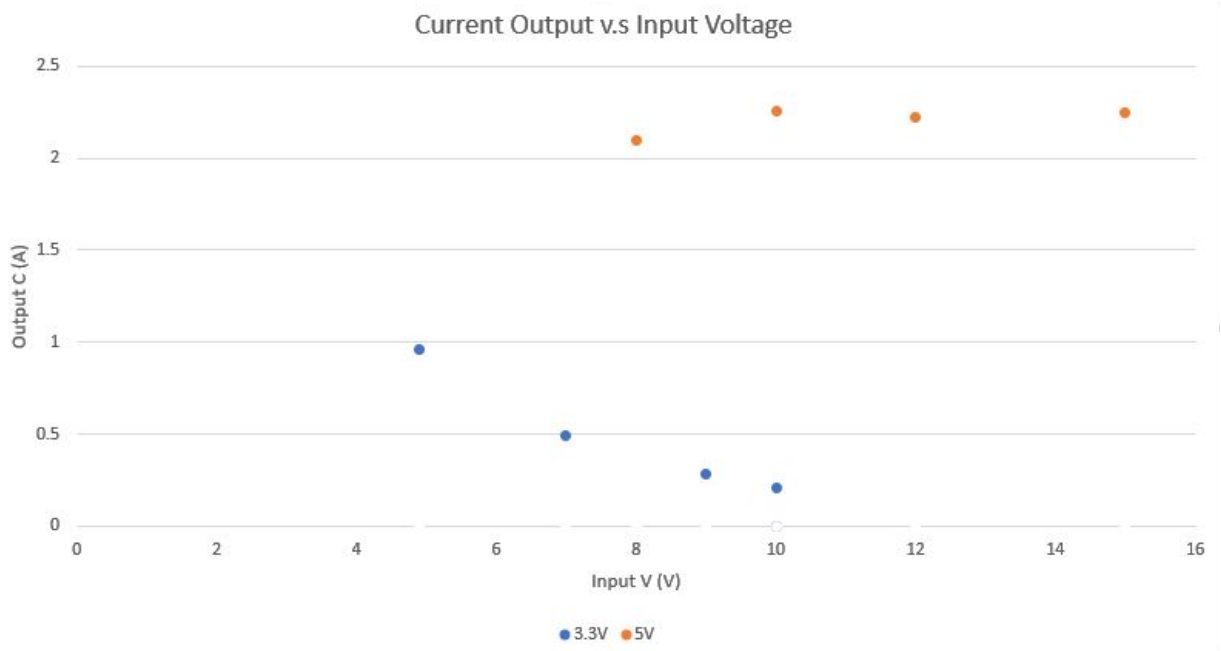
2: Why do we test nominal current? Why not just test peak current?

Because the peak current should not be the current used to specify “safe operating parameters.” With the nominal current requiring a steady supply for over 30 seconds, these data points are safer to use in recommendations for the user.

Input and output current vs input voltage for peak current test:

Questions:

1: Discuss the efficiency of the 3.3V vs. the 5V power supply for the peak currents. Plot the efficiency of each supply against the input voltage.



As shown in the above graph, the 5V supply was much more consistent with its peak current across the voltage spectrum. Also as shown, the 5V supply is much more efficient at current supply. With an input of 10V, the 5V output was providing 2.08A, whereas the 3.3V provided a meager 0.21A.

Nominal and peak output current vs input voltage:

Questions

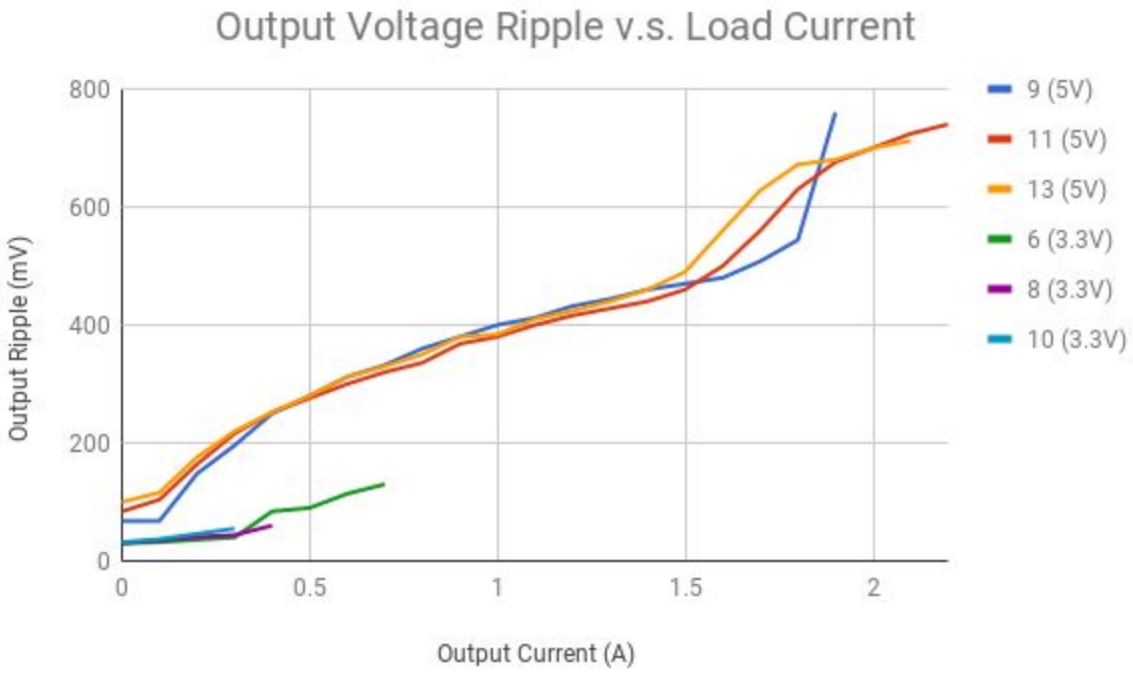
1: From your data, what conclusion can you make about when each type of supply is to be used?

The 3.3V supply is meant to be used by something with a low power usage. That device must require no more than 3.3V, and must pull less than 1A. If more voltage or current is required, the 5V supply should be used. Additionally, a device that operates on 3.3V will be more efficient if supplied with 3.3V, as opposed to 5V. If the device is fed 5V, it must dissipate the other 1.7V, and will therefore be more inefficient.

Output voltage ripple vs load current for at least 3 input voltages:

Questions

1: From your data, what conclusions can be drawn about voltage ripple vs. load current for the 5V and 3.3V supply?



It is apparent from the above picture that as the load current increases, ripple increases. I think this is due to the strain being put on the hardware; as the supply must work harder to supply more current; it adds more “noise” to the system. Furthermore, the 3.3V supply appears to produce significantly less ripple. This is due to the fact that the 3.3V line utilizes a simple voltage regulator, whereas the 5V line utilizes a step-down converter.