Signal Analysis – Mario

By:

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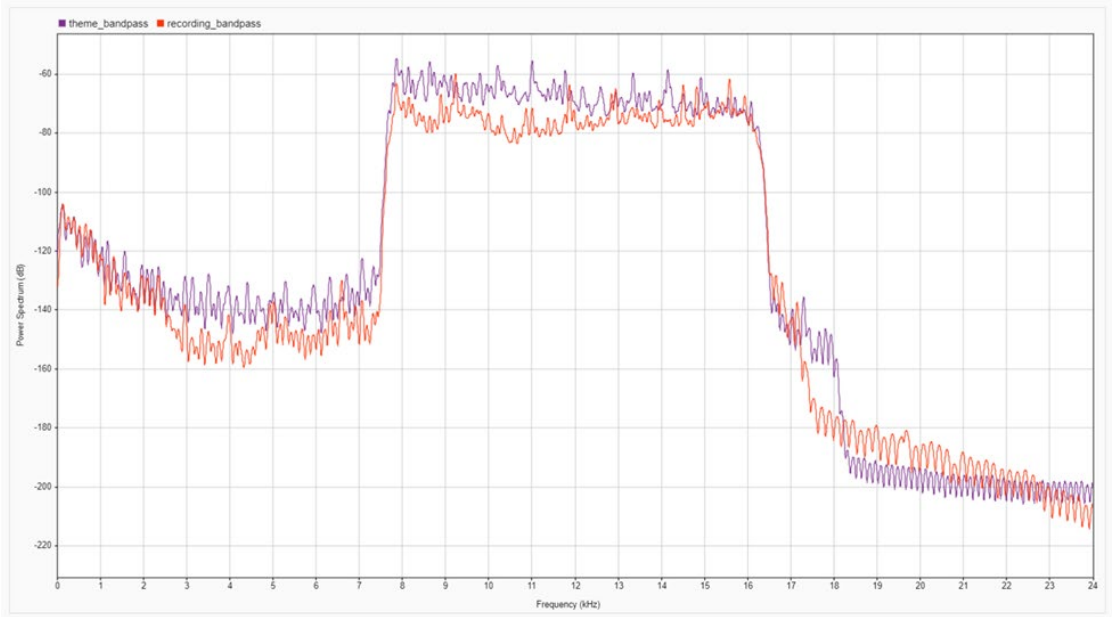
Intro

- Compare recorded audio and downloaded audio file of the Super Mario Bros game theme song
  - Recorded audio has background game sounds (collecting coins, jumping, stomping on goombahs, etc.)
- Pass audio files through low-pass filter, band-pass filter, and high-pass filter using MATLAB
- Isolate background game sounds to clean the signal of recorded audio and compare to downloaded audio file

Expected Outcome

- Attenuation in the recorded audio signal due to loss of signal and quality of signal

- Recorded audio signal consists of some additional components from background sound

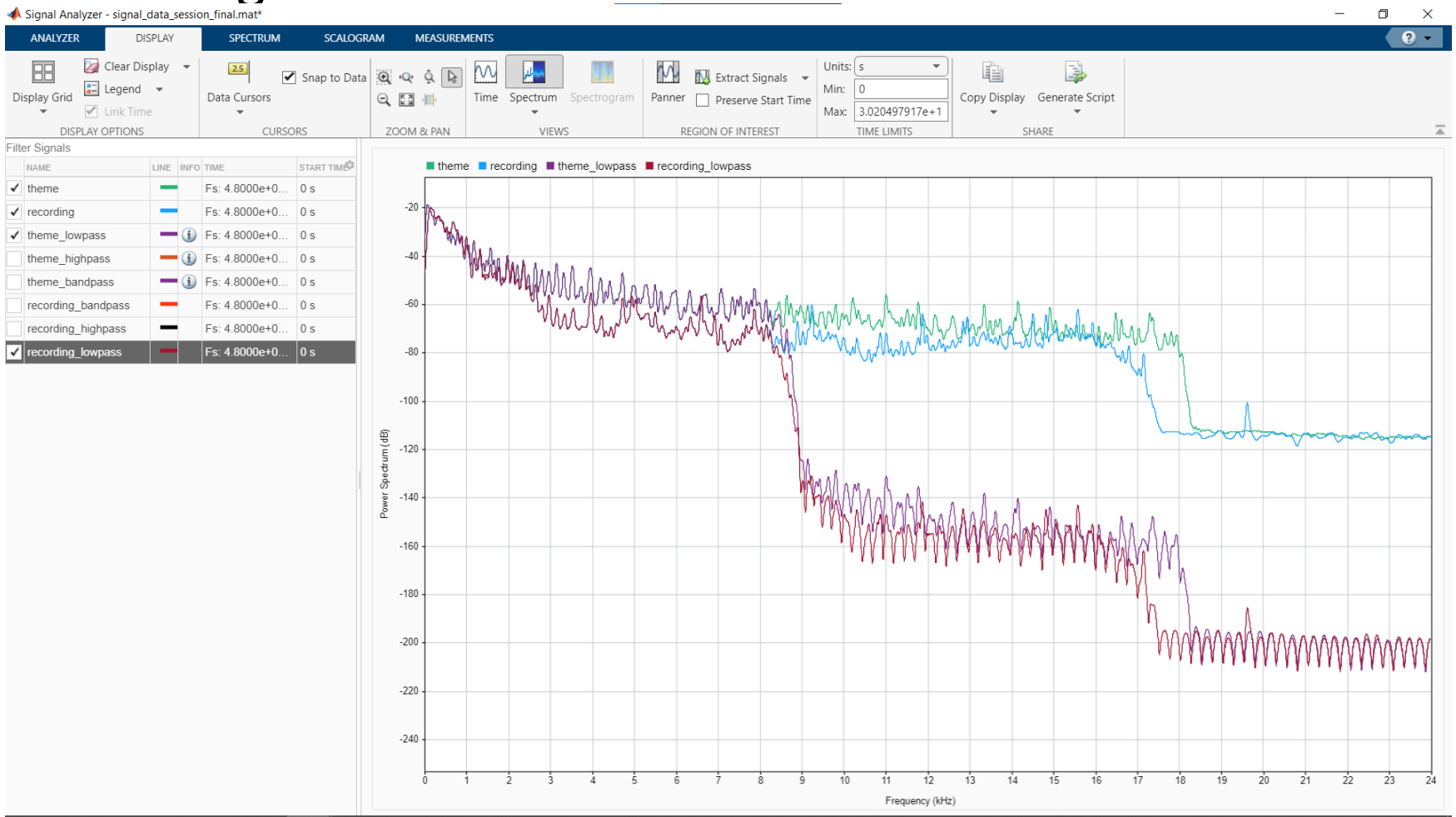


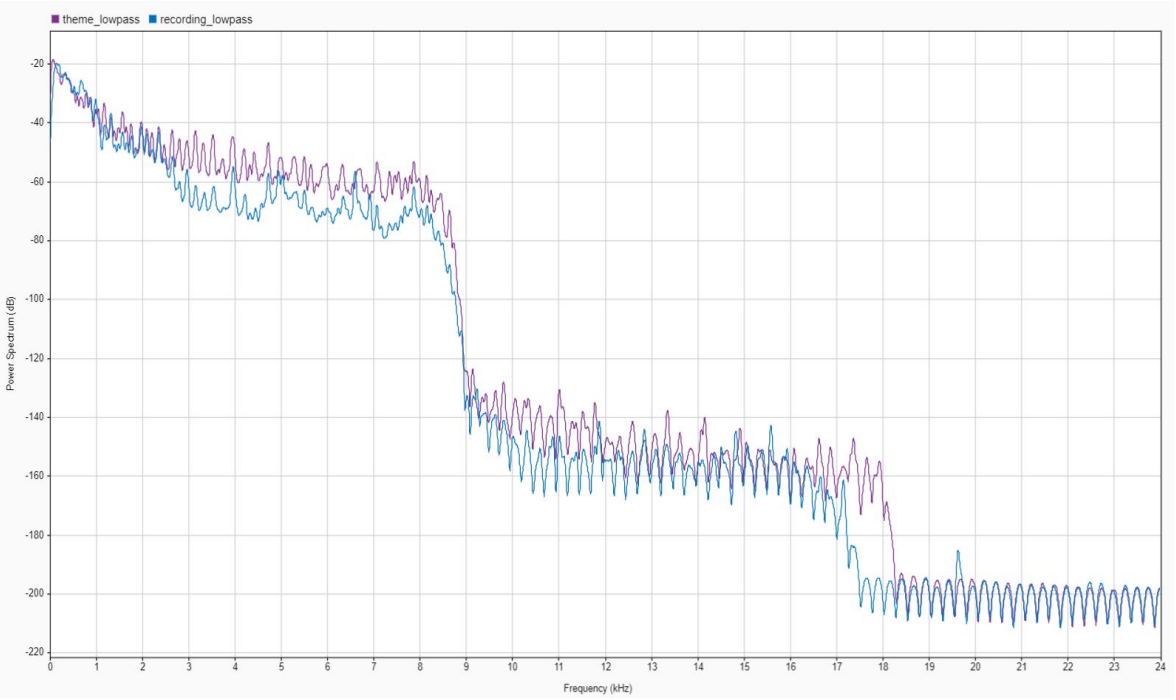
Signal Acquisition

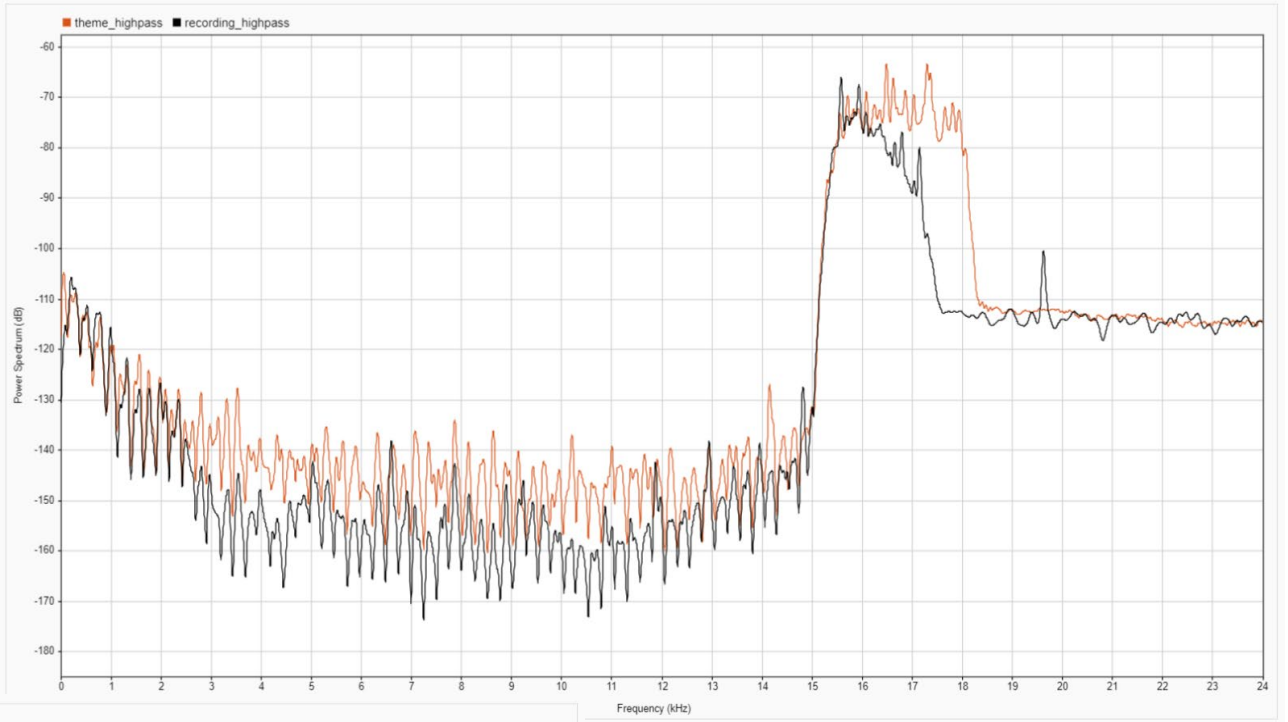
- Played World 1, Level 1 of Super Mario Bros on 3DS at maximum volume
- Used iPhone to record sound
- Uploaded recorded audio file to computer
- Downloaded original audio file from internet archives

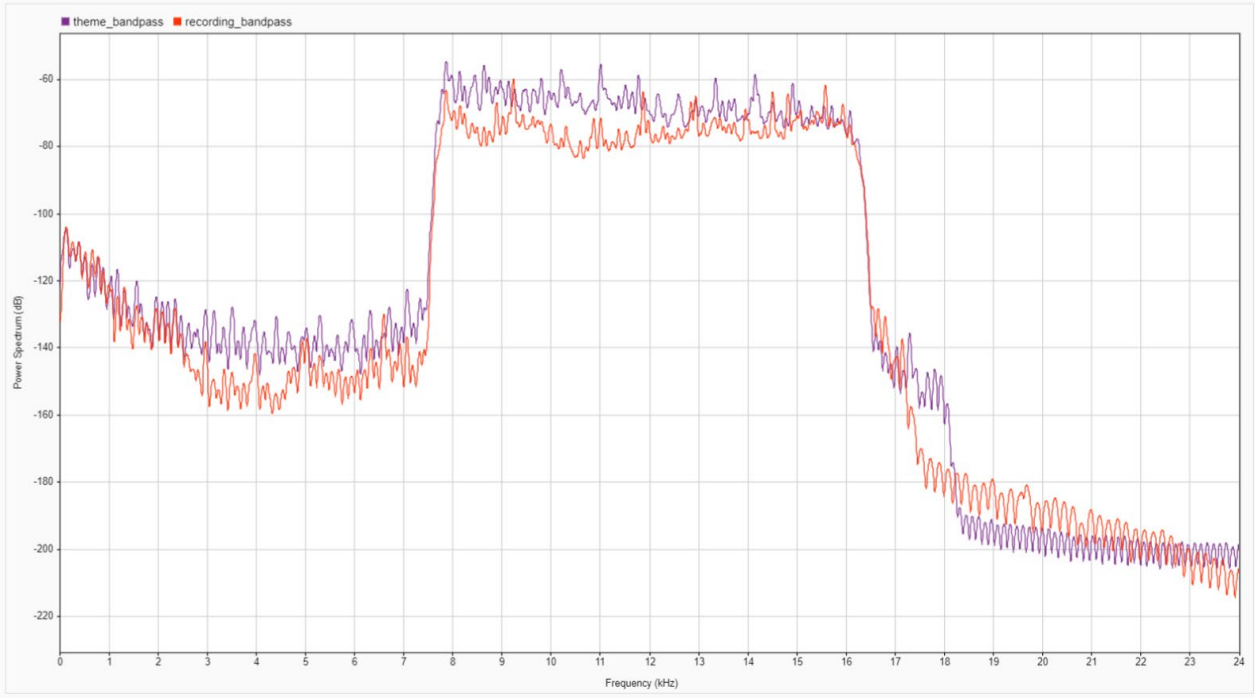
Signal Analysis

- We used the MATLAB signal analyzer tool from the signal toolbox.
- Both signals were trimmed to the same length for proper analysis.
- Filtered the signals with included filters.









Left: Low-pass filter
Right: High-pass filter
Bottom: Band-pass filter

Summary

- Low pass

Strong magnitude in the beginning, reduce the magnitude as the frequency goes up.

- High pass

Low magnitude in the beginning, increase the magnitude as the frequency goes up

- Band pass

Low magnitude in the beginning, increase the magnitude first, then decrease.