Jack Hepburn **Decibels Project**

Part 1

Sound Source 1: Electrical Utility Box

SPL measurement: 71.9 dB

Location: Next to an electrical utility box

Qualitative Evaluation: Standing next to the electrical utility box, there was a consistent humming sound with occasional mechanical clicks and whirring.

Quantitative Evaluation: Decibel X showed that frequencies around 60 Hz and 1 kHz were measured at much higher levels than others, probably from the hum of electrical machinery.

Sound Source 2: Dryer

SPL measurement: 52.9 dB

Location: Laundry room near an operating dryer

Qualitative Evaluation: In the laundry room near the dryer, there was a steady rumbling noise with periodic thumping of clothes inside.

Quantitative Evaluation: The meter showed that the dryer was at 52.9 dB from where I was standing. There were dominant frequencies around 100 Hz and 2 kHz, due to the dryer motor and tumbling clothes.

Sound Source 3: Running faucet

SPL measurement: 52.3 dB

Location: Kitchen next to a running faucet

Qualitative Evaluation: Standing next to the running faucet in the kitchen, there was a steady stream of water noise accompanied by a gentle splashing sound.

Quantitative Evaluation: Around 500 Hz and 2 kHz were measured at higher levels than others from the flowing water and splashing.

Sound Source 4: Laptop

SPL measurement: 44.6 dB

Location: Bedroom with a laptop

Qualitative Evaluation: In the bedroom with the idle laptop, there was a faint whirring sound coming from the laptop's fan and a high-pitched ringing sound which probably was some kind of coil whine.

Quantitative Evaluation: Around 7 kHz to 10 kHz there was a boost in volume from the GPU coil whine in my laptop. At 2 kHz, the fan noise was most prominent.

Sound Source 5: Food Truck

SPL measurement: 85.6 dB

Location: Street corner near a food truck with a running generator

Qualitative Evaluation: Standing near the truck itself, there was a constant humming noise and the rumbling of the generator's engine.

Quantitative Evaluation: Frequencies around 100 Hz and 1 kHz were measured at higher levels than others, because of the mechanisms that allow the generator to function. Additionally, the frequencies in the higher range, above 5 kHz, that are connected to electrical humming and mechanical vibrations, were also elevated compared to lower frequencies.

Sound Source 6: AC

SPL measurement: 55.2 dB

Location: Apartment living room with a running AC

Qualitative Evaluation: There was a steady humming noise with the sound of the unit's fan and the sound of air circulating through the vent.

Quantitative Evaluation: Decibel X showed dominant frequencies at both 200 Hz and 900 Hz. There were frequencies in the mid-range around 2 kHz, but at lower amplitudes.

Sound Source 7: Amtrak Train

SPL measurement: 73.8 dB

Location: Train station platform with an idling Amtrak train

Qualitative Evaluation: There was a constant bassy rumble that could continuously be heard. There was also an oscillating higher pitched sound that stuck out.

Quantitative Evaluation: The bassy rumble was primarily around 100 Hz while the high-pitched sound was at 15 kHz. There was also an apparent boost in amplitude around 500 Hz.

Sound Source 8: Microwave

SPL measurement: 61.5 dB

Location: Kitchen with a running microwave

Qualitative Evaluation: The microwave was emitting a consistent hum with some vibrations of the material it’s made out of.

Quantitative Evaluation: The microwave had a fundamental frequency of 160hz. Other than that, sonic information above 600 Hz was minimal when excluding the ambient room noise.

Part 2

Sound Source 1: Electrical Utility Box

SPL measurement: 58.4 dB

Approximate distance to sound source: Around 20 feet from the electrical utility box

Qualitative Evaluation: From 20 feet away, the humming sound was still audible but significantly quieter, with less distinct mechanical noise.

Quantitative Evaluation: There was a decrease in the intensity of frequencies across the spectrum, specifically 1 kHz and above being dampened. There was a reduction in overall sound intensity due to increased distance from the source.

Sound Source 2: Dryer

SPL measurement: 41.7 dB

Approximate distance to sound source: Around 20 feet from the dryer

Qualitative Evaluation: The rumbling noise was still perceptible but less intense and I could hear faint thumping sounds.

Quantitative Evaluation: The meter had a lower reading of 41.7 dB at this distance. Decibel X showed less frequencies above 3 kHz and the lower frequencies remained intact but 11 dB less than the first measurement.

Sound Source 3: Running faucet

SPL measurement: 41.9 dB

Approximate distance to sound source: Around 20 feet from the running faucet in my kitchen

Qualitative Evaluation: The water noise was still audible but considerably quieter, with the details from the splashing barely able to be heard.

Quantitative Evaluation: Specifically, frequencies around 500 Hz and 1.5 kHz, from the sound of flowing water were decreased in amplitude compared to the closer measurement. Its sound is attenuated as the distance from the source increases.

Sound Source 4: Laptop

SPL measurement: 33.4 dB

Approximate distance to sound source: 20 feet from the idle laptop in the bedroom

Qualitative Evaluation: At 20 feet away, the fans could still be heard but the coil whine stood out more.

Quantitative Evaluation: The frequencies associated with the idle laptop's fan, around 1 kHz and 2 kHz, exhibited a notable decrease in amplitude compared to closer measurements. The coil whine around 8 kHz stood out more among all the additional room noise.

Sound Source 5: Food Truck

SPL measurement: 72.7 dB

Approximate distance to sound source: 20 feet from the food truck

Qualitative Evaluation: The mechanical hum was dominant in comparison to the surrounding environment but the rumbling was considerably quieter.

Quantitative Evaluation: At this distance, the frequencies below 200 Hz were significantly decrease in amplitude as opposed to being right next to it. Additionally, the high end information above 9 kHz was decreased in amplitude as well. The mid-range rumbling was prominent sounding almost like a bandpass filter.

Sound Source 6: AC

SPL measurement: 40.2 dB

Approximate distance to sound source: 50 feet from the apartment's living room AC unit

Qualitative Evaluation: The AC shooting air through the vent sounded hollow but deep and rich. There was occasionally some rattling from within the vents that added extra intricacies.

Quantitative Evaluation: The frequency range of the AC was very wide starting from 80 Hz up to 5 kHz. The occasional rattling would fall into frequencies above 6 kHz.

Sound Source 7: Amtrak Train

SPL measurement: 61.5 dB

Approximate distance to sound source: 20 feet from the idling Amtrak train at Uptown station

Qualitative Evaluation: The bassy rumble that I could hear while the train was in idle was significantly quieter but I could still hear the high pitched sound. The higher pitched sound sounded like scraping metal.

Quantitative Evaluation: The overall amplitude was 12.3 dB less than the first measurement. There was a significant roll-off in bass frequencies below 200 Hz. The resonance at 1.5 kHz was the measured at 58 dB at it's peak.

Sound Source 8: Microwave

SPL measurement: 48.5 dB

Approximate distance to sound source: 20 feet from the running microwave oven in the kitchen

Qualitative Evaluation: The humming of the microwave was still very apparent while the other detailed sounds of the motor spinning were significantly dampened.

Quantitative Evaluation: The low frequency at 160 Hz remained intact but was 10 dB less in amplitude when compared to the first measurement. Information above 400 Hz was masked by the room noise on the frequency spectrum.