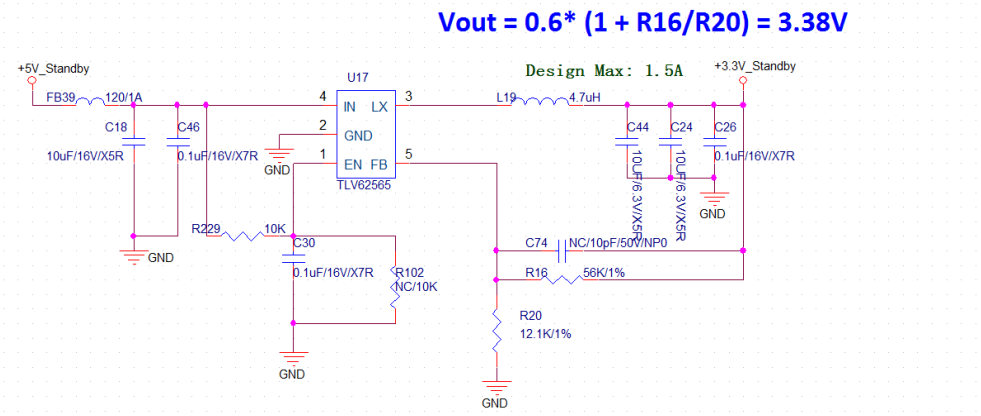
Worse image performance is caused by PFM mode of TLV62565.

Schematic:



Issue: In customer one Set-Box (STB) project, TLV65256 outputting 3.38V is as power rail for RF demodulator IC. The picture shows some unexpected mosaic during tests.

Test conditions: Vin=5V, Vout=3.38V, I+3v3_standy is dynamic and minimum is about 75mA, peak value is about 350mA. I+3v3_standy waveforms are shown as following.

Root cause: Tlv62565 output voltage is unstable and changed between voltage setting with PFM and that setting in normal mode.

Ways:

Tlv62565 is kept working in normal mode by placing 10uF inductor to replace 4.7uH inductor. Output is stable with customer system. Picture performance is good.

Questions:

1. Is there any risk for 10uH inductor, such as loop compensation, how to choose output capacitors?
2. From DS. of tlv62565, once tlv62565 leave out DCM, tlv62565 will leave PFM and enter normal mode immediately. Is it right? In actual test, by checking SW waveform to assert which mode tlv62565 is working, it seems that tlv62565 will last for some period to enter normal mode (Vout is still kept at value setting with (1+0.9%) *06). Do you find the same phenomena?

Waveforms;

Fig.1. Red CHL: Vin;Green CHL: I+3v3_standby.50mA/div;10ms/div;

Fig.2. Red CHL: Vout, 100mv/div, with 3.0V offset;Green CHL: I+3v3_standby.50mA/div;10ms/div;

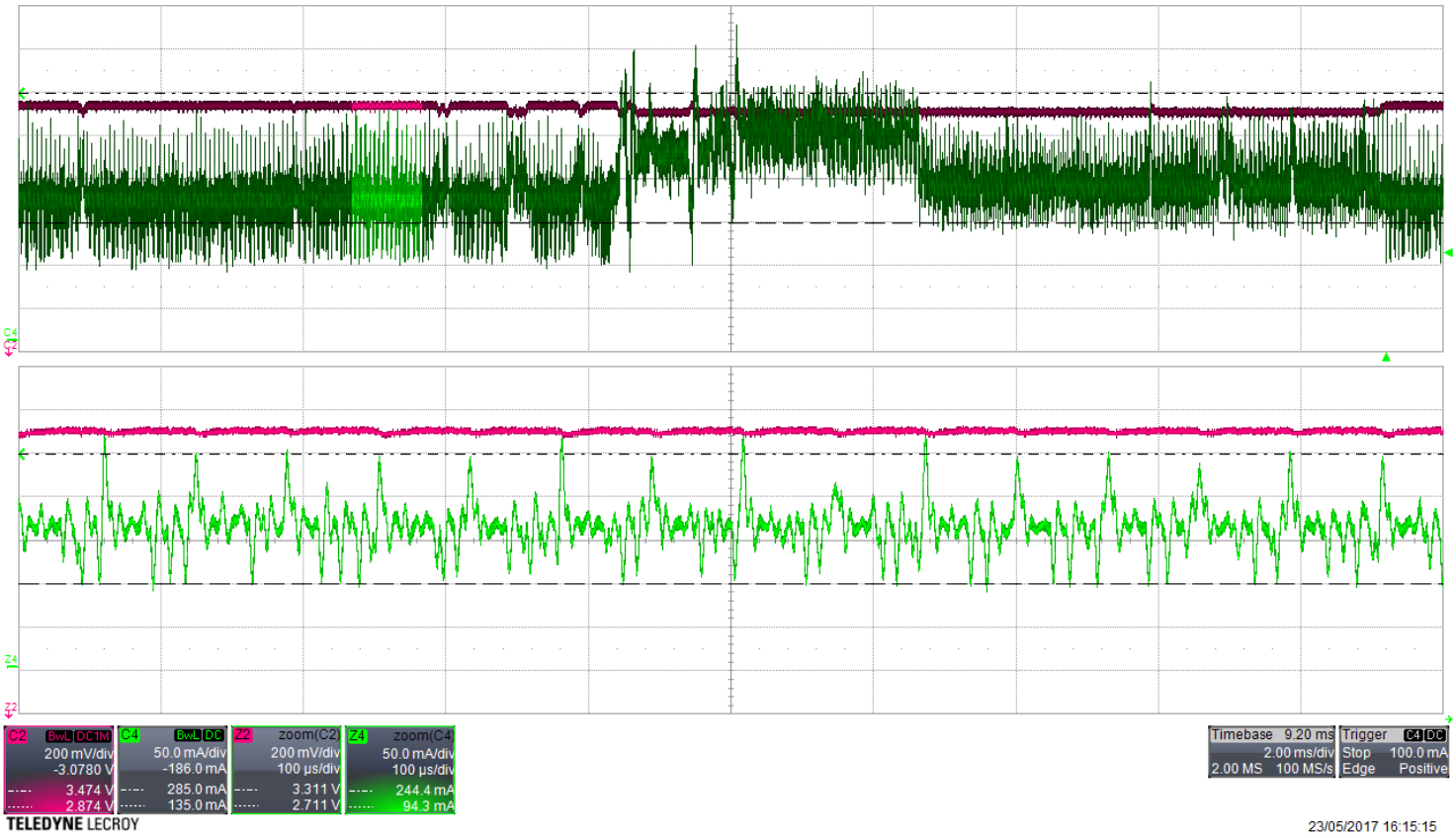


Fig.3. Red CHL: Vout, 200mv/div, with 3.0V offset; Green CHL: I+3v3_standby.50mA/div;2ms/div;