Calculation of fco per TI-recommendation on data sheet TPS57112q1(page 20)

The design guidelines for TPS57112-Q1 loop compensation are as follows:

1. The modulator pole, fpmod, and the esr zero, fz1 must be calculated using Equation 15 and Equation 16. Derating the output capacitor (C_{OUT}) may be needed if the output voltage is a high percentage of the capacitor rating. Use the capacitor manufacturer information to derate the capacitor value. Use Equation 17 and Equation 18 to estimate a starting point for the crossover frequency, fc. Equation 17 is the geometric mean of the modulator pole and the esr zero and Equation 18 is the mean of modulator pole and the switching frequency. Use the lower value of Equation 17 or Equation 18 as the maximum crossover frequency.

$$fp\,mod = \frac{Ioutmax}{2\pi \times Vout \times Cout} \quad (15)$$

$$fz\,mod = \frac{1}{2\pi \times Resr \times Cout} \quad (16)$$

$$f_C = \sqrt{fp\,mod \times fz\,mod} \quad (17)$$

$$f_C = \sqrt{fp\,mod \times \frac{fsw}{2}} \quad (18)$$

Ioutmax = 2A, Vout =1.2V, Vin =5V
Cout=44µF/5mΩ, fsw=1.666MHz

i.e. fpmod=6kHz

fzmod=1446kHz

fc=$\sqrt{6kHz\ x\ 1446kHz}$ =93 kHz

fc=$\sqrt{6kHz\ x\ \frac{1666}{2}kHz}$ =70kHz

that means I have to use fco=70kHz.

Calculation of fco (cross over frequency) as per TI-Seminar in Vienna:
(http://www.ti.com/ww/en/techdays/2010/docs/TD_Vienna_Agenda.pdf)

Step-by-Step Compensation

- Select cross over frequency f_{co}, between $f_s/4$ to $f_s/10$. Select 50kHz.
- The high frequency gain must be such that the over all system has 0 dB at the required crossover frequency ⟶ 15.8dB

That means I have to select fco between 1.666Mhz/4 =416.5kHz and 1.666MHz/10 =166.6Khz

There is huge differences between two information: for my application (load regulation from 300mA to 2A with maximum allowed output voltage drop out 5%) the fco 70kHz is very low. I have selected fco =300kHz which yields to satisfactory result (about 1.66% output voltage deviation from nominal value 1.2V)Compensation Network Type 2A :

For fco=70kHz R3= 8.2kΩ, C1=3.3nF, C2= 22pF

For fco=300kHz, R3=36kHz, C1=820pF, C2=10pF