Droop when a Clause 104 PSE or PD PI is encompassed within the MDI

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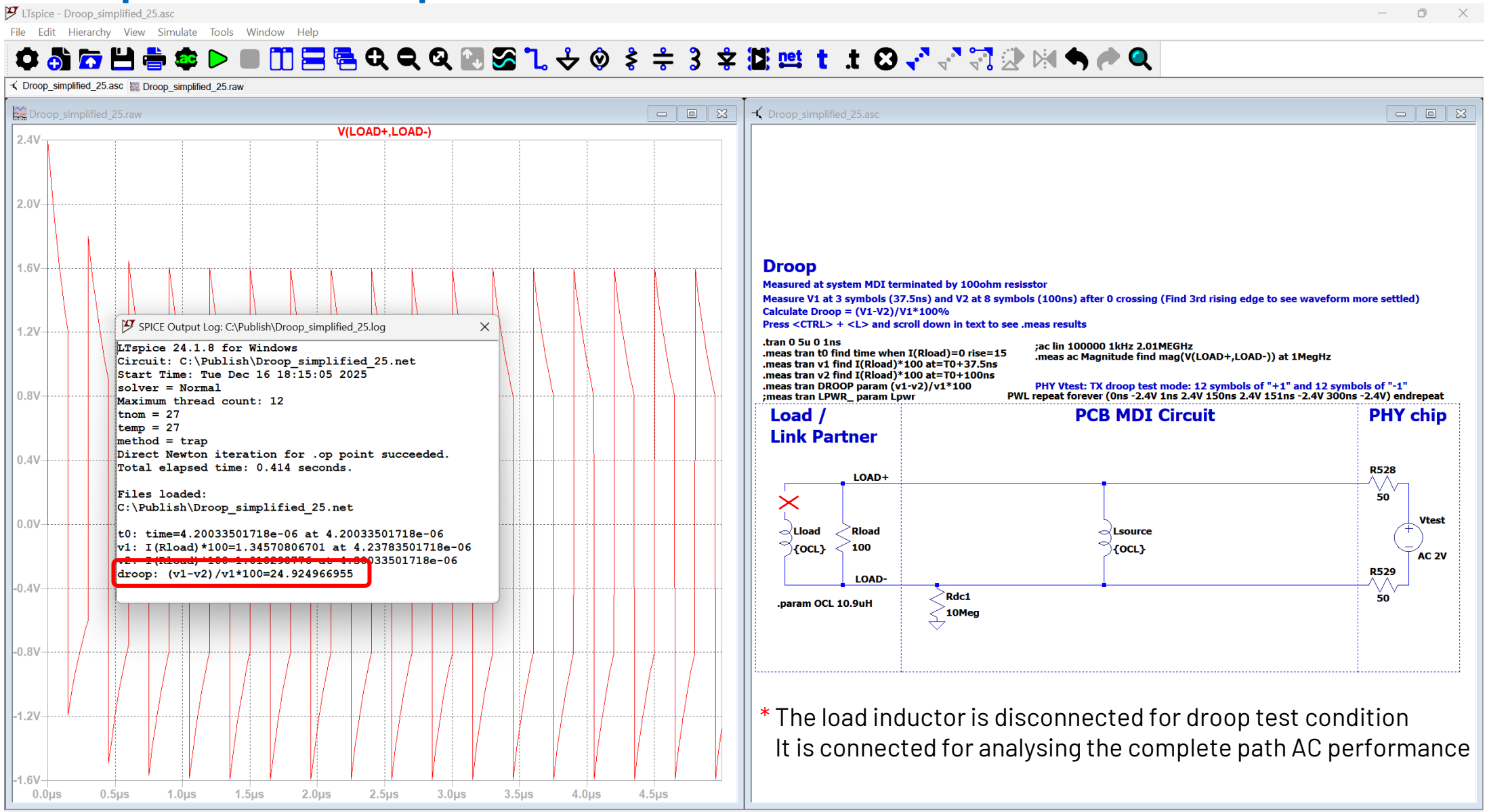
Review of IEEE Draft P802.3dg / D2.2

- Currently the requirement for the POE application is as follows:

  When a Clause 104 PSE or PD PI is encompassed within the MDI, the magnitude of both the positive and negative droop shall be less than 25% measured with respect to an initial value at 37.5 ns after the zero crossing and a final value at 100 ns after the zero crossing.

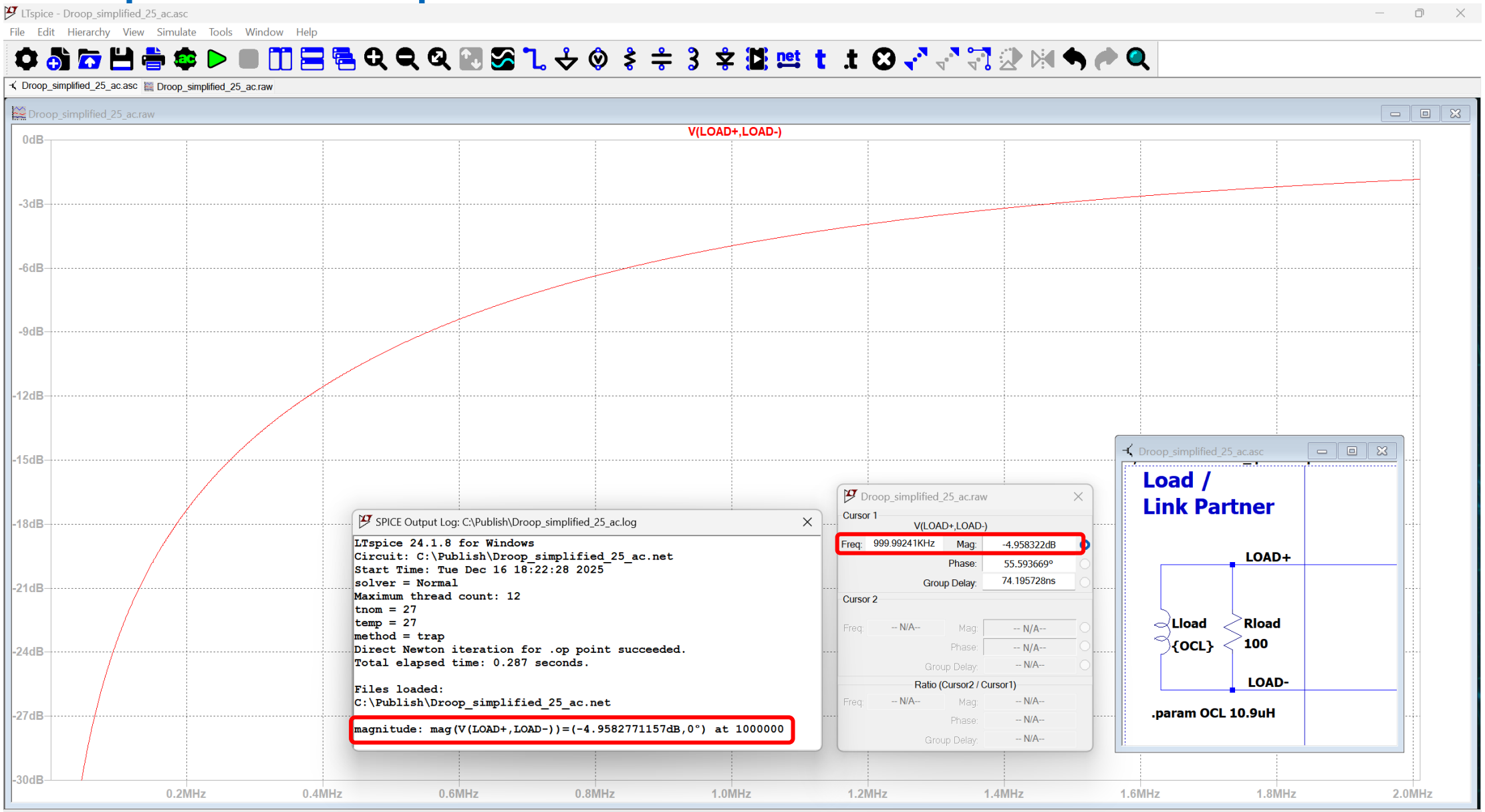
- The value of 25% was carried over from clause 146 without much analysis or discussion
  - Since the symbol period for 100BASE-T1L is less than 10% of the symbol period for 10BASE-T1L, 25% droop is very high
  - The equivalent total open-circuit inductance (OCL) to give 25% droop is about 10.9 uH
  - With shunt inductances as low as this on both sides of the link there is significant in-band attenuation, ~ -5dB at 1MHz.
  - This could significantly affect the link performance

Droop 25% - Simplified Circuit - Transient Simulation



* The load inductor is disconnected for droop test condition
It is connected for analysing the complete path AC performance

Droop 25% – Simplified Circuit – AC Simulation



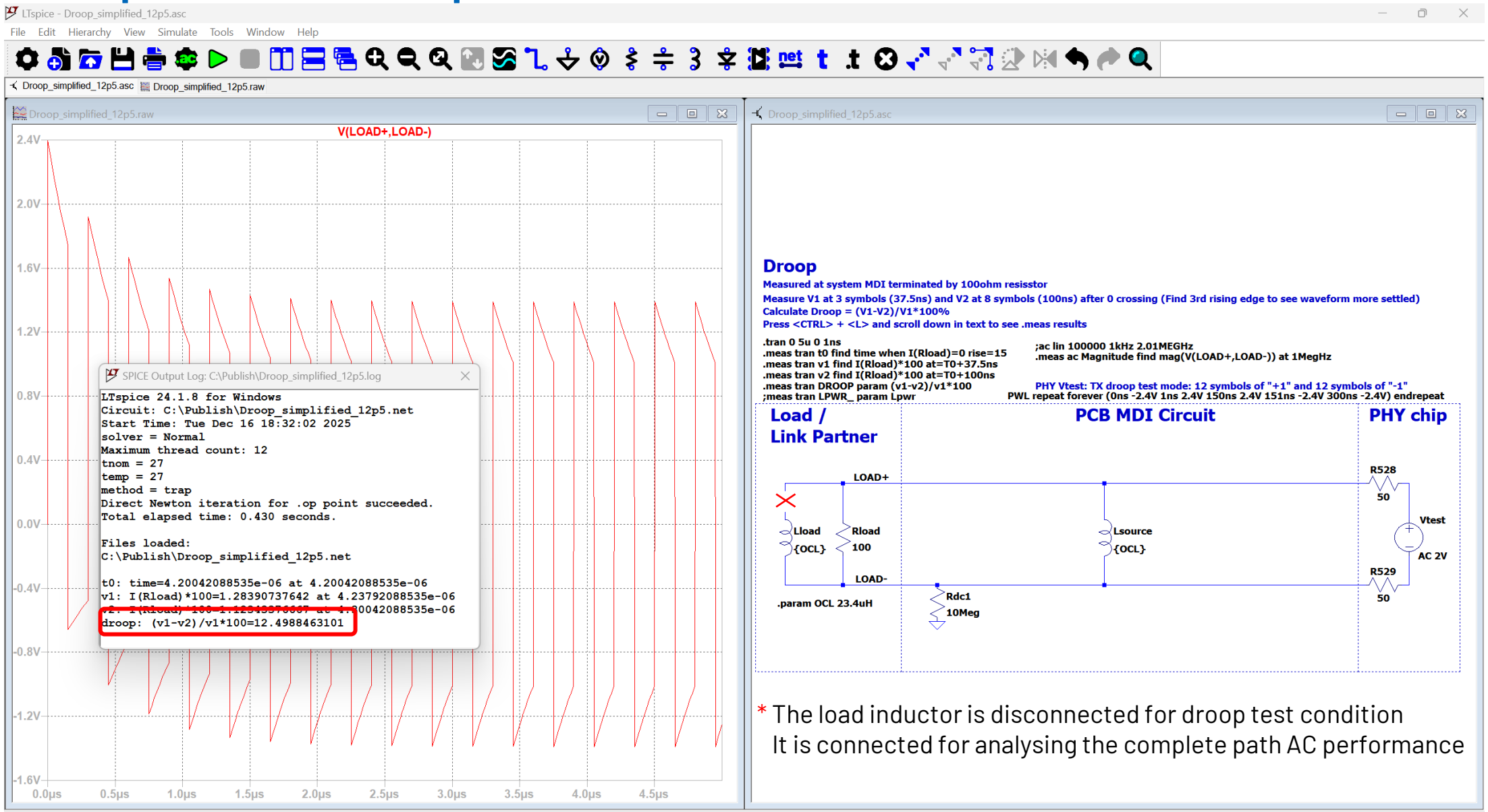
Proposal

- We propose to set the limit to 12.5% measured over 62.5 ns
  - The equivalent total OCL is about 23.4 uH
  - This would improve the in-band attenuation, to about -1.65dB at 1MHz

- The proposed text is as follows:

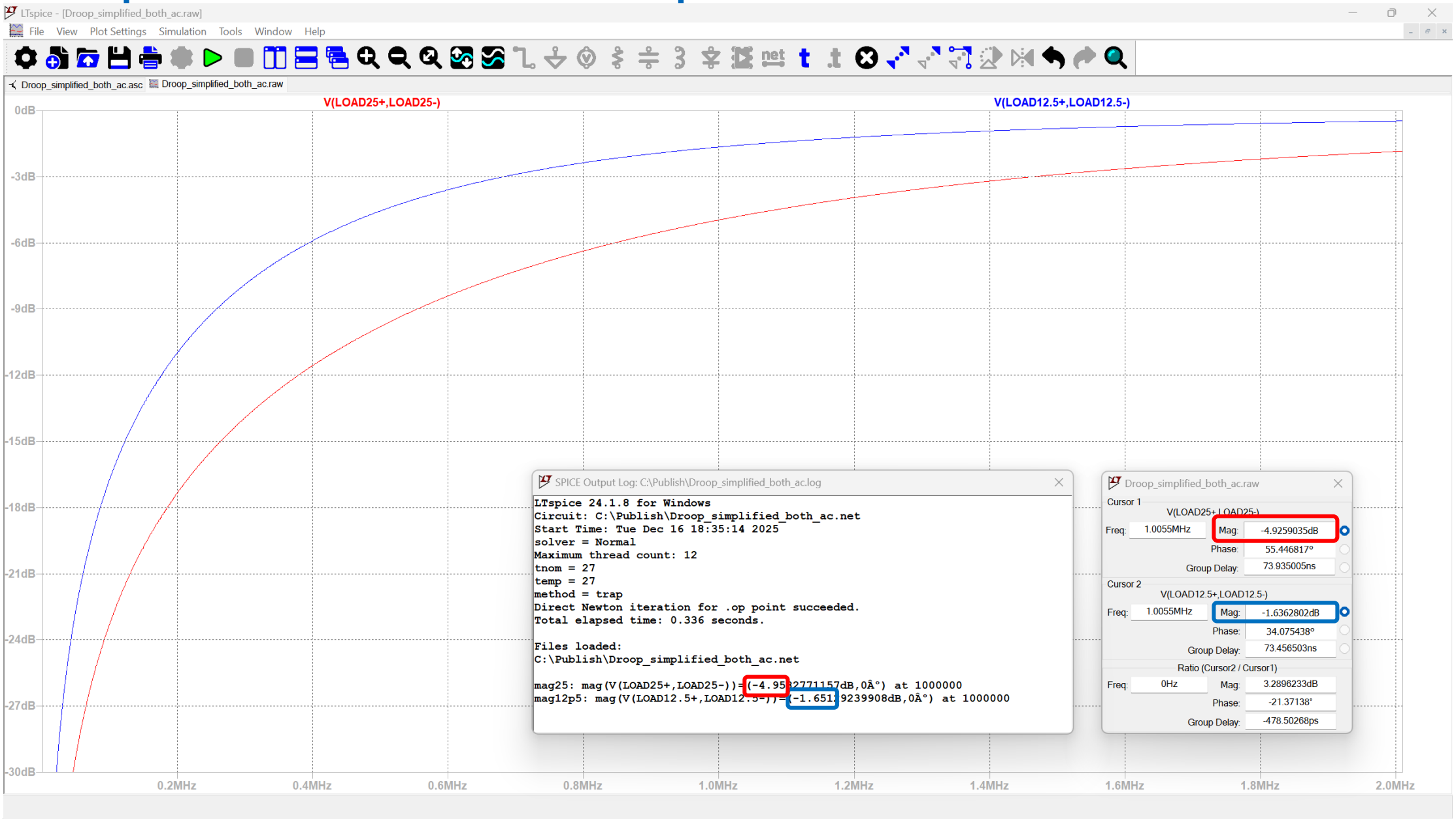
  When a Clause 104 PSE or PD PI is encompassed within the MDI, the magnitude of both the positive and negative droop shall be less than 12.5% measured with respect to an initial value at 37.5 ns after the zero crossing and a final value at 100 ns after the zero crossing.

Droop 12.5% - Simplified Circuit - Transient Simulation

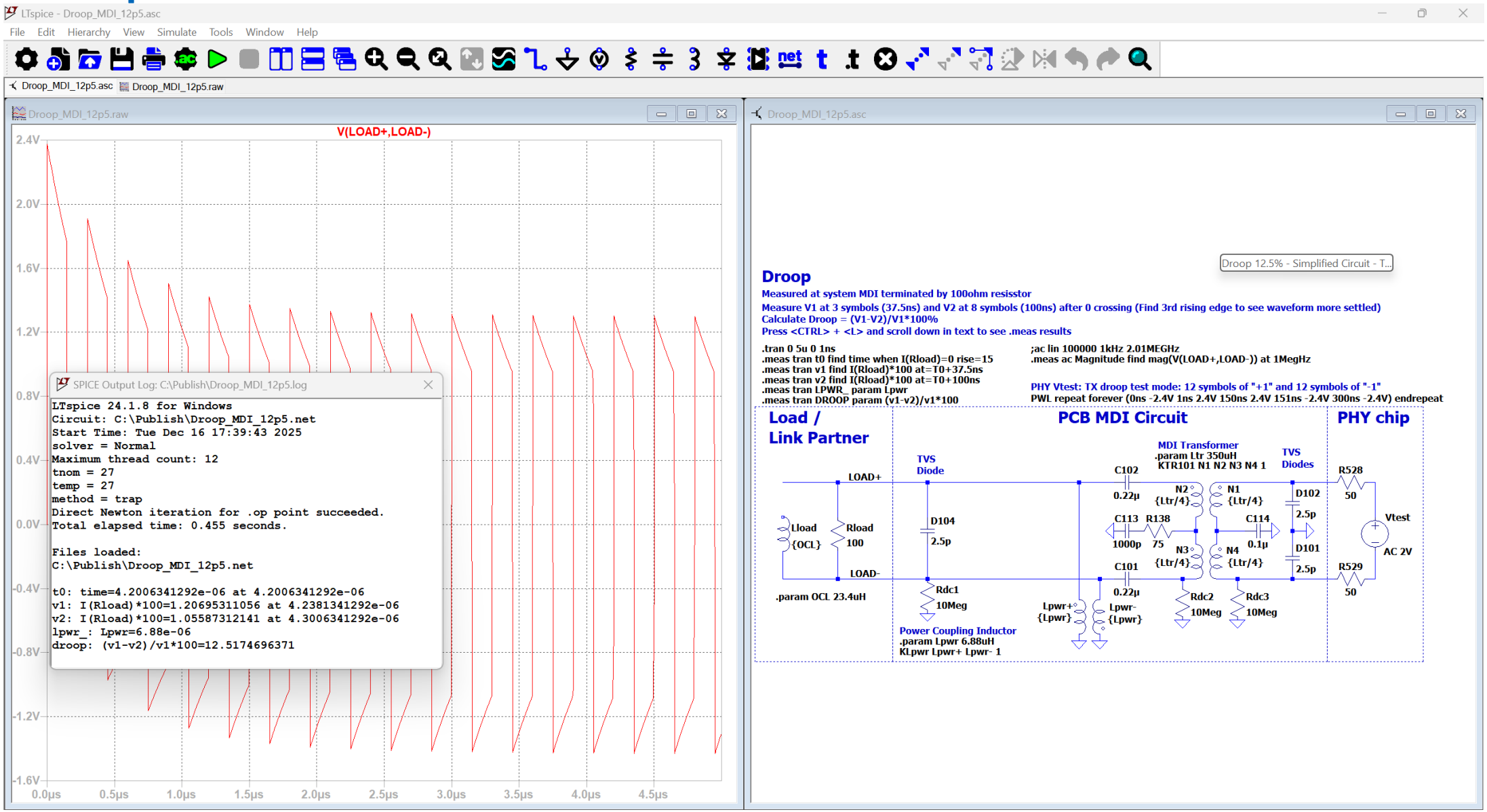


* The load inductor is disconnected for droop test condition
It is connected for analysing the complete path AC performance

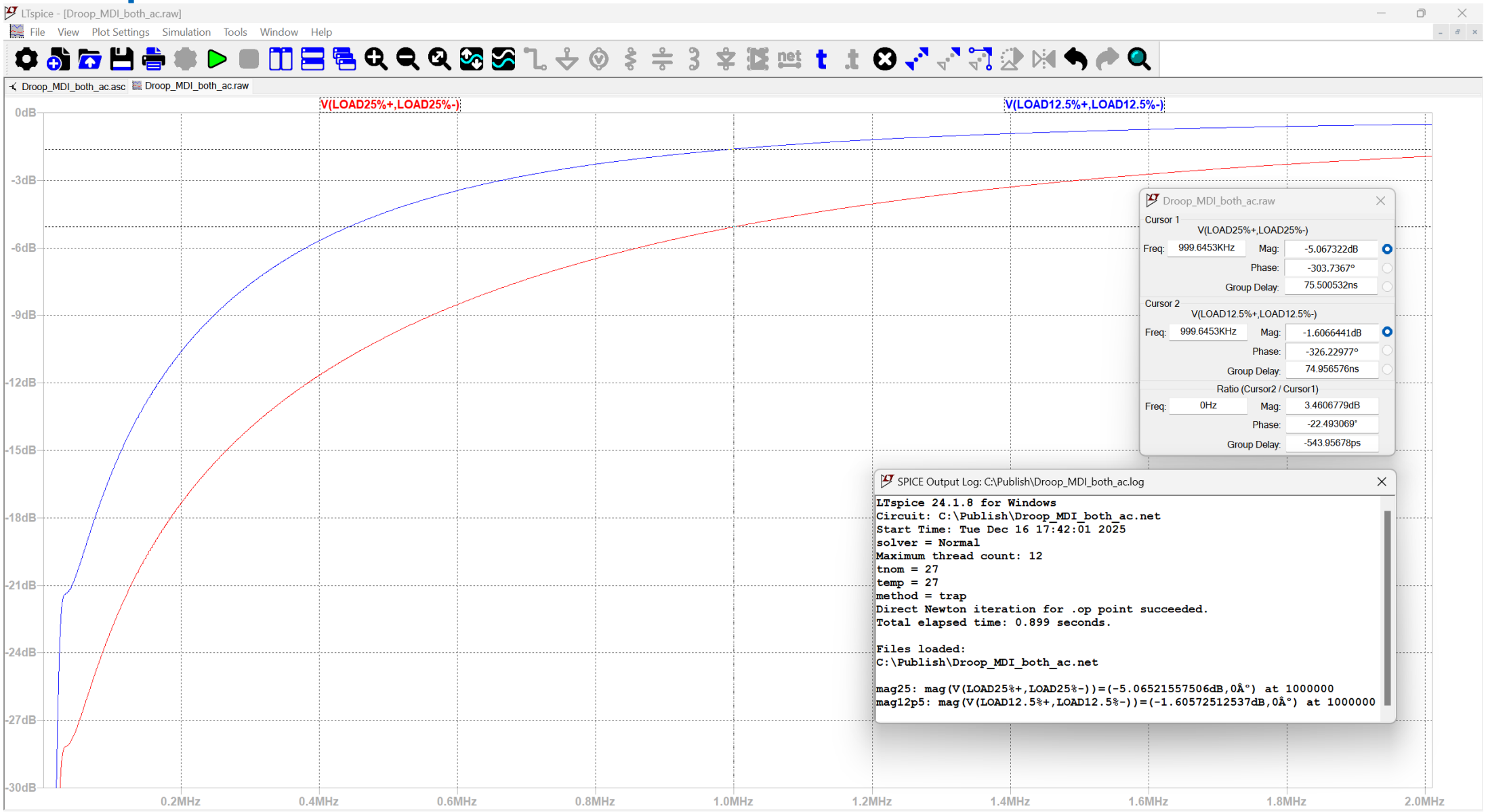
Droop 12.5% vs. 12.5% – Simplified Circuit – AC Simulation



Droop 12.5% - with MDI Circuit - Transient Simulation



Droop 12.5% vs. 25% - with MDI Circuit – AC Simulation



Thank You.
Questions?