SURPRISING VARIATION IN LIP SYNC WITH POPULAR MOBILE DEVICES

- Case study: video lip sync measurements of popular tablets and phablets

Today, the share of mobiles and tablets in online video views has increased significantly (Business Insider Intelligence 2014). In addition to deviation and speed, one other key feature of video performance for the user is lip sync – a synchronized timing of audio and video. For manufacturers, lip sync is a serious problem in digital broadcasting technologies and iP-based streaming.

We measured the lip sync of several popular tablets/phablets. It turned out that only a few devices had good lip sync. Most devices, barely, even met moderate performance, and exhibited a human noticeable time difference between the video and audio. The best performer at the test was Microsoft Surface 2.

Test setup

The lip sync of tablets and phablets were mßeasured by using the **OptoFidelity Video Multimeter** measurement device. It *is a professional measurement solution for measuring the true and objective video playback performance of* a *mobile, tablet or any multimedia device. The Video Multimeter also has an option to measure lip sync. The* video was measured optically from the display and the audio electronically from the AV connection. The measurement is not bound to any technology, software or hardware, and carries out the analysis from the user point of view.

In the test, “audio early” and “audio late” were measured continuously in milliseconds, over a 10 second test video. Every lip sync measurement was repeated several times, and an average score was taken to the overall results. The results were generated for three categories, according to general ATSC and ITU standards.

The measurement were carried out by using a test video created by OptoFidelity Test Video Generator:
https://www.youtube.com/watch?v=X45XFaDn1UQ&list=PLg3J_XlZzhnU3V1rCzuYVl9yNP6FypxiL

Test result categories:

- Green (Good): within -15 .. +45 msec (Acceptance limit, according to ATSC IS-191)
- Yellow (Moderate): within -45 .. +125 msec (Human noticeable limit, according to ITU-R BT.1359-1)
- Red (Poor): over -45 .. +125 msec (Human noticeable limit, according to ITU-R BT.1359-1)

In the test results the whole end-to-end chain of lip sync can be seen. The chain starts with YouTube encoding after the original, zero-delay test video has been uploaded. Although for the overall results, the performance of the device under test has most effect.

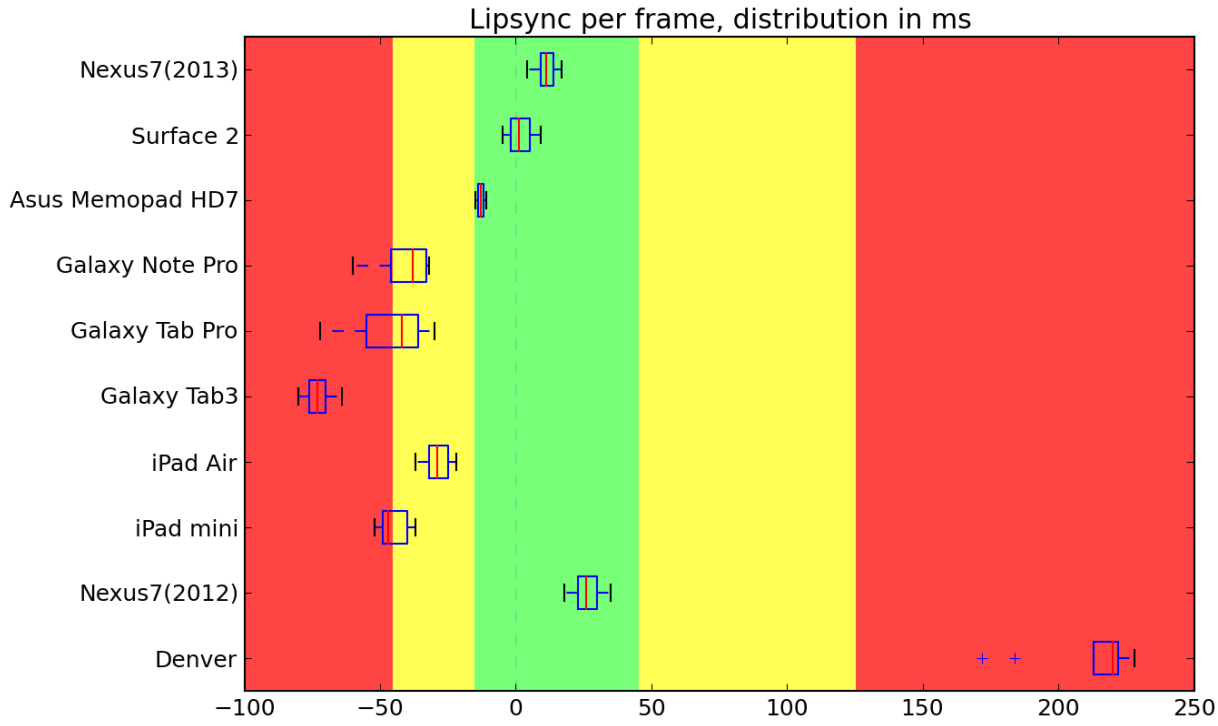
Devices under test (DUT)

The devices under test were selected randomly and they were selected among some of the most popular devices and most common operating systems.

- Denver 10.1” TAC-10011 tablet
- Asus Nexus 7 (2012)
- iPad mini
- iPad Air
- Samsung Galaxy Tab3
- Samsung Galaxy Tab Pro
- Samsung Galaxy Note Pro
- Asus Memopad HD7
- Asus Nexus 7 (2013)
- Microsoft Surface 2

Results

Only four devices out of ten had a “good” performance, according to the test results. Other devices had such an early or late lip sync that that user could notice that the audio is not synchronized. The device with the best audio-video synchronization was Microsoft Surface 2. The average of the Surface 2 results reached the category “good”, with a very small dispersion for human perception. Other good performance devices were Asus Nexus 7 (both 2012 and 2013 models) and Asus Memopad HD7. Two devices had a poor performance, with more than -70 ms early audio (Galaxy Tab 3) or more that 200 ms late audio (Denver 10.1” TAC-10011).



(Image 1: OptoFidelity Video Multimeter LIpsync per frame results)

SUMMARY

As tablet TV, mobile media and second-screen viewing continue to grow, manufacturers has to solve how to offer a good video performance experience for the user. The lip sync and early or late audio are very easily noticeable features for the user and determine user experience. Especially important feature lip sync is for sports video streaming which is reported to have up to 640 % annual growth (cmo.com/online video benchmark report 2013). When different sounds and hits (golf, baseball, ice-hockey) are an essential part of the user experience, the audio-video synchronization is also a key feature of the mobile devices performance.

When taking this trend in mobile video streaming into account, several brands and the most popular devices have surprisingly noticeable problems with lip sync.

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THE COMPANY BEHIND THE RESULTS

OptoFidelity is a Finnish, nonaligned high technology company, specializing in test and measurement automation. Our focus is on non-intrusive testing and measuring devices, from the end-user point of view.

Our mission is to fight against poor manual testing and show that investments in the right testing automation can pay back in more qualified applications and devices, as well as a more satisfied end-user user experience.

We have several test systems and testing tools that can be used separately or for building a complete, fully automated test system. Most of our products are scalable and can also be integrated to the customer's own testing automation system or our partners' script test or software testing tools.

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