Follow-Up Test Report for Apple iPad, model A1219

Andrea Avila, MPAA Office of Technology
June 24, 2010

TEST SUMMARY

Apple’s Video Player application, which is pre-installed on the iPad, when playing legally acquired content was able to generate CGMS-A signals for the progressive scan signals sent through the component video cable. The progressive scan signals contained CGMS-A bits that were set correctly: inhabiting either a “Copy Never” (NTSC) or “Copy No More” (PAL) state. Yet, when the composite video cable was connected, there were no CGMS-A signals for either the NTSC or PAL video modes. The lack of CGMS-A signals from the composite cable was a trend. When testing 3rd party iPad applications (such as Netflix and Yahoo) and websites (such as NYTimes.com) that played streaming video (which was viewed using the Quicktime player) CGMS-A signals were present only when the component video cable was connected. The CGMS-A bits observed for the 3rd party applications and websites demonstrated a state of “Copy Control Not Asserted” (equivalent to Copy Freely).

Apple also offers a VGA cable to allow Users to output video. While CGMS-A is not sent through a VGA cable, we were curious to see how the video was handled when sent through the VGA cable. When using the Apple Video Player application to send an iTunes movie through the VGA cable we received the following message: “Cannot Play Movie. The connected display is not authorized to play protected movies”. However, when we played an iTunes TV show we did not receive this message and the video was allowed to pass through the VGA cable. The remaining media access points, 3rd party iPad applications and websites, allowed video to be sent through the VGA cable.

With respect to the iPad Software Development Kit (SDK), we continue to read through it and thus far we have not discovered any sections within the SDK that prevents 3rd party applications (such as Netflix) or streaming video websites from setting the right values for the CGMS-A bits. Also, we are still investigating whether the applications themselves are not making the calls required to set the correct CGMS-A bits through an available iPad SDK Application Programming Interface (API).

For the instances when the video was able to be output through the video cables it was observed that the video could only be viewed on one display: either the iPad or a TV. So, when the video cable was connected from the proprietary connector to a TV, the iPad’s video screen reacted by displaying a black screen or a still image of the selected content.

**Next Step(s):**

* Continue to read through SDK

COMPANY BACKGROUND

Apple Inc. creates a variety of personal computing and media players. Apple is famous for creating the “i” line of products: iMac, iPod, iPhone, and now the iPad. The latter three of these products are intended for purposes of portability. To expand the device’s functionality, Apple also allows the User to connect a variety of cables to their proprietary output connector. One of the cables that the User can purchase is a video cable to view content on an alternate display.

Please note that Apple recently overtook Microsoft in market capital, and is one of the largest technology companies in the world today. This also makes it the largest IT company in forums like DVD CCA.

Apple Inc. is located at:

1 Infinite Loop

Cupertino, CA 95014

408.996.1010

U.S. iPod, Mac and iPad technical support:

(800) APL-CARE (800-275-2273)

Website: www.apple.com

Unit Information:

**iPad, model A1219**

Unit IDs: QG & QJ

Storage Capacity: 64GB & 16GB

Manf: Apple Inc.

Manf Date: Not Marked, but debuted in 2010.

Test Date(s): 6/9/10 – 6/23/10

Tester: Andrea Avila

CGMS-A TESTING

Copy Generation Management System over Analog (CGMS-A) is a signaling system designed to protect analog signals from being copied. To test CGMS-A, we first connected the proprietary Apple connector of our Apple video cable sets to the iPad’s proprietary output. Then, we attached the video connectors of the Apple video cable sets to our test station. The test station consists of a series of broadcast and waveform monitors that allow us to view 1) if a CGMS-A signal is present and if so, then 2) enable us to decipher the CGMS-A bits.

The component video cable triggers progressive scan resolutions from the iPad: 480p and 576p. The composite video cable triggers interlaced resolutions from the iPad: 480i and 576i. To change the output resolution between 480 and 576, go to the “Video” submenu in the “Settings” menu and select “NTSC” for 480 resolutions and “PAL” for 576 resolutions.

Since the iPad does not have a disc drive, content was acquired from the following access points:

1. Pre-installed Applications provided by Apple – video content was purchased, saved onto the iPad’s internal hard drive, and then played via the Apple video Application.
2. 3rd Party Application – online content is directly accessed by an iPad application designed by a 3rd party, such as Netflix.
3. Website – online services that stream video content.

List of content access points, sources and titles used for testing: 16

(1): From pre-installed application(s) provided by Apple

1. Apple Video Player, Standard Definition (SD) iTunes content\*
2. Apple Video Player, High Definition (HD) iTunes content\*\*
3. Apple Video Player, Consumer Digital Copy (SD) of “Juno” \*\*\*
4. Apple Video Player, Ripped digital copy (SD) of “Clue” \*\*\*

(2): From the internet accessed via a 3rd Party Application

1. Netflix, SD movie: “The Proposal”
2. Netflix, HD movie: “The Dish”.
3. Yahoo, SD Clip of world news
4. YouTube, SD Clip of Jimmy Kimmel show

(3): From Websites

1. Amazon.com, video on demand
2. Funnyordie.com, SD Clip of Gulf Leaks spoof
3. LATimes.com
4. NYTimes.com, SD Clip of “Timecast”
5. Reuters.com, SD Clip of “U2”
6. TED.com, SD Clip of Johanna Blakley presentation
7. Vimeo.com, SD Clip of “Paper Dreams”
8. YouTube.com, SD Clip of Jimmy Kimmel show

\* For tablet QG, we used the iTunes movie: “Up”. For tablet QJ we used the iTunes movie “Wall-E”.

\*\* For tablet QG we used the iTunes movie: “Star Trek”. For tablet QJ we used the iTunes TV show: “Dr. Horrible’s Sing-Along Blog”.

\*\*\* Due to permissions on QG, this content was only tested on QJ. The digital copy of “Juno” was included with the purchased DVD version, while the digital copy of “Clue” (DVD was purchased from a store) was generated using an iPad conversion software.

Test Results for Tablet #1 (QG)



Test Results for Tablet #2 (QJ)



TEST SET A: Content accessed by the Apple Video Application(1)

For interlaced signals, the CGMS-A signal was absent.

For progressive scan signals, when viewing purchased digital content, CGMS-A content protection signals were observed and set to “Copy Never” or “Copy No More”. The results are as listed below:

* **525i (480i) – Line 20/283 through Analog Output –** Signal is absent.
* **525i (480i) – Line 20/283 CRCC** – Signal is absent.
* **525i (480i)** - **Line 21, Field 2** (**Line 284) through Analog Output** – Signal is absent.
* **525p (480p) – Line 41 CRCC** – Correct.
* **525p (480p) – Line 41** – Correct
	+ The CGMS-A bit message for Line 41 was {1 1} = “Copy Never”.
	+ Signal amplitude was within the range of approximately 66.7% to 66.8%
		- According to CEA-805 the signal amplitude should be 70% +/- 10%.
* **625i (576i) – Line 23 through Analog Output** – Signal is absent.
* **625p (576p) – Line 43** – Correct
	+ The CGMS-A bit message for Line 43 was {0 1} = “Copy No More”, meaning ‘no more’ or in this case ‘no’ copies are permitted.
	+ Signal amplitude was approximately 468mV
		- According to IEC 62375 the signal amplitude should be 500mV +/- 25mV

TEST SETS B & C: Content accessed by 3rd Party Applications(2) and Websites(3)

For interlaced signals, the CGMS-A signal was absent.

For progressive scan signals, it was discovered that both the 3rd party iPad applications(2) and the websites(3), generated CGMS-A signals, but did not assert either a “Copy Never” or “Copy No More” state for the bits. Observed results were as follows:

* **525i (480i) – Line 20/283 through Analog Output –** Signal is absent.
* **525i (480i) – Line 20/283 CRCC** – Signal is absent.
* **525i (480i)** - **Line 21, Field 2** (**Line 284) through Analog Output** – Signal is absent.
* **525p (480p) – Line 41 CRCC** – Correct.
* **525p (480p) – Line 41** – No copy protection
	+ The CGMS-A bit message for Line 41 was {0 0} = “Copy Control Not Asserted”.
	+ Signal amplitude was within the range of approximately 66.3% to 66.8%
		- According to CEA-805 the signal amplitude should be 70% +/- 10%.
* **625i (576i) – Line 23 through Analog Output** – Signal is absent.
* **625p (576p) – Line 43** – No copy protection
	+ The CGMS-A bit message for Line 43 was {0 0} = “Copy Control Not Asserted”.
	+ Signal amplitude was within the range of approximately 463mV to 468mV
		- According to IEC 62375 the signal amplitude should be 500mV +/- 25mV

Note: We tested all the applications at all the available content resolutions.

PRODUCT DESCRIPTION

The iPad debuted in the Spring of 2010 and has a starting price tag of $499 for the 16GB version with WiFi.

The promotional page from the Apple website appears as the following:

******

The iPad measures 7.47” wide x 0.5” deep x 9.56” high, with a weight of 1.5lb.



Other Technical Specifications:



 