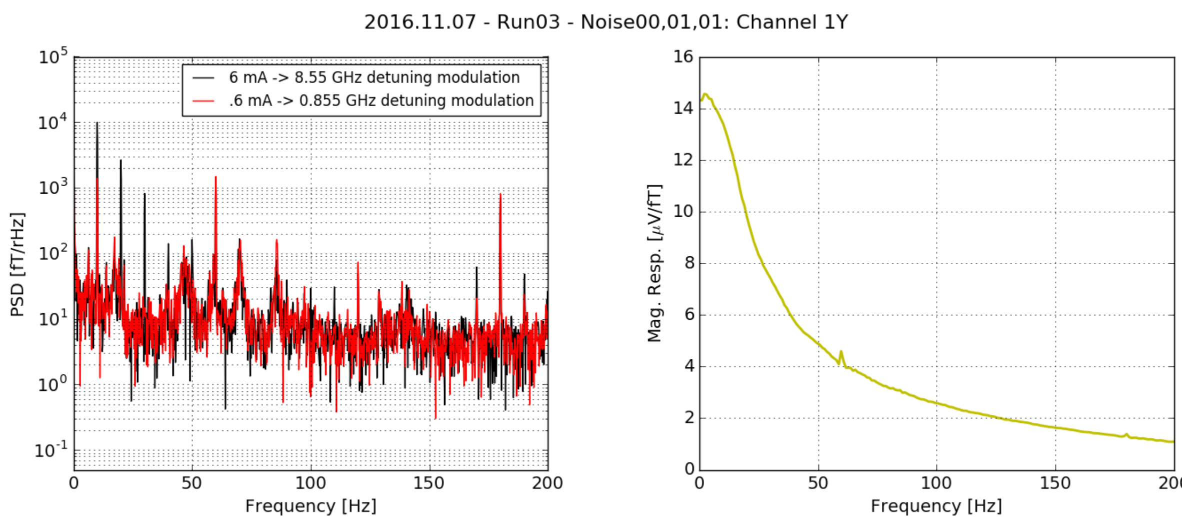
Tried directly modulating the current on the pump beam. Modulated at 10 Hz and kept the modulation amplitude pretty small (< 1 V). The current driver has a 20 mA/V modulation input, and the laser has a roughly 1.425 GHz/mA current coefficient of frequency (0.003 nm/mA x 475 GHz/nm [@795 nm] = 1.425 GHz/mA). Thus, the coefficient is 28.5 GHz/V of modulation.

0.3 V -> 8.55 GHz
0.03 V -> 0.855 GHz

We looked at the actual intensity of the pump beam on a photodiode and saw variations of 4.2 mV on a 2.34 V DC signal, or about a 0.2% modulation in intensity.

In [10]:
```
plotMagRunPSN(loc='Chambo', day='2016.11.07', runNum='03', noiseNum='00', noiseNum2='01', noiseNum3='01', Chan=1, direc='Y', ver='v16', fignum=1, bs=1, nLim=[0.0, 200.0, 0.05, 100000.0], psn=0, Ipr=0.0001, calib=2e-06, cfit=0, fitfunc=1, dispFig=1, ZM=0, leg=1, lbl1='6 mA -> 8.55 GHz detuning modulation', lbl2='.6 mA -> 0.855 GHz detuning modulation', lbl3=0);
```



When the modulation was large, we could see higher harmonics of the 10 Hz signal as well. At that level of modulation, we saw about a 10,000 fT -> 10 pT modulation peak. Turning down the modulation by a factor of 10 gave us about a 1500 fT -> 1.5 pT peak at 10 Hz and also removed evidence of higher harmonic noise.

So if we're at a level of 1500 fT/.855 GHz, that's 1.754 fT/MHz. I can't imagine the laser is stable down to the MHz level, so this might explain part of our noise problem. This is, of course, pinning all of the observed noise on frequency variations rather than intensity variations. The pumping rate, of course, depends on both of these.

In [ ]: