[redacted], Denise Wang
EC ENGR 3 Lab 1B
Week 4 Lab 4

MyDAQ NI ELVISmx – DMM

1 kHz Cyclic RMS

Wave (5 Vpp)	Key Scope Voltage	Meter Voltage DMM	myDAQ/DMM	% Difference (vs Scope) DMM	myDAQ
Sine:	1.786	1.786	1.763	0	-1.3%
Triangle:	1.459	1.453	1.387	-0.4%	-4.9%
Square:	2.519	2.345	2.750	-6.9%	9.2%

The MyDAQ measurement of sine, square waves and triangular waves behaves the same than the digital multi-meter because they show a smaller RMS voltage than the scope does.

MyDAQ NI ELVISmx – Oscilloscope

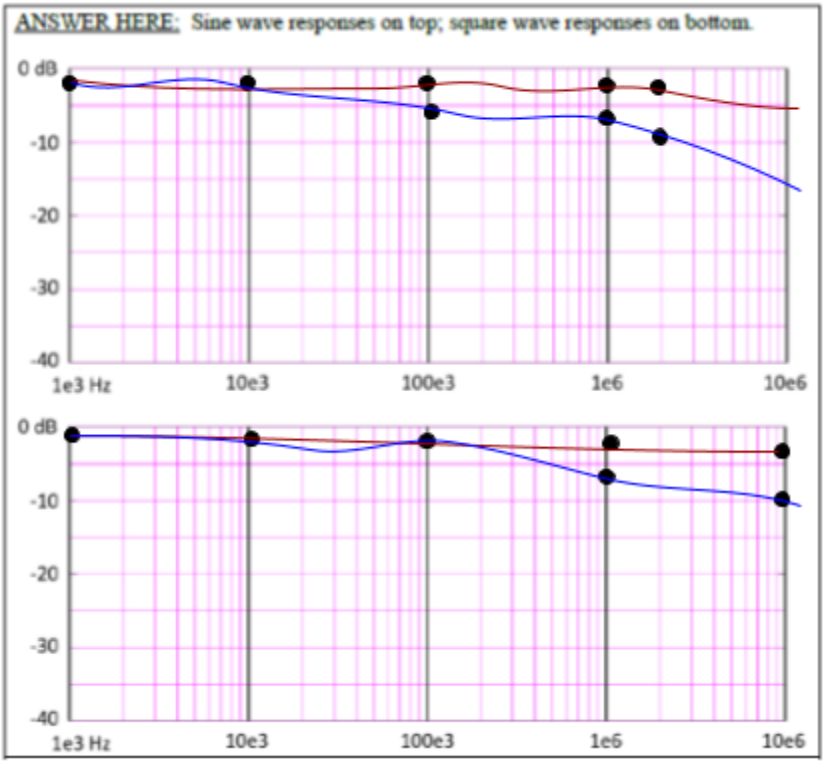
Keysight & MyDAQ Oscilloscope RMS Voltages

Frequency Sine Wave

KHz	Keysight RMS Volts	Key/Theo dB	MyDAQ RMS Volts	MyDAQ/Theo dB
1	1.786	0.127	1.773	0.060
10	1.785	0.123	1.768	0.039
99	1.785	0.123	2.200	1.938
999	1.774	0.069	1.593	-0.866
1999	1.756	-0.020	0.840	-6.425

Frequency Square Wave

KHz	Keysight RMS Volts	Key/Theo dB	MyDAQ RMS Volts	MyDAQ/Theo dB
1	2.513	0.045	2.506	0.021
10	2.517	0.059	2.501	0.003
99	2.504	0.014	2.400	-0.355
999	2.439	-0.215	1.888	-2.439
1999	2.362	-0.493	1.121	-6.967



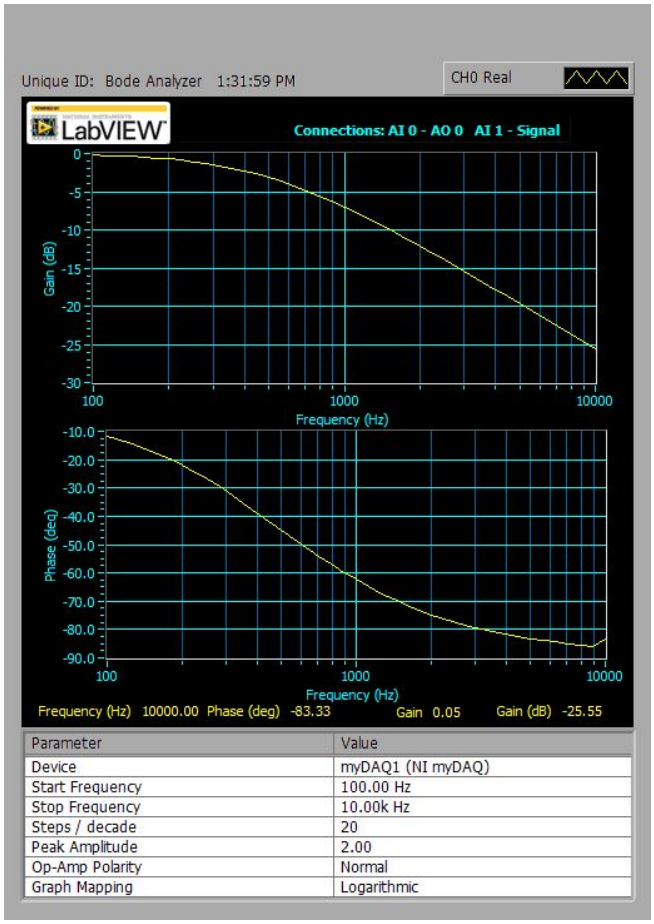
No. We can't determine the frequency response of either tool because we do not see the response pass through -3Db twice. We can, however, estimate the upper frequency response of the MyDAQ to be about 1000kHz.

MyDAQ NI ELVISmx – Dynamic Signal Analyzer (AKA Spectrum Analyzer)

Harmonic	Ration, in dB	Theory
1	0	0
2	81	infinite
3	9.49	-9.542
4	83	infinite
5	13.80	-13.979
6	82	infinite
7	16.52	-16.902
8	88	infinite
9	18.42	-19.085
10	85	infinite

MyDAQ NI ELVISmx – Bode Analyzer

Bode Analyzer taking 20 measurements starting at 100 Hz and ending at 10 KHz



Parameter	Value
Device	myDAQ1 (NI myDAQ)
Start Frequency	100.00 Hz
Stop Frequency	10.00k Hz
Steps / decade	20
Peak Amplitude	2.00
Op-Amp Polarity	Normal
Graph Mapping	Logarithmic

The theoretical cutoff frequency (-3 dB point) of the filter 482.288 Hz

The cutoff frequency as measured by the Bode Analyzer 500 Hz

The % difference, using theoretical as the reference. 3.67%

Causes of the difference:

The bode plot only measured the response at intervals of 20 Hz, extrapolating the rest. Also, the internal characteristics of the MyDAQ could have slightly changed the frequency response of the system.