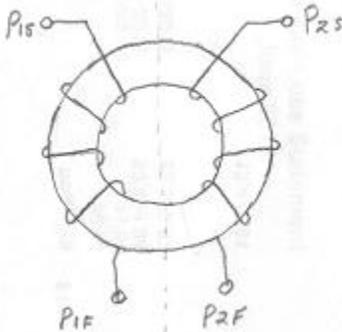


## Reference Toroid Anomaly Part2 4\_6\_16 jmf

This is additional test info for the anomalous reference toroid (RT) as described in "Common Mode Coil Tests 3\_23\_16". The previous test did not include the in-phase condition of this device. There will be a comparison of a virgin toroid/coil assembly using the same core and windings to the anomalous RT.

The basic winding schematic is shown below. The core is a 2"OD x 1.25"ID x .75"HT ferrite in P7070 material from Arnold Engineering. The counter-wound windings are 92 turns each in 26 ga magnet wire. P1S and P2S will be alternately connected to the output of an audio amplifier or grounded. P1F and P2F are connected and referenced as the "tap". The output voltage is measured at this tap.



The scope probe connections used are as follows:

CH1(yel) = Input voltage from amplifier.

CH2(blu) = Output voltage at the tap.

CH3(pnk) = "Sniffer probe voltage"

CH4(grn) = Input current.

Math = CH1 x CH4 input power in mean watts.

The "Ref\_Tor1A" scope shot below shows the input connection that yields the in-phase output at the tap. This voltage level should be 50% of the input but is in fact ~385% of the input.

**Edit 4\_11\_16: To clarify, if a core exhibits this anomaly, one winding used with the input connection will always produce an in-phase output on the tap while alternately if the other winding is used as the input, an out-of-phase (180') output will always be present on the tap. These results will be the same even if the start and finish of the windings are reversed.**

"Ref\_Tor1B" shows the 180' out-of-phase connection that is ~285% of the input. Note that this condition does not exist in a normal toroid device as will next be examined.

"V\_Tor1" shows the identical core/coil winding arrangement as the RT but is virgin. IOW, not used for any other tests prior to these measurements. Note the tap voltage level is ~50% of the input level.

"V\_Tor2" shows the same virgin device with the input leads reversed and the basic same results as "V\_Tor1".

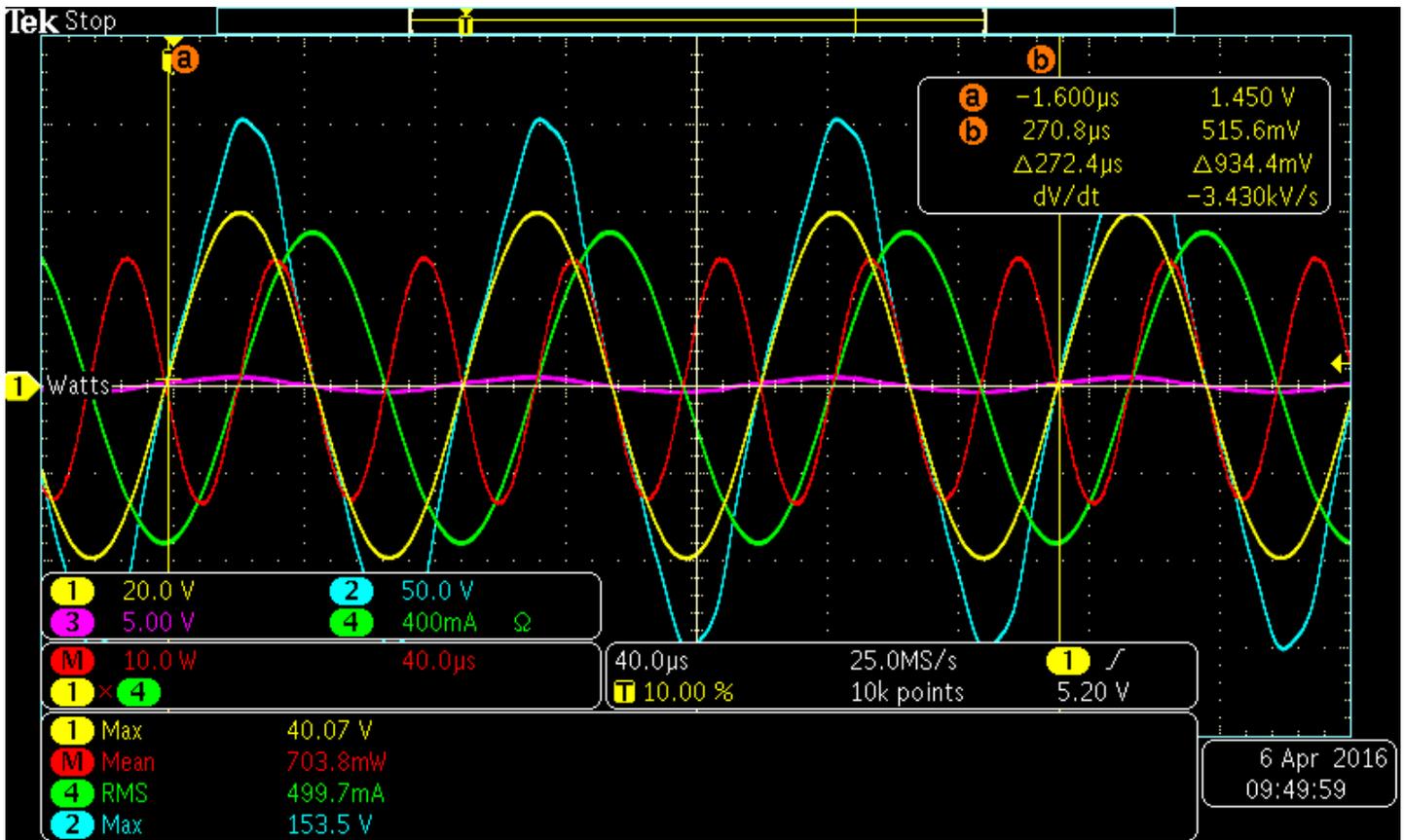
"Rep\_Float1" shows a replication attempt using sticky backed felt 1/16" thick cut into 3/16" strips that are adhered to the inside and outside edges that slightly elevate the windings from the core surface. Other attempts use 4x34 litz wound normally and 26ga magnet wire wound loose that also exhibit some of the anomalous characteristics but not the level of the RT.

"Rep\_Float2" shows the reversed inputs and the out-of-phase output on the tap.

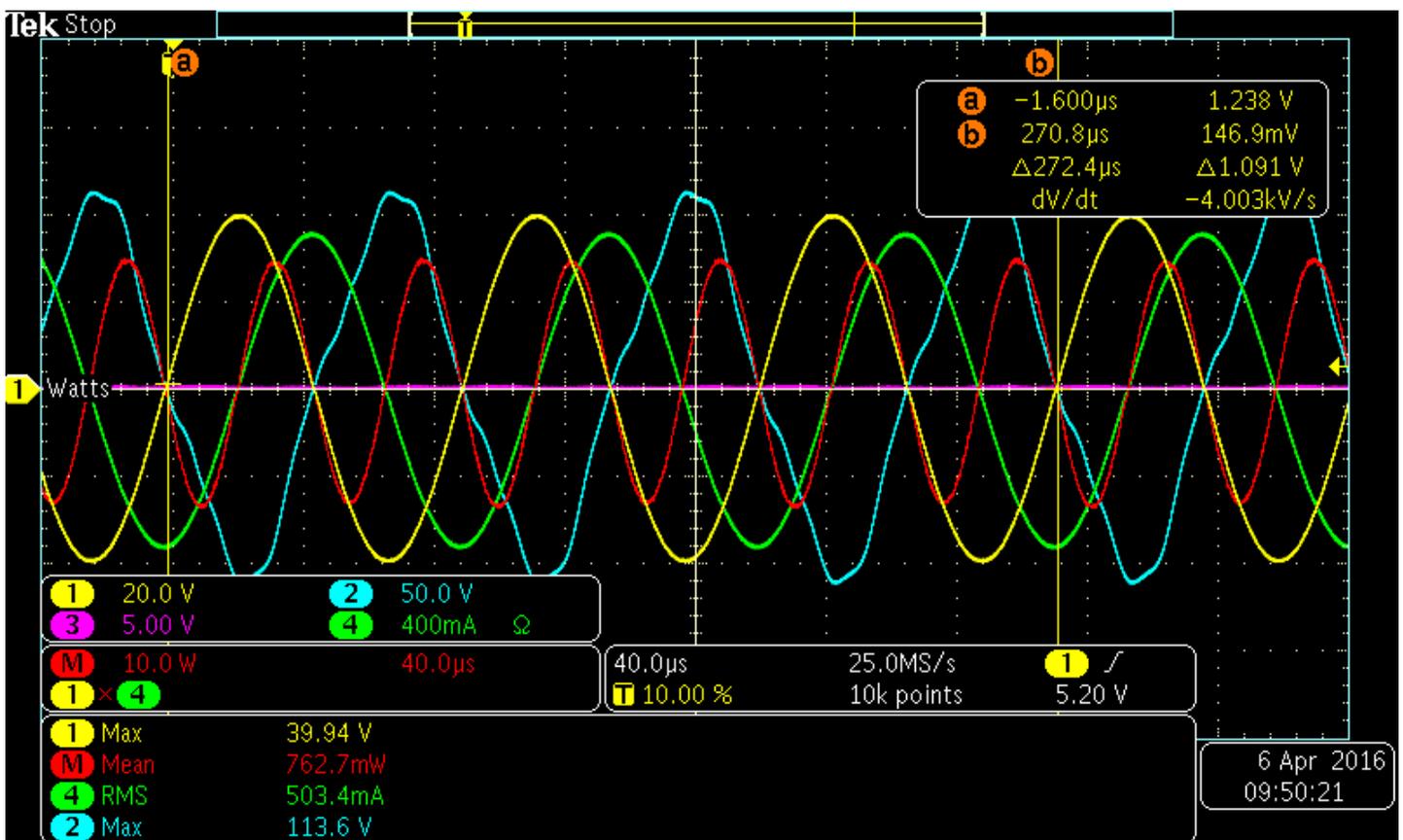
The next paper will begin to analyze what might be causing this effect.

Jon Flickinger

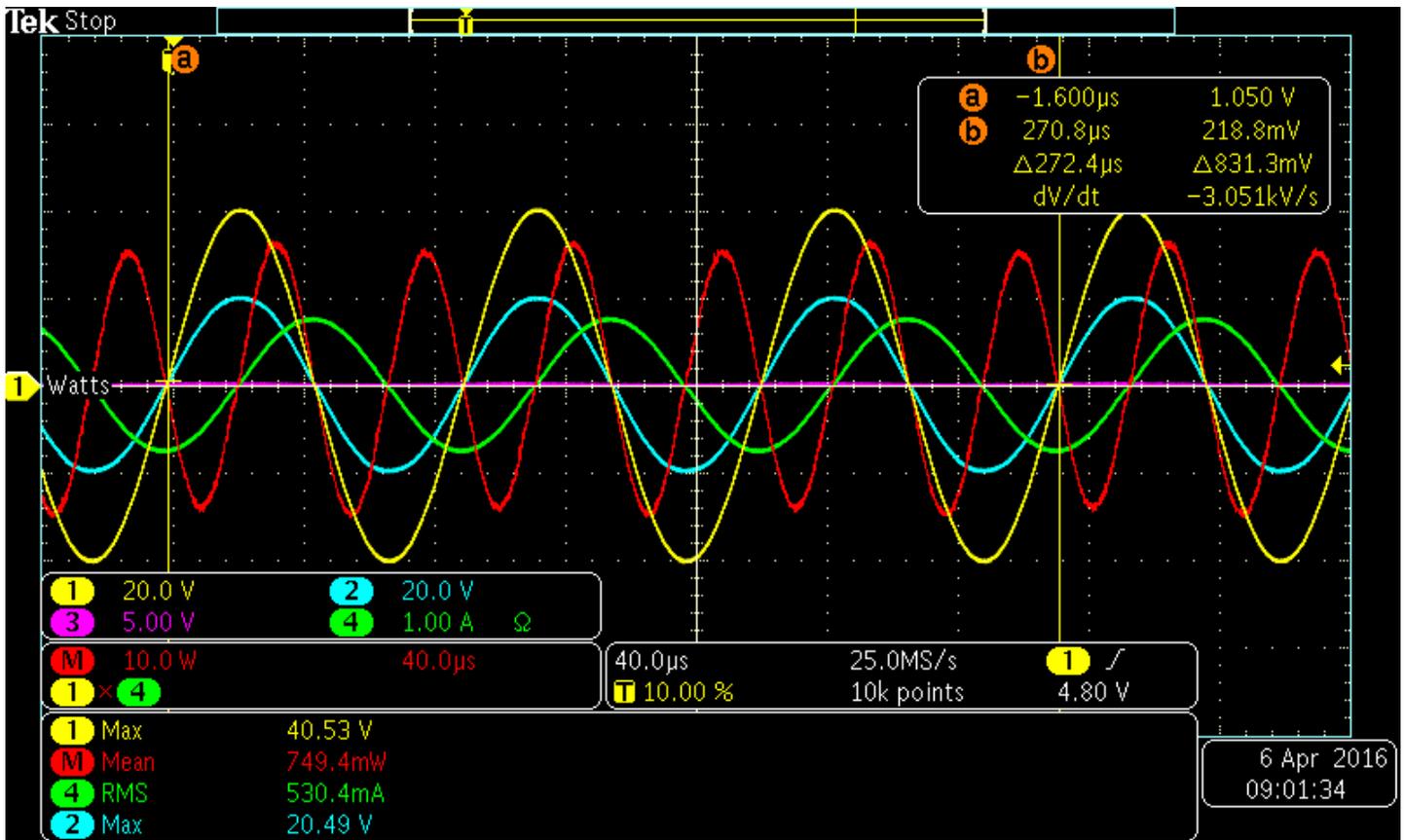
Ref\_Tor1A



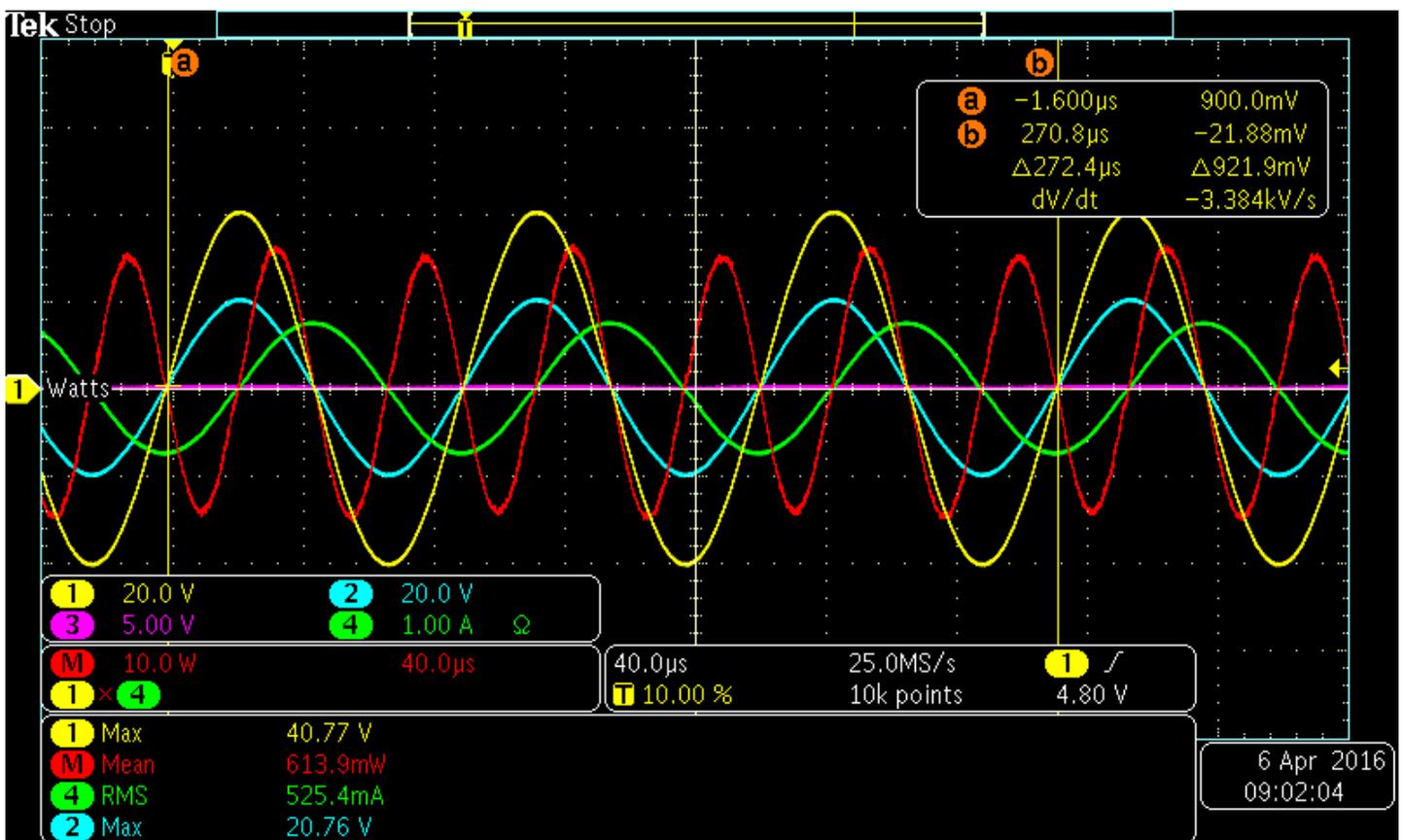
Ref\_Tor1B



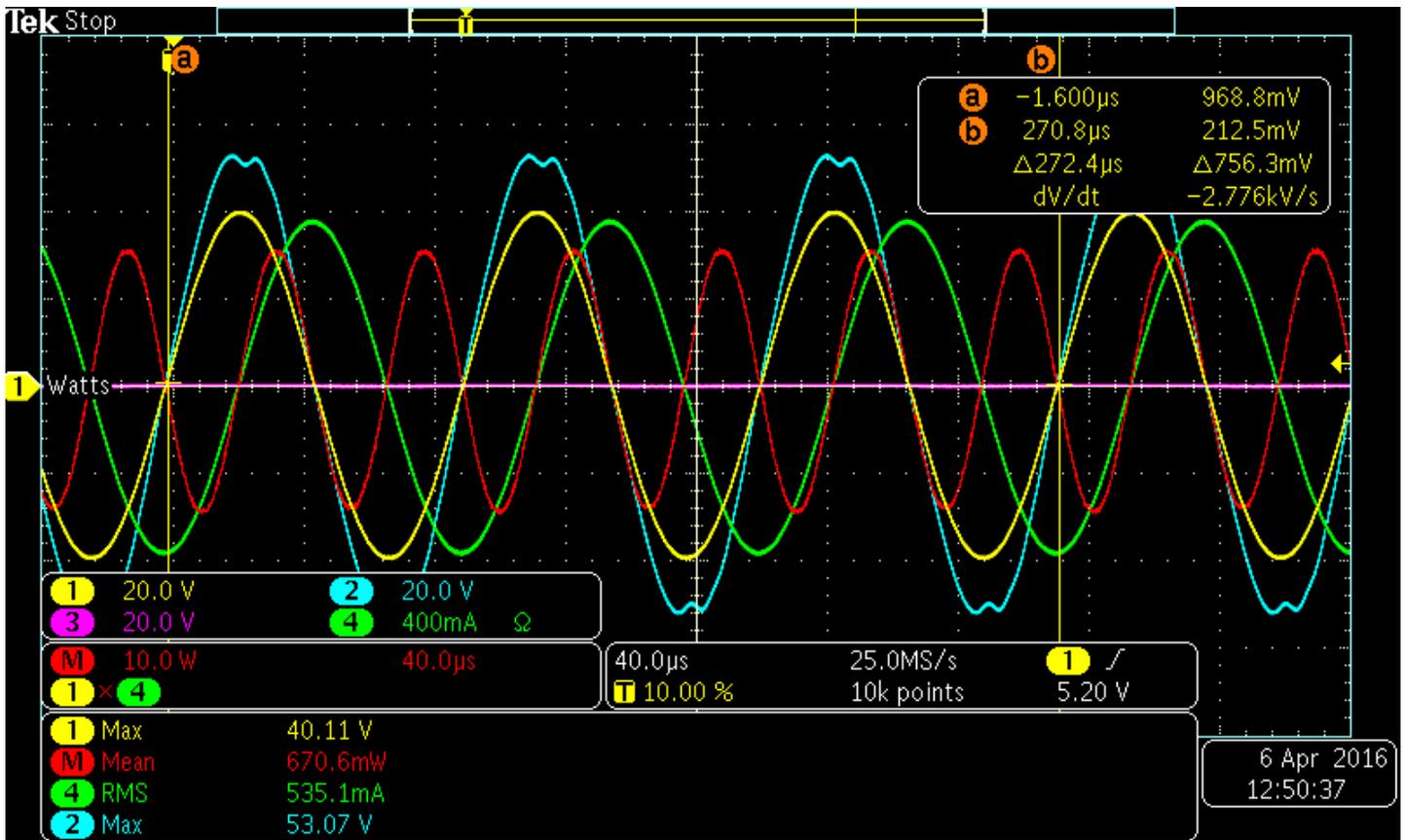
V\_Tor1



V\_Tor2



Rep\_Float1



Rep\_Float2

