ECEN 325 – Electronics

Fall 2020

Lab 11: Report

Submitted by:

Student Name	UIN:	**Section #**
Michael Mengistu	12500724	**508**

Date Performed: November 10, 2020

I. Objective

The objective of this lab is to understand the properties of MOSEFT amplifier configurations by designing common-drain and common-source MOSEFT circuits and analyzing their measurements.

II. Procedure

For the procedure I first had to calculate the values of unknown resistors for the common-emitter and the common-source MOSEFT circuits. From there, I created a schematic of the two circuits and performed an interactive simulation, AC simulation, Fourier simulation and a transient simulation of each of the circuits to obtain measurements of their resistances, voltages, and total harmonic distortion. Lastly, I also performed a AC simulation to obtain the clipping output voltage of the common-emitter MOSEFT circuit.

III. Difficulties

There were no difficulties during this lab.

IV. Results

Fig.3a Circuit schematic

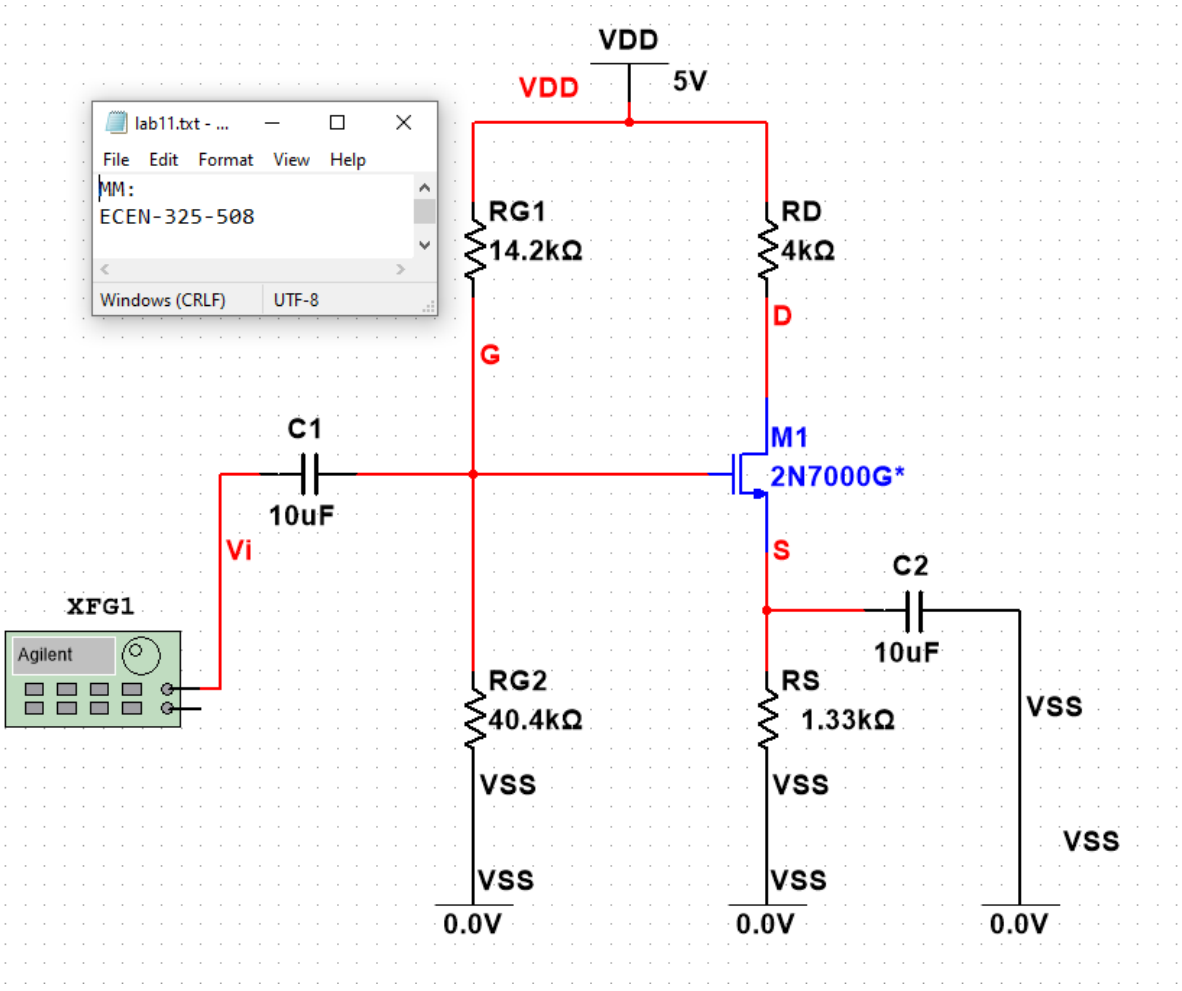


Fig.5a Circuit schematic

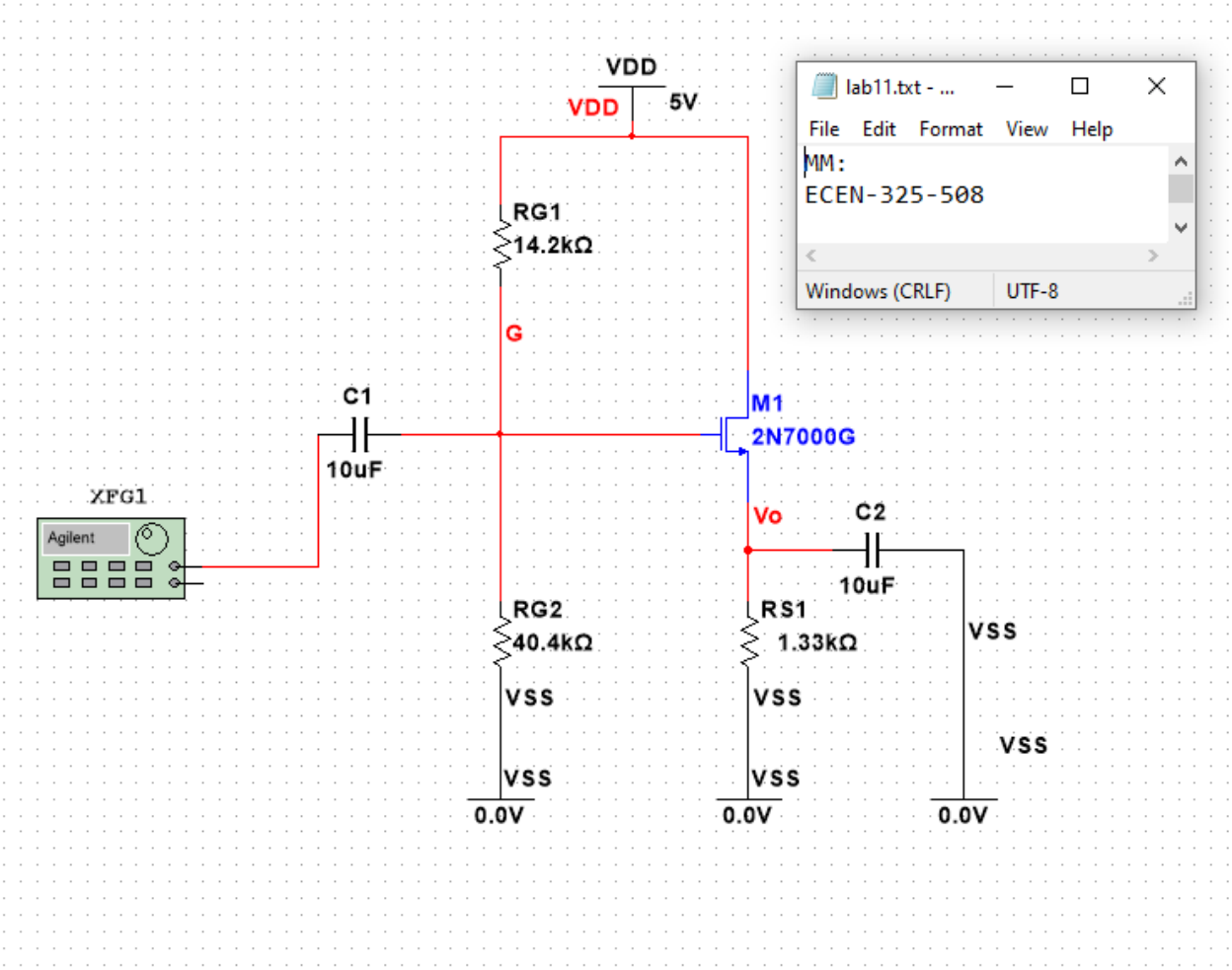


Fig.3a DC solution measured and calculated results

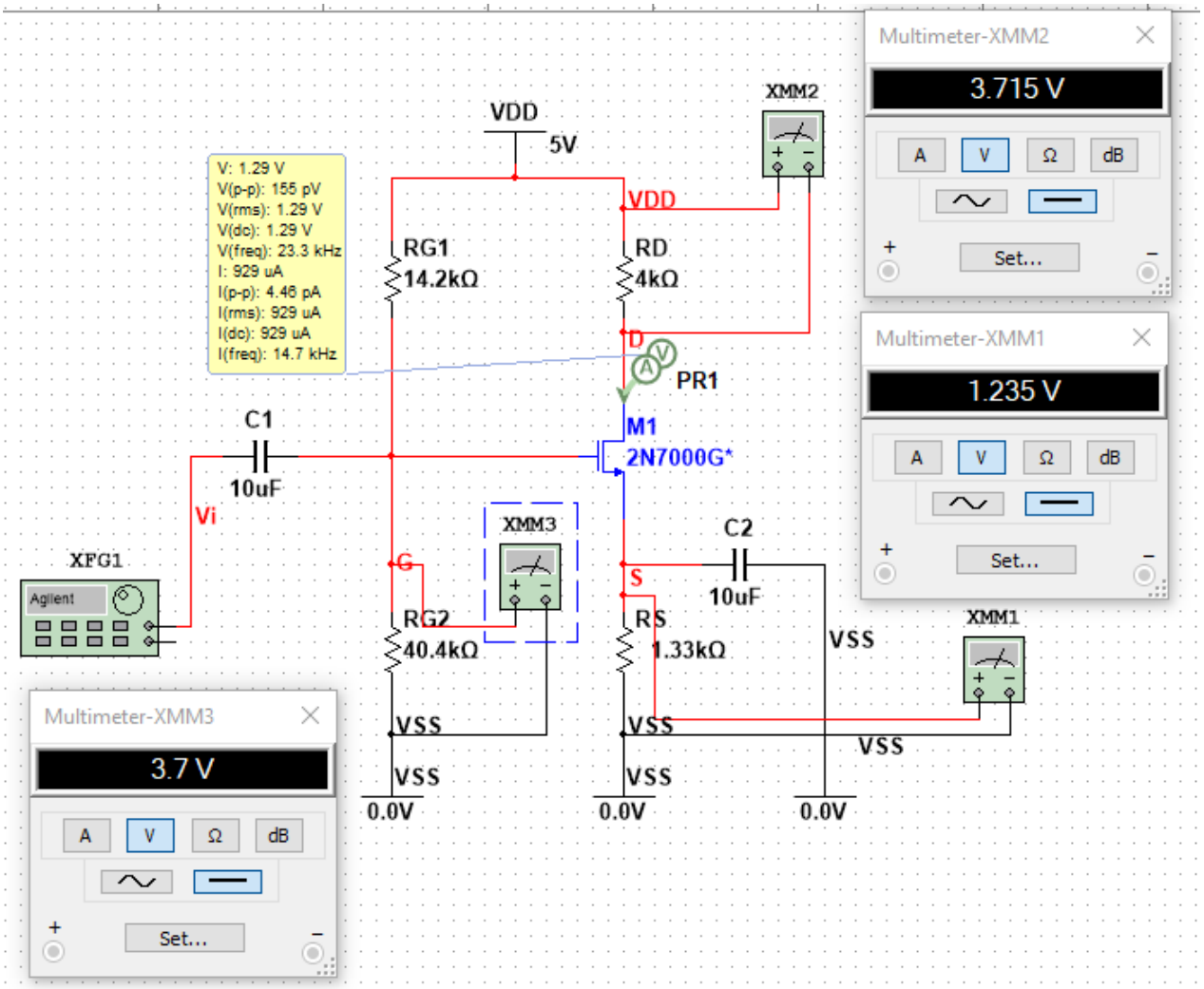
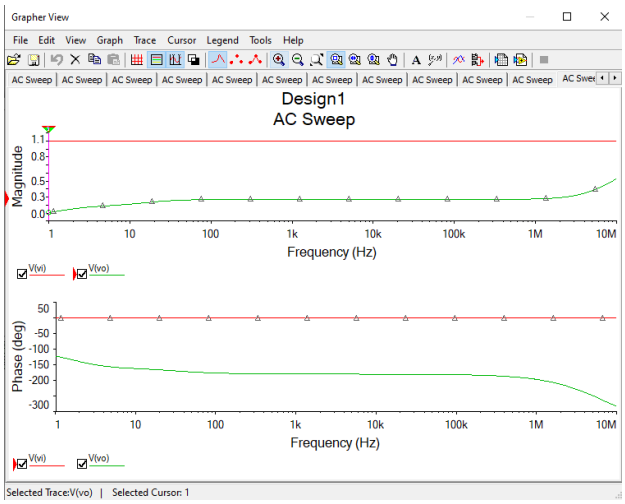
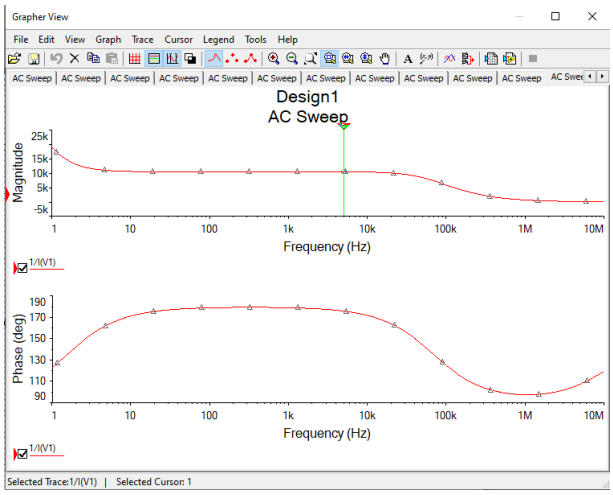


fig.3a	V_{RG2} (V)	V_{RS} (V)	V_{RD} (V)	$V_{o,dc}$ (V)	I_D (mA)
Measured	3.7	1.235	3.715	1.29	0.929
Calculated	4.225	1	3	1.2	0.75

Fig.3a AC Simulation measured and calculated results





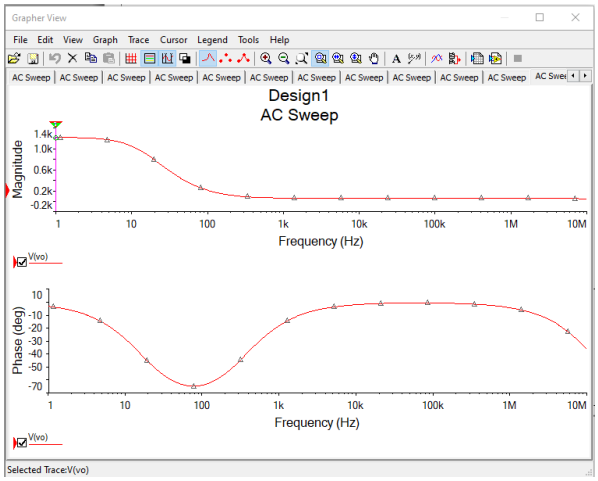


fig.3a	$\|A_v\|$	R_i (Ω)	R_o (Ω)
Measured	0.271	10479	1219
Calculated	25	10500	4000

Fig.3a Time-Domain Waveform

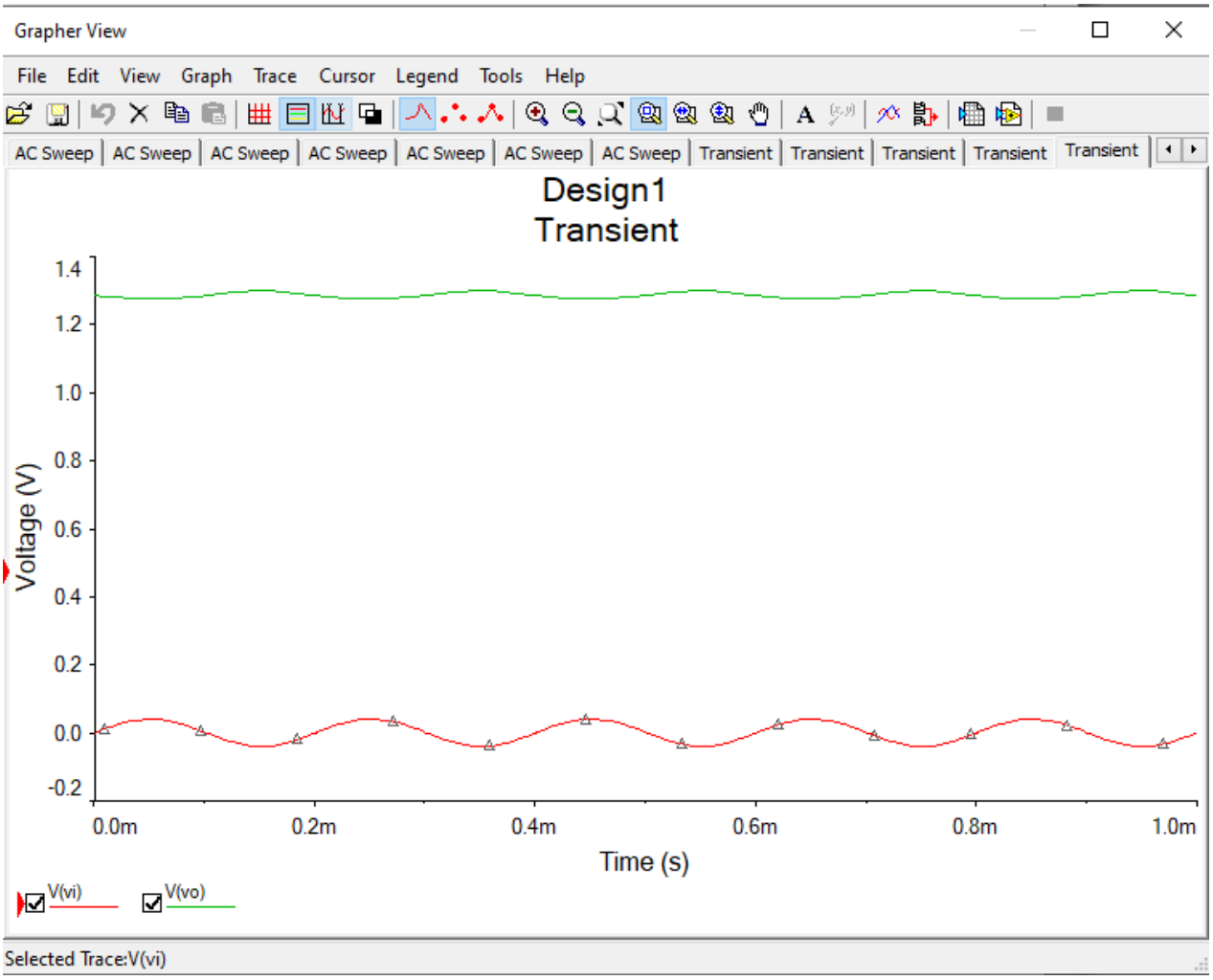


Fig.3a Fourier Simulation

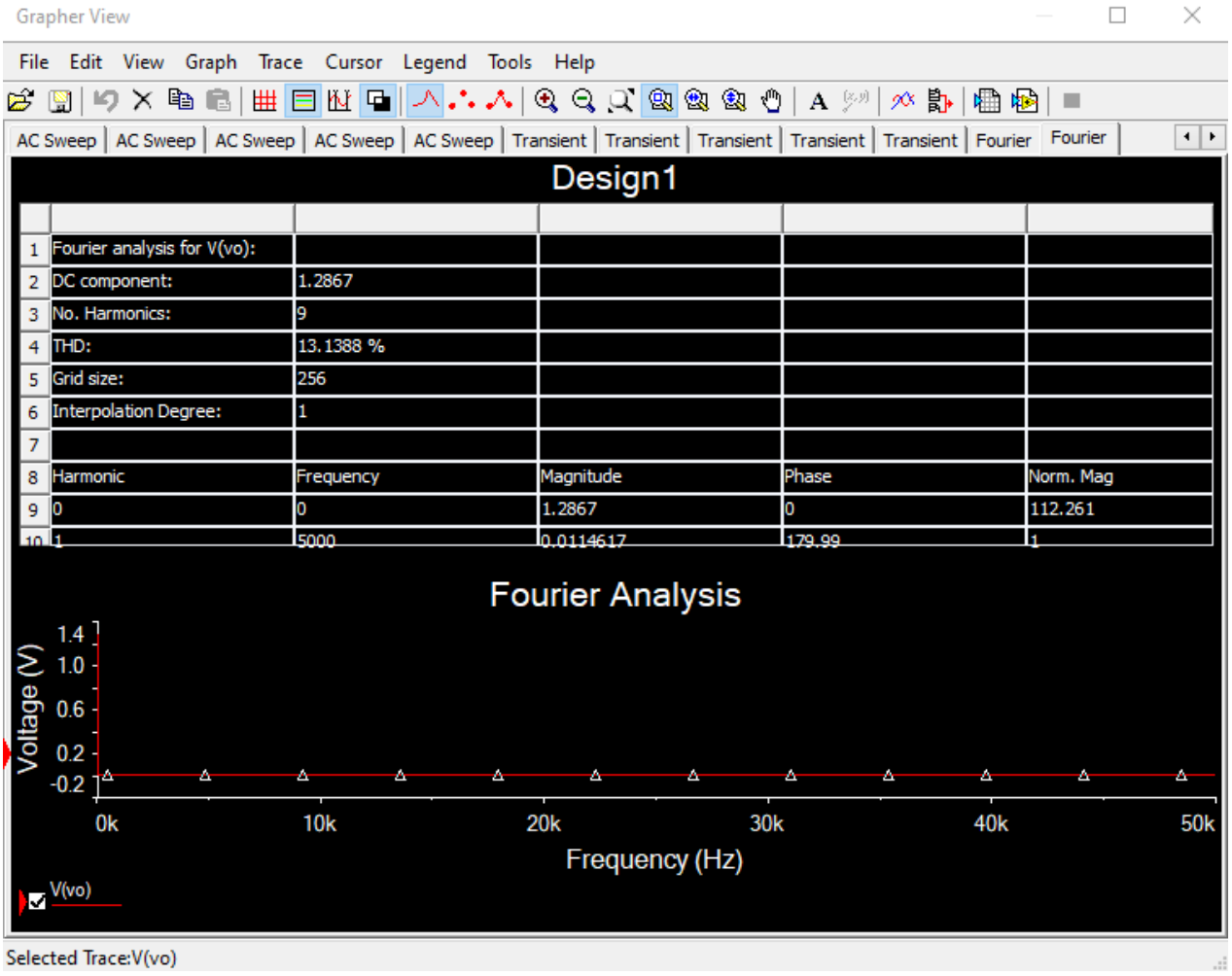


fig.3a	THD (%)
Measured	13.1388

Fig.3a at clipping

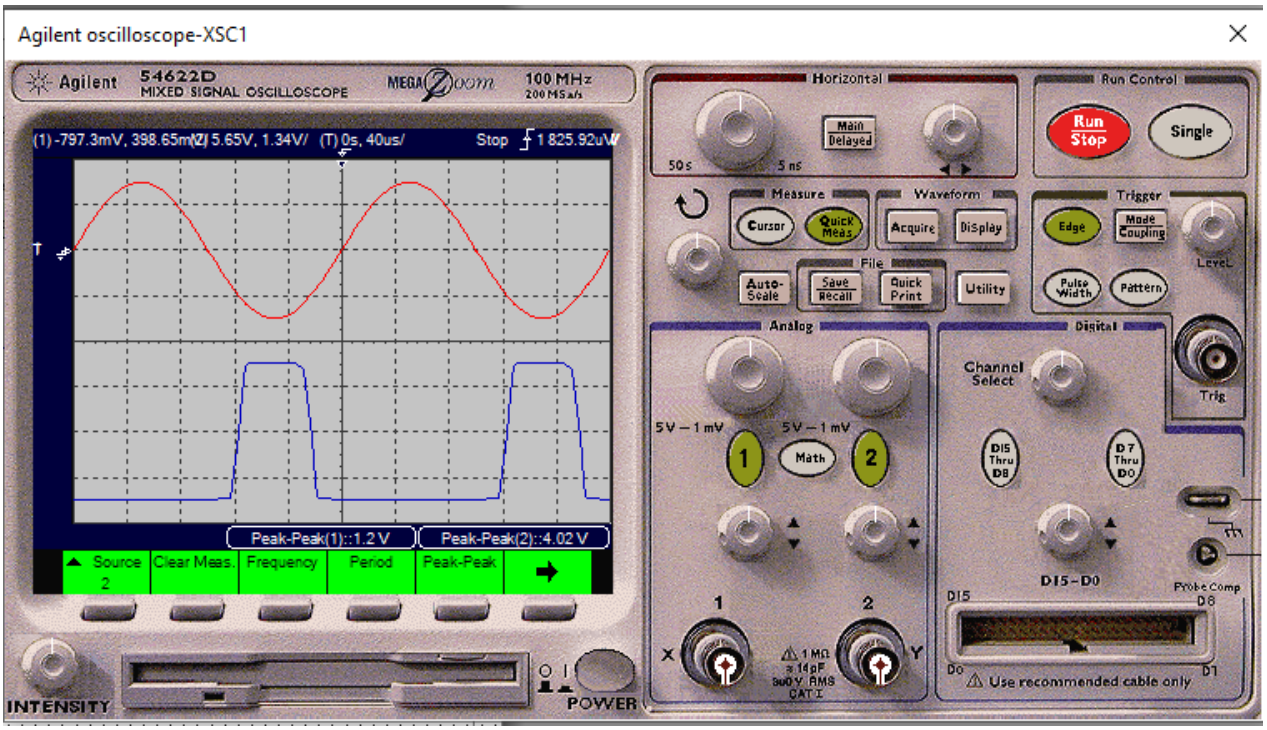


fig.3a at cliping	V_i (Vpp)	V_o (Vpp)
Measured	1.2	4.02

Fig.5a DC solution measured and calculated results

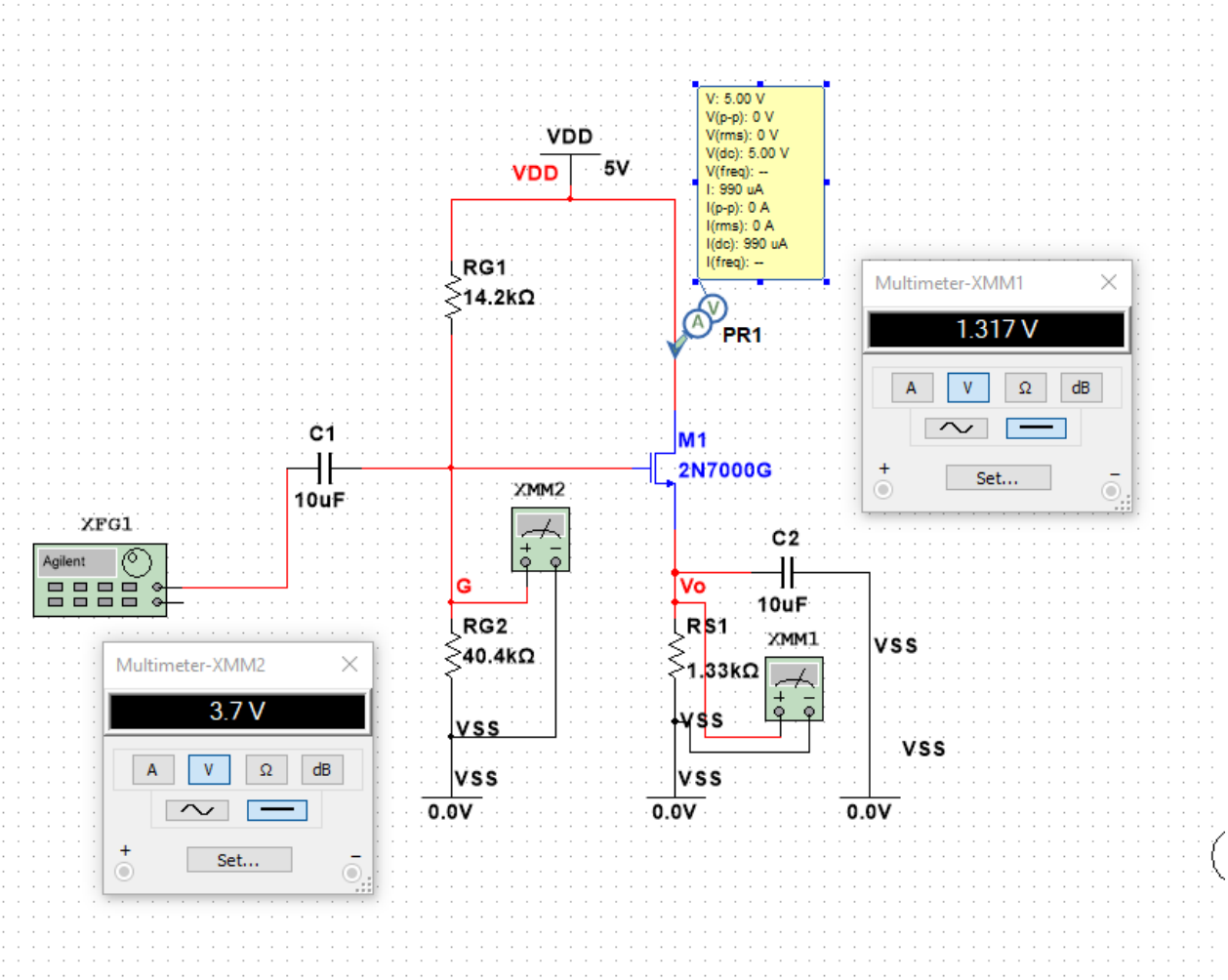
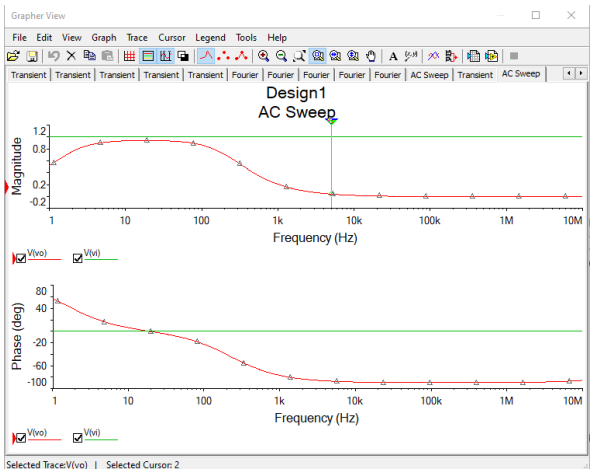
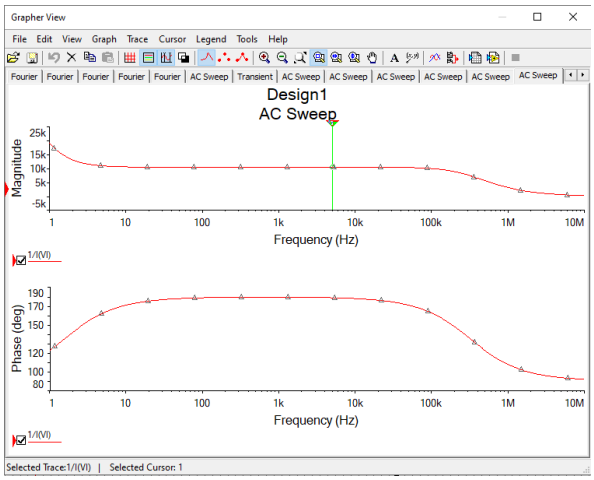


fig.5a	V_{RG2} (V)	V_{RS} (V)	V_{RD} (V)	I_D (mA)
Measured	3.7	1.317	5	0
Calculated	4.225	1	3	0.75

Fig.5a AC Simulation measured and calculated results





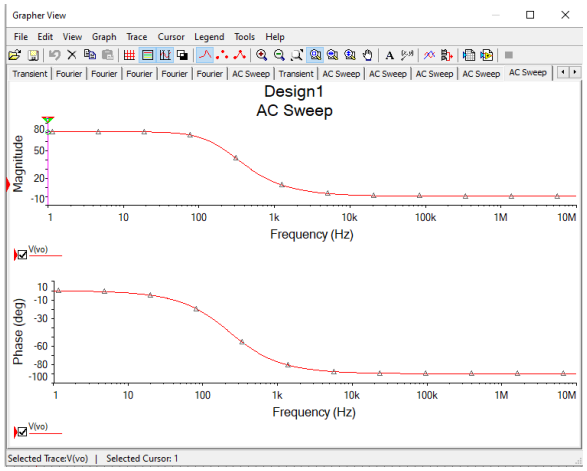


fig.5a	$\|A_v\|$	R_i (Ω)	R_o (Ω)
Measured	0.0042	10508	80
Calculated	25	10500	15.8

Fig.5a Time-Domain Waveform

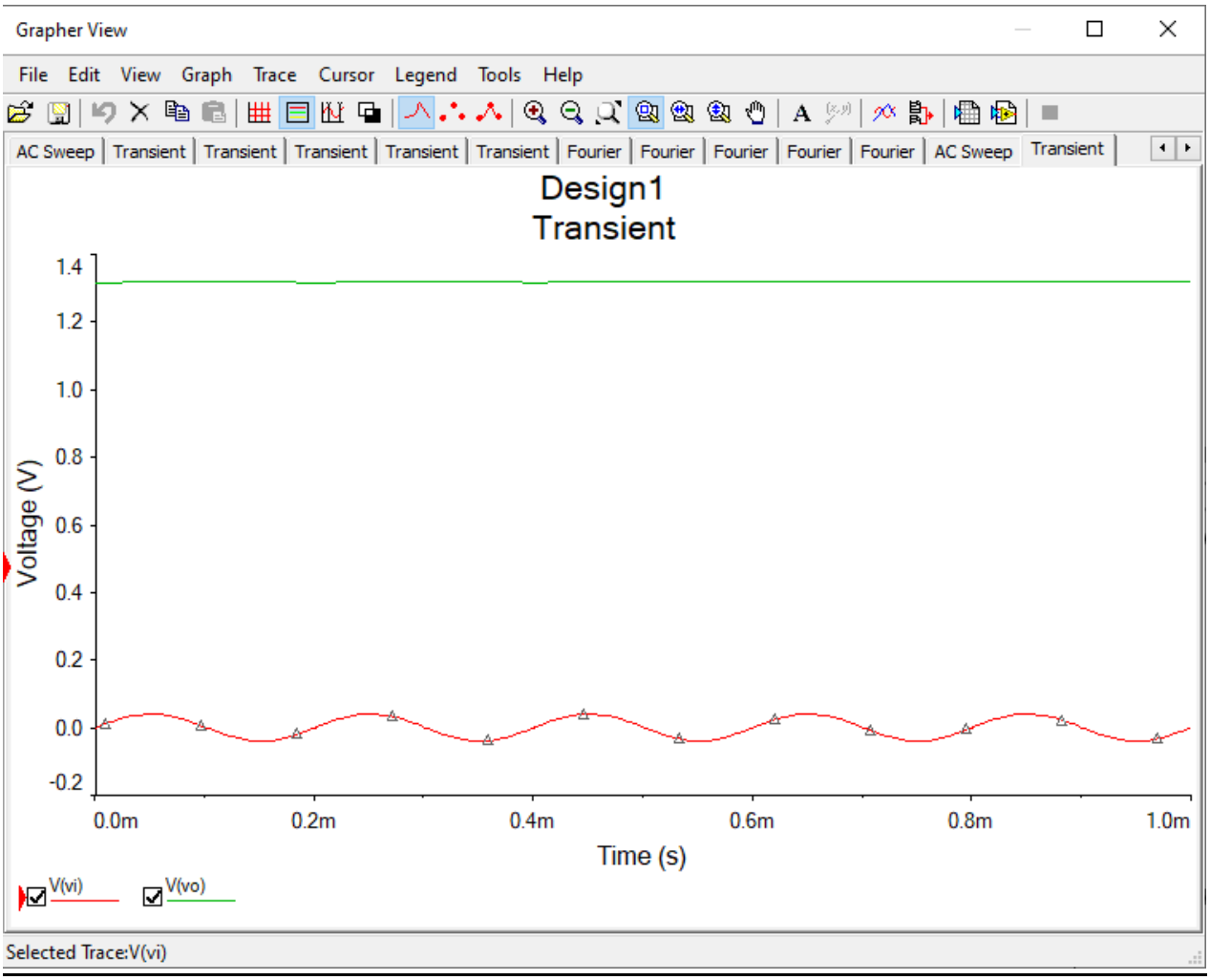


Fig.5a Fourier Simulation

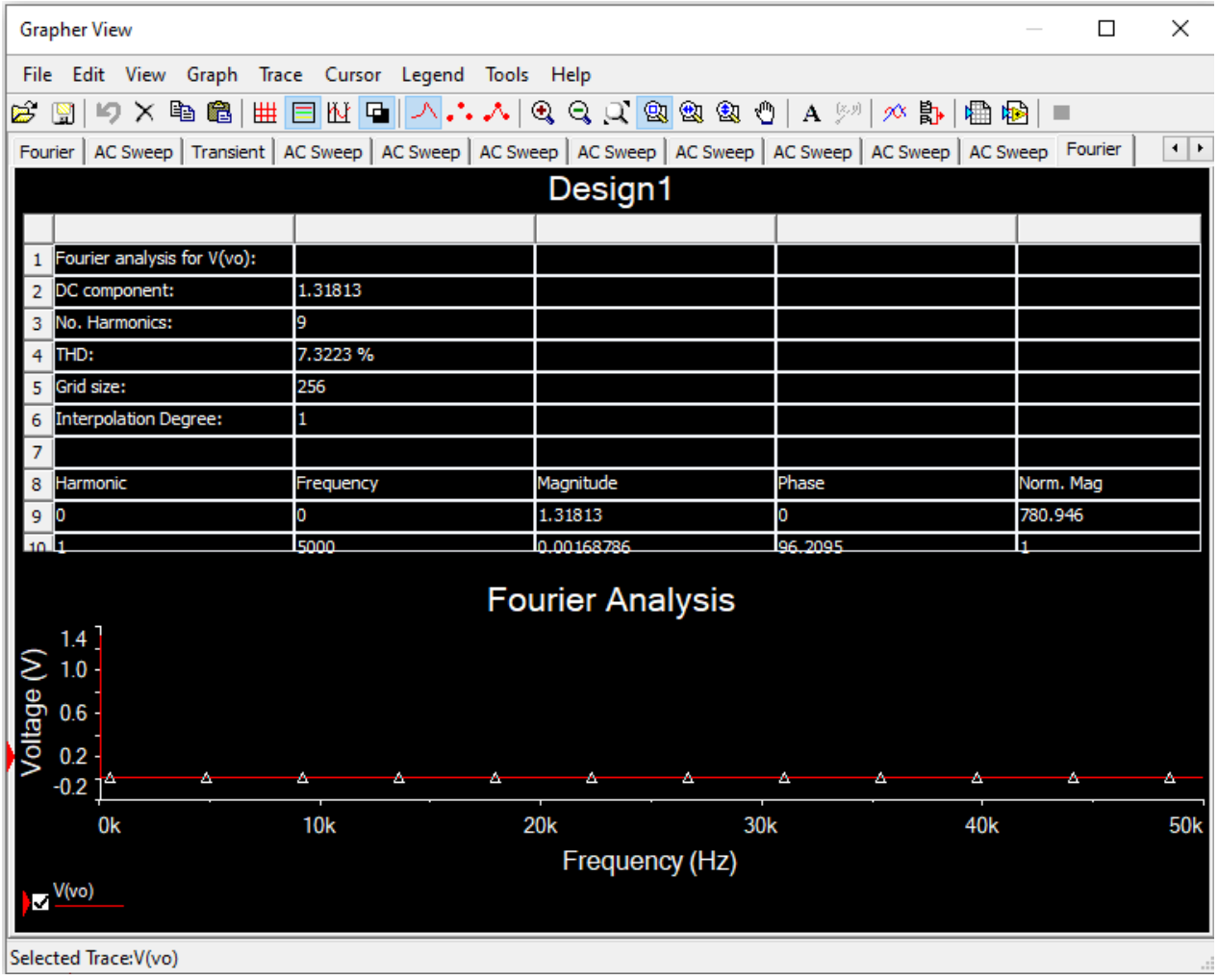


fig.5a	THD (%)
Measured	7.3223

V. Conclusion

In conclusion, I was able to build and obtain the measurement for the common-source and common-emitter MOSEFT circuits by following the procedure. I was able to get the measurements by using the interactive simulation, AC simulation, Fourier simulation and a transient simulation of each of the circuits to obtain their resistances, voltages, and total harmonic distortion and clipping voltage for fig.3a.