# Weekly Report ('04 Winter) # 2.1
# 「Whitenoise of Demodulator2」

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## 1 Noise search of improving demodulator

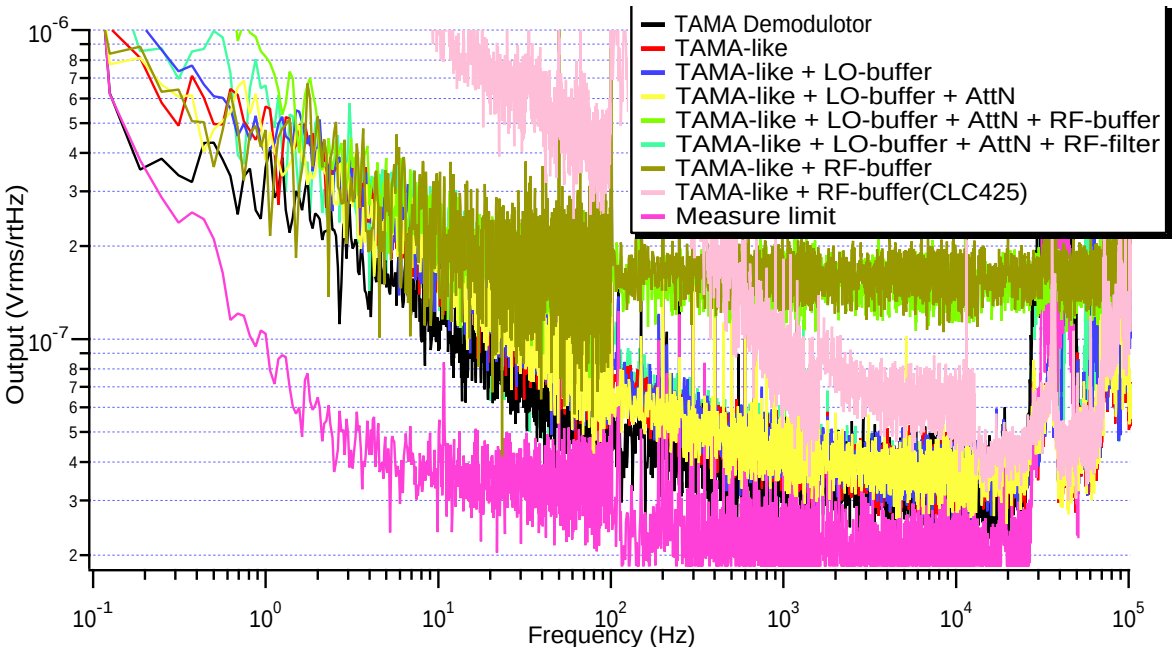


Figure 1: Noise improvement. This graph shows noise spectrums of various demodulatorconfigurations. LO input is sinusoidal wave signal of 15.235MHz, 2.55V. RF input is terminated 50Ω. Outputs of demodulator were recorded. Each step shown in the legend box is ploted. BLACK line shows TAMA demodulator. RED line shows TAMA-like demodulator (I used an improved TAMA like new demodulator). At next step, a buffer and a filter added one by one to find out how improvement is accomplished. AD811 was used as a buffer except "TAMA-like + RF-buffer(CLC425)".

From figure1, the addition of a LO-buffer, an attenuator, and a RF-filter hardly

changed the spectrums. But adding the RF-buffer, the spectrum changed clearly worse. I found the source of noise was a buffer, and I need to consider about this.

On the other hand, the noise level of AD811 was about -160dBVrms/rtHz. This contained $12.3 \times 10^{-9}$Vrms/rtHz noise at the output port. This noise level is almost the same as the spec sheet of AD811. From this, the noise level doesn't get worse by only AD811.

I also replaced the buffer by CLC425. The noise level was about -155dBVrms/rtHz. This contained $22.0 \times 10^{-9}$Vrms/rtHz noise at the output port. The comparison with AD811 failed because CLC425 was something wet and too hot after the measurement. The cause was that I suppled higher voltage to CLC425 more than allowable. (I inputed 15V ,but the max of this is 14V) The result is on figure1.

It was quite difficult to identify the noise source of demodulators. I try again.

# 2 Next Week

- Replacement of the buffer AD811 by AD8099.
- Dividing the ground plate.