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| --- | --- | --- | --- | --- | --- | --- |
| Title of Musical | Frozen | Frozen | Come From Away | Come From Away | The Book of Mormon | The Book of Mormon |
| Title of Song | For The First Time In Forever | For The First Time In Forever | Prayer | I Am Here | Hello! | Sal Tlay Ka Siti |
| Artist/s | Kristen Bell and Idina Menzel |  | Chad Kimball and ‘Come From Away’ Company | Q Smith | Andrew Rannells, Josh Gad, Rory O'Malley, Kevin Duda, Clark Johnsen, Justin Bohon, Brian Sears, Scott Barnhardt, Benjamin Schrader, Lewis Cleale & Jason Michael Snow | Nikki M. James |
| Composer/s | Robert Lopez and Kristen Anderson-Lopez | Robert Lopez and Kristen Anderson-Lopez | Irene Sankoff and David Hein | Irene Sankoff and David Hein | Robert Lopez, Matt Stone and Trey Parker | Robert Lopez, Matt Stone and Trey Parker |
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| Genre | Musical |  | Folk Rock Musical | Folk Rock Musical | Musical Comedy | Musical Comedy |
| Source | iTunes |  | iTunes | iTunes | iTunes | iTunes |
| File/Audio Format | Wav |  | Wav | Wav | Wav | Wav |
| Number of Channels | 2 |  | 2 | 2 | 2 | 2 |
| Sample Rate | 44. 100Hz |  | 44. 100Hz | 44. 100Hz | 44. 100Hz | 44. 100Hz |
| Bit per second | 256kbps |  | 256kbps | 256kbps | 256kbps | 256kbps |
| Duration | 3mins 45secs |  | 3mins 26secs | 1min 48secs | 2mins 52secs | 3mins 42secs |

Advantage of time-frequency analysis over a wave-form based analysis

As notes have to be played at certain frequencies to be heard and to produce the same volume of sound using time-frequency analysis means an estimation of the notes played in the piece can be extracted. In wave-form analysis it is much harder to see clearly the frequency and it is therefore much harder to guess the notes being played. Time-frequency also allows deeper analysis of the most common frequencies and it gives a clear view of the piece as a whole. Time-frequency can also easily show the fading of musical parts such as voices over a long period of time. Wave-form based analysis also requires looking at the waves in close detail, zooming in on the waves to really see the wave properly. However, with time-frequency analysis the colours and clear points highlighted can be seen without having to look up close at the image. The power of the frequency can also be easily determined from time-frequency analysis. It is clear to see where the notes lie in the music this is especially true in the Hello spectrogram image as the initial doorbell sounds can be really clearly seen and identified at the very beginning of the piece. This cannot be extracted from the wave-form analysis as the peaks are not obvious and they do not show the frequencies which help to identify the notes.