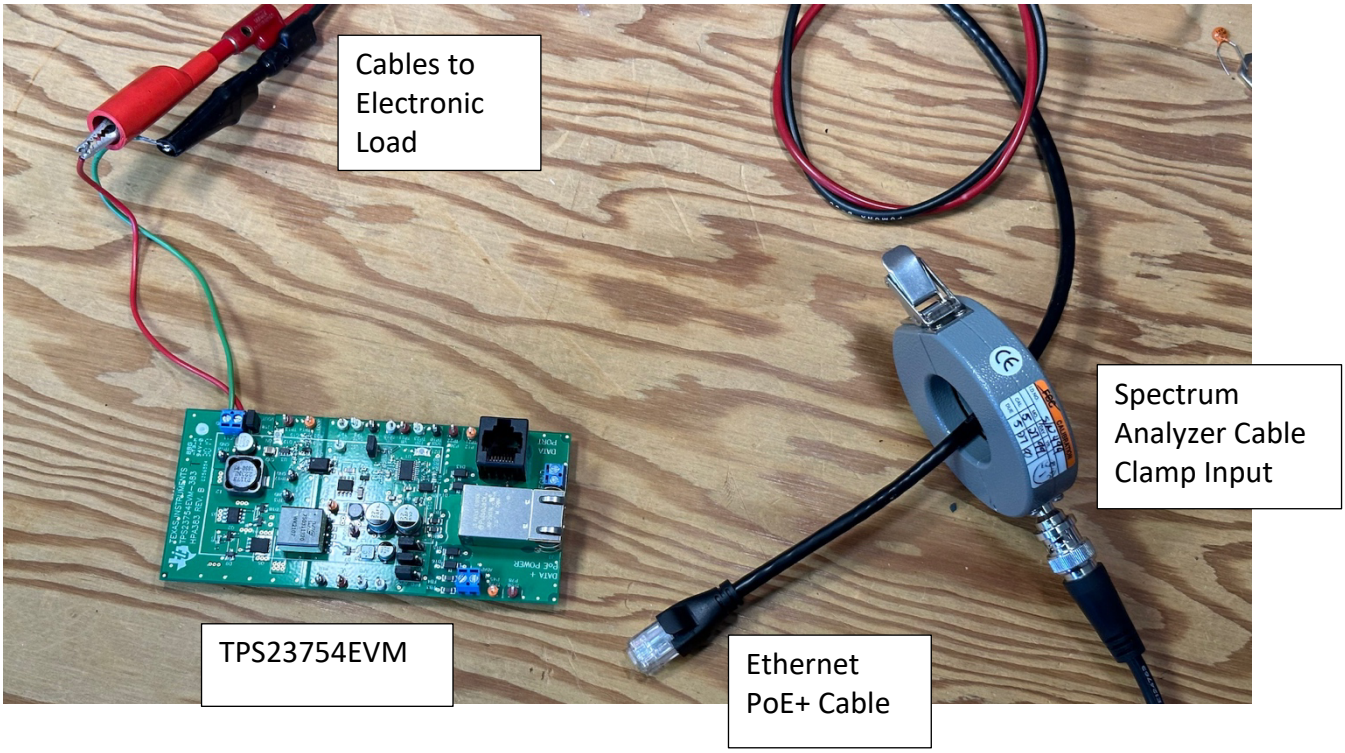
Figure 1: Setup showing TPS23754EVM-383 with spectrum analyzer cable clamp positioned on disconnected Ethernet cable. Keysight electronic load is connected to the output of the TPS23754EVM.



Note that with this setup the Spectrum Analyzer is measuring currents in the Ethernet cable. These are related to signals picked up in the EMI test chamber but not identical.

The rest of this document shows the results of tests with this setup that indicate that the signals in the 30 - 40 MHz range are coming from the TPS23754EVM.

Note that the spectra shown on the following pages are similar to the spectra that have been obtained from our board in the 10 meter EMI test chamber. An example is shown below. The only failing signals are in the 30 – 40 MHz range:

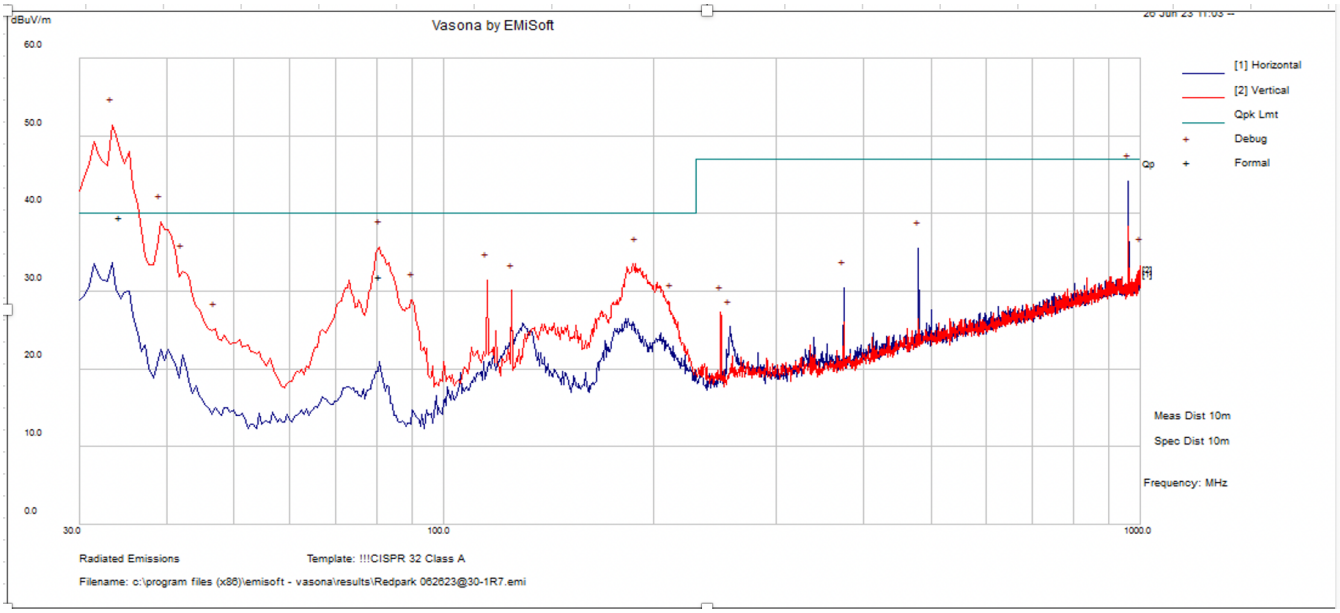


Figure 2: Spectrum with Ethernet cable disconnected

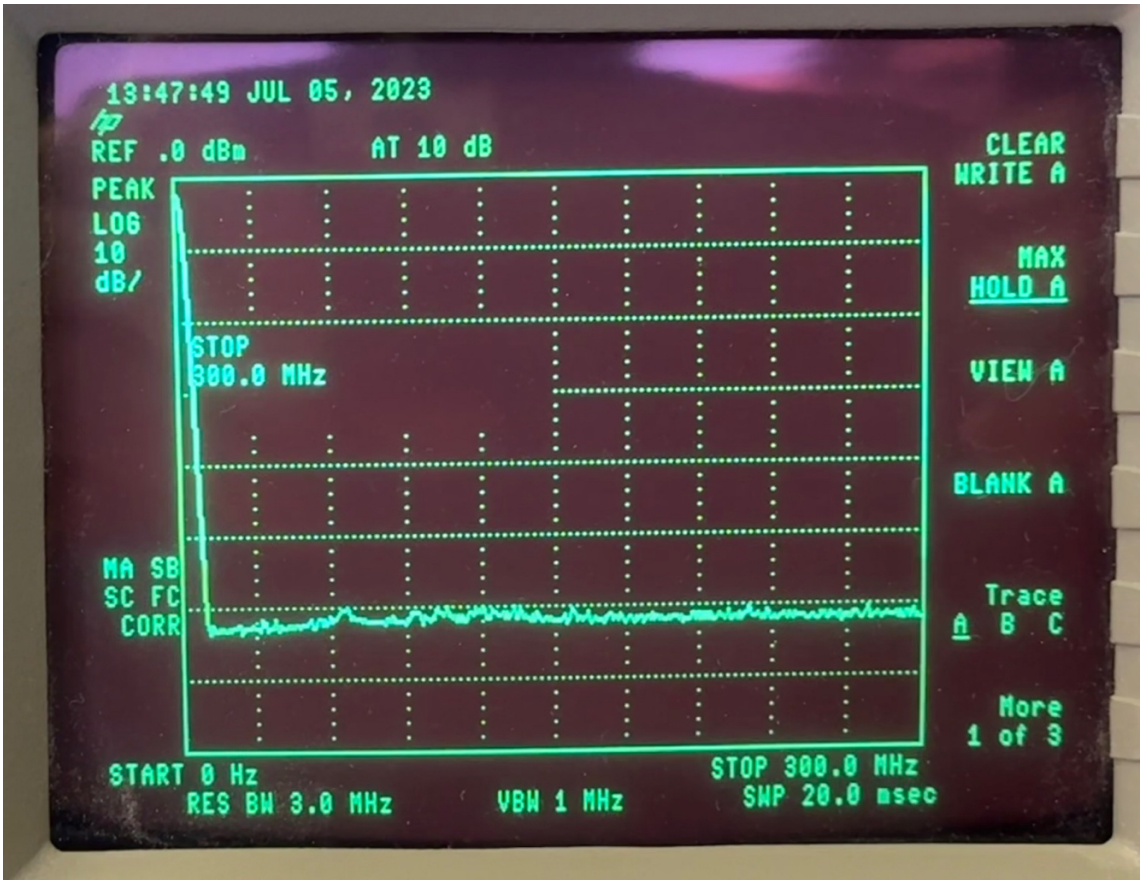


Figure 3: Spectrum with Ethernet PoE connected, Keysight load adjusted to 50 mA

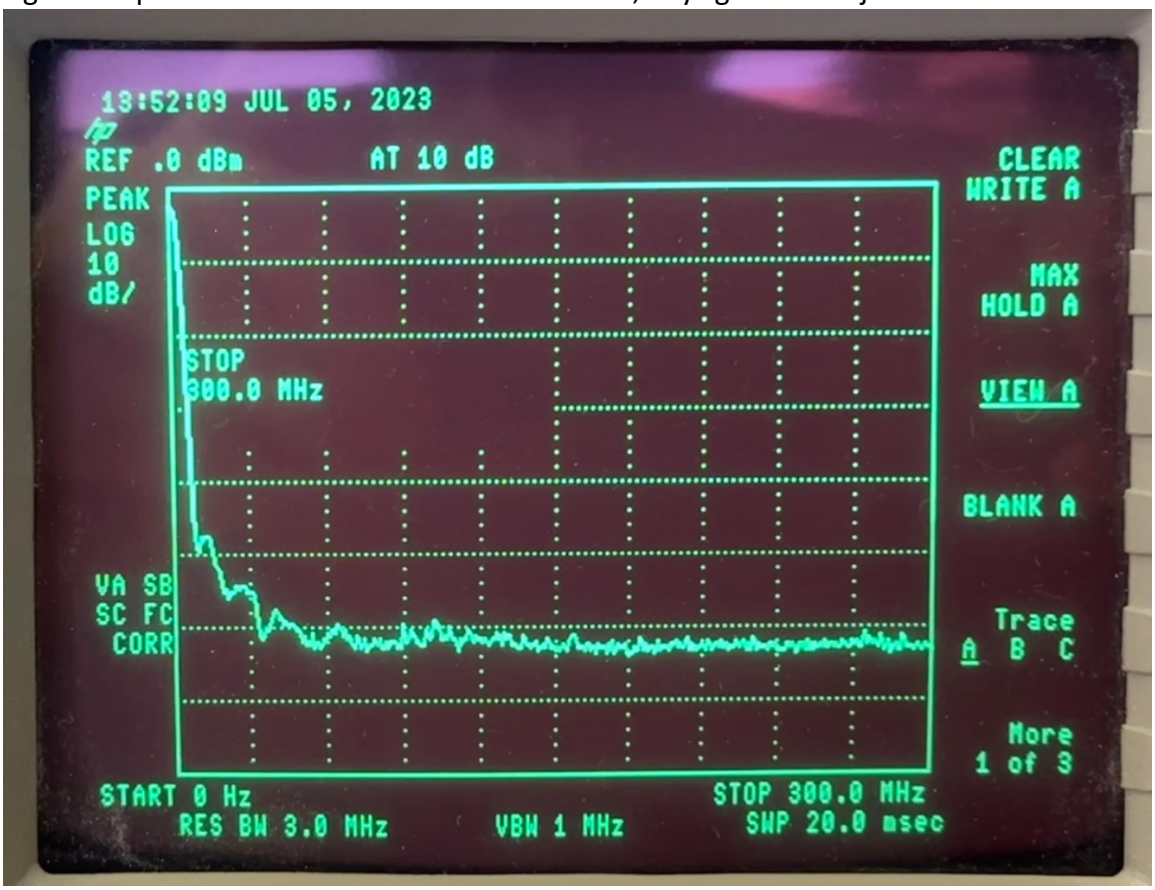


Figure 4: Spectrum with Ethernet connected, Keysight load adjusted to 1.0 A

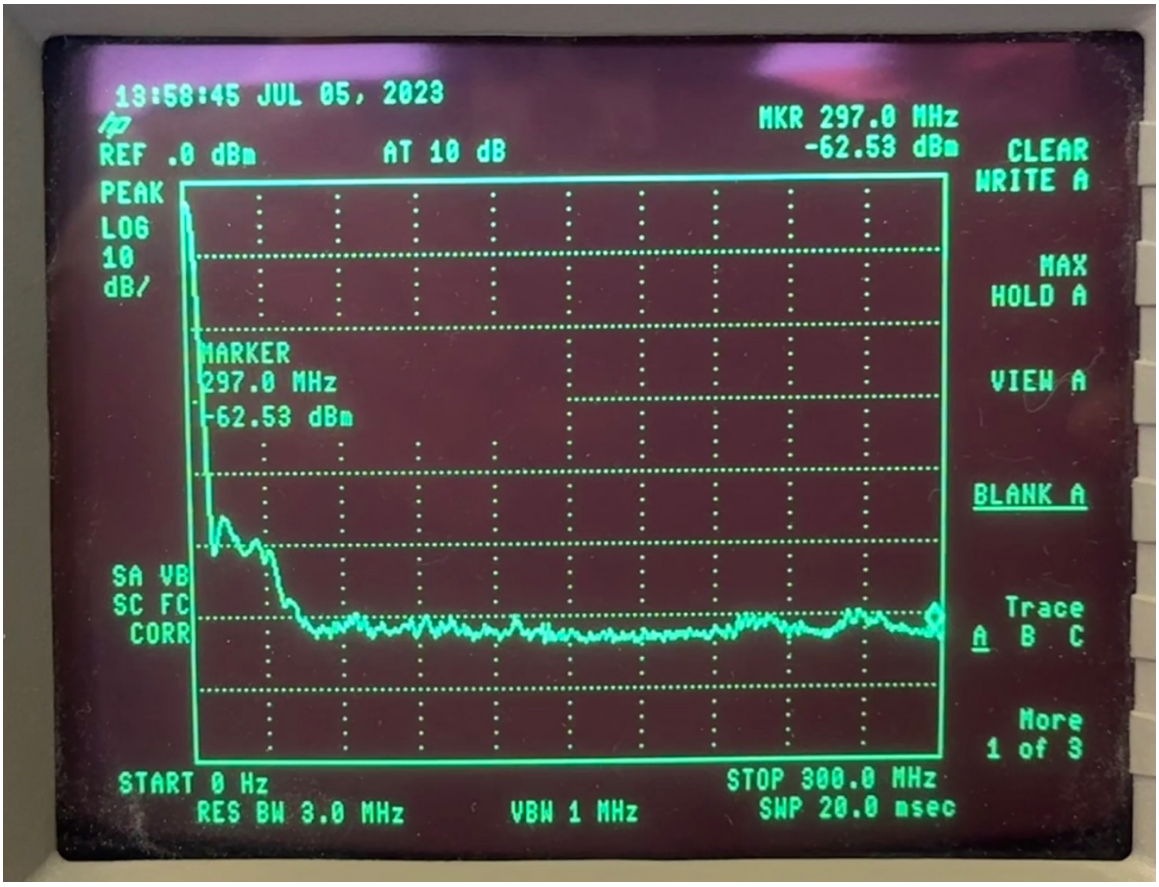


Figure 5: Spectrum with Ethernet connected, Keysight load adjusted to 2.0A.

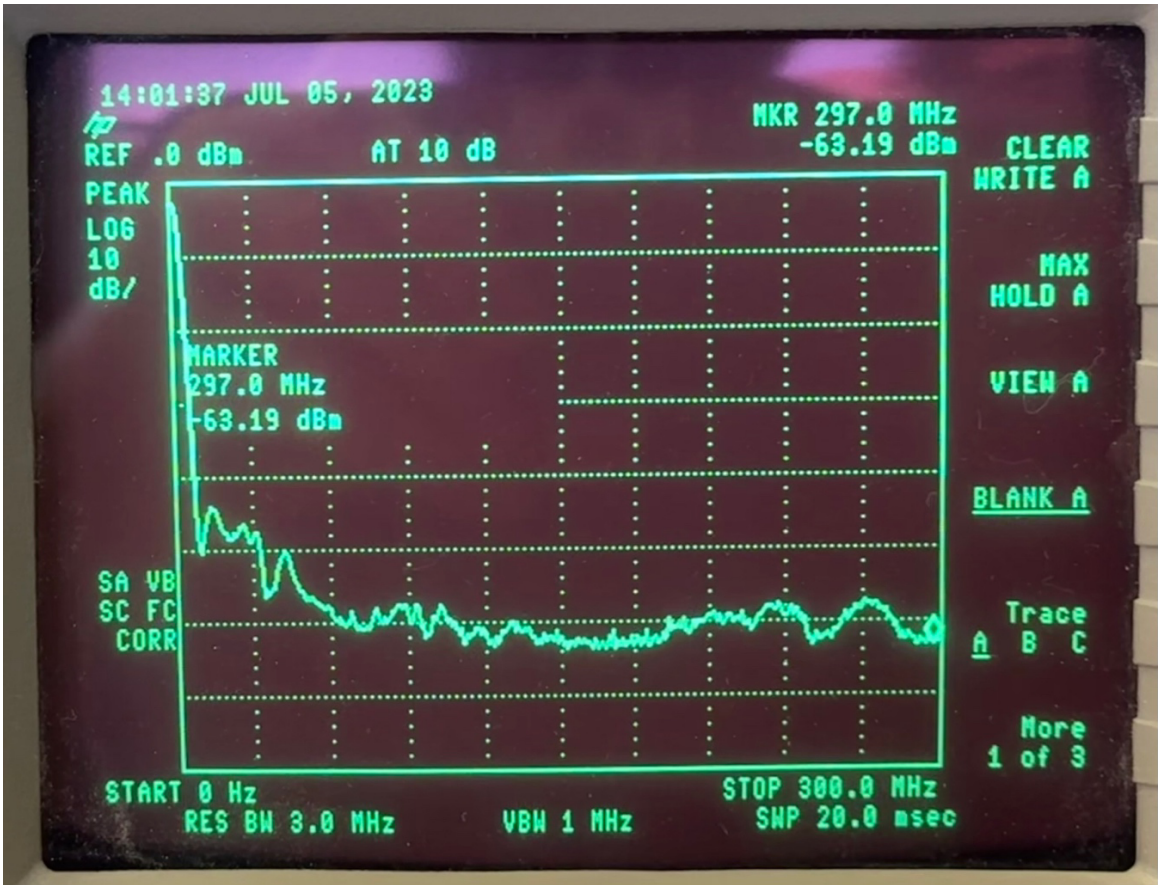


Figure 6: Compare spectra with Keysight load adjusted to 50 mA and 2.0A. Note that the magnitude of the 30+ MHz signals is correlated to the power output by the EVM. That is a good sign that the noise source is in the TPS23754EVM.

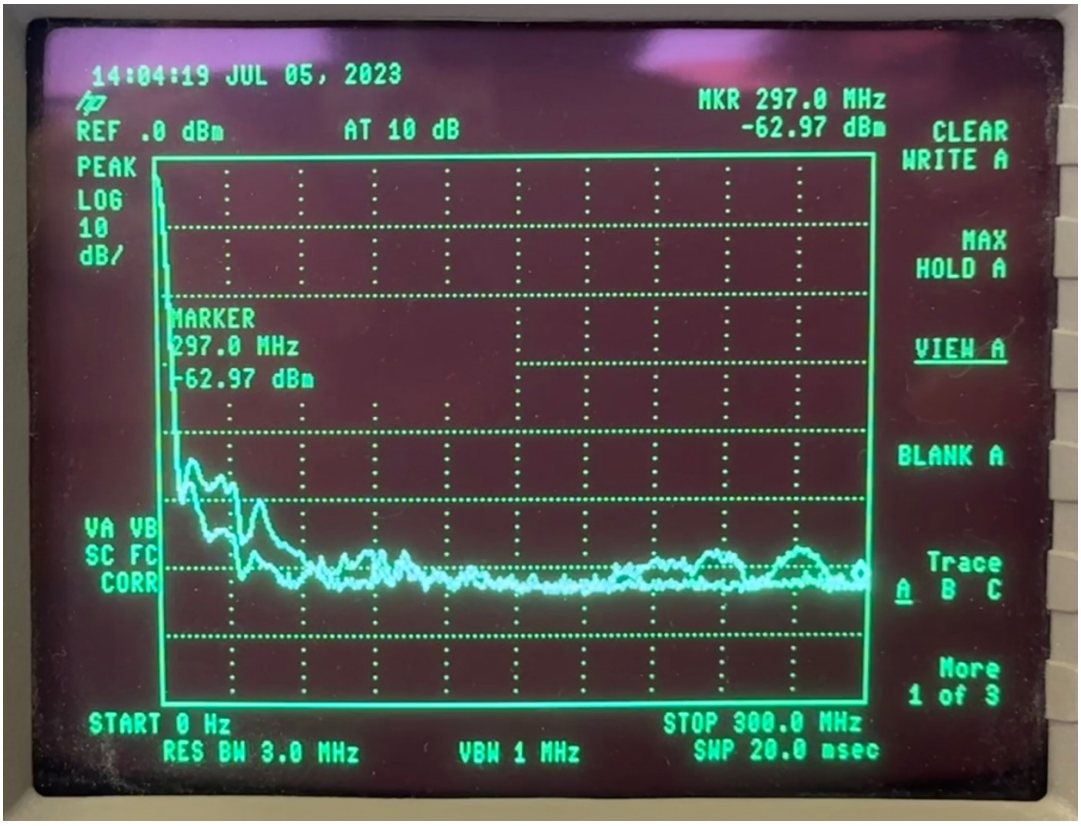


Figure 7: Compare spectra, Ethernet disconnected with Ethernet connected & Keysight load adjusted to 2.0A

Figure 8: Note that both of the following “Ethernet disconnected” configurations produce identical spectra on the spectrum analyzer, indicating the Ethernet cable is not carrying 30 MHz signals from the PoE Switch (See Figure 2), and is not picking up ambient 30 MHz signals.

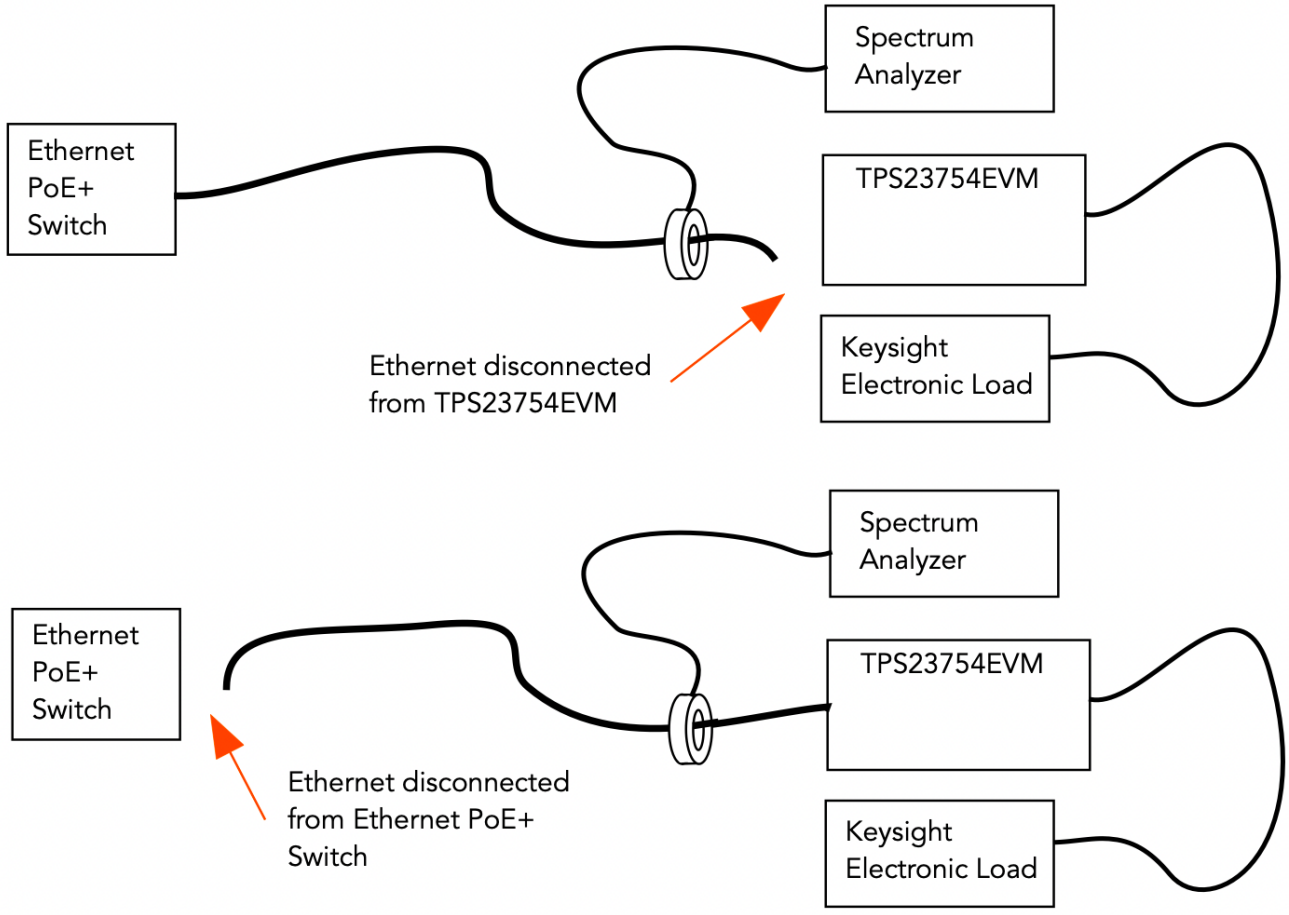


Figure 9: Two ferrite cable clamps were attached to the Ethernet PoE+ cable.

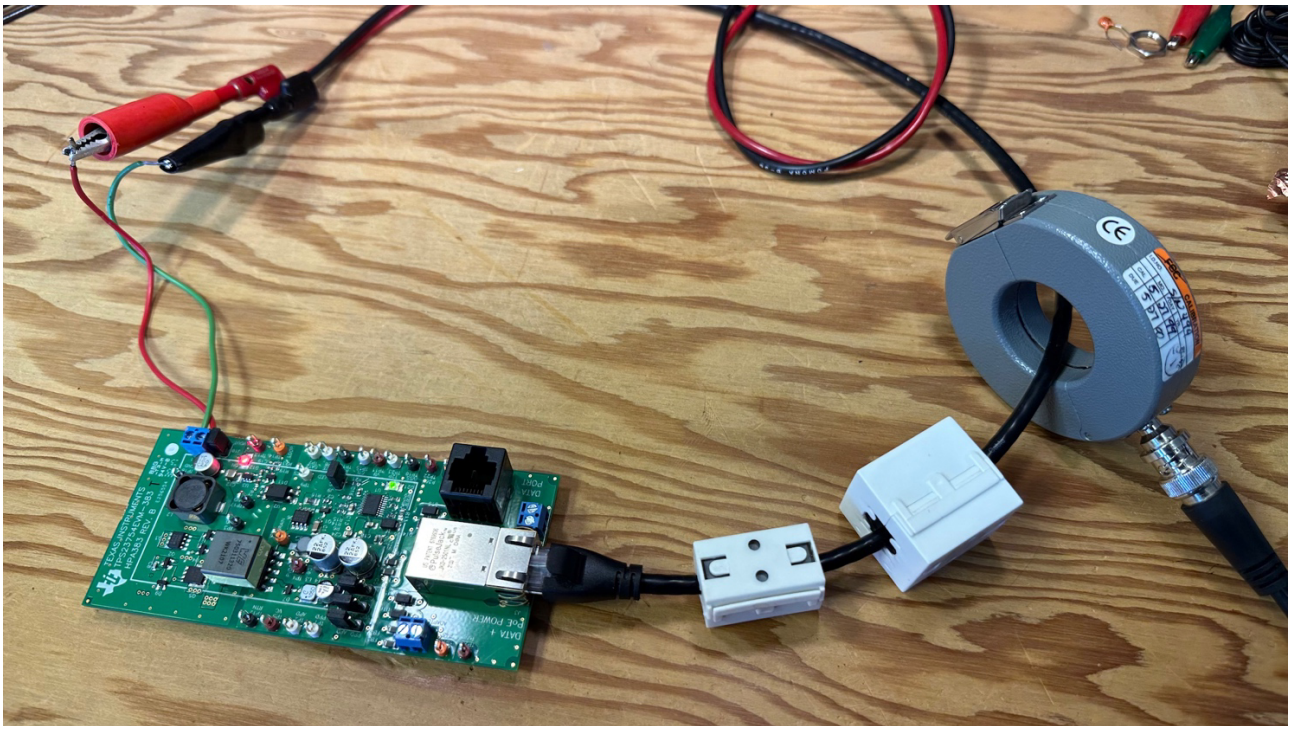


Figure 10: Spectrum without ferrite clamps

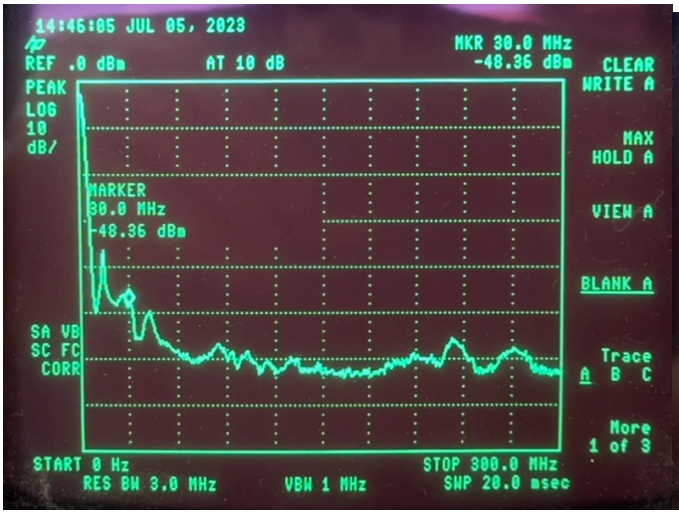


Figure 11: Spectrum with ferrite clamps

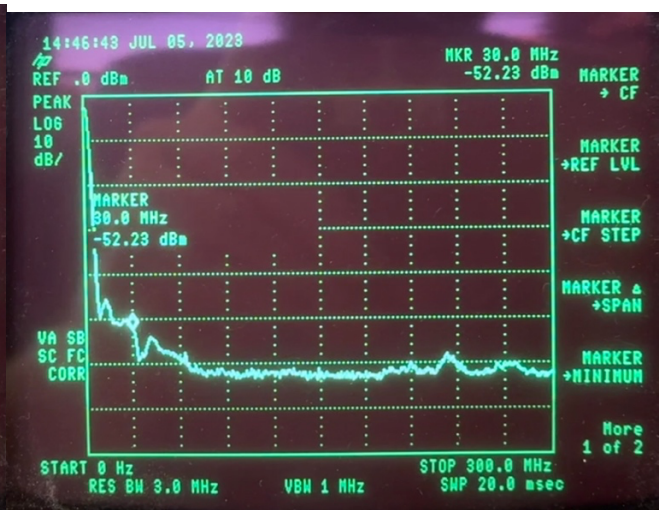


Figure 12: Combined spectra with clamps and without clamps. Clamps reduce the noise level ~ 4 dB at 30 MHz.