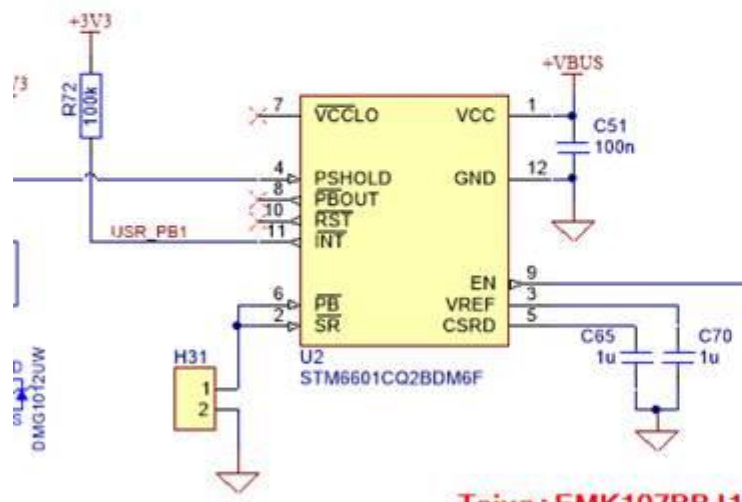
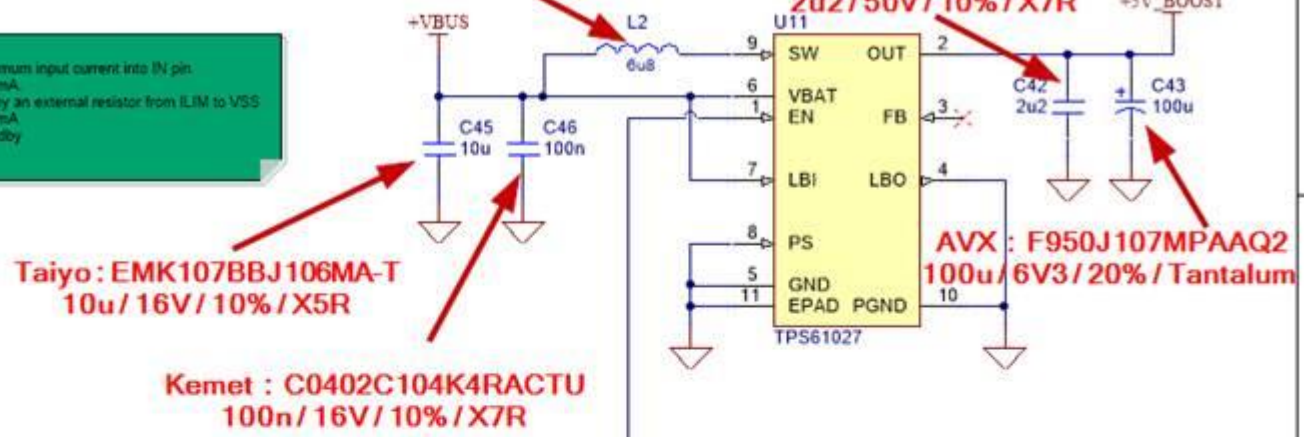
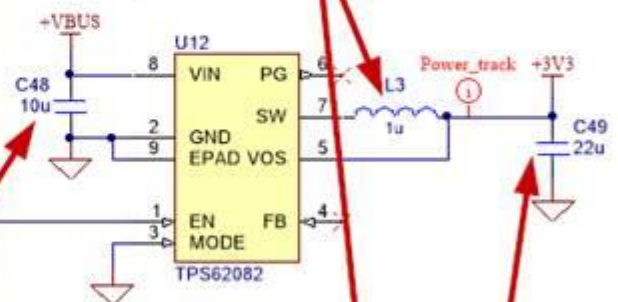


EN2	EN1	Maximum input current into IN pin
0	0	500 mA
0	1	Set by an external resistor from ILIM to VSS
1	0	100 mA
1	1	Standby

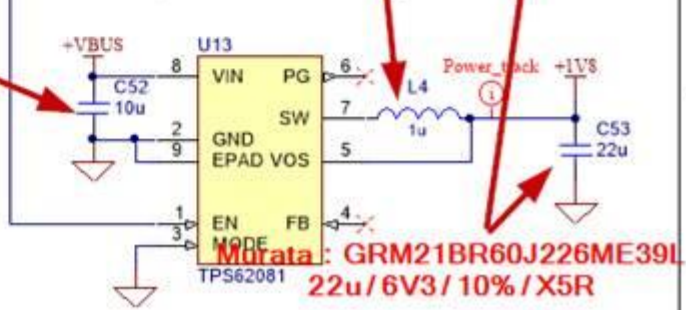
5V Boost (For USB Host and RGB LEDs)



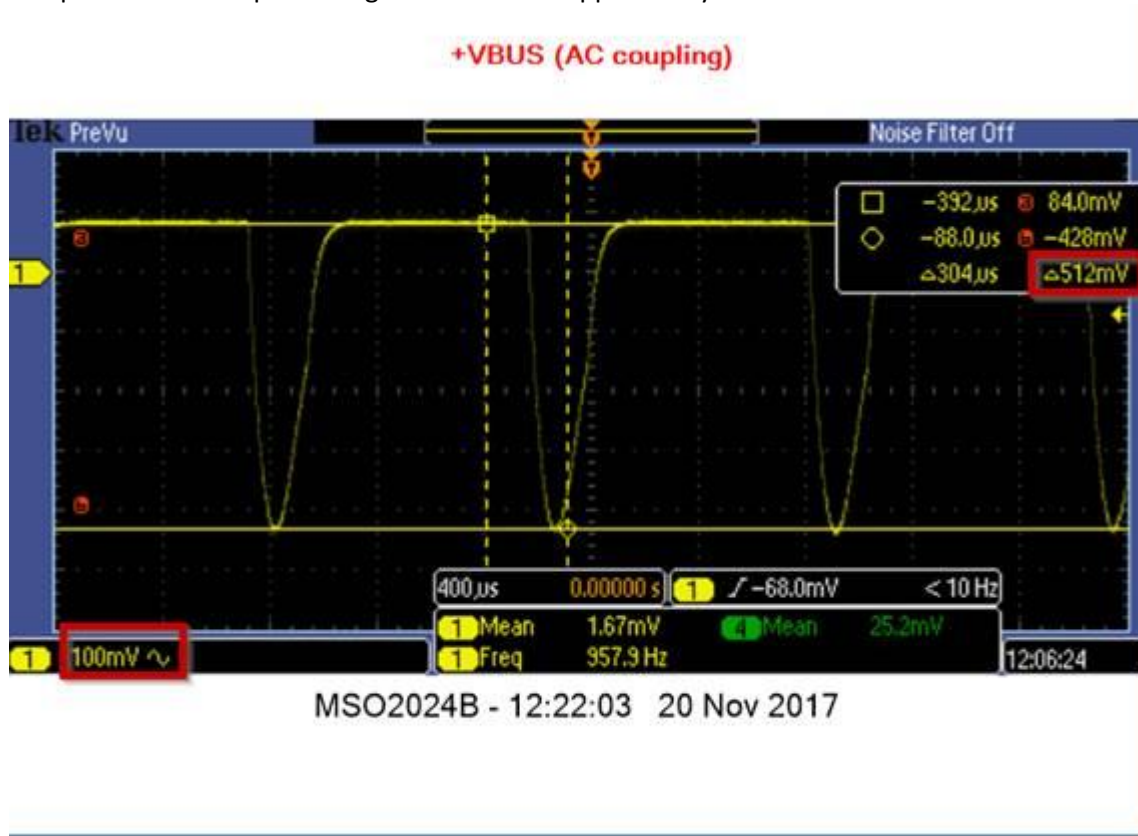
3V3, 1.2A Buck Regulator



1V8, 1.2A Buck Regulator



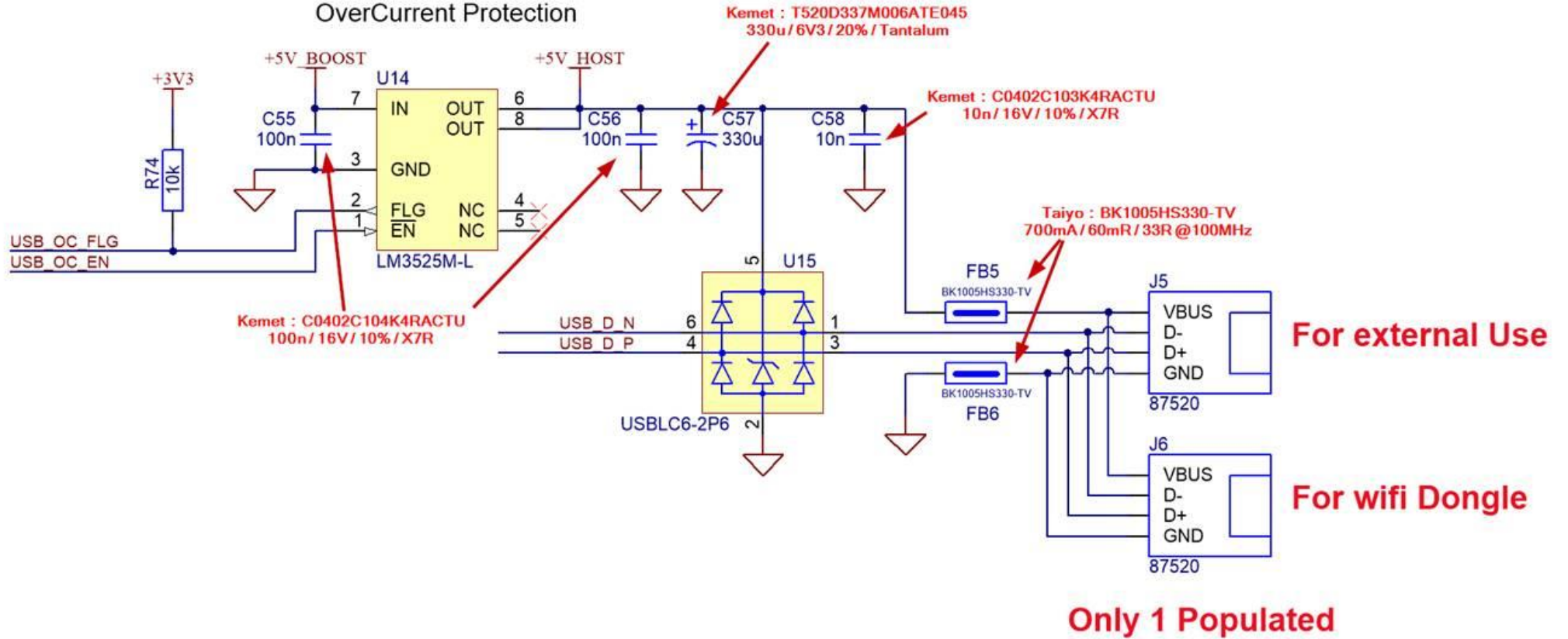
The problem I am experiencing is that there is ripple on my +VBUS rail when those 3 IC are switched on.

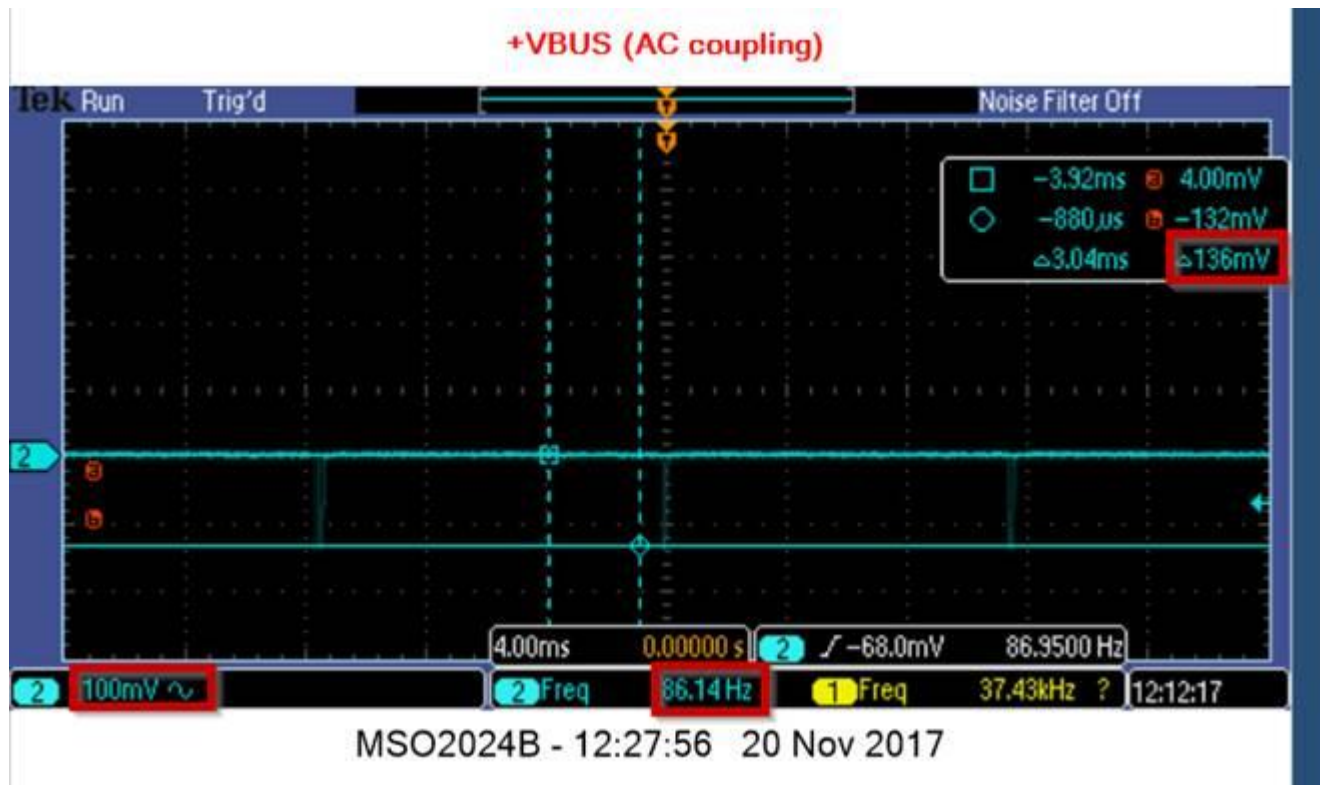


I am testing on 2 boards at the moment and the behaviour is not the same. (frequency of the ripple and amplitude are different)

USB A (Host)

OverCurrent Protection

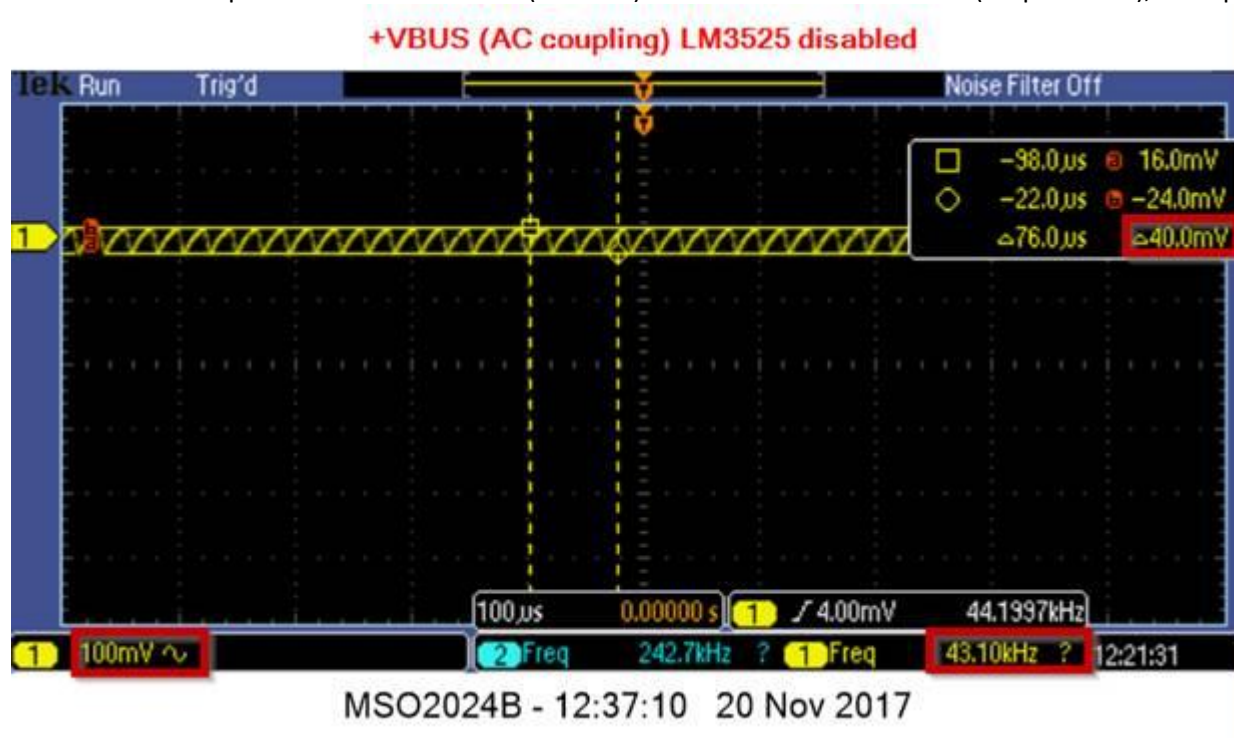




By process of elimination we found out that the ripple was induced by the 5V power rail.

That power rail feeds 2 RGB LEDs and a USB A connector for a host. We are currently using the USB connector for a Wi-Fi dongle. We are using an Over current protection IC for the USB Host connector (LM3525M-L).

We narrowed the problem down to that IC (LM3525). So when we disable the IC (EN pull HIGH), the ripple disappears but the VBUS line is still noisy.

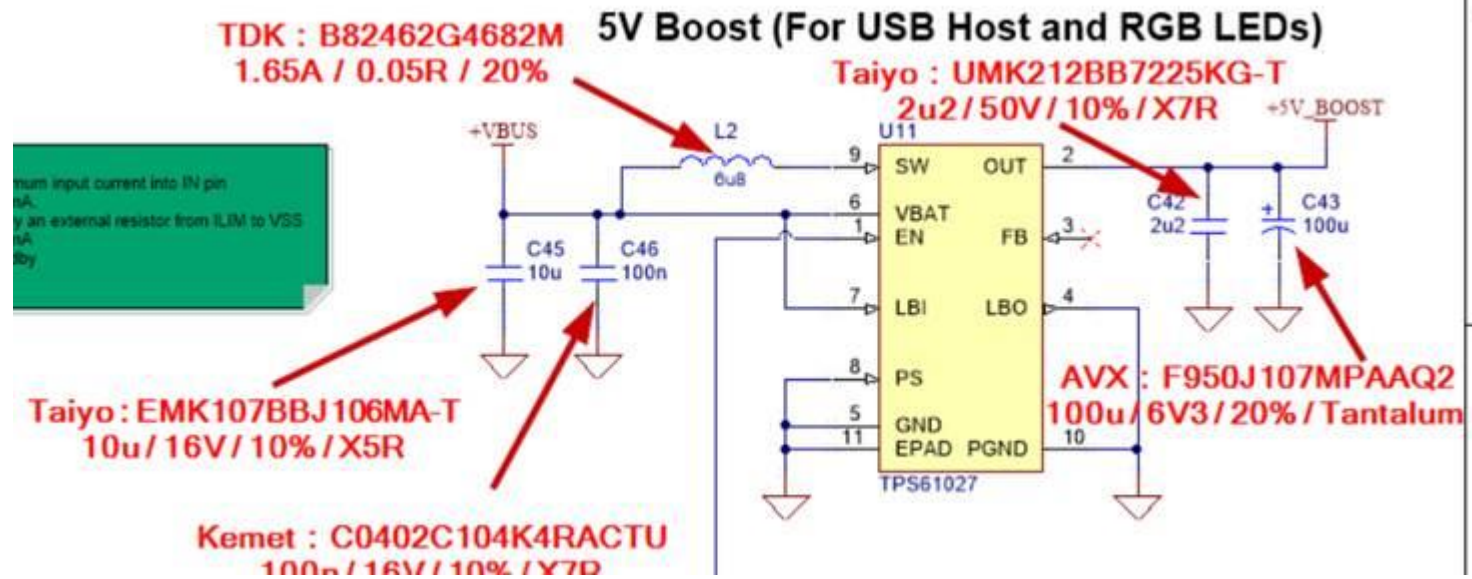


We can observe the same phenomenon when the Bulk capacitor (C57) is removed and LM3525 is enabled.

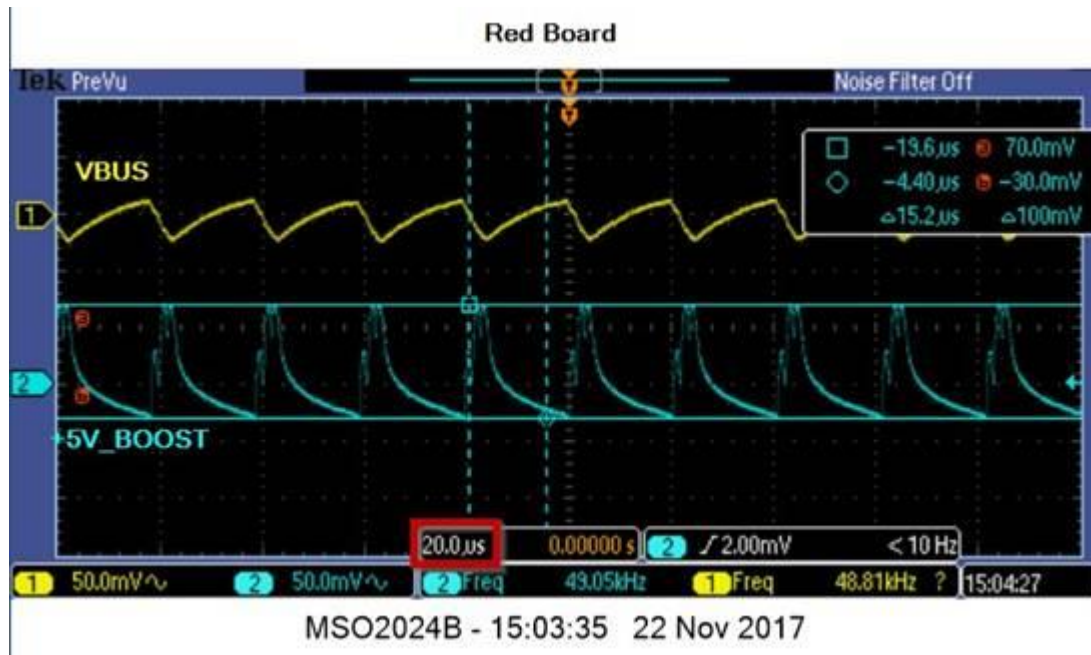
We have tried to add a 100uF Electrolytic cap at the input (in parallel with C55) but the ripple is still there.

Turns out it wasn't the LM3525 fault.
I removed the IC and the bulk capacitors and the issue was still there.

As a reminder, here the schematics for the 5V Boost converter

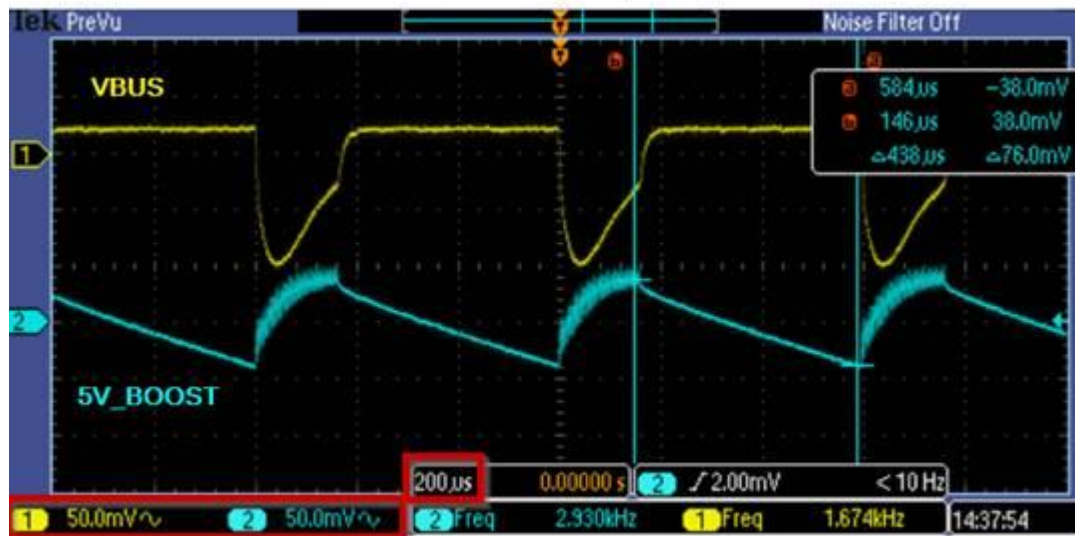


If nothing is connected to the 5V_BOOST (output of TPS61027) then the VBAT and VBUS are noisy.



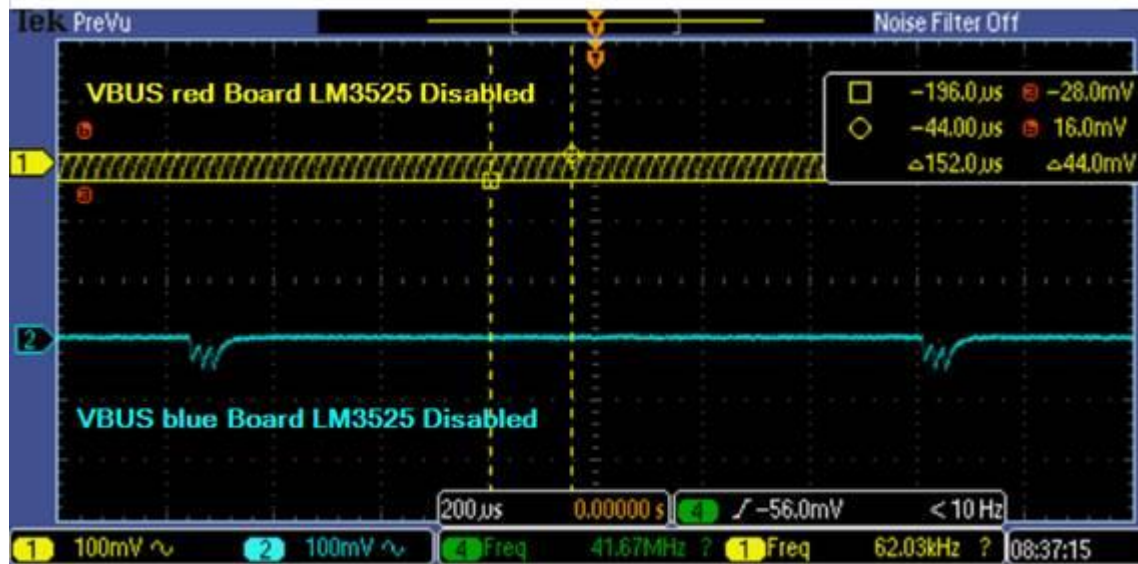
As soon as I connect something to the 5V_BOOST, I get those 100+mV ripple on the VBUS. In the following example I only use a 220uF capacitor connected between 5V_BOOST and GND.

Red Board 220uF cap on 5V_BOOST



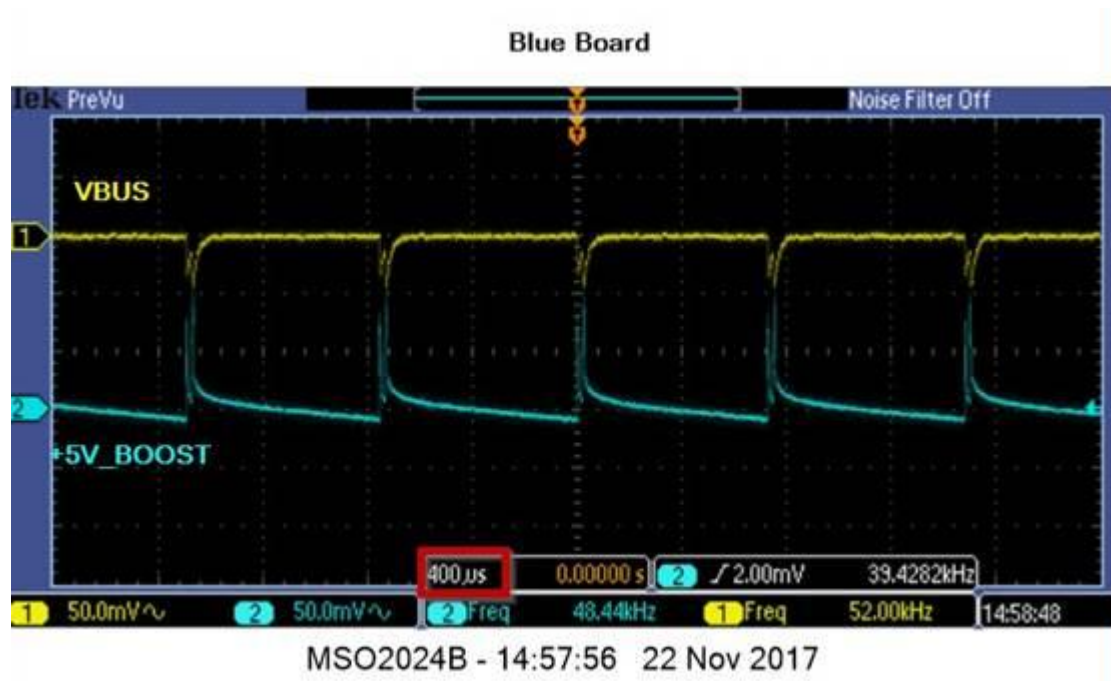
MSO2024B - 14:37:03 23 Nov 2017

I am currently testing on 2 different boards (I named them Blue and Red board. The Red one being the “faulty” one)
You can see in the following scope screenshot the difference of behaviour on VBUS in the same conditions.



MSO2024B - 08:36:21 21 Nov 2017

For comparisons here the screenshot for the blue board showing VBUS and 5V_BOOST with no loads



We can see that the amplitude and frequency of the ripple are really different on both boards. The behaviour of Blue board is not ideal but would be acceptable for our application. The behaviour of red board isn't acceptable for our application. The voltage dips influence the power supplies for the all system where I need them to be constant.

Can you ask TI if they have ever encountered that problem ?

What can they recommend to fix it ?

Do they think the IC is damaged ? If yes, does that happen often ?