legends: Orange (Medium Priority), Red (Critical/High Priority), Blue (Info), Green (Good work!)

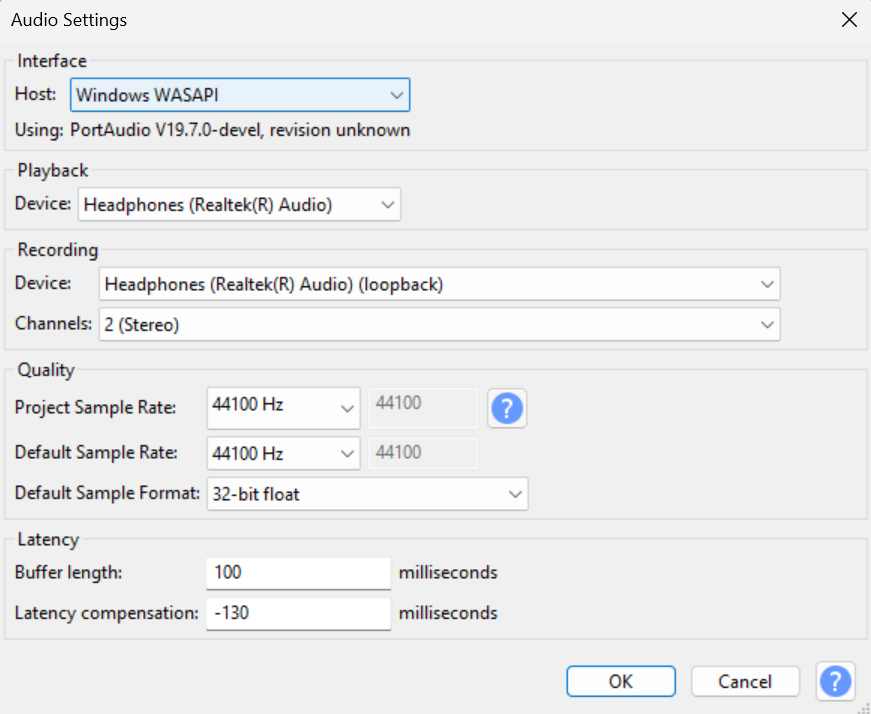
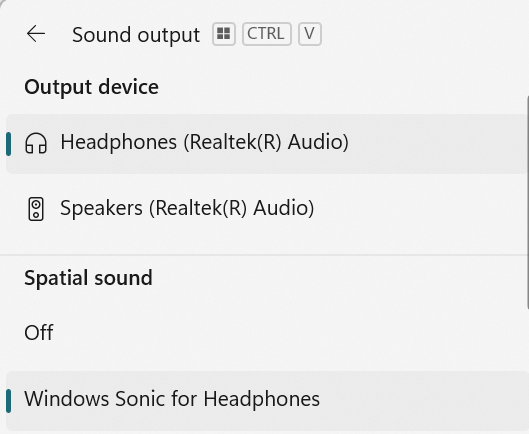
Done, Important

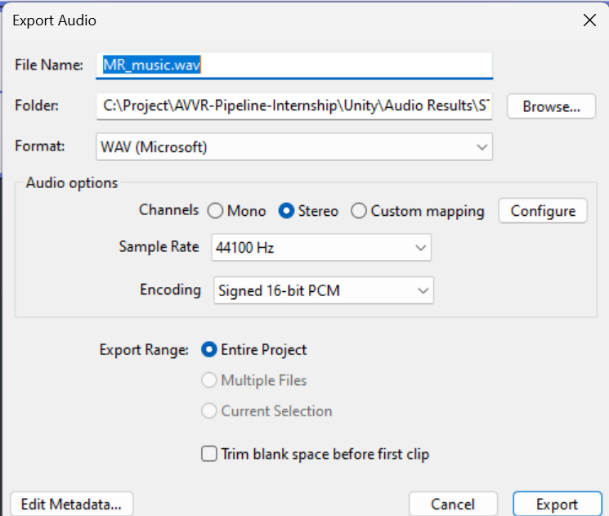
# Monday, 22 July 2024

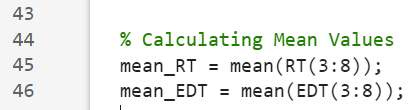
Morning started with Midway Development Day talks etc. Thus, real work started afternoon after lunch lol.

## **UPDATED TODO:**

1. Confirm steam audio setting and standardize/clean project directory to be less convoluted and organised (Mona gave her project as reference)
   1. automate baking with 1 button to streamline
   2. Add lighting indicator for when steam audio is working
2. Generate all audio done
3. Do analysis using provided matlab, have proper report and findings for meeting.
4. Create unity scenes for all scenes and its category (VRDemo, nonVRDemo)
5. Add Rachel and Joao for Demo for more immersive VR demo , and probably have more audio cue. otw
6. Continue monodepth optimisation using enhance360debug.py
7. Remove docker clutter automatically
8. Remove LiDAR from LFS, and use separate cloud service to download that, or use MeshLab to optimize it.

For Eval scenes, record at least 30 sec after sound stop to be safe (to make sure get all reverb/reflections). Thus, disable loop and start record earlier (before pressing play, make sure no other sound). Recording using Audacity with following setup on Sony WH1000-XM4, at 50% Windows volume with Spatial Audio, make sure it is stereo. There is concern regarding audio quality and compression of using external software instead of directly through Unity but unfortunately there’s no simple way with Steam Audio compared to Google Resonance. (Need to confirm with Dr. Hansung if this is acceptable)

Audio export with following setting.

Matlab changes on octave band from 2:6 to 3:8 to follow previous paper methodology (as advised by Mona). To analyse the sound, just change directory definition and run the Main file (Main\_Immersive\_EDT\_RT60.m)

To get the RIR file for analysis, run the .ipynb coded by Mona in respective scene folders.

Honestly my brain kinda fried alr today so will continue tomorrow instead.

# Tuesday, 23 July 2024

Interesting to note, one of the most important factor for room reverb properties is its size, and the material properties inside it, imo the furniture shape etc is not as they only serve purpose to make room smaller (less echo) and depending on type of furniture/objects.

Another interesting thing to note, is that sometimes the reverb effect is not applied for first few second when game is play (for example, speech on ST), especially apparent when there supposed to be strong reverb. So using loop and having very long silence at the end might be needed.

Generated all audio!

## **UPDATED TODO:**

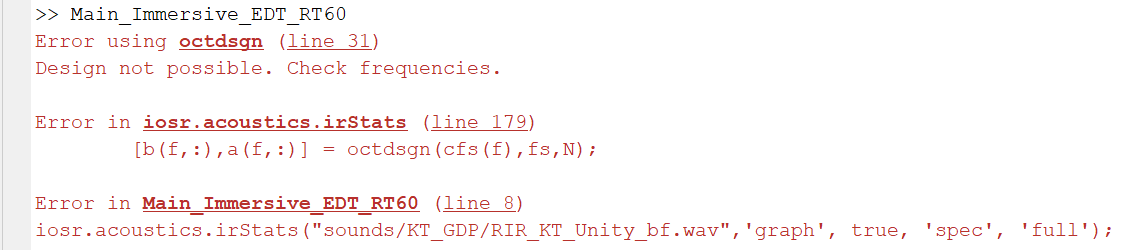
1. Do analysis using provided matlab, have proper report and findings for meeting.
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Copied the RIR analysis folder one by one for commit and organisation to remove clutter (unneeded files), and also to make sure the original form Mona is unchanged for reference. It is also easier to have everything related to this internship in one repo instead of two.  
Changed absolute paths to relative paths in Kitchen .ipynb for RIR generation form sine sweep deconvolve using Mona provided .ipynb. Using Python version 3.8.19 after asking Mona (she uses 3.8.9, major version is what matters the most imo so no less compatibility/discrepancy issue).

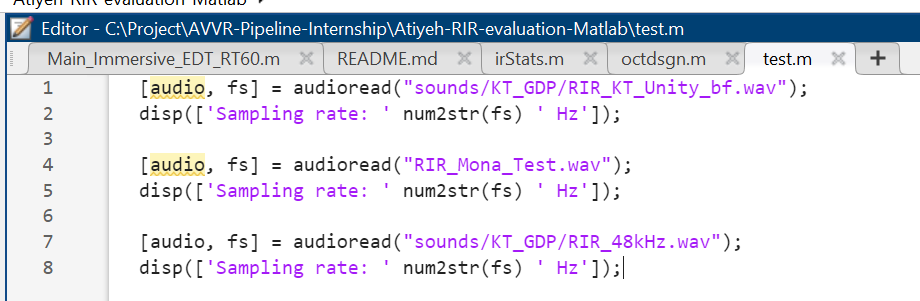
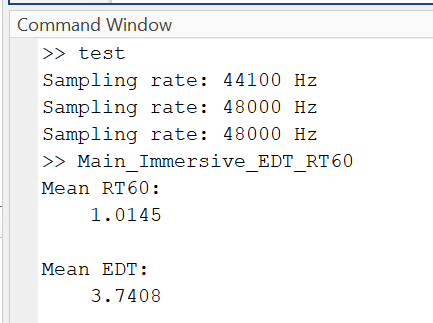
Added Atiyeh-matlab folder for sounds output path. Added Main matlab file for RT60 and EDT analysis. Now modifying it to work with new folder in sounds folder (KT\_GDP etc)

Copied dependencies folder (IoSR Toolbox, RIRs, and octave) from original repo to working repo

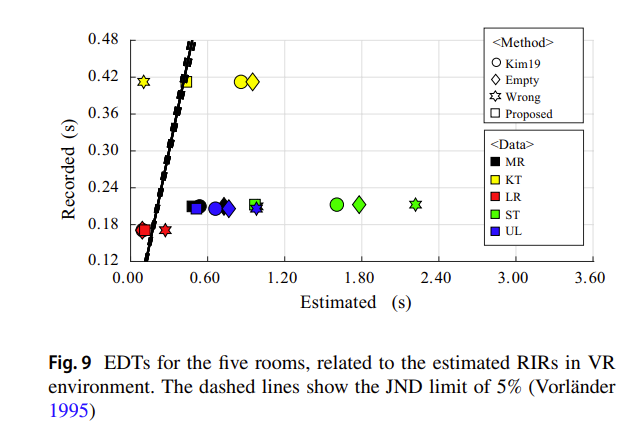
Got this error…

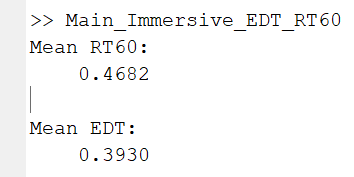


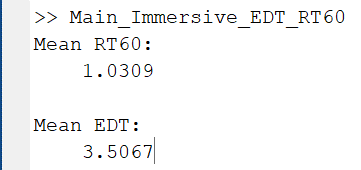
Found out the culprit, it is the sampling rate. It should be 48kHz instead of 44.1kHz. This is confirmed by looking into sampling rate of Mona audio files (cus they work), and after converting mine to 48kHz using Audacity (right click track, rate to 48kHz, then change export setting to 48kHz), it also works

 The problem is whether or not this affect the result in meaningful way, should I just rerecord everything at 48kHz in the first place?

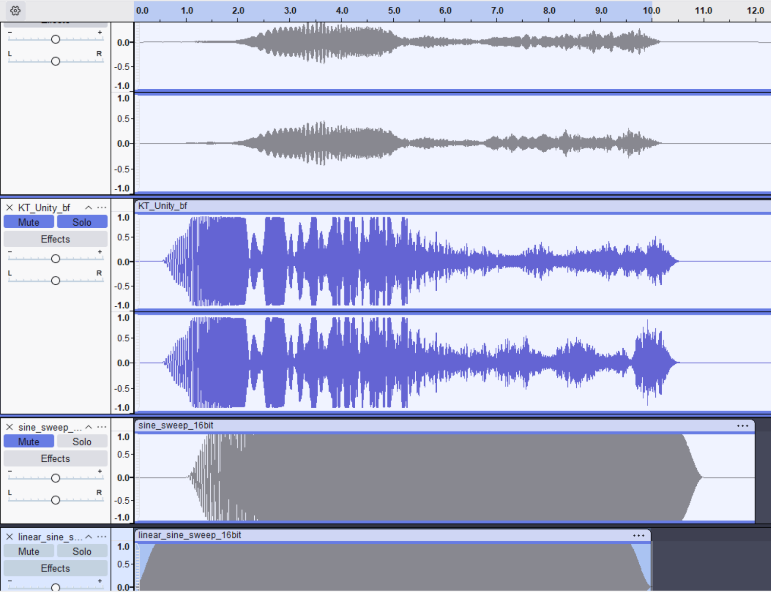
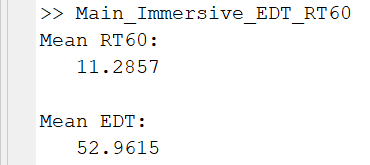
Will need to do some testing on KT first to see if I should rerecord or if its okay to just convert after.

It is most likely not alright, as seen on the right, the EDT is way off…

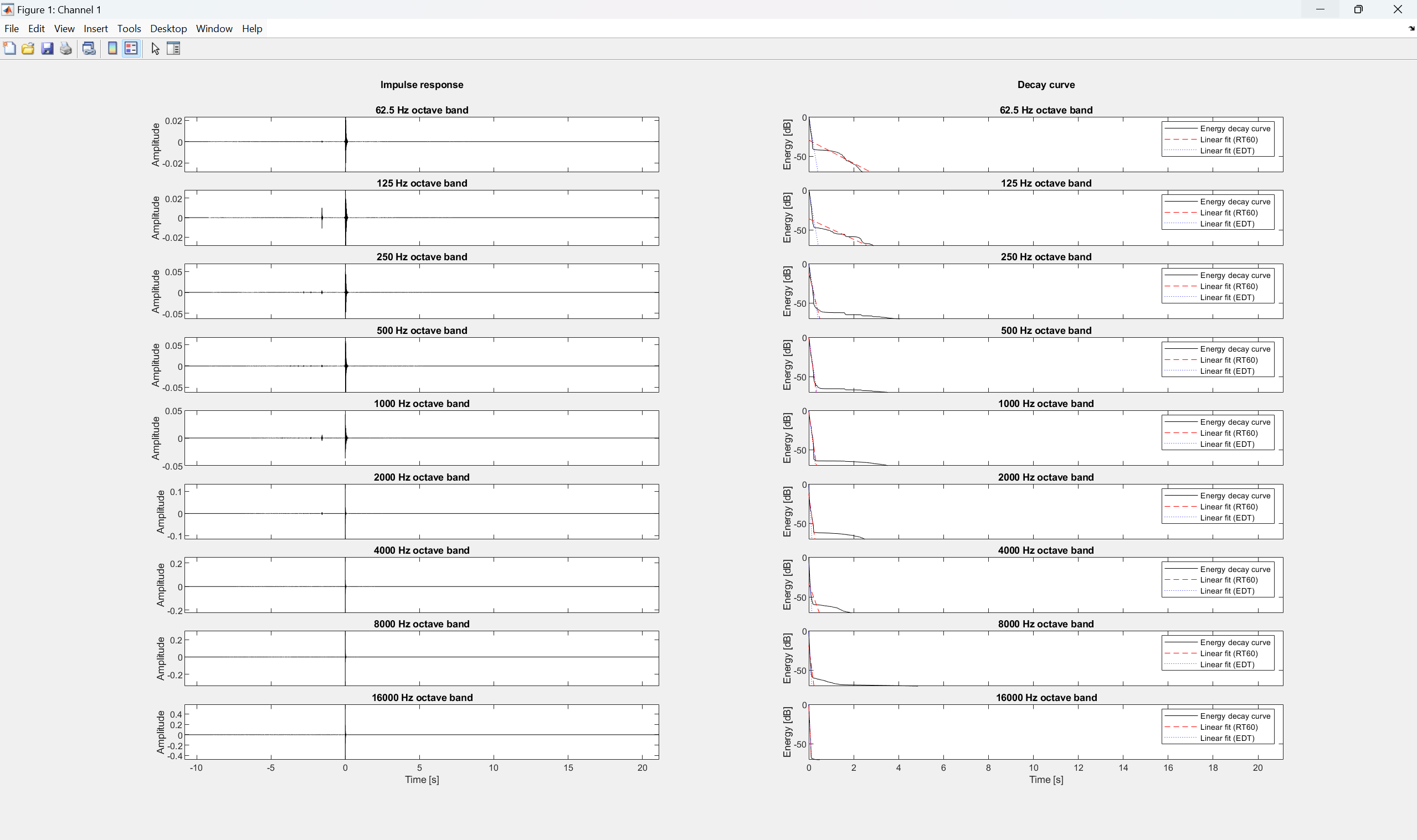
For reference this is EDT and RT60 Mona got for KT…

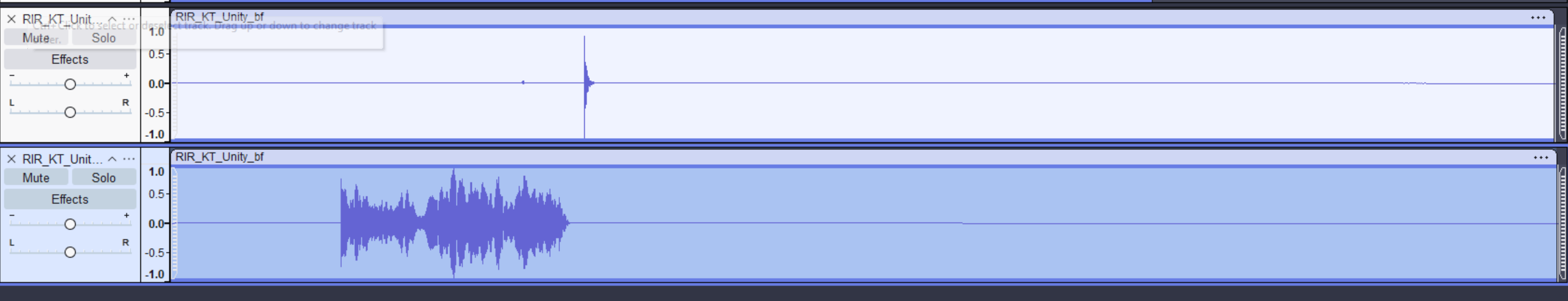
No difference…

After looking back into the waveform of generated audio and input audio etc. I think the problem is that I used wrong sine sweep. Should’ve used linear sine sweep audio file instead, as seen, the second track (Mona) starts earlier, which coincide with linear.

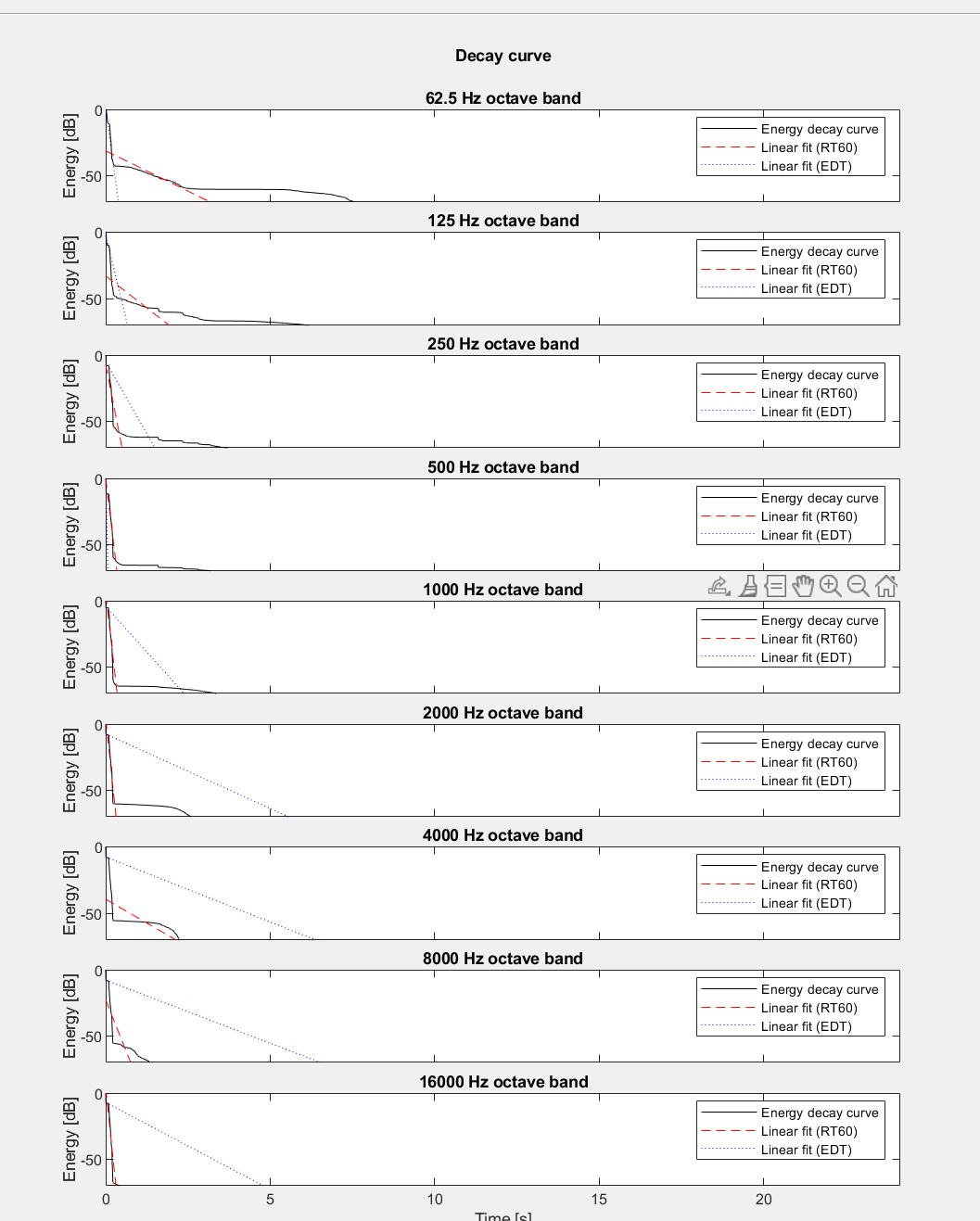
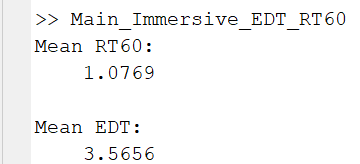
Ok nvm, this give even worse result…

Ok after looking at the generated matlab charts and also RIR on audacity.

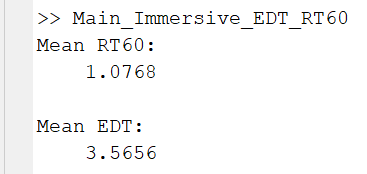




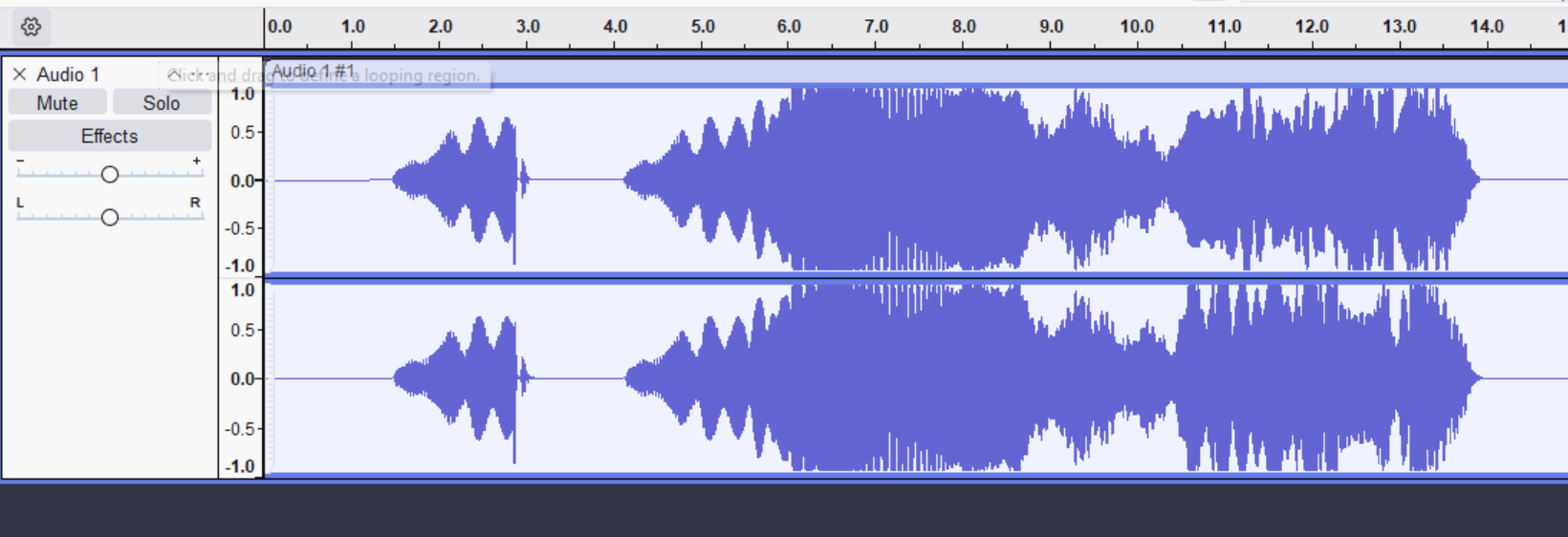
Top is correct (Mona’s), bottom is what I got, its obvious that’s the wrong file as deconvolve obviously not working to get RIR. So linear sweep is wrong.   
Lets try increasing probe number (decrease horizontal spacing in probe batch box to see if accuracy improves)

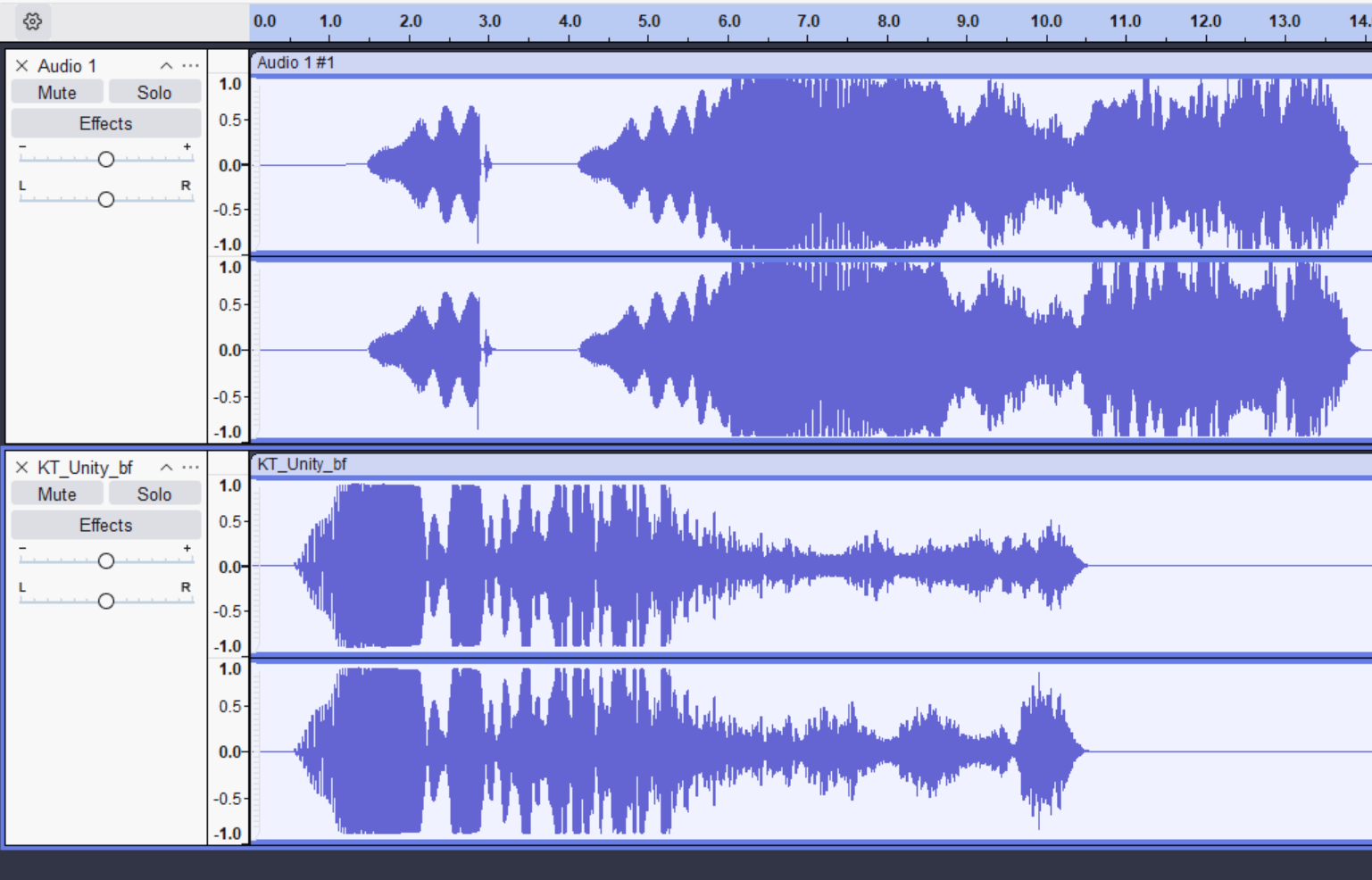
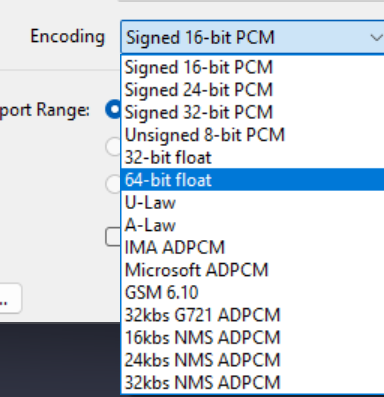
OK after looking into my generated audio EDT graph more, im confident this high EDT value is due to the bug mentioned before (where the reverb doesn’t take effect until few millisecond into the game play mode, which causes very bad reverb effect, in turn bad EDT/RT60 (theory), interesting enough, this only prevalent for higher octave band (frequencies)

Ig the fix is to delay the audio playback a bit by either adding more silence in front (I don’t want to), or not play on awake, instead call it using custom script after 1 sec of awake or something (this can also be used to internally record audio via unity scripting later instead of external software)

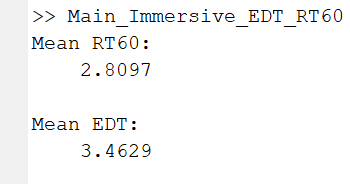
Unfortunately, even after audio delay playback, still got same value, and same EDT graphs as before…

Maybe I need to trim the start? Wavepad have this option easily and that’s what it looks to get Mona’s audio file. Also, maybe I should use higher volume (unlikely the culprit but worth checking)

Ok trimming start did nothing, but interesting enough, changing volume on audio source from 0.13 to 1 causes some frequency to cutoff… 

And when comparing to Mona’s recorded audio, notice how its shorter.. Did she remove the first part??

Another thought, maybe the encoding also matters, it was at signed 16 bit PCM all this time, but I think wavepad default/highest is at 32bit PCM, so im changing to that.

Ok even after removing the early part, and trimming, and at volume 1.0 instead of 0.13, I still get very wrong, in fact it is now worse…

There must be something wrong somewhere but im tired so off for now…