Deliverables for the Final Project

FRA Function Settings: (Frequency Response Analysis)

- 1Vpp Amplitude
- High-Z
- 10Hz – 10kHz
- At least 60 Points (The more points the better, it will take longer)
- Correct Channels for Vin (Source) Vout (Output)

Specification	**Requirement**	**Proof of Requirement (Deliverable in Report)**
Speaker Resistance	8 Ohms	Nothing, its given to you
Bass Filter -3dB cut-off (Lowpass Filter)	320Hz ±10% (Cut off needs to be in the range of 288Hz – 352Hz) (Shows that your Bass Filter will filter at the right frequency) (Make sure to isolate the filter)	Use FRA function on Oscilloscope. (Look at settings above) 2 Probes (Vin, Vout) A plot of Phase and Magnitude of the filter with a cursor or marker on the -3dB cut off point.
Mid Filter with two -3dB cut-offs (Midpass Filter)	320Hz ±10% to 3200Hz ±10% (Lower cut off needs to be in the range of 288Hz – 352Hz) (Higher cut off needs to be in the range of 2880Hz – 3520Hz) (Shows that your Mid Filter will filter at the right frequency) (Make sure to isolate the filter)	Use FRA function on Oscilloscope. (Look at settings above) 2 Probes (Vin, Vout) A plot of Phase and Magnitude of the filter with a cursor on the lower -3dB cut off point. A plot of Phase and Magnitude of the filter with a cursor on the higher -3dB cut off point.
Treble Filter with -3dB cut-off (Highpass Filter)	3200Hz ±10% (Cut off needs to be in the range of 2880Hz – 3520Hz) (Shows that your Treble Filter will filter at the right frequency) (Make sure to isolate the filter)	Use FRA function on Oscilloscope. (Look at settings above) 2 Probes (Vin, Vout) A plot of Phase and Magnitude of the filter with a cursor or

		marker on the -3dB cut off point.
Vamp with all equalizer knobs turned to minimum settings.	Vamp < 15mVrms at 200Hz, 2kHz, 10kHz (Shows that your equalizer has minimal leakage voltage on low, mid and high frequencies, when the volume is the lowest) (Make sure to turn all knobs to the lowest position)	3 Screenshots: 2 Probes (Vin, Vout) Vin = 1Vpp @ 200Hz Show that: Vamp < 15mVrms Vin = 1Vpp @ 2000Hz Show that: Vamp < 15mVrms Vin = 1Vpp @ 10000Hz Show that: Vamp < 15mVrms
Vamp with all equalizer knobs turned to maximum settings.	Vamp = 100 mVrms ± 10% at 200Hz, 2kHz, 10kHz (90Vrms < Vamp < 110Vrms) (Shows that your equalizer has the correct gain low, mid and high frequencies) (Make sure to turn all knobs to the highest position)	3 Screenshots: 2 Probes (Vin, Vamp) Vin = 1Vpp @ 200Hz Show that: 90Vrms < Vamp < 110Vrms Vin = 1Vpp @ 2000Hz Show that: 90Vrms < Vamp < 110Vrms Vin = 1Vpp @ 10000Hz Show that: 90Vrms < Vamp < 110Vrms
Vamp,max – Vamp,min max ripple with equalizer at max	15mVrms from 200Hz to 10kHz (Shows that your equalizer frequency response is a straight line) (Make sure to turn all knobs to the highest position)	Use FRA function on Oscilloscope. (Look at settings above) 2 Probes (Vin, Vamp) A plot of Phase and Magnitude of the equalizer with a cursor on the maximum magnitude. A plot of Phase and Magnitude of the equalizer with a cursor on the minimum magnitude. A handwritten calculation showing that the difference in

		voltage of the maximum and minimum is less than 15mVrms.
Amplifier Output Power	Pamp > 400mW from 200Hz to 10kHz (Shows that your amplifier is amplifying correctly at all frequencies) (Make sure to turn all knobs to the highest position)	Use FRA function on Oscilloscope. (Look at settings above) 2 Probes (Vin, Vspeaker) A plot of Phase and Magnitude of the whole design with a cursor on the minimum magnitude. A picture of the amount of current the amp is drawing from the Power Supply when your design is playing music. A handwritten calculation showing that at the minimum magnitude the power is above 400mW