

OptoFidelity

**iPhone 6 and iPhone 6 Plus:
Video Playback Performance and Audio-Video
Synchronization**

Report

1. Introduction

Apple has launched new iPhone generation, the 4.7" iPhone 6 and 5.5" iPhone 6 Plus. The larger screen allows users to have better visual experience on the iPhone, especially on the video playback. Apart from having bigger screen, both iPhone 6 and iPhone 6 Plus have included the new 64-bit A8 chip for faster processing powers. This can improve the video playback performance on HD video sources and streaming performance.

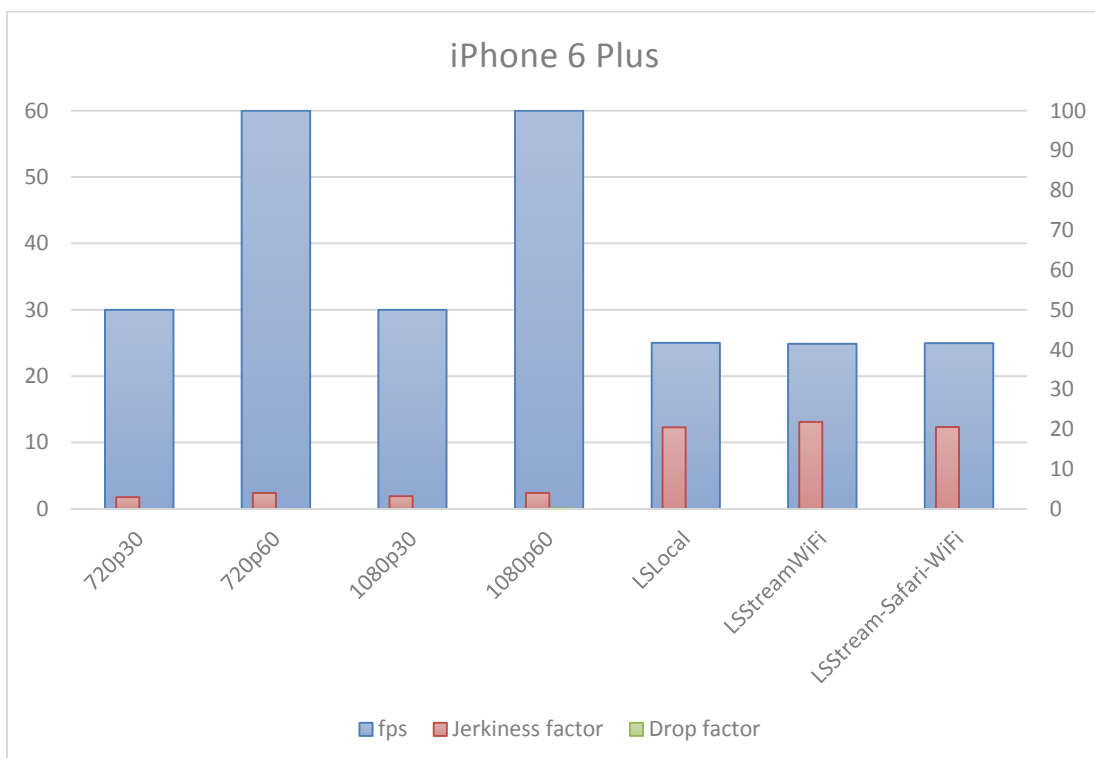
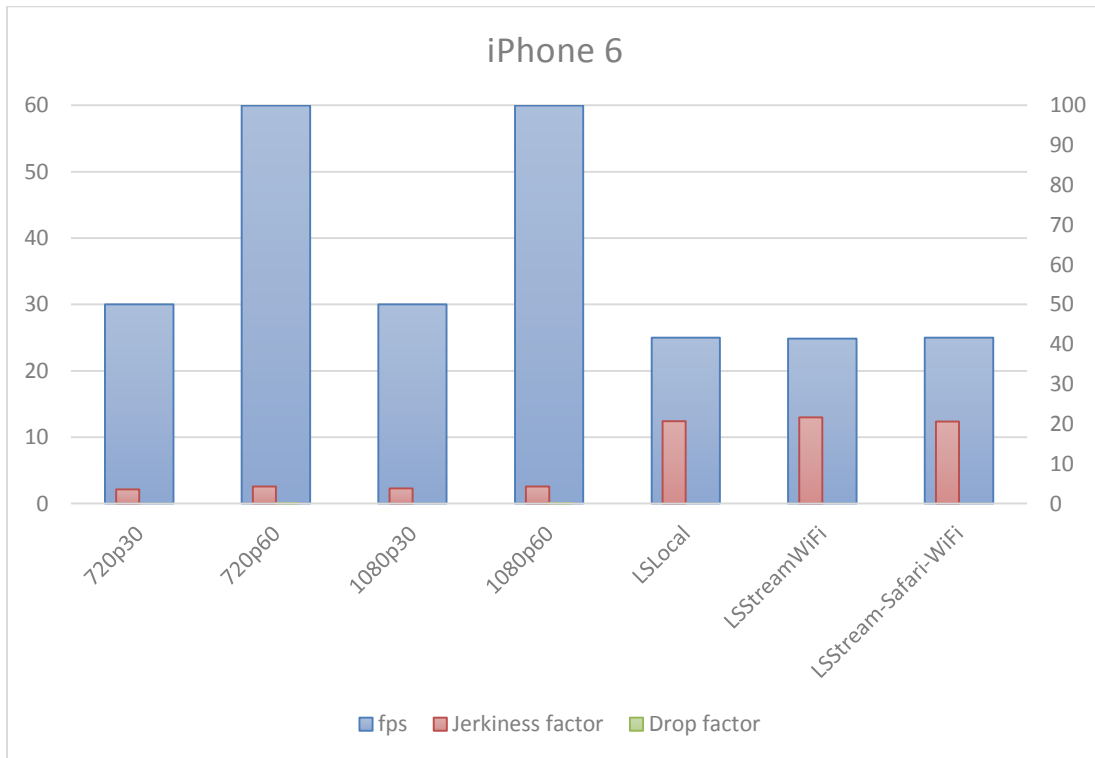
In this report, OptoFidelity tested the new iPhones about the video playback performance and audio-video synchronization by OptoFidelity Video Multimeter. Video Multimeter is easy to use, non-intrusive solution for measuring video playback performance. It can be used either as a stand-alone, self-contained measurement device, or as a part of automated test system. The test file used local video HD video files, streamed test video on YouTube and streamed test video on Safari (YouTube website). This test is divided into four main sections:

- 1) Video playback performance under low or high background usages
- 2) The difference between WiFi and 4G on streaming video
- 3) The importance of video applications on video playback performance
- 4) Comparison between iPhone 6 and iPhone 6 Plus

2. Situational Reviews

Firstly, recent news argues the use of different NAND chip on iPhone will affect the storage performance. It is controversial on TLC chip in iPhone 6 that has shorter life cycle and poor read/write performance. The poor storage performance become significance during high system loads and rams usages. Hence, the test will take account of different background usages in order to how it can affect the video playback performance and audio-video synchronization. Secondly, the popularity of 4G allows better streaming video experience. It may have disparate streaming performance between 4G and WiFi because of different system resources allocation. Thirdly, the video application is a major factor to affect the quality of video playback performance including streaming video. The test will also consider these factors finding which can affect the video playback performance. Finally, the only differences between iPhone 6 and iPhone 6 Plus are bigger screen and higher resolution on iPhone 6 Plus. Higher resolutions will require more system resources to process. iPhone 6 Plus may performs differently on video playback compare with iPhone 6.

Graphs:



Analysis 1: Video Playback Performance

There was no noticeable difference among playing all testing local video files, streaming video on YouTube and Safari under either low or high background usages. The average fps was very stable during the playback. Although there was only 1GB ram on iPhone 6, the allocation of system resources on iOS 8 given a decent job to enable smooth video playback under high background usages.

The difference performance between WiFi and 4G on streaming video was depending on the video applications. Using 4G to stream video on YouTube app and Safari gave a surprise result. Streaming video with WiFi was stable on both YouTube app and Safari but it became different under 4G condition. The 4G signal was affected due to busy network during the testing period. Hence, the video quality was forced to adjust by the application. The video playback performance on YouTube app suffered from serious fps drop, the playback quality was unstable. However, Safari was streaming the video smoothly under the same network condition, no fps drop was found. It could explain the video application was key to enable better streaming video performance instead of the hardware.

There was no significance different between iPhone 6 and iPhone 6 Plus on video playback performance testing. Both devices were having the same average FPS on the same test video. Despite of higher screen resolution, the processing power of A8 chip is sufficient to adapt more data flow from extra pixels.

Analysis 2: Audio-Video Synchronization Performance

The iPhone 6 was found with noticeable audio latency on both local video APP and YouTube APP. iPhone 6 was a good device to process video however it was weak on audio-video synchronization. Under the local video test with Video APP, iPhone 6 was recorded with average -41.6 ms audio latency. Then, latency problem became more serious with the use of YouTube APP. iPhone 6 was recorded with average -94.0 ms audio latency. The prior one belongs to moderate performance and the later one belongs to poor performance as they fall into human noticeable limit according to ITU-R BT.1359-1. The situation is completely different on the Safari. iPhone 6 was recorded with average -10.6 ms audio latency that is an acceptance limit according to ATSC IS-191. This is an interesting result that native video application underperformed with the browser. The processing power of A8 chip is proved in the video playback performance however the video application is acting as an agent to exchange data with the system. This test could help Apple Inc. and video application developer to understand the current problem on audio-video synchronization. Similar to the result of video playback performance, both iPhone 6 and iPhone 6 Plus also having similar result in audio-video synchronization performance.

Conclusion:

iPhone 6 and iPhone 6 Plus perform well on video playback performance however there is a difference on audio-video synchronization. The selection of video application is key to maximize full video experience on iPhone 6 and iPhone 6 Plus. Safari is the best APP to watch streaming videos on YouTube with similar video performance and the best audio-video synchronization performance. Although Safari allows user to have better video watching experience, the usability is relatively poor compare with the YouTube APP. This problem may be fixed in the future update on iOS or YouTube APP, OptoFidelity will keep an eye on it then give another report to the public. Overall speaking, iPhone 6 and iPhone 6 Plus are both good on playing HD videos with highly stable FPS and bigger retina screen.

