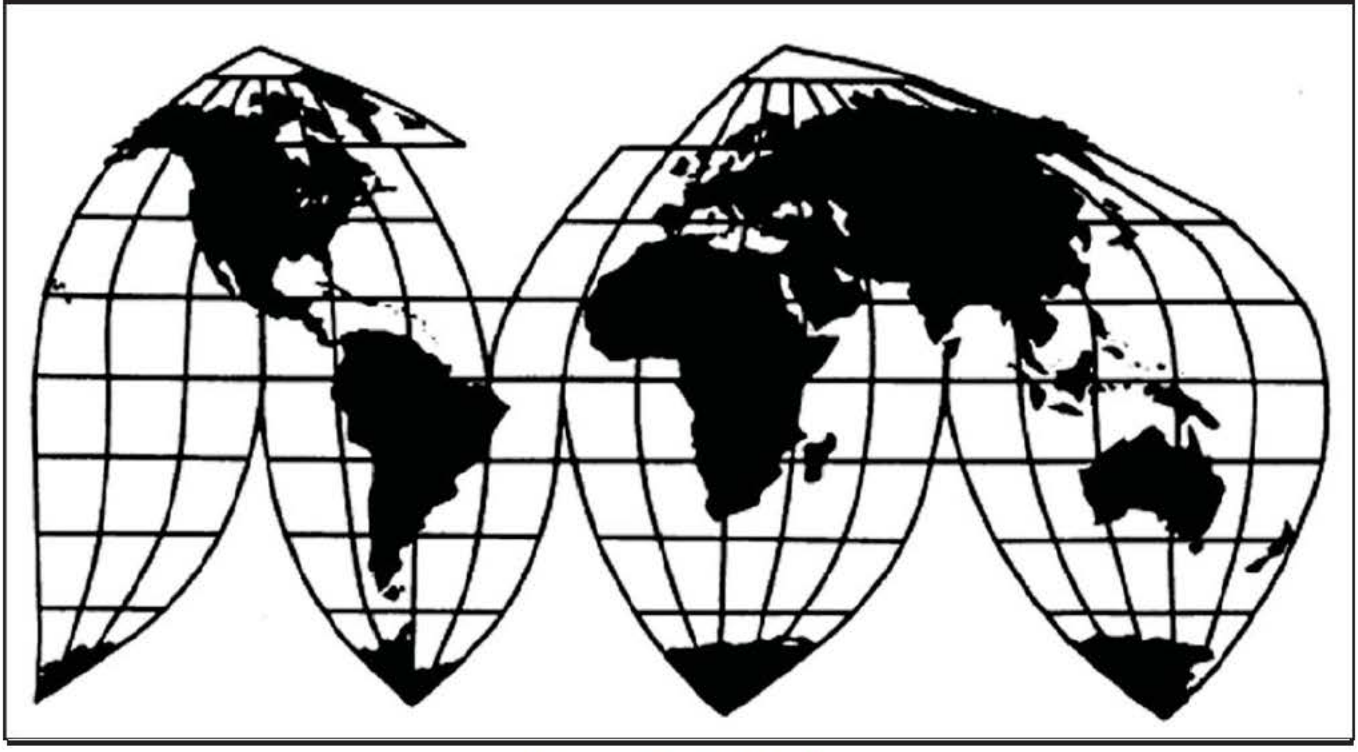
In the Matter of

CERTAIN ELECTRONIC DEVICES WITH IMAGE PROCESSING SYSTEMS, COMPONENTS THEREOF, AND ASSOCIATED SOFTWARE

Investigation No. 337-TA-724
Volume 1 of 2

Publication 4374 **February 2013**

U.S. International Trade Commission



Washington, DC 20436

U.S. International Trade Commission

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UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C. 20436

In the Matter of **CERTAIN ELECTRONIC DEVICES WITH IMAGE PROCESSING SYSTEMS, COMPONENTS THEREOF, AND ASSOCIATED SOFTWARE**	**Inv. No. 337-TA-724**

NOTICE OF FINAL COMMISSION DETERMINATION OF NO VIOLATION AND TERMINATION OF THE INVESTIGATION

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has determined that no violation of section 337 of the Tariff Act of 1930 (19 U.S.C. § 1337) has been shown in the above-captioned investigation and that the investigation is terminated.

FOR FURTHER INFORMATION CONTACT: Clark S. Cheney, Office of the General Counsel, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone 202-205-2661. Copies of non-confidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone 202-205-2000. General information concerning the Commission may also be obtained by accessing its Internet server (*http://www.usitc.gov*). The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at *http://edis.usitc.gov*. Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on 202-205-1810.

SUPPLEMENTARY INFORMATION: The Commission instituted this investigation on May 19, 2010, based on a complaint filed by S3 Graphics Co. Ltd. and S3 Graphics Inc. (collectively, "S3G"). 75 Fed. Reg. 38118 (July 1, 2010). The complaint alleged violations of section 337 of the Tariff Act of 1930 (19 U.S.C. § 1337) by reason of infringement of various claims of United States Patent Nos. 6,658,146 ("the '146 patent"); 6,683,978 ("the '978 patent"); 6,775,417 ("the '417 patent"); and 7,043,087 ("the '087 patent"). The complaint named Apple Inc. of Cupertino, California ("Apple") as the only respondent.

On July 1, 2011, the ALJ issued a final ID in this investigation finding that Apple violated section 337. Specifically, the ALJ found that Apple computers utilizing an image compression format called DXT infringe claim 11 of the '978 patent and claims 4 and 16 of the '146 patent. The ALJ recommended that the Commission issue a limited exclusion order and a cease and

desist order. The ALJ found no violation with respect to the other asserted claims, which are claim 13 of the '146 patent, claims 14 and 16 of the '978 patent, claims 7, 12, 15, and 23 of the '417 patent, and claims 1 and 6 of the '087 patent. On September 2, 2011, the Commission determined to review the ID in its entirety.

On September 15, 2011, non-parties Advanced Micro Devices, Inc. ("AMD") and its subsidiaries ATI Technologies ULC and ATI International SRL filed a motion to intervene and terminate the investigation based on a claim that AMD owns the patents at issue and declines to assert them in this investigation. On September 19, 2011, respondent Apple filed its own motion to terminate based on AMD's patent ownership claims. Subsequently, the Commission determined to extend the target date for completion of the investigation until November 21, 2011.

Having examined the record of this investigation, including the ALJ's final ID and the submissions of the parties and non-parties, the Commission has determined to reverse the ALJ's finding of a violation of section 337 and find no violation. Additionally, the Commission has determined to deny AMD's motion to file public interest comments out of time, to grant AMD's motion to file a reply in connection with its motion to intervene and terminate, to deny AMD's motion to intervene and terminate, and to deny Apple's motion to terminate.

The authority for the Commission's determination is contained in section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337), and in part 210 of the Commission's Rules of Practice and Procedure (19 C.F.R. part 210).

By order of the Commission.

James R. Holbein
Secretary to the Commission

Issued: November 21, 2011

CERTAIN ELECTRONIC DEVICES WITH IMAGE PROCESSING SYSTEMS, COMPONENTS THEREOF, AND ASSORTED SOFTWARE **Inv. No. 337-TA-724**

PUBLIC CERTIFICATE OF SERVICE

I, James R. Holbein, hereby certify that the attached **NOTICE** has been served by hand upon, the Commission Investigative Attorney, Kecia J. Reynolds, Esq. and the following parties as indicated on **November 21, 2011.**

James R. Holbein, Secretary
U.S. International Trade Commission
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PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of **CERTAIN ELECTRONIC DEVICES WITH IMAGE PROCESSING SYSTEMS, COMPONENTS THEREOF, AND ASSOCIATED SOFTWARE**	**Inv. No. 337-TA-724**

COMMISSION OPINION [1]

The Commission instituted this investigation on July 1, 2010, based on a complaint filed by S3 Graphics Co. Ltd. and S3 Graphics Inc. (collectively, "S3G"). 75 *Fed. Reg.* 38118 (July 1, 2010). The complaint alleged violations of section 337 of the Tariff Act of 1930 (19 U.S.C. § 1337) in the importation into the United States, the sale for importation, and the sale within the United States after importation of certain electronic devices with image processing systems, components thereof, and associated software by reason of infringement of various claims of United States Patent Nos. 6,658,146 ("the '146 patent"); 6,683,978 ("the '978 patent"); 6,775,417 ("the '417 patent"); and 7,043,087 ("the '087 patent"). The complaint named Apple Inc. of Cupertino, California ("Apple") as the only respondent.

On July 1, 2011, the ALJ issued a final Initial Determination ("ID") in this investigation finding that Apple violated section 337. Specifically, the ALJ found that Apple computers utilizing an image compression format called DXT infringe claim 11 of the '978 patent and claims 4 and 16 of the '146 patent. The ALJ recommended that the Commission issue a limited

[1] Commissioner Lane would have affirmed the ALJ's finding of a violation of section 337 and does not join those portions of this opinion finding no violation.

exclusion order and a cease and desist order to remedy that infringement. The ALJ found no violation with respect to the other asserted claims, which are claim 13 of the '146 patent, claims 14 and 16 of the '978 patent, claims 7, 12, 15, and 23 of the '417 patent, and claims 1 and 6 of the '087 patent. On September 2, 2011, the Commission determined to review the ID in its entirety.

On September 15, 2011, non-parties Advanced Micro Devices, Inc. ("AMD") and its subsidiaries ATI Technologies ULC and ATI International SRL (collectively, "ATI") filed a motion to intervene and terminate the investigation based on a claim that AMD owns the patents at issue and declines to assert them in this investigation.[2] On September 19, 2011, respondent Apple filed its own motion to terminate based on AMD's patent ownership claims.[3]

For the reasons discussed herein, the Commission has determined to reverse the ALJ's finding of a violation of section 337 and find no violation. Additionally, the Commission has determined to deny AMD's motion to intervene and terminate and to deny Apple's motion to terminate.

I. BACKGROUND

A. Overview of the Technology

The asserted patents relate to the compression of digital images. A digital image is made up of dots of color called pixels. A pixel can be defined as a combination of three primary colors, for example: a certain amount of red, a certain amount of green, and a certain amount of

[2] On August 26, 2011, non-party AMD also moved for leave to file a submission purporting to be responsive to the Commission's July 22, 2011, notice soliciting statements on the public interest in this investigation. The notice set August 10, 2011, as the deadline for submissions. The Commission has determined that AMD's submission is untimely and that AMD has not shown good cause to accept the submission out of time. Accordingly, AMD's motion for leave to file public interest comments is therefore denied.

[3] After S3G opposed the motions by AMD and Apple to terminate the investigation, AMD moved for leave to file a reply to S3G's opposition. AMD's motion for leave to file a reply is hereby granted and AMD's reply is deemed filed.

blue. Digital bits can be used to represent the amount of each color in the pixel. Because an image may comprise millions of pixels, storing all of the bits for every image in every frame of a movie or video game would require an enormous amount of computer memory. Compression reduces the amount of data required to represent digital images.

Textures are a particular class of images used in video games and animated movies. Textures are applied to shapes in computer graphics to make them appear more realistic. Textures can have properties such as translucency or transparency. Like other images, textures can be defined pixel by pixel. Texture compression techniques reduce the amount of memory required to store a digital image texture.

B. The Asserted Patents

The four patents asserted in this investigation share the same inventors, similar specifications, and the same U.S. priority date of October 2, 1997. The invention disclosed in the '146 patent, the earliest issued patent, is representative of the patented technology. In one embodiment of the invention, each pixel in a digital texture image is originally represented by a 24-bit value: 8 bits to represent the red value, 8 bits to represent the green value, and 8 bits to represent the blue value. '146 patent at 5:50-59. The invention breaks an image into blocks four pixels wide by four pixels high. *Id.* Instead of representing every pixel in the block with a 24-bit value, the patented data format represents each block using two 16-bit codewords identifying two representative colors and a set of 16 two-bit index values. The two codewords are combined with the index values to select one of four possible equations to derive the value of the most

appropriate color for each of the 16 pixels. *Id.* at 8:43-46; 10:45-60; 14:45-52. Thus, each pixel in a compressed block can be represented by 4 bits[4] instead of 24 bits. *Id.* at 16:22-26.

The invention compresses images using an image decomposer that "breaks an original image into image blocks, each having a plurality of pixel values (*e.g.*, colors) or equivalent color points." '146 patent at 2:50-52. The image block may comprise a four-by-four pixel block in which each of the 16 pixels is a different color. *See id.* at 5:50-59. Each image block is transferred to a block encoder to be compressed or encoded by reducing the number of colors used to represent the pixels of that block. *Id.* at 5:28-32. The block encoder selects four colors to represent the colors in the block. *Id.* at 7:56-64. The asserted patents refer to the reduced number of colors as "quantized colors" (*id.* at 7:49-64), "quantized pixel values" (*id.* at 7:44-49) or "quantized image data values" ('417 patent, abstract). Two of these quantized colors are referred to as "codewords." '146 patent at 6:50-59. The other two quantized colors are inferred from the codewords. *Id.* at 7:56-64. In one embodiment, the two inferred colors are calculated as two points in the color space equidistant between the codewords. *Id.* at 10:28-36.

After the colors are quantized they are indexed. In one embodiment, 2-bit values (*i.e.*, 00, 01, 10, or 11) are used to represent the four quantized colors (two codewords and two inferred colors). *Id.* at 7:56-61. Then, a bitmap construction module creates a bit map. Each pixel in the block is mapped to the closest quantized color. *Id.* at 10:54-60. The bit map stores the appropriate index value for each pixel in the block. The output of the bitmap construction module is an "encoded image block" comprising codewords and index values. *Id.* at 11:7-9. In one embodiment, the encoded image blocks for an image are collected and stored in a data

[4] In the preferred embodiment of the invention, each block of 16 pixels is represented by two 16-bit codewords plus 16 two-bit index values for a total of 64 bits per block. Dividing the 64-bit representation by 16 pixels per block yields 4 bits per pixel.

file with a "modified header." *Id.* at 6:27-34; Fig. 3E. The modified header contains information about the contents of a file. *Id.* at 6:34-43.

The asserted patents also describe a decoding method and apparatus that uses inferred colors and indexes to decompress an image data file. '146 patent at 11:28-36. The invention uses an image decomposer to break the encoded image data file into a header and a plurality of encoded image blocks. *Id.* at 11:41-43. The encoded image blocks are forwarded to the block decoders for processing. *Id.* at 11:46-50. The block decoder uses the two codewords in each encoded image block to generate a set of four quantized colors. As in the encoding process, the block decoder infers additional colors equidistant between the two color codewords using a formula. *Id.* at 14:45-53. After the block's four quantized colors are determined, the block decoder assigns each pixel to one of those colors based on the pixel index value. *Id.* at 15:15-26. Finally, an image composer places the decoded blocks of data in order to reproduce the originally encoded image. *Id.* at 15:27-34.

C. The Asserted Claims

Of the twelve patent claims asserted by S3G, five claims relate to "encoding" or compressing an image, four claims relate to "decoding" or decompressing a compressed image, and three claims relate to data formats for storing compressed image files. The asserted claims are directed to methods, apparatuses, and data formats:

Patent-in-Suit	Asserted Claims	Claim Type
'146 patent	Claim 4	Encoding Apparatus
	Claim 13	Encoding Method
	Claim 16	Encoding Method
'417 patent	Claim 7	Encoding Apparatus
	Claim 15	Encoding Method
	Claim 12	Decoding Apparatus
	Claim 23	Decoding Method
'087 patent	Claim 1	Decoding Apparatus
	Claim 6	Decoding Apparatus

'978 patent	Claim 11 Claim 14 Claim 16	Data Format Data Format Data Format

Representative claims from each patent are reproduced below.

'146 patent, Claim 4 (including claims upon which it depends) (encoding apparatus claim):

1. A system for encoding an image, comprising:
an image decomposer, coupled to receive an image, for breaking the image into one or more image blocks, each image block having a set of colors;
at least one block encoder for receiving each image block and for compressing each image block to generate an encoded image block, wherein each block encoder includes a color quantizer for receiving each image block and for generating at least one codeword from which at least one quantized color is derived, the color quantizer having a selection module for computing a set of parameters from the set of colors, the at least one codeword derived from the set of parameters; and
an encoded image composer for receiving and ordering the encoded image blocks into a data file.

3. The system of claim 1, wherein each block encoder comprises:
a bitmap construction module for mapping the colors of an image block to one of the at least one quantized colors.

4. The system of claim 3, wherein the color quantizer further comprises:
a block type module, coupled to receive the image block, for selecting a block type for the image block; and
a codeword generation module for generating the least one codeword from the set of parameters generated by the selection module.

'146 patent, Claim 16 (including the claim upon which it depends) (encoding method claim):

13. A method of compressing an original image block having a first set of color points defined within a selected color space, comprising:
fitting a geometric element to the first set of color points so that the geometric element includes a second set of color points having a minimal moment of inertia when fitted to the center of gravity of the first set of color points;
computing a set of codewords from the second set of color points;
computing a set of computed colors using the set of codewords;
mapping each of the first set of color points to one of the computed colors or one of the codewords to produce an index for each of the first set of color points; and
using the indices produced by the mapping each of the first set of color points and the set of codewords to represent the first set of color points.

16. The method of claim 13, wherein mapping further includes mapping a first set color point to a predefined index, if the first set color point represents an alpha value.

'417 patent, Claim 23 (decoding method claim):

> 23. A method for fixed-rate block-based image decompression of an encoded image, comprising the steps of:
> decomposing the encoded image of into a modified header and a plurality of encoded image blocks having at least one codeword and a plurality of image elements associated with an index value;
> generating a set of quanitized image data values including the at least one codeword and at least one image value derived from the at least one codeword; and
> mapping the index value for each image element to one of the quantized image data values.

'087 patent, claim 1 (decoding apparatus claim):

> 1. An image decoder engine for decoding an encoded image data file, comprising:
> an encoded image decomposer for decomposing the encoded image data file into a modified header and at least one compressed image block, each image block having at least one associated codeword and a plurality of image elements associated with an index value; and
> at least one block decoder coupled to the encoded image decomposer for decompressing the at least one compressed image block into at least one decompressed image block by generating a set of quantized image data values and mapping the index value to a quantized image data value from the set of quantized image data values, the at least one block decoder further comprising,
> at least one decoder configured for decompressing each of the at least one compressed image block to generate colors for each of the at least one compressed image block.

'978 patent, Claim 11 (data format claim):

> 11. A data format for representing an original image block having a pixel color set, comprising:
> a codeword portion for storing at least one codeword;
> a bitmap portion for storing a set of indices, said set of indices includes an available index for representing a transparency identifier, the bitmap portion constructed by a bitmap construction module utilizing the codeword portion associated with the bitmap portion; and
> wherein said codeword defines a set of colors that approximate the pixel color set, and said indices map the pixel color set to at least one color in said set of colors.

D. The Accused Products

S3G's infringement allegations focus on two types of texture compression used in Apple products. The first is DXT, which stands for DirectX Texture Compression. S3G claims that devices using Apple's Mac OS X operating system ("the Mac OS X Devices") infringe the

asserted patents through two independent implementations of DXT: a software implementation called the [[ ]] codec[5] and a hardware implementation in graphics processing units ("GPUs") that Apple obtains from NVIDIA Corporation ("NVIDIA") or AMD.[6] The Mac OS X Devices include laptop computers (MacBook, MacBook Pro, and MacBook Air) and desktop computers (iMac, Mac mini, and Mac Pro).

The second texture compression scheme S3G accuses is PVRTC, which stands for PowerVR Texture Compression. S3G claims that devices using Apple's iOS operating system ("the iDevices") infringe the asserted patents through two independent implementations of PVRTC: a software decompressor and a hardware GPU provided by Imagination Technologies ("Imagination"). The iDevices include Apple's iPhone, iPad, and iPod Touch. S3G also claims that Apple's iOS software development kit ("the iOS DSK") and certain applications sold by Apple through its iTunes web store implement PVRTC.

The ALJ found that the DXT implementation in the Mac OS X devices infringe a data format claim ('978 patent claim 11), an encoding apparatus claim ('146 patent, claims 4), and an encoding method claim ('146 patent, claim 16). However, the ALJ found that the PVRTC implementations in the iDevices, the iOS DSK, and applications sold by Apple through iTunes store do not infringe any of the asserted patents.

II. ANALYSIS

A. Jurisdiction

Apple asserted to the ALJ that the Commission lacks jurisdiction in this investigation because, in Apple's view, the evidence did not show that the accused products infringe an

[5] A "codec" is a term well-known in art that stands for "coder/decoder." *See* S3G Br. at *xviii*, Glossary of Terms and Abbreviations.

[6] GPUs supplied by AMD are variously referred to in the briefs as AMD GPUs, ATI GPUs, and AMD/ATI GPUs. AMD acquired ATI in 2006. Apple Pet. for Review at 40, n.10.

asserted patent claim at the time of importation. We, like the ALJ, find that Apple's argument conflates an analysis of the Commission's jurisdiction with an analysis of whether S3G has met its burden to prove a violation of section 337. There is a distinction between (1) alleging sufficient facts to support the Commission's subject matter jurisdiction, and (2) proving a violation of 19 U.S.C. § 1337(a)(1)(B)(i) on the merits after an investigation has been instituted. The distinctions between the two questions are subtle, and commonly misunderstood. We clarify the basis for the Commission's jurisdiction here.

The Federal Circuit has set forth the framework for analyzing the Commission's jurisdiction in *Amgen, Inc. v. Int'l Trade Comm'n*, 902 F.2d 1532 (Fed. Cir. 1990). The complainant in *Amgen* alleged a violation of 19 U.S.C. § 1337(a)(1)(B)(ii), an analogous statutory provision to the one at bar. Section 337 (a)(1)(B)(ii) concerns imported articles made using a process covered by a U.S. patent. The Commission determined that the asserted patent claims were directed to genetically altered cells, not to a patented process for making an article as contemplated in section 337 (a)(1)(B)(ii). The Commission dismissed the investigation for lack of jurisdiction, stating that "existence of a process patent claim was a jurisdictional prerequisite for an investigation" under that section of the statute. *Amgen*, 902 F.3d at 1535. The Federal Circuit reversed, holding that because "the jurisdictional requirements of [section 337] mesh with the factual requirements necessary to prevail on the merits[,]" the Commission should first "assume jurisdiction" and then determine "the merits of the case." *Id.* at 1536.

The Commission's determination in *Certain Cardiac Pacemakers and Components Thereof*, Inv. No. 337-TA-162, Order No. 37 (March 21, 1984) (unreviewed in relevant part) followed a similar analysis. In *Cardiac Pacemakers*, two imported components were combined in the United States with several domestic components to create an allegedly infringing device.

In evaluating the Commission's jurisdiction, the ALJ drew a distinction between whether the Commission "has jurisdiction over the subject matter of an investigation" and "whether there is a violation of the statute upon which a remedy can be based." *Id.* The ALJ found that "sufficient facts existed that established jurisdiction for the Commission to investigate alleged unfair acts by [the respondent]." After having determined that the Commission had subject matter jurisdiction, the ALJ turned to the question of "whether the importation constitutes the alleged infringement." *Id.* The ALJ found that "the two imported components do not constitute the entire pacemaker and, therefore, cannot read on all elements of the claims recited in the suit patents." *Id.* Accordingly, the ALJ issued a summary determination finding that one of the respondents had "committed no unfair acts within the meaning of § 337."

Under the reasoning in *Cardiac Pacemakers* and *Amgen*, the ALJ in this investigation did not err in finding the Commission has jurisdiction to investigate S3G's complaint that Apple violated section 337. Here, S3G alleged sufficient facts that, if proven, would show Apple imported articles that infringe S3G's patents. *See, e.g.*, Complaint, ¶¶ 88-94. Accordingly, we determine the Commission properly has jurisdiction over S3G's complaint. *Amgen*, 902 F.3d at 1536.

B. Proof of a Violating Importation, Sale for Importation, or Sale After Importation

To prove a violation of section 337(a)(1)(B)(i) based on patent infringement, a complainant must prove "[t]he importation into the United States, the sale for importation, or the sale within the United States after importation" of articles that infringe a U.S. patent. 19 U.S.C. § 1337(a)(1)(B)(i). Although satisfaction of the importation requirement is seldom disputed in section 337 investigations, the present case is an exception. With respect to the articles that formed the basis for the ALJ's finding of a violation of section 337, there is no dispute that

Apple has imported Mac OS X Devices into the United States. JX-157C. However, Apple argues that it does not import articles "that infringe" S3G's asserted patents in violation of section 337. The parties do not dispute that claim 11 of the '978 patent and claim 16 of the '146 patent are directly infringed, if at all, only after the accused devices have been imported into the United States. *See* Apple's Pet. for Review at 35; S3G's Resp. to Apple's Pet. for Review at 38. The ALJ held that this was not an impediment to finding a violating importation. ID at 17-18, 282. Apple argues that its products must meet every limitation of claim 11 of the '978 patent at the time those products are imported into the United States. Apple further contends that practicing the patented method steps defined in claim 16 of the '146 patent inside the United States using imported devices is not a violation of section 337 absent a showing of indirect infringement. The issues are more precisely examined after reviewing the facts surrounding the importation of the accused products.

i. Factual Findings

We make the following factual findings, based on the record. A least one unit of each of the following Apple products has been imported, sold for importation, and/or sold after importation into the United States by Apple: the MacBook, the MacBook Air, the MacBook Pro, the iMac, the Mac mini, and the MacPro, (*i.e.*, all of the accused Mac OS X Devices), and the iPhone 3GS, the iPhone 4, the iPad, and the 2nd, 3rd, and 4th Generation iPod touch (*i.e.*, all of the accused iDevices). *See* JX-157C at 1-2. However, S3G has not proven by a preponderance of the evidence that Apple imported the iOS SDK into the United States. [7]

[7] S3G points to testimony from Apple's witness Mr. Haun for the proposition that Mr. Haun [[ ]] *See* Tr. at 2378:10-13 (Haun). However, we find even if that testimony were to be credited, S3G has not shown that Apple, the only respondent in this investigation, has imported the iOS SDK into the United States.

We find that the Mac OS X Devices are imported with the Mac OS X operating system installed, which includes the [[ ]] codec at the time of importation. *See* Apple's Obj. to S3G's Prop. Find. Fact I.D.3.190, 192; II.03. However, with respect to the asserted data format claims (claims 11, 14, and 16 of the '978 patent), the Mac OS X Devices are not imported with DXT-encoded images. *See* Apple's Pet. for Review at 35; S3G's Resp. to Apple's Pet. for Review at 38. We also find that S3G has not proven by a preponderance of the evidence that the imported iDevices contain PVRTC-encoded images at the time of importation. *See* S3G Pet. for Review at 19 (relying on Apple's testing inside the U.S. as proof of infringement). *See also* S3G's Resp. to Apple's Pet. for Review at 40 n.12 (stating that S3G's proof of a section 337 violation with respect to the '978 patent and the iDevices is based on "the same reasons" as the Mac OS X Devices, which reasons are based on Apple's testing in the U.S., not proof that the imported devices contain texture encoded images at the time of importation). We adopt all factual determinations by the ALJ that support these findings.

ii. Analysis

The Commission "is a creature of statute, and must find authority for its actions in its enabling statute." *Kyocera v. Int'l Trade Comm'n*, 545 F.3d 1340, 1355 (Fed. Cir. 2008). Accordingly, our analysis begins with the language of section 337 at issue in this investigation:

> [T]he following are unlawful, and when found by the Commission to exist shall be dealt with, in addition to any other provision of law, as provided in this section:
>
> ***
>
> The importation into the United States, the sale for importation, or the sale within the United States after importation by the owner, importer, or consignee, of articles that –
>
> (i) infringe a valid and enforceable United States patent or a valid and enforceable United States copyright registered under title 17, United States Code; or
>
> (ii) are made, produced, processed, or mined under, or by means of, a process covered by the claims of a valid and enforceable patent.

19 U.S.C. § 1337(a)(l)(B).

The plain language of the statute first identifies three specific acts that may form the basis of a violation of section 337: importation, selling for importation, and selling after importation. The statute then specifies, in list form, categories of articles that must be involved in the proscribed acts. First on the list are "articles that – infringe" a U.S. patent. *Id.* § 1337(a)(1)(B)(i). Because the statute specifies that the articles in question must "infringe," an importation analysis that ignores the question of infringement would be incomplete.[8]

The word "infringe" in section 337 derives its legal meaning from 35 U.S.C. § 271, the section of the Patent Act that defines patent infringement. *See Tianrui Group Co. Ltd. v. Int'l Trade Comm'n*, No. 2010-1395, slip op. at 22-23 (Fed. Cir. Oct. 11, 2011) (citing *In re Amtorg Trading Corp.*, 75 F.2d 826, 834 (CCPA 1935) for the proposition that by enacting section 337 Congress did not intend to expand statutory patent rights). Section 271 defines infringement to include direct infringement (35 U.S.C. § 271(a)) and the two varieties of indirect infringement, active inducement of infringement and contributory infringement (35 U.S.C. § 271(b), (c)). Thus, section 337(a)(l)(B)(i) covers imported articles that directly or indirectly infringe when it refers to "articles that – infringe." We also interpret the phrase "articles that – infringe" to

[8] We do not mean that the ALJ must in every instance first make a determination as to infringement when evaluating whether the importation element of a violation of section 337 is satisfied. Ordinarily, such as where complainant alleges that there has been an importation of accused devices that directly infringe an apparatus claim, it will be sufficient to perform separate analyses of whether there has been an importation of the accused devices and whether the accused devices infringe the asserted patent claim. As explained in this opinion, however, the current investigation presents an unusual circumstance in which a respondent's domestic infringement cannot support a violation of section 337. In circumstances like those presented here, the ALJ's importation analysis must include an evaluation of whether the type of infringement alleged will support a finding that there has been an importation of an article that infringes in violation of section 337.

reference the status of the articles at the time of importation. Thus, infringement, direct or indirect, must be based on the articles as imported to satisfy the requirements of section 337.[9]

We adopt the ALJ's finding that when Apple tests the Mac OS Devices in the United States, data is created in a format that would directly infringe claim 11 of the '978 patent under 35 U.S.C. § 271(a). Nevertheless, S3G has not shown that Apple's creation of DXT data in the United States constitutes a violation of section 337. Where a violation of section 337 based on patent infringement is alleged, the Commission is authorized to exclude only imported articles that infringe a U.S. patent. 19 U.S.C. §§ 1337(a)(1)(B)(i), 1337(d). An article directly infringes a patent claim when every claim limitation can be found in the accused product. *See Pass & Seymour, Inc. v. Int'l Trade Comm'n*, 617 F.3d 1319, 1325 (Fed. Cir. 2011) (finding no violation of section 337 where article lacked limitations of asserted claims). Apple does not import an article that meets every limitation of claim 11; the data that S3G relies upon for infringement of claim 11 is created in the United States. Thus, Apple does not import an article that directly infringes claim 11.

We also reject S3G's argument that Apple has violated section 337 by selling articles in the United States that infringe claim 11 of the '978 patent. S3G's argument appears to be based on online sales of software applications that contain DXT data through a website operated by

[9] For example, in an investigation based on an allegation of contributory infringement, the imported article may be "a component of a patented machine, manufacture, combination, or composition, or a material or apparatus for use in practicing a patented process, constituting a material part of the invention" that is "especially adapted for use in an infringement" of a patent, and "not a staple article or commodity of commerce suitable for substantial noninfringing use." *See* 35 U.S.C. § 271(c); *Spansion, Inc. v. Int'l Trade Comm'n*, 629 F.3d 1331, 1353 (Fed. Cir. 2010) ("[T]o prevail on contributory infringement in a Section 337 case, the complainant must show *inter alia*: (1) there is an act of direct infringement in violation of Section 337; (2) the accused device has no substantial non-infringing uses; and (3) the accused infringer imported, sold for importation, or sold after importation within the United States, the accused components that contributed to another's direct infringement.").

Apple.[10] S3G has not shown, however, that the DXT software applications sold on the Apple website were imported. Accordingly, S3G has not shown that sales of DXT software applications through the Apple website violate section 337. *See* 19 U.S.C. § 1337(a)(1)(B)(i). Further, we adopt the ALJ's determination that S3G has not proven indirect infringement of any asserted claim, including claim 11. Because S3G has not shown importation, sale for importation, or sale after importation of articles that infringe claim 11, either directly or indirectly, S3G has not shown a violation of section 337 based on claim 11 of the '978 patent.

S3G argues that certain Commission decisions have found a violation of section 337 where an imported article does not meet all of the limitations of the asserted patent claims. S3G contends that such conclusions are justified so long as the complainant has shown some nexus between the imported articles and the acts of infringement.

We acknowledge that language in some prior investigations could be read to support S3G's position. For example, *Certain Sputtered Carbon Coated Computer Discs and Products Containing Same, Including Disk Drives*, Inv. No. 337-TA-350, Comm'n Op., 13 (Nov. 1993) (Watson, Brunsdale & Crawford, Comm'rs), stated that "[t]he Commission has long held that there must be a nexus between unfair activities such as patent infringement on the one hand, and importation . . . on the other." The origin of this "nexus" requirement traces back more than thirty years to the Commission's decision in *Certain Welded Stainless Steel Pipe and Tube*, Inv. No. 337-TA-29, Comm'n Op., USITC Pub. 863 (Feb. 1978) (Minchew, Moore, and Alberger, Comm'rs) ("*Steel Pipe*"). *Steel Pipe* concerned unfair pricing; it was not an intellectual property investigation. The statute at the time authorized the Commission to provide relief for unfair acts resulting in injury to domestic industries as a result of "the importation of articles into the United

[10] S3G does not appear to contend that Apple's sales of the Mac OS X Devices in the United States constitute a violation of section 337, presumably because at the time of sale the Mac OS X Devices do not contain DXT data that would infringe claim 11 of the '978 patent.

States or in their sale by the owner importer, consignee, or agent of either . . . " *Steel Pipe* at 11 (citing to 19 U.S.C. § 1337(a) as it appeared in 1978). The Commission was concerned that its jurisdiction would "broaden" and do so "considerably" unless it was "limited in some way by the concept of importation." *Id.* Accordingly, the Commission required "some nexus between unfair methods or acts and importation before this Commission has power to act." *Id.*

The 1988 amendments to the Tariff Act of 1930 repealed the version of section 337 interpreted in *Steel Pipe* and enacted modern sections 337(a)(1)(A), (B), (C), and (D). *See Amgen, Inc. v. Int'l Trade Comm'n*, 902 F.2d 1532, 1539 (Fed. Cir. 1990). Modern section 337(a)(1)(B)(i) eliminated the domestic industry injury requirement, obviating a need to show a nexus between importation and injury as discussed in *Steel Pipe*. The amendments also added more express language concerning patent infringement. Unlike the version of the statute the Commission interpreted in *Steel Pipe,* modern section 337(a)(1)(B)(i) does not concern unfair acts relating to "importation of articles" generally but instead expressly applies to the importation, sale for importation, and sale in the United States after importation of "articles *that — infringe*" U.S. patents. 19 U.S.C. § 1337(a)(l)(B)(i) (emphasis added).

After the 1988 amendments, however, some Commission decisions continued to use the obsolete nexus language from *Steel Pipe*. *See, e.g., Sputtered Carbon Coated Computer Discs*, Inv. No. 337-TA-350, Comm'n Op. at 13 (Watson, Brunsdale & Crawford, Comm'rs). Other Commission determinations have left unreviewed language by ALJs that might be read as authorizing the Commission to provide a remedy so long as some minimal nexus is shown between an imported article and an act of infringement. *See, e.g., Certain Digital Satellite System Receivers and Components Thereof*, Inv. No. 337-TA-392, Initial Determination, 4-5

(Oct. 20, 1997) (unreviewed in relevant part); *Certain Set-Top Boxes and Components Thereof*, Inv. No. 337-TA-454, Initial Determination at 7-8 (Nov. 8, 2002) (unreviewed in relevant part).

We clarify here that a showing of a nexus between imported articles and alleged acts of infringement will not substitute for proof that all of the statutory requirements found in section 337 have been satisfied. As a result, to the extent that S3G relies upon language in these earlier decisions for the proposition that merely showing some nexus between an act of infringement and the importation of an article satisfies the requirements of section 337, we cannot agree. Such an argument would ignore the fact that the statutory language of section 337 now expressly defines the relevant unfair acts to be importation, sale for importation, and sale after importation of "articles *that — infringe*" U.S. patents. 19 U.S.C. § 1337(a)(l)(B)(i) (emphasis added). S3G has not proven Apple committed an unlawful act under section 337 based on infringement of claim 11 of the '978 patent.

With respect to method claim 16 of the '146 patent, we find that Apple does not directly infringe the patented method when it imports the accused computers because the act of importation is not an act that practices the steps of the asserted method claim. Precedents of the Federal Circuit "draw a clear distinction between method and apparatus claims for purposes of infringement liability." *Cardiac Pacemakers, Inc. v. St. Jude Medical, Inc.*, 576 F.3d 1348, 1363-64 (Fed. Cir. 2009) (relevant portions *en banc*). Merely importing a device that may be used to perform a patented method does not constitute direct infringement of a claim to that method. *See id.* at 1364 (the act of shipping a device that is capable of performing a patented method is not an act of infringement under 35 U.S.C. § 271(f) because that provision relates to components, not methods); *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282, 1319 (Fed. Cir. 2005) ("Congress has consistently expressed the view that it understands infringement of

method claims under section 271(a) to be limited to use."). Similarly, we conclude that any alleged sales by Apple in the United States do not constitute direct infringement of method claim 16. *See Ricoh Co., Ltd. v. Quanta Computer Inc.*, 550 F.3d 1325, 1335 (Fed. Cir. 2008) (sale of software does not infringe a method claim because direct infringement of a patented method is "performance of the process itself").

The only record evidence of direct infringement of method claim 16 is Apple's internal practice of the method in the United States when it tests Mac OS X Devices. S3G argues that because Apple imports computers that have a "nexus" to that later infringement in the United States, Apple has violated section 337. We disagree. We analyze a violation of section 337(a)(1)(B)(i) based on method claim 16 under the statutory rubrics of indirect infringement. *See Certain Chemiluminescent Compositions, and Components Thereof and Methods of Using, and Products Incorporating the Same*, Inv. No. 337-TA-285, USITC Pub. 2370, Initial Determination at 38 n.12 (March 1991) (finding a violation of section 337 based on indirect infringement of a method claim). *See also Alloc, Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1374 (Fed. Cir. 2003) (analyzing indirect infringement when sustaining a violation of section 337 based on method claims). As we have noted above, the language of section 337(a)(l)(B)(i) covers articles that indirectly infringe when it refers to "articles that – infringe." The statutorily defined theories of indirect infringement appropriately reach activities beyond direct infringement without resorting to the concept of a "nexus" to imported articles.

Thus, S3G might have proved a violation of section 337 if it had proved indirect infringement of method claim 16.[11] S3G failed to do so, however, and we adopt the ALJ's findings to that effect. Because S3G has not shown importation, sale for importation, or sale

[11] For example, in *Chemiluminescent Compositions*, , Inv. No. 337-TA-285, ID at 38 n.12, the ALJ found that the "importation and sale" of the accused articles constituted contributory and induced infringement of the method claim at issue in that investigation.

after importation of articles that infringe method claim 16, directly or indirectly, S3G has not shown a violation of section 337 based on infringement of method claim 16.

S3G argues that it would be inconsistent with Congress's broad grant of remedial power to find that section 337 may reach articles involved in indirect infringement of method claims but not articles that are used by the importer to directly infringe a method claim. S3G's argument proceeds from a premise divorced from the actual language of section 337. S3G's argument boils down to a contention that Apple should be liable under section 337 because Apple used an imported product to perform a patented method in the United States. In the absence of indirect infringement, we find no support in the language of the statute that Congress intended section 337 to reach Apple's domestic actions using imported articles. "Use" of a patented method may constitute infringement under 35 U.S.C. § 271(a), but domestic use of such a method, without more, is not a sufficient basis for a violation of section 337(a)(1)(B)(i), which concerns the "importation" or "sale" of articles that infringe a U.S. patent.

In summary, we determine that S3G has not proven by a preponderance of the evidence that Apple imported an article that meets the limitations of claim 11 of the '978 patent at the time of importation. We further determine that S3G has not proven by a preponderance of the evidence that Apple sold an imported article in the United States that meets the limitations of claim 11. We also affirm the ALJ's determination that S3G has not proven indirect infringement of any patent claim. In light of these determinations, S3G's proof will not support a determination of a violation of section 337(a)(1)(B)(i) with respect to the '978 patent. Accordingly, we reverse the ALJ's determination of a violation based on claim 11 of the '978 patent.

Further, we determine that Apple's domestic use of imported devices to practice the method steps in claim 16 of the '146 patent will not support a determination of violation of section 337(a)(1)(B)(i) without evidence of indirect infringement. We affirm the ALJ's determination that S3G has not proven indirect infringement of any claim in this investigation. Accordingly, we reverse the ALJ's determination of a violation based on Apple's use of the method claimed in claim 16 of the '146 patent.

C. Infringement

Apple contends that the ALJ erred in finding that the implementation of DXT in the Mac OS X Devices directly infringes claim 11 of the '978 patent and claims 4 and 16 of the '146 patent. S3G contends that the ALJ erred in finding that Apple's implementations of PVRTC do not infringe any asserted patent and that Apple does not induce infringement through its PVRTC technology. The Investigative Attorney ("IA") does not raise any error in the ALJ's findings concerning the elements of the claims found in the accused devices. This section divides the infringement issues between the accused DXT technology and the accused PVRTC technology.

i. DXT

a. Claim 11 of the '978 Patent

Claim 11 of the '978 patent is directed to a specific data format. The ID determined that Apple directly infringes claim 11 of the '978 patent "when it [1] tests the functionality in the software compressor in the [[ ]] codec to create compressed DXT texture, [2] when it tests the functionality in the software decompressor in the [[ ]] codec and the hardware decompressor in the NVIDIA GPU using compressed DXT texture, and [3] when it sells applications containing compressed DXT texture." ID at 69.

We affirm the ALJ's finding that it is more likely than not that testing of the Mac OS X devices resulted in the creation of at least one image in a data format that meets all of the elements of claim 11 of the '978 patent. Indeed, Apple does not appear to dispute that the implementation of DXT in the Mac OS X devices would produce such an image; Apple only disputes whether S3G has provided sufficient proof that such an image came into being. Infringement need only be proven by a preponderance of the evidence, and may also be proven with circumstantial evidence. *See Lucent Technologies, Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1317-18 (Fed. Cir. 2009) (sustaining verdict of infringement even though most evidence of infringement was circumstantial and there was "little, if any, direct evidence of infringement"). The ALJ's finding that Apple's testing results in an image that meets every element of claim 11 is supported at least by circumstantial evidence, and we defer to the ALJ's factual determinations on this point. As we note above, however, even if Apple's testing in the United States resulted in an article that would infringe under 35 U.S.C. § 271(a), S3G has not met its burden to prove that Apple's domestic testing constitutes a violation of section 337.

With respect to the ALJ's finding that Apple sold "applications containing compressed DXT texture," we note that the citations relied upon by the ALJ appear only to relate to applications that implement PVRTC. Accordingly, we vacate the conclusion that the ALJ drew from the evidence cited. S3G cites additional record evidence in its memorandum on review to claim that Apple sells applications that decode DXT compressed textures. *See* Apple Br. on Review at 32. Even if Apple's sales would constitute infringement under 35 U.S.C. § 271(a), however, S3G has not proven that the applications that Apple sells were ever imported. Indeed, S3G's arguments appear to imply that the software in question originates in the United States. *See* Apple Br. on Review at 32. Accordingly, we find that S3G has not shown by a

preponderance of the evidence that applications containing compressed DXT texture were imported into the United States and then sold after importation. We therefore determine that S3G has not met its burden to prove that Apple's software sales constitute a violation of section 337.

b. Claim 4 of the '146 Patent

Claim 4 of the '146 patent is an apparatus claim directed to an encoder. The ID found that the implementation of DXT in the Mac OS X Devices infringes claim 4. ID at 88. Apple notes that claim 4 requires "an image decomposer, *coupled to receive an image*." Apple Pet. at 33. Apple contends that it does not provide an application to couple to the [[ ]] codec, and therefore any image decomposer in Apple's devices is not "coupled to receive" the image noted in the claim. S3G argues that because claim 4 is an apparatus claim, it only requires the presence of an image decomposer capable of receiving an image. S3G contends that there is no dispute that the [[ ]] codec has such a decomposer.

Claim 4 of the '146 patent only requires an image decomposer capable of receiving an image; it does not require that the decomposer actually receive some externally generated image as Apple argues. No party asked the ALJ to construe "an image decomposer, coupled to receive an image" in any particular way. *See* Order 19. Thus, the ALJ's finding of infringement with respect to claim 4 is not erroneous and we affirm it. However, as we note below, Apple has shown that claim 4 of the '146 patent is invalid.

c. Claim 16 of the '146 Patent

Claim 16 of the '146 patent is an encoding method claim. The ID found that Apple's testing of DXT in the Mac OS X Devices infringes claim 16. ID at 91. Apple argues that claim 16 is directed to encoding "an original image." Apple claims that S3G's only proof of

infringement of claim 16 is Apple's testing of its computers. Apple argues that the evidence concerning this testing does not specifically identify a particular image that was encoded. S3G points to evidence that Apple tested the [[ ]] codec. *See* JX-54C, Sandmel Depo. Tr. at 95:3-22; JX-53C, Rosasco Depo. Tr. at 111:21-24.

We affirm the ALJ's finding that it is more likely than not that testing of the Mac OS X Devices fulfills each step of claim 16. Indeed, Apple does not appear to dispute that the implementation of DXT in the Mac OS X Devices would perform the encoding method in claim 16; Apple apparently only disputes whether S3G has identified a specific image that was encoded using the patented method. However, as discussed above with respect to a violating importation, we have determined that practicing the method of claim 16 in the United States using an imported device will not support a violation of section 337 without proof of either contributory infringement or inducement of infringement. Because S3G has failed to prove indirect infringement of any asserted method claim, we reiterate that S3G has not shown a violation of section 337 with respect to claim 16 of the '146 patent.

d. The Other Asserted Patent Claims

We find no error in the ALJ's findings that S3G has shown evidence of every limitation of claims 1 and 6 of the '087 patent, claims 7, 12, 15, and 23 of the '417 patent, claims 7, 14, and 16 of the '978 patent, and claim 13 of '146 patent in the Mac OS X Devices or in Apple's testing of those devices. *See* ID at 275. We therefore adopt the ALJ's findings relating to those claims, with appropriate clarification that those findings do not necessarily equate to a violation of section 337, as noted above, and with the clarification that Apple has proven meritorious defenses to some of those claims, as noted below.

e. Indirect Infringement

We find no error in the ALJ's determination that S3G did not meet its burden to prove indirect infringement of any asserted patent claim. *See* ID at 275-276. Accordingly, we adopt those findings.

ii. PVRTC

S3G's infringement claims based on Apple's use of PVRTC implicate the iDevices, the iOS SDK, and certain applications sold by Apple through its iTunes web store. The ALJ found that no Apple products infringe the asserted patents through implementation of PVRTC. As summarized below, the ALJ found multiple elements required by the asserted claims to be missing from the products that use PVRTC:

	MISSING ENCODER CLAIM LIMITATIONS		
Asserted Claim	"index"	"decomposing" original image into blocks	"fitting a geometric element" to an original image
'417 patent, claim 7	X	X	
'417 patent, claim 15	X	X	
'146 patent, claim 4		X	
'146 patent, claim 13	X		X
'146 patent, claim 16	X		X

	MISSING DECODER CLAIM LIMITATIONS		
Asserted Claim	"index"	"block decoder"	"decomposing" modified header
'087 patent, claim 1	X	X	X
'087 patent, claim 6	X	X	X
'417 patent, claim 12	X	X	X
'417 patent, claim 23	X		X

	MISSING FILE FORMAT CLAIM LIMITATIONS		
Asserted Claim	"index"	"header"	"fitting a geometric element" to original image colors
'978 patent, claim 11	X		
'978 patent, claim 14	X		X
'978 patent, claim 16	X	X	

a. Whether PVRTC Has "Index" Values Required by All Asserted Patent Claims

As can be seen from the charts above, eleven of the twelve asserted claims expressly require an "index." The ALJ found this claimed feature to be missing from Apple's implementations of PVRTC.

S3G's main criticism of the ID's analysis with respect to the "index" element in PVRTC is a factual dispute: S3G disagrees with the ALJ's failure to equate the "modulation values" used in PVRTC with the "index" values required by the asserted patent claims. The ALJ found that modulation values "do not identify any property or characteristic of the original pixels they pertain to; they are only inputs to an equation that is used to calculate color." ID at 97. We discern no clear error in the ALJ's finding. The ALJ has construed the term "index" to mean "an identifier for an image data value." In other words, the claimed index must be able to identify a particular corresponding color. The modulation values in PVRTC do not meet that requirement because the same modulation value in PVRTC can correspond to a number of different colors. Accordingly, we agree with the ALJ's conclusion that Apple's implementation of PVRTC does not infringe any of the asserted patent claims.

b. Whether PVRTC Uses Block Encoding and Decoding

Claims 7 and 15 of the '417 patent are encoder claims that require "decomposing an original image into blocks." Claim 4 of the '146 patent is an encoder claim that requires "an image decomposer" "for breaking the image into one or more image blocks." Claims 1 and 6 of the '087 patent and claim 12 of the '417 patent are decoder claims that require a "block decoder . . . for decompressing . . . at least one compressed image block."

The ALJ construed "decompose" and its variants to mean "to break up or separate into basic components or parts." ID at 60, n.4. The ALJ found that S3G did not meet its burden to

prove that PVRTC encoding breaks up an image into blocks. ID at 98. Regarding PVRTC decoding, the ALJ found that the accused Apple products lack a "block decoder." The ALJ determined that the PVRTC scheme decodes an entire image in scan-line order, not in blocks. ID at 58-59.

We find no clear error in the ALJ's factual findings regarding block encoding and decoding in PVRTC. The record contains sufficient evidence to support a conclusion that PVRTC does not encode and decode image data on a block-by-block basis, as required in the set of patent claims at issue in this section.

c. S3G's Additional Infringement Arguments Based on PVRTC

Because Apple's implementations of PVRTC lack the two features described above (index values and block encoding/decoding), no PVRTC products directly infringe any of the asserted patent claims. Without evidence of direct infringement there can be no contributory infringement or inducement of infringement. Accordingly, we adopt the ALJ's conclusion that PVRTC implementations do not infringe directly or indirectly. *See Dynacore Holdings Corp. v. U.S. Philips Corp.*, 363 F.3d 1263, 1272 (Fed. Cir. 2004) ("Indirect patent infringement, whether inducement to infringe or contributory infringement, can only arise in presence of direct infringement.").

S3G raises several additional criticisms of the ALJ's infringement analysis with respect to PVRTC. We have carefully considered all of S3G's additional infringement arguments, but only briefly address them here.

First, S3G argues that when analyzing claim 23 of the '417 patent, which is a claim to a decoder, the ALJ referred to his reasoning concerning a different claim to an encoder. This

argument lacks merit because the ALJ's analysis of claim 23 appears to include a conclusion that the accused PVRTC implementations lack an "index value." ID at 63.[12]

Second, S3G contends that when analyzing claim 23 of the '417 patent and claim 16 of the '978 patent, the ALJ erred by failing to find the "header" limitation to be satisfied in PVRTC in view of the ALJ's finding that the header limitation is satisfied by a very similar piece of code in DXT. Even if S3G were correct, however, the PVRTC implementations still lack the "index value" required by claim 23 and the "indices" required by claim 16.

Third, S3G argues that the ALJ erred by finding that Apple's PVRTC implementations lack a geometric element fitted to a color set, as required in claim 14 of the '978 patent and claim 16 of the '146 patent. S3G contends that the ALJ imposed a requirement that the color set to which the geometric element is fitted is the *original* color set. S3G admits that the geometric element in PVRTC is fitted to a delta image which is not the original image, but S3G argues that the delta image contains "rough components of the original image." S3G Pet. for Review at 39. We see no error in the ALJ's determination that the color set to which the claimed geometric image is fitted is a color set from the original image; plain language in the two claims states as much. *See* '978 patent, claim 14 ("an original image block having a pixel color set"); '146 patent, claim 15 (upon which claim 16 depends) ("an original image block having a first set of color points"). We also see no error in the ALJ's determination that a set of colors from a delta image is not the same as a color set from an original image.

Fourth, S3G contends that the ALJ erred by linking its infringement analysis of claims 13 and 16 of the '146 patent to its analysis of claim 4 of the '146 patent. S3G claims that the ALJ's analysis of claim 4 "focuses almost entirely" on a claim element not found in claims 13 and 16.

[12] Apple suggests that the ALJ's reference to the encoder claim reasoning was a typographical error. Apple Resp. Pet. at 41. Whether or not that is true, the Commission need not decide that issue as the ALJ's ultimate conclusion of no infringement is sustained on other grounds.

This argument lacks merit. "Almost entirely" is not "entirely." The ALJ's analysis of claim 4 discusses evidence that the modulation values in PVRTC operate in a different manner than claimed invention. *See, e.g.*, ID at 97. Claims 13 and 16 both require an "index," and in connection with those claims the ALJ examined evidence that the modulation values in PVRTC do not meet the "index" limitation. ID at 100. Accordingly, we see no error in the ALJ's conclusion of no infringement.

D. Validity of the '146, '978, '417, and '087 Patents

The ALJ found nine of the twelve asserted claims invalid as obvious under 35 U.S.C. § 103: claim 13 of the '146 patent; claims 14 and 16 of the '978 patent; claims 7, 12, 15, and 23 of the '417 patent; and claims 1 and 6 of the '087 patent. The ALJ primarily relied upon U.S. Patent No. 5,046,119 to Hoffert ("Hoffert"), alone and in combination with other prior art, to find those claims invalid. The ALJ further found that none of the patent claims were invalid for anticipation under 35 U.S.C. § 102.

S3G and the IA contest the ALJ's findings on obviousness relating to all of the asserted patents. Apple argues that the ALJ erred in finding that an alleged prior invention by an Apple employee named Drebin does not anticipate all of the asserted patent claims. Apple also contends that the ALJ erred in finding that claim 4 of the '146 patent is not anticipated by Hoffert, that claim 11 of the '978 patent is not obvious in view of Hoffert and other art, and that claim 16 of the '146 patent is not obvious in view of Hoffert and other art. Apple further challenges the ALJ's conclusion that the asserted claims are not invalid for failure to comply with the written description and enablement requirements of 35 U.S.C. § 112. Additionally, Apple raises several contingent validity arguments, as noted herein.

i. Anticipation of All Asserted Patent Claims by the Drebin Invention

Apple claims that the invention disclosed in U.S. Patent No. 7,058,218 to Drebin was conceived and reduced to practice ten months before the priority date of the asserted patents, and that it renders all asserted claims invalid under 35 U.S.C. § 102(g)(2). The ALJ found that Mr. Drebin was an Apple employee, and therefore an interested witness whose testimony required corroboration. ID at 136. The ALJ determined that Apple failed to adequately corroborate its assertion that the Drebin invention was made before the priority date of the asserted patents. ID at 145, 150, 155, 163, 179. Apple claims that the ALJ committed legal error by requiring Apple to corroborate every aspect of the invention.

We agree with Apple that proof of prior invention does not require corroboration for every factual issue contested by the parties. *See Cooper v. Goldfarb*, 154 F.3d at 1330. However, we disagree with Apple's conclusion that the ALJ violated this rule. The ALJ was aware of and cited to *Cooper v. Goldfarb*. ID at 137. "Whether or not corroboration exists is a question of fact." *See Medichem, S.A. v. Rolabo, S.L.*, 437 F. 3d 1157, 1171 (Fed. Cir. 2006). We discern no error in the ALJ's factual finding that Apple failed to properly corroborate the claim of prior invention. The ALJ did not, as Apple suggests, fail to consider Apple's evidence; rather, the ALJ found Apple's evidence lacking. For example, the ALJ found that the allegedly corroborating software identified by Apple "did not compress or decompress data or calculate a set of colors from codewords." ID at 139. The ALJ also found that other allegedly corroborating evidence was not tied to a particular point in time. ID at 143. In our view these factual findings are not clearly erroneous and support a conclusion that Apple did not sufficiently corroborate Drebin's claim of prior invention.

However, the ALJ made other findings relating to the Drebin invention that we do not adopt. In particular, the ALJ found that the Drebin invention was abandoned, suppressed, or concealed. ID at 147. The Commission takes no position on whether the Drebin invention was abandoned, suppressed, or concealed. *See Beloit Corp. v. Int'l Trade Comm'n*, 742 F.2d 1421, 1423 (Fed. Cir. 1984).

ii. Anticipation of Claim 4 of the '146 Patent by Hoffert

The ID begins its validity analysis of claim 4 of the '146 patent by noting that the disputed issue is whether a "block type module" is disclosed in Hoffert. ID at 155. However, the ID's stated conclusion with respect to claim 4 focuses on a "header." The ID states that Hoffert lacks a "header" and therefore does not anticipate the claim. ID at 155-158. Claim 4 does not recite a "header" as one of its elements.

Apple argues that every element in claim 4 of the '146 patent is disclosed in Hoffert. Apple claims that the only reason the ALJ did not invalidate claim 4 in view of Hoffert is because the ALJ mistakenly understood claim 4 to require a "header." S3G agrees that claim 4 does not require a header. S3G Resp. Pet. for Review at 4. However, S3G claims that Hoffert lacks the "block type module" required by claim 4. S3G admits that Hoffert discloses a "Block Type Identification Circuit," but argues that the Hoffert circuit detects different block attributes than the block type detector in the asserted claims. *Id.* at 6-7.

We agree with Apple that the ALJ's findings with respect to anticipation of claim 4 appear to be the result of a mistake. We reverse the ALJ's conclusion that Hoffert does not anticipate claim 4 of the '146 patent. We determine, for the reasons stated herein, that Hoffert anticipates claim 4, or, in the alternative, renders claim 4 obvious.

The central dispute between the parties on the validity of claim 4 of the '146 patent is whether Hoffert discloses the block type module. S3G did not ask the ALJ to construe the terms "block type module" or "block type detector" to require that those elements detect a specific set of block attributes, as S3G requested for the first time in its petition for Commission review. S3G has therefore forfeited any argument for anything other than application of the ordinary meaning of the claim language to a person of skill in the art at the time of the invention. Even if S3G had not forfeited such an argument, the intrinsic record shows no reason to impose any additional limitations on the terms "block type module" or "block type detector" in the manner suggested by S3G. Accordingly, when the ALJ examined the "block type module" or "block type detector" limitations required by claims 7 and 12 of the '417 patent and claim 6 of the '087 patent, the ALJ found that the "Block Type Identification Circuit" in Hoffert meets those limitations. *See* ID at 124, 151-52. We find no error in the ALJ's findings with respect to those claims, and we affirm them.

For similar reasons, we determine that Hoffert discloses the "block type module" in claim 4 of the '146 patent. *See* ID at 124. Dr. Delp testified that a "block type refers to the characteristics of a block, an image block." Tr. at 1460-61. Hoffert discloses a Block Type Identification Circuit 106. Hoffert at Fig. 10. Hoffert also teaches that each block is evaluated "to determine which of 4 types of compression/encoding should be used." Hoffert at 3:27-29. Accordingly, we find that Hoffert discloses the block type module recited in claim 4. Because the only dispute between the parties is whether Hoffert discloses the block type module, we determine that Hoffert anticipates claim 4.

iii. Anticipation of Other Patent Claims by Hoffert

Apple argued to the ALJ that claims 7, 12, 15, and 23 of the '417 patent; claims 1 and 6 of the '087 patent; and claim 16 of the '978 patent are anticipated by Hoffert. All of those claims

require the use of headers. In evaluating Apple's argument, the ALJ noted testimony from S3G's expert that the invention described in the Hoffert patent did not necessarily require headers. ID at 118-120, 177. The ALJ relied on that testimony to find that the use of headers is not inherent in Hoffert. *Id.* at 120, 151-52, 165. Apple contests that finding, arguing that because the invention disclosed in Hoffert can be implemented using "[o]rdinary programming" on a "general purpose computer" (*see* Hoffert at 9:58-62), Hoffert's invention inherently uses file headers.

"[A]nticipation by inherent disclosure is appropriate only when the reference discloses prior art that must *necessarily* include the unstated limitation . . . ." *Transclean Corp. v. Bridgewood Servs., Inc.*, 290 F.3d 1364, 1373 (Fed.Cir.2002) (emphasis in original). "Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Continental Can Co. USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1269 (Fed. Cir. 1991) (quoting *In re Oelrich*, 666 F.2d 578, 581 (CCPA 1981)). Whether a reference anticipates a claimed invention is a question of fact. Here, the ALJ found a factual dispute as to whether or not headers were necessary to practice the invention in Hoffert. He resolved that dispute by finding one expert's statements more credible than another's. ID at 119-120. We find no error in the ALJ's factual findings on inherent anticipation, and we adopt them. We affirm that Apple has not shown by clear and convincing evidence that Hoffert inherently anticipates claims 7, 12, 15, and 23 of the '417 patent; claims 1 and 6 of the '087 patent; and claim 16 of the '978 patent.

iv. Obviousness in View of Hoffert and Other Art

As mentioned above, the ALJ found nine of the twelve asserted claims to be obvious in view of Hoffert alone and in combination with other prior art. This section addresses arguments raised by S3G and the IA challenging the ALJ's conclusions on obviousness.

a. Whether Hoffert Teaches Away From Fixed Rate Compression

S3G and the IA argue that Hoffert and the other prior art cited by the ALJ teach away from fixed rate compression, which is the object of the asserted patents. S3G and the IA therefore contend that it would *not* have been obvious to combine Hoffert with the various prior art references relied upon by the ALJ. We find that the arguments from S3G and the IA on this point lack merit. First, while the inventions in the asserted patents may be particularly useful for performing fixed rate compression, nothing in the asserted claims requires the use of fixed rate compression. Accordingly, the question of whether the prior art relates to fixed rate compression or variable rate compression is not a controlling issue.

Further, Hoffert expressly discloses an embodiment of the invention that uses fixed rate compression and an embodiment that uses variable rate compression. Hoffert at 8:55-64. In Hoffert, fixed rate compression is referred to as "type 11 coding." *Id.* at 4:29-50. Hoffert teaches,

> The type 11 coding can be used with excellent results as the ***only*** coding mode in a compression/decompression system. That is, ***all*** of the video data can be compressed, stored and decompressed using the type 11 compression.

Id. at 8:60-64 (emphasis added). For this reason, and for the reasons that follow below, we find no error in the prior art combinations found by the ALJ to render certain patent claims obvious.

b. Whether It Would Have Been Obvious to Use Headers with Hoffert

The ALJ found that a person of ordinary skill in the art at the time of the patented inventions would have found the use of headers in the invention disclosed by Hoffert to be

obvious, and therefore seven asserted patent claims involving headers were invalid for obviousness. ID at 177-78, 182-83, 193. These claims include claim 16 of the '978 patent, claims 7, 12, 15, and 23 of the '417 patent, and claims 1 and 6 of the '087 patent.

S3G and the IA argue that the ALJ did not articulate a sufficient reason that a person of skill in the art would be motivated to use headers with Hoffert. Apple argues that the use of headers was ubiquitous in the art at the time of the patented inventions. Apple contends that the ALJ's analysis is proper and fully supported by the record.

The Supreme Court has stated that "any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 402 (2007). When examining whether a claimed invention would have been obvious in view of the prior art, a tribunal may "look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art." *Id.* at 417-18.

We find that a person of ordinary skill in the art reading Hoffert would have understood that the Hoffert invention compressed and decompressed images by breaking an image into blocks of 4x4 pixels and representing the 16 colors of each block with a reduced number of colors. Hoffert at FIG. 6, 7:53-8:5. A person of ordinary skill implementing the Hoffert invention would have to make design choices about how to interpret and manage the original and compressed image files used with the invention.

By October 1997, that person would have known that headers were commonly used to provide information about files in video and image compression schemes. Tr. at 1183:11-24 (Hoffert) (testifying that headers were commonplace by 1991, 1992); Tr. at 1451:20-1452:1

(Delp) (testifying that headers were "ubiquitous"); Tr. at 1452:2-18, 1455:7-24 (Delp) (testifying that the first time he used a header on image files was in the 1970s, that he was teaching his students about headers by the 1980s and that by the mid-1990s students from a typical undergraduate program in electrical engineering would have known about headers and how to use them); Tr. at 1459:8-19, 1664:15-1665:8 (Delp); Tr. at 2539:18-2540:20 (Richardson); RX-483; RX-512; RX-513; RX-517; RX-529; RX-532; RX-537. Additionally, at the time of the asserted inventions, a person of ordinary skill in the art would have been familiar with multiple well-known compression systems and formats that used headers, including IFF, UTAH RLE, TIFF, GIF, GIF89a, PICT, and JPEG. RX-483; RX-512; RX-513; RX-517; RX-529; RX-532; RX-537; Tr. at 1183:11-1184:5 (Hoffert); Tr. at 1451:20-1452:18, 1455:7-24, 1664:15-1665:8 (Delp); Tr. at 2539:18-2543:16 (Richardson); Tr. at 1183:11-24 (Hoffert). Such a person also would have been exposed to multiple patents pre-dating the filing date of the asserted patents that referred to the use of headers in compression systems. RX-537; RX-517; Tr. at 1675:5-1676:3, 1666:18-1667:11 (Delp).

The artisan also would have known that the information provided in a header was typically needed to understand how to interpret the image or video being decoded. Tr. at 1183:11-24 (Hoffert) ("Headers was the mechanism that was used to be able to interpret an image or a video sequence . . . Headers were needed to be able to understand how to interpret the image or video that you were decoding.").

Thus, at the time of the invention there was a known problem in the field of image compression (how to convey information about the image files to be compressed and decompressed) and a known solution (using headers). Using headers with the Hoffert invention would simply be the application of a well-known concept in an arrangement where each element

of the invention performs the same function it had been known to perform, and the combination yields no more than one would expect from such an arrangement. *See KSR*, 550 U.S. at 415-417; *see also Sundance, Inc. v. Demonte Fabricating Ltd.*, 550 F.3d 1356, 1366-67 (Fed. Cir. 2008).

Because a person of ordinary skill in the art at the time of the inventions would have found it obvious to use headers with the Hoffert invention, we find that Apple has shown by clear and convincing evidence that claim 16 of the '978 patent, claims 7, 12, 15, and 23 of the '417 patent, and claims 1 and 6 of the '087 patent are invalid under 35 U.S.C. § 103. We adopt all of the ALJ's findings consistent with that conclusion.

c. Whether It Would Have Been Obvious to Use Headers with Hoffert in View of Normile

The ALJ found that it would have been obvious at the time of the patented inventions to use the headers disclosed in U.S. Patent No. 5,822,465 to Normile ("Normile") with Hoffert's invention. ID at 183; *see also id.* at 193. We affirm the ALJ's conclusion, and provide additional clarification here.

The ALJ found S3G's arguments against combining Normile with Hoffert to be "somewhat strange in light of the fact that the asserted claims feature headers themselves." ID at 182. To the extent that this passage suggests that the ALJ used the claimed invention as a template in his obviousness analysis, we vacate this portion of the ALJ's reasoning. The Federal Circuit has stated, "It is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious." *In re Fritch*, 972 F.2d 1260, 1266 (Fed. Cir. 1992).

Ultimately, however, we agree with the ALJ's conclusion that combining Hoffert with Normile to arrive at an invention using headers would have been obvious. Normile discloses the use of multiple types of headers. Normile at 20:35-23:23 (describing, *e.g.*, sequence headers,

chunk headers, frame headers, and block headers). Further, the face of the Normile patent specifically lists Hoffert as a cited reference. Thus, a person of ordinary skill in the art at the time of the invention would be aware that the teachings in Normile are related to the teachings in Hoffert. As described above, at the time of the invention there was a known problem in the field of image compression (how to convey information about the image files to be compressed and decompressed) and a known solution (using headers). Accordingly, it would have been obvious to a person of ordinary skill in the art at the time of the invention to use the headers disclosed in Normile to convey information about the files to be compressed and decompressed in the Hoffert invention.

S3G argues that Normile teaches away from the use of headers. However, the fact that Normile recites a disadvantage of one type of header in one particular circumstance (Normile at 6:43-60) does not necessarily thwart the use of headers in a combination with Hoffert. *See Medichem, S.A. v. Rolabo, S.L.*, 437 F. 3d 1157, 1165 (Fed. Cir. 2006) ("a given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine."); *Winner Int'l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 n.8 (Fed. Cir. 2000) ("The fact that the motivating benefit comes at the expense of another benefit, however, should not nullify its use as a basis to modify the disclosure of one reference with the teachings of another."). The fact remains that Normile discloses embodiments that *do* employ headers. Those embodiments provide a proper basis to determine that the combination of Normile and Hoffert would have been obvious. We therefore determine that Apple has shown clear and convincing evidence that claim 16 of the '978 patent, claims 7, 12, 15, and 23 of the '417 patent, and claims 1 and 6 of the '087 patent are obvious under 35 U.S.C. § 103 based on

Hoffert in view of Normile. We adopt all of the findings by the ALJ that are consistent with conclusion.

d. Whether It Would Have Been Obvious to Combine Hoffert and Knittel

Claim 13 of the '146 patent and claim 14 of the '978 patent each require a geometric element having a minimal moment of inertia fitted to a color set. This feature helps to select a coding color set in a way that minimizes error. The ALJ found that a 1995 article by Knittel, *et al.*, entitled "Hardware for Superior Texture Performance," when combined with Hoffert, renders claim 13 of the '146 patent and claim 14 of the '978 obvious. ID at 198, 211. The ALJ relied upon Knittel for the geometric element limitations in those claims. In explaining why a person of ordinary skill in the art would have been motivated to combine Hoffert and Knittel, the ALJ pointed to the fact that one of the inventors named on the asserted patents, Mr. Iourcha, knew about Knittel's work. According to the ALJ, this fact showed that "such technology was readily within the knowledge of persons of ordinary skill in the art." ID at 198.

S3G argues that by referring to Mr. Iourcha's knowledge at the time he developed the patented inventions, the ALJ violated 35 U.S.C. § 103(a), which states, "Patentability shall not be negatived by the manner in which the invention was made."

We affirm the ALJ's determination that a person of ordinary skill in the art would be motivated to combine the Hoffert and Knittel references. The Hoffert invention builds on prior art that divided an image into blocks and compressed each block by selecting two representative colors (also known as "quantized" colors) for the block. Tr. at 1098:3-1099:5, 1104:21-1105:17, 1136:8-1137-11 (Hoffert); Hoffert at 1:32-44,4:32-50, 7:23-8:26, Fig. 2. Hoffert improved the quality of the decompressed images by selecting four representative colors for a block instead of

the two representative colors. *Id.* Using additional colors allows for a closer approximation of the colors of the block.

Hoffert teaches computing the set of colors for a block by dividing the original colors into two groups: those having luminance values above the mean luminance of the block, and those having luminance values below the mean luminance of the block. Hoffert at 4:57-5:7, Figs. 3 & 5A. Hoffert also disclosed using a line in color space to select the four colors for a block. Hoffert at 8:27-30; Tr. at 1604:25-1605:18 (Delp). Hoffert did not, however, teach how to optimize the colors selected for a block by fitting a geometric element to the set of colors for the original block. That method was taught in an earlier prior art reference, Knittel.

In 1995, Dr. Gunter Knittel published an article entitled "Hardware for Superior Texture Performance." (RX-491, "Knittel.") Knittel disclosed a method of using a geometric element, a "best fit line" technique, to select the colors of an image block compressed using color cell compression. Dr. Delp testified how one of ordinary skill in the art would have both motivation and ability to combine the improvements of Hoffert and Knittel. Tr. 1600:4-1605:18 (Delp). Knittel and Hoffert are closely related art. Knittel is a self-described variation of color cell compression aimed at improving the selection of representative colors for a block. Knittel at 35; Tr. at 1603:2-9 (Delp). Hoffert also builds on color cell compression, improving the quality of compressed images by selecting four representative colors for a block instead of the two representative colors selected in prior art color cell compression. Tr. at 1098:3-1099:5, 1104:21-1105:17, 1136:8-1137-11 (Hoffert); Hoffert at 1:32-44, 4:32-50, 7:23-8:26, Fig. 2.

A disadvantage in Hoffert's method for selecting representative colors provided a compelling reason for combining Hoffert with Knittel. *See KSR*, 550 U.S. at 420 ("any need or problem known in the field of endeavor at the time of the invention and addressed by the patent

can provide a reason for combining the elements in the manner claimed"). Knittel recognized that Hoffert's method of using luminance for grouping or clustering the colors could be problematic in some instances: "If there are different colors with similar luminance in the same block, this method will fail." Knittel at 35-36. To address this problem, Knittel teaches an alternative method of selecting the representative colors that involves fitting a geometric element to the colors for the block. Knittel at 35. One of ordinary skill would have been motivated to use Knittel's method of optimal color selection to avoid the disadvantage of Hoffert's method of selecting colors by luminance clustering. The artisan would use Knittel's method with Hoffert because Hoffert likewise proposed using a line in color space to select the four colors for a block. Hoffert at 8:27-30; Tr. at 1604:25-1605:18 (Delp). Knittel, however, teaches the optimal way to select that line. Knittel at 35-36.

Combining Hoffert's four color block with Knittel's method of using a best fit line to select colors is simply an arrangement of known elements, where each element performs the function it had been known to perform. *Sundance*, 550 F.2d at 1366-67. When Hoffert and Knittel are combined, the Hoffert compression system would still perform its original function of breaking an image into blocks and encoding and decoding each block using four colors. Likewise, Knittel's function of generating a best fit line for the original colors of the block would still be performed by the combination. *See id.* at 1367. The combination of Knittel's color selection method with Hoffert also yields no more than a person of ordinary skill would expect: a compression/decompression scheme with the combined benefits of optimal color selection and more quantized colors for each block.

Further, combining Knittel with Hoffert applies a known technique (using a best fit line to select colors) to prior art (Hoffert) ready for the improvement. *See id.* The benefit Knittel's

color selection method provides to Hoffert (*i.e.*,the selection of colors that more closely resemble the original colors for the block) is the same benefit Knittel provides to the original color cell compression system it sought to improve.

How to select representative colors for a block was a known problem with a finite number of known solutions. Knittel's method was a known solution to the problem of color selection at the time of the asserted inventions. Thus, it would have been obvious to use Knittel's technique for its intended purpose with Hoffert's compression scheme to achieve the claimed invention.

We adopt all of the findings by the ALJ that are consistent with a conclusion that it would have been obvious to combine Knittel's best fit line with the Hoffert invention. However, we vacate, as a basis for obviousness, any reliance on the fact that the inventor, Mr. Iourcha, knew about the Knittel reference. *See* ID at 198. We also note that the ID appears to mistakenly imply that claim 16 of the '146 patent is invalid over Hoffert in view of Knittel. ID at 211. We vacate any conclusion that Hoffert in view of Knittel renders obvious claim 16 of the '146 patent.

e. Whether the Block Type Identification Circuit in Hoffert Renders the Claim 4 of the '146 Patent Obvious

As an alternative to our determination that claim 4 of the '146 patent is anticipated by Hoffert, we also determine that the invention in claim 4 would have been obvious in view of Hoffert. As noted above, the central dispute between the parties with respect to the validity of claim 4 is whether Hoffert shows the same kind of block type module as is claimed in the '146 patent. S3G argues that the block type module in claim 4 distinguishes between those blocks in an image with transparent colors and those blocks without transparent colors. In contrast, S3G contends that the Block Type Identification Circuit 106 in Hoffert distinguishes between blocks encoded using four different compression schemes.

Assuming, for the sake of argument, that S3G's belated interpretation of the patent claims were correct, we conclude that any differences between the Block Type Detection Circuit in Hoffert and the block type module in claim 4 would have been obvious. The '146 patent states that it was known in the prior art that compressing images with transparent colors can result in degraded image quality. '146 patent at 2:33-36. Hoffert is similarly concerned about the effect that compression can have on image quality. Hoffert at 3:29-40. Hoffert teaches a solution to this problem: a user can select different threshold values that result in different types of encoding and corresponding differences in image quality. *Id.* Hoffert also discloses a block type identification circuit for determining which type of encoding or decoding should be applied. Hoffert at 3:27-29, 11:28-49. In other words, the invention in Hoffert identifies a block type so the compressor can know how to encode, or the decompressor can know how to decode, the image, and a user can alter these selections by setting certain values.

If a person of skill in the art would have applied the Hoffert invention to images having transparent colors, that person would have understood that she could set a value that would result in the invention using a particular type of encoding for blocks with transparent colors, with a corresponding effect on image quality. Hoffert at 3:29-40. The skilled artisan would also understand that the block type identification circuit in Hoffert is used to identify the need for a particular type of processing to be used with a particular type of block, which could be a block with transparent colors. Accordingly, we conclude that it would have been obvious for a person of ordinary skill in the art at the time of the invention to use the block type identification circuit in Hoffert in the manner S3G argues that claim 4 requires.

v. Secondary Considerations of Nonobviousness

a. The Parties' Arguments

S3G claims that the ALJ failed to properly consider the evidence it presented relating to secondary considerations of nonobviousness. These considerations include statements of acclaim, industry acceptance, commercial success, long-felt need, failure of others, licensing, and unexpected results. S3G particularly complains about evidentiary rulings by the ALJ that excluded some evidence on these topics as hearsay and the ALJ's conclusion that S3G had not shown a nexus between the secondary considerations and the merits of the claimed inventions over the prior art. Apple contends that the ALJ's evidentiary rulings were proper and that the ALJ applied the correct standard for showing a nexus between secondary considerations and the claimed invention.

Evidentiary rulings are committed to the discretion of the ALJ. *See, e.g.*, 19 C.F.R. §§ 210.36(e), 210.37(g). While hearsay is permitted in Commission proceedings, there is no requirement that it must be admitted. To the contrary, the Commission's Rules allow for the admission of hearsay evidence only when it is "[r]elevant, material, and reliable." 19 C.F.R. § 210.37(b). We determine the ALJ did not abuse his discretion when ruling on the admission of evidence with respect to secondary considerations of obviousness. Further, the ID shows that the ALJ considered S3G's nonobviousness arguments but did not find them persuasive. *See, e.g.*, ID at 184-192. We find no clear error in the ALJ's findings concerning secondary considerations of obviousness, and we adopt them.

vi. Enablement and Written Description

Apple asserts that the ALJ erred in finding that Apple failed to prove invalidity under 35 U.S.C. § 112 for lack of enablement and written description. Apple contends that the asserted

patents disclose an encoding scheme that examines the pixels inside the 4x4 block in question when making encoding choices. Apple claims that when the ALJ construed the asserted patent claims, he failed to limit the invention to using only data within the block for making encoding choices. Consequently, Apple argues, the claims as construed would cover an invention that uses data from inside the block *and from surrounding blocks* in making its coding choices. Apple asserts that the named inventors never contemplated or described such an invention, and therefore the patent lacks a proper written description and the claims are not enabled.

Apple's enablement and written description arguments lack merit. There are no disclaimers in the asserted patents that would support narrowing the claims in the manner Apple suggests. All of the asserted patent claims use the open-ended term "comprising" in their preamble. This type of language has consistently been interpreted to establish a floor, not a ceiling, on the elements contained in an infringing device. *See, e.g., Crystal Semiconductor Corp. v. TriTech Microelectronics Int'l., Inc.*, 246 F.3d 1336, 1348 (Fed. Cir. 2001) ("In the parlance of patent law, the transition 'comprising' creates a presumption that the recited elements are only a part of the device, that the claim does not exclude additional, unrecited elements.") Thus, the ALJ did not err when he found the open-ended patent claims in this investigation to cover devices that have more features than the asserted patent claims. Accordingly, we adopt the ALJ's determination that Apple's enablement and written description defenses lack merit.

E. Implied License and Patent Exhaustion

i. Apple's Purchase of NVIDIA Components

The ALJ found that the Mac OS X Devices that implement DXT infringe all of the asserted claims. ID at 275. However, the ALJ found that an implied license defense and a patent exhaustion defense applied to a subset of the Mac OS X Devices (the MacBook, MacBook Air,

and Mac mini) because those devices incorporated graphics processing units ("GPUs") purchased from NVIDIA Corporation ("NVIDIA"), and the ALJ found those NVIDIA products to be licensed under the asserted patents. ID at 255, 260. The ALJ did not find that Apple's implied license and patent exhaustion defenses apply to the MacBook Pro, iMac, and Mac Pro. *Id.*

According to the ALJ, Apple's implied license and patent exhaustion defenses stem from a settlement agreement between NVIDIA and S3G's predecessor company, S3 Incorporated ("S3"). ID at 251. The ALJ found that in February 2000, NVIDIA and S3 settled patent litigation between those two companies by executing a Term Sheet that granted NVIDIA a license to the patents at issue. ID at 220-51. The ALJ found that S3G acquired its rights in the asserted patents from S3 subject to the license granted to NVIDIA. ID at 251. The ALJ concluded that Apple, as a customer of NVIDIA, has an implied license to the asserted patents. ID at 255.

The ALJ also found that NVIDIA's sales to Apple exhausted any claim by S3G against Apple with respect to the sold NVIDIA products. The ALJ stated that when a patented device has been lawfully sold in the United States, subsequent purchasers inherit the same immunity under the doctrine of patent exhaustion. ID at 260 (citing *Jazz Photo Corp. v. U.S.*, 439 F.3d 1344, 1350 (Fed. Cir. 2006)). The ALJ found evidence of a sale of NVIDIA's accused technology to Apple "in the United States, in the State of California." ID at 259. The ALJ described sales discussions between Apple and NVIDIA concerning technology, price, and quantity. ID at 257-59. The ALJ concluded that Apple had proven by a preponderance of the evidence that a sale under the asserted patents had occurred in the United States, and therefore

the doctrine of patent exhaustion provided Apple with "a complete defense" with respect to importation of the MacBook, MacBook Air, and Mac mini OS X Devices. ID at 260.

S3G attacks Apple's implied license and patent exhaustion defenses on three levels. First, S3G challenges the contract between S3 and NVIDIA. S3G claims that the settlement agreement Term Sheet that NVIDIA and S3 executed lacks (1) a description of the parties' obligations when the patents at issue are assigned; (2) an exact identification of the patents at issue; and (3) the length of time for which the cross-license would apply. S3G claims that those terms are material, and because they are lacking, the settlement agreement is not enforceable and NVIDIA had no license to the asserted patents. S3G claims that it received the asserted patents from S3 clear of any encumbrances, including any agreement between S3 and NVIDIA. S3G also criticizes the ALJ's finding that S3G lacks standing to challenge the contract between S3 and NVIDIA. ID at 245.

Second, particularly with respect to Apple's patent exhaustion claim, S3G challenges the ALJ's finding that NVIDIA's sales to Apple occurred in the United States. S3G claims that Apple's products are produced by manufacturers in China, [[

]] S3G claims that these circumstances do not amount to a sale in the United States. S3G further criticizes the legal authority that ALJ cited in its discussion with regard to exhausting sales in the United States. S3G argues that *Robbins Co. v. Lawrence Mfg.*,[13] and *Monolithic Power Sys., Inc. v. O2 Micro Int'l Ltd.*,[14] cited by the ALJ, deal with the issue of a

[13] *Robbins Co. v. Lawrence Mfg. Co.*, 482 F.2d 426, 434-35 (9th Cir. 1973).

[14] *Monolithic Power Sys., Inc. v. O2 Micro Int'l Ltd.*, Nos. C04-2000 & C06-2929CW, 2007 WL 3231709, *3 (N.D. Cal. Oct. 30, 2007) (unreported).

prior art sale under 35 U.S.C. § 102(b), not what constitutes a sale for patent exhaustion purposes.

Third, S3G argues that Apple's patent exhaustion and implied license defenses do not extend to Apple's use of the [[ ]] codec, a software implementation of DXT that S3G claims Apple developed independently from the GPUs it purchases from NVIDIA.[15]

Apple argues that the ALJ correctly interpreted the Term Sheet between S3 and NVIDIA and correctly found that agreement to provide NVIDIA with a license to the asserted patents. Apple argues it obtains an implied license under the patents when it purchases GPUs from NVIDIA. As for the[[ ]] codec, Apple argues that the codec exists in the Mac OS X Devices in order to meet the requirements of OpenGL, a cross-platform standard used by multiple different companies for describing graphics functionality. Apple argues that S3G granted a license to NVIDIA that allows NVIDIA to sell GPUs under the patents that operate in the OpenGL framework. Apple points to an email from S3G's representative to the OpenGL standards group, Yanjun Zhang, to support that contention. Apple argues that when it purchases NVIDIA GPUs, it obtains an implied license to operate NVIDIA GPUs within the OpenGL framework. Apple claims that OpenGL requires a "fallback" software encoder and decoder for any format (such as DXT) that can be decoded in hardware. Apple argues that it incorporates the [[ ]] codec into the Mac OS as a "fallback" encoder/decoder for the GPU hardware, and that such an implementation is covered by the implied license it obtained through purchase of the NVIDIA GPUs.

With respect to the location of an exhausting sale under the patent, Apple raises two arguments. First, Apple defends the ALJ's finding that the sales from NVIDIA to Apple occurred in the United States. Apple argues that the situs of delivery does not, as a legal matter,

[15] The [[ ]] codec is part of the Mac operating system. (S3G Pet. for Review at 13.)

determine the situs of a sale. Apple defends the ALJ's citation to *Robbins* and *Monolithic Power Systems,* cases that S3G characterizes as concerning prior art sales. Apple explains that the legal concept of a "sale" arises in many areas of patent law, including a sale or offer for sale to prove infringement under 35 U.S.C. § 271(a), the on-sale bar of 35 U.S.C. § 102(b), a sale under 19 U.S.C. § 1337(a)(1)(B), or a sale under the doctrine of patent exhaustion, and that in each circumstance the norms of traditional contractual analysis apply.

Apple's second argument is that S3's license of the asserted patents to NVIDIA is itself an exhausting sale under *LG Elecs. Inc. v. Hitachi Ltd.*, 655 F. Supp. 2d 1036, 1047-48 (N.D. Cal. 2009) ("the license agreement represented a sale for exhaustion purposes") and *Certain Semiconductor Chips with Minimized Chip Package Size and Products Containing Same*, No. 337-TA-630, ID at 151 (Aug. 28, 2009).

The IA also contests the ALJ's implied license and patent exhaustion analysis. The IA argues that the Term Sheet between S3 and NVIDIA was not a license, and therefore Apple has no implied license under the patents when it purchases components from NVIDIA. With respect to patent exhaustion, the IA argues that an exhausting sale must occur in the United States. The IA further contends that a sale occurs "where the goods are delivered," relying upon *Minebea Co. v. Papst*, 444 F. Supp. 2d 68 (D.D.C. 2006). The IA contends that the record does not support a conclusion that the sales from NVIDIA to Apple occurred in the United States, and therefore the doctrine of patent exhaustion does not apply.

We adopt the ALJ's determination that NVIDIA holds a license to the patents at issue by virtue of the Term Sheet executed in its settlement with S3. We further adopt the ALJ's conclusion that S3G acquired the patents in suit subject to NVIDIA's license. On this later point, however, we vacate a subsidiary determination found in the ID that "S3G does not have standing

to challenge the Term Sheet." *See* ID at 245. We need not reach the standing issue in this opinion. *See Beloit Corp. v. Int'l Trade Comm'n*, 742 F.2d 1421, 1423 (Fed. Cir. 1984).

With respect to Apple's implied license defense, we adopt the ALJ's determinations and find that Apple enjoys an implied license under the asserted patents to use and sell computers that incorporate the NVIDIA GPUs. The ID is ambiguous, however, as to whether Apple's implied license covers implementation of the [[ ]] codec. For the reasons discussed below, we determine that it does.

Apple notes that Mr. Toksvig, the NVIDIA engineer who designed the DXT decoder in the NVIDIA GPU, testified that the NVIDIA GPU could not operate without the OpenGL interface, which he described as the "law of the land." Tr. at 2220:11-23 (Toksvig). Mr. Toksvig further testified that OpenGL is the only way to use an NVIDIA GPU in a Mac OS X Device to decode a compressed DXT texture:

> Q. Now, is there any way to pass DXT 3 encoded information to the [N]VIDIA GPU in a Mac computer, other than through one of these OpenGL functions?
>
> A No.

Tr. at 2216:2-6 (Toksvig).

S3G understood that NVIDIA's GPUs operate in the OpenGL framework. S3G's representative to the OpenGL standards group, Yanjun Zhang, expressly acknowledged in 2005 that NVIDIA's license entitled NVIDIA to implement EXT_texture_compression_S3TC, an extension to the OpenGL standard for DXT texture compression:

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RX-43C at S3G00085178-79; JX-117C at S3G00068419; CX-275C; JX-11; Tr. at 287:15-20 (Weng); Tr. at 1853:1-1856:16; 1881:19-23, 1882:21-1883:2, 1883:18-22 (Domingo). Thus, the evidence supports a conclusion that S3G understood that the NVIDIA license authorized the use of NVIDIA devices to practice the OpenGL standard, including any extensions contributed by S3G.

The OpenGL standard has a number of software implementations that must be present for a system to be OpenGL compliant. For example, OpenGL specifies that implementations include a "fallback" software encoder and decoder for any format (such as DXT) that can be decoded in hardware. Tr. at 2308:16-25 (Sandmel). Apple incorporates the [[ ]] codec into the Mac OS as a "fallback" encoder/decoder for the GPU hardware. *See* Tr. at 2307:20-23 (Sandmel). As Mr. Sandmel explained, the [[ ]] codec was incorporated to comply with the OpenGL specification:

> Q. Why is the [[ ]] codec present in the Mac products?
>
> A. This code is present in the Mac products as part of software, our software implementation to be compliant with the OpenGL specification. And if there is a fall back case where we execute routines in software, in the event that the underlying GPU hardware is not capable of implementing the OpenGL specification.

Tr. at 2308:16-25 (Sandmel). *See also* JX-54C, Sandmel Dep. Tr. at 60:5-13, 61:17-62:4, 65:23-66: 17; RX-381.

In view of the foregoing evidence, we find that NVIDIA was authorized under its license from S3 to sell GPUs for use in OpenGL environments. By purchasing NVIDIA GPUs, Apple obtained an implied license that included that same authorization. *See Hewlett-Packard Co. v. Repeat-O-Type Stencil Mfg. Corp.*, 123 F.3d 1445, 1451 (Fed. Cir. 1997) (the buyer of a patented device "has an implied license under any patents of the seller that dominate the product or any uses of the product to which the parties might reasonably contemplate the product will be put").

Apple developed the[[ ]] codec to be compliant with the OpenGL standard, and selling the NVIDIA GPUs with the [[ ]] codec is covered by Apple's implied license. Accordingly, we determine that Apple has an implied license under the asserted patents with respect to those MacBook, MacBook Air, and Mac mini products that contain both an NVIDIA GPU and the [[ ]] codec. Apple has committed no violation of section 337 based on the importation or sale of such products.

Because we find no violation of section 337 on other grounds, we take no position on the issue of patent exhaustion with respect to the NVIDIA components in this final determination. *See Beloit*, 742 F.2d at 1423.

ii. Apple's Purchase of Intel Components

It is undisputed that Apple purchases from Intel central processing units ("CPUs") and GPUs for incorporation in the Mac OS X Devices. ID at 264. It is also undisputed that those Intel products are licensed under the asserted patents. *Id.* Apple contends that under the doctrines of implied license and patent exhaustion, Apple has no liability for infringement for products containing Intel processors. Because we find no violation on other grounds, we take no position on Apple's defenses based on Intel chips. *See Beloit*, 742 F.2d at 1423.

F. Evidentiary Sanction

The ALJ found that Apple violated a discovery order when it did not timely produce certain documents related to AMD, which supplies GPUs to Apple. Order No. 38. S3G alleges that (1) the components obtained from AMD are used by the Mac OS X Devices to infringe certain patent claims, (2) its infringement case was harmed by Apple's failure to timely produce the AMD documents in its possession, and (3) because Apple's production occurred only days before the hearing, it was unable to use the produced documents in the evidentiary hearing.

The ALJ determined that the appropriate sanction for Apple's untimely production was to infer that the evidence Apple delayed in producing would have tended to show infringement. ID at 274. However, the ALJ declined to extend the inference to be dispositive on the issue of whether Apple devices incorporating AMD components infringe. *Id.* The ALJ ultimately concluded that, even with the inference granted, S3G failed to prove that the AMD products infringe. *Id.*

S3G and the IA claim that the ALJ erred by failing to adopt an inference that Apple products with AMD components infringe. Apple claims that the ALJ erred by adopting any adverse inference at all. Apple further seeks clarification in the ALJ's conclusions and in the scope of any remedial order that Apple may import Mac OS X Devices having AMD GPUs.

The ALJ is vested with discretion in issuing sanctions for discovery abuse. *See* 19 C.F.R. § 210.33(b). An adverse inference is one sanction specifically authorized by the Commission's Rules. *See id.* at § 210.33(b)(1). We cannot say that the ALJ abused his discretion by failing to adopt an ultimate inference of infringement. We note that despite being on notice of the potential relevance of the AMD devices during the discovery phase of this investigation, S3G did not seek the issuance of a subpoena to AMD to produce evidence. Apple Pet. for Review at 50. Thus, the ALJ may not have deemed it appropriate for S3G to reap a windfall verdict without such diligent efforts. Accordingly, we find no abuse of discretion in the ALJ's sanction and no error in the ALJ's finding that S3G failed to prove infringement by the AMD devices. We therefore adopt the ALJ's determinations with respect to the sanctions issue and infringement based on AMD's products.

G. AMD's Claim to the Patents

Two motions currently pending before the Commission relate to AMD's claim that it owns the patents asserted in this investigation: a motion by AMD to intervene and terminate the investigation and a motion by Apple to terminate the investigation. S3G has filed an opposition to those motions and AMD has moved for leave to file a reply to S3G's opposition. Because the proposed reply supplied by AMD is at least marginally helpful in resolving these motions, we hereby grant leave for its filing and deem it filed. The sections below discuss the motions from AMD and Apple.

i. AMD's Motion to Intervene

AMD seeks to intervene in this investigation on the side of respondent Apple to assert a claim that it owns the patents at issue. AMD contends it satisfies the four criteria for intervention at the Commission, namely: (1) AMD's motion to intervene is timely; (2) AMD has an interest relating to the property that is the subject of the action; (3) AMD is so situated that the disposition of the action may as a practical matter impair or impede its ability to protect that interest; and (4) AMD's interest is not adequately represented by the existing parties. AMD Memo. at 9 (citing 19 C.F.R. § 210.19 and *Certain Baseband Processor Chips and Chipsets*, Inv. No. 337-TA-543, Order No. 27 (Feb. 15, 2006)).[16]

With respect to the first factor, AMD argues that its motion to intervene is timely because it concerns a dispositive jurisdictional issue that cannot be waived and that may be raised at any time. AMD Memo. at 13. Specifically, AMD asserts that the Commission lacks jurisdiction because AMD is the true owner of the asserted patents, not the complainant S3G. AMD also argues that it had good reason for not previously "investigating" ownership of the patents at

[16] AMD ordered these factors differently in its brief, presumably to deemphasize the timeliness factor. The order listed here is consistent with prior Commission decisions on the issue.

issue. *Id.* at 14. AMD submitted a declaration from its counsel stating that counsel for S3G had repeatedly told AMD that AMD was a "licensee" of the asserted patents and that AMD was not the focus of this investigation. *Id.* at 14; AMD Memo. Ex. 17, Zimmerman Decl. AMD asserts that the Commission's determination to review the ID in early September 2011 "heightened the risk" that Apple's accused products might be found to infringe and prompted AMD to undertake "a thorough assessment of the case and potential defenses." AMD Memo. at 15. AMD avers that its investigation caused it to "recognize" that its subsidiary ATI obtained title to the asserted patents through ATI's purchase of the FireGL Business from SONICblue. *Id.* AMD claims that it moved promptly to intervene after coming to this realization in mid-September 2011. *Id.*

With respect to the second factor, AMD argues it has a property interest in the patents asserted in this investigation and a business interest in the importation and sale of the accused products because some of those products contain GPUs sold by AMD. *Id.* at 10-11.

With respect to the third factor, AMD claims that its interest in the patents will be impaired if S3G is allowed to usurp AMD's alleged patent rights by pursuing this investigation. *Id.* at 10. AMD also contends that the outcome of this investigation could impair AMD's ability to sell products if its products are found to infringe or if the products of its customer Apple are excluded from importation. *Id.* at 11.

With respect to the fourth factor, AMD claims that its interests have not been adequately represented in the investigation because none of the named parties realized or asserted that AMD owns the patents in question. *Id.* at 12. AMD also argues that it has knowledge about the ownership of the patents that Apple does not have. *Id.* at 13.

S3G opposes AMD's motion to intervene. S3G argues that all four of the criteria for intervention outlined by AMD must be satisfied before intervention will be allowed and AMD has satisfied none of those criteria. S3G Opp. at 27.

First, S3G argues that AMD's motion is untimely. S3G contends that AMD had actual notice of this investigation at least by October 15, 2010, when Apple subpoenaed AMD's employee, Konstantine Iourcha, in connection with this investigation. Mr. Iourcha is a named inventor on each of the asserted patents, based on work he performed while employed by S3 prior to his employment with AMD. S3G avers that AMD's counsel represented Mr. Iourcha at his deposition on October 28, 2010. S3G Opp. at 28.

S3G also notes that Apple served a subpoena upon AMD in this investigation for documents relating to the asserted patents on October 18, 2010. *Id.* Additionally, S3G contends that in February 2011, counsel for AMD communicated with the parties several times concerning a discovery dispute over the production of AMD source code in Apple's possession. S3G argues that AMD never raised a claim to own the patents during any of these events but waited until eleven months after actual notice of the investigation to bring its claim. *Id.* at 29-30.

With regard to the second and third factors—the potential that AMD's interests will be impaired as a result of the investigation—S3G argues that AMD's failure to timely intervene cuts against a conclusion that AMD's stated interests are genuine. *Id.* at 34. S3G also claims that even if Apple's products are excluded from entry, AMD's interests will not be impaired because AMD "doubtless" has other customers. *Id.* at 34-35.

With regard to the fourth factor—whether other parties can adequately represent AMD's interests—S3G presents two arguments. First, S3G claims AMD's interests are aligned with its customer Apple, and Apple is capable of defending its products without assistance from AMD.

Id. at 35. Second, S3G argues that if Apple cannot adequately represent AMD's interests it is AMD's own fault. Specifically, S3G contends that documents relating to AMD's claims of patent ownership would have been responsive to the subpoena that Apple served on AMD last fall. S3G asserts that if AMD failed to provide Apple with adequate discovery to support those claims, AMD has no one to blame but itself for Apple's failure to protect AMD's interests. *Id.*

Finally, S3G speculates that AMD's "entire purpose" in seeking to intervene so late in the investigation is to produce a delay that would prejudice S3G and help AMD's customer, Apple. S3G urges the Commission not to reward AMD by endorsing a course of action that will delay issuance of any remedial orders. *Id.* at 28.

The IA also opposes AMD's motion to intervene. The IA agrees that the Commission should consider the four factors identified by the parties above. IA Opp. at 3. With regard to the first factor, the IA contends that the fact that AMD knew about the patents and products implicated in this investigation many months before moving to intervene weighs against a conclusion that AMD's motion is timely. *Id.* at 4-5. In response to AMD's argument that its motion is timely because jurisdictional issues may be raised at any time, the IA asserts that courts still consider timeliness when a party moves to intervene to assert a jurisdictional argument. *Id.* at 4 n.5 (citing *Elliott Indus. v. BP America*, 407 F.3d 1091, 1103-04 (10th Cir. 2005)).

With regard to the second and third factors, the IA concedes that AMD has shown that it has an interest in the property that is the subject of the investigation and that the Commission's determination may impair that interest. IA Opp. at 6.

With regard to the fourth factor, the IA contends that AMD's interest in the investigation may be adequately represented by Apple, which has filed a motion seeking to terminate the

investigation for the same reasons as those argued by AMD. *Id.* The IA also asserts that Apple possesses the information relating to patent ownership that AMD has relied upon in its motion.

Finally, the IA asserts that because Congress has statutorily required that section 337 investigations should be concluded "at the earliest practicable time," S3G's potential right to a timely exclusion order should not be delayed by the late intervention of AMD. IA Opp. at 5 (citing 19 U.S.C. § 1337(b)(1)).

Under Commission Rule 210.19, the Commission "may" grant a motion to intervene to the extent and upon such terms as may be proper under the circumstances. 19 C.F.R. § 210.19. As indicated by the word "may" in Rule 201.19, intervention is a matter of Commission discretion, not a matter of right. Federal Rule of Civil Procedure 24 provides some guidance in determining whether intervention in a particular matter is appropriate. *See Certain Baseband Processor Chips and Chipsets*, Inv. No. 337-TA-543, Order No. 27 (Feb. 15, 2006); *Certain Garage Door Openers*, Inv. No. 337-TA-459, Order No. 7 (November 20, 2001). Based on the factors found in Federal Rule 24, a party's motion to intervene is most persuasive where (1) the motion is timely; (2) the movant has an interest relating to the property or transaction which is the subject of the action; (3) the movant is so situated that the disposition of the action may as a practical matter impair or impede the movant's ability to protect that interest, (4) the movant is not adequately represented by existing parties; and (5) the intervention will not unduly delay or prejudice the adjudication of the original parties' rights. Fed. R. Civ. P. 24; *Certain Baseband Processor Chips and Chipsets*, Inv. No. 337-TA-543, Order No. 27 (Feb. 15, 2006). We examine AMD's motion with respect to each of those factors.

1. Whether AMD's Motion Is Timely

The question of whether a motion to intervene is timely is a threshold issue. *See NAACP v. New York*, 413 U.S. 345, 365 (1973) (a tribunal considering a motion to intervene "must first be satisfied as to timeliness"). Timeliness is to be determined from all the circumstances. *Id.* at 365-66. Commonly considered factors include how far the litigation had progressed at the time of the motion;[17] the length of time during which the prospective intervenor knew or reasonably should have known of its rights;[18] the risk of prejudice to the rights of the existing parties or proposed intervenor;[19] and the existence of unusual circumstances militating either for or against a determination that the motion is timely.[20]

AMD's motion is untimely. With respect to the stage of the litigation, the evidentiary record in this investigation closed several months ago. The ALJ has already issued his final ID and the Commission has requested and obtained submissions on a potential remedy. Quite literally, AMD could not have filed its motion to intervene any later in the investigation than it has. The late stage of the investigation therefore weighs against a determination that AMD's motion is timely.

Further, AMD had actual notice of this investigation at least by October 18, 2010, when Apple subpoenaed documents from AMD relating to the asserted patents. Apple's subpoena requested any licenses between AMD and S3G or its predecessors, any licenses relating to the

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[17] *Blount-Hill v. Zelman*, 636 F.3d 278, 285 (6th Cir. 2011); *United States v. Ritchie Special Credit Invs.*, 620 F.3d 824 (8th Cir. 2010).

[18] *Blount-Hill,* 636 F.3d at 285; *Ritchie,* 620 F.3d at 824; *Oklahoma ex rel. Edmondson v. Tyson Foods*, 619 F.3d 1223, 1232 (10th Cir. 2010); *R&G Mortgage Corp. v. Fed. Home Loan Mortage Corp.*, 584 F.3d 1, 7 (1st Cir. 2009); *Belton Inds. v. U.S.*, 6 F.3d 756, 762 (Fed. Cir. 1993).

[19] *Blount-Hill,* 636 F.3d at 285; *Ritchie,* 620 F.3d at 824; *Tyson Foods,* 619 F.3d at 1232; *R&G Mortgage,* 584 F.3d at 7.

[20] *Blount-Hill,* 636 F.3d at 285; *R&G Mortgage,* 584 F.3d at 7; *Belton,* 6 F.3d 756 at 762; *see also Tyson Foods,* 619 F.3d at 1232.

asserted S3G patents and other S3G patents, documents relating to any S3G patents, and documents

> relating to the incorporation of technology from S3 GRAPHICS into AMD products, including but not limited to FireGL products and any texture compression function, algorithm, encoder, decoder or format of S3 texture compression ("S3TC") or DirectX (DXT1, DXT2 or other DXT format).

S3G Memo., Ex. Q, Subpoena to AMD (Oct. 18, 2010).

AMD produced, in response to Apple's subpoena, copies of the asset purchase agreement and other documents associated with the purchase of the FireGL business by AMD's subsidiary ATI. AMD Memo., Ex. 17, Zimmerman Decl. at ¶¶ 3,19 (March 23, 2011). As will be discussed in more detail below, those are the very documents that AMD is now relying upon for its claim of patent ownership. *See* AMD Memo. at 1-2. AMD was quite conscious of the operative facts surrounding the FireGL purchase, as long as one year ago. In March 2011, AMD's counsel, Mr. Zimmerman stated:

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AMD Memo., Ex. 17, Zimmerman Decl. at ¶ 3 (March 23, 2011). In light of this record, we find that AMD should have been aware of any property interest connected to the FireGL transaction at least by March 23, 2011, and possibly as early as September 2010. Yet AMD did not file its motion to intervene until September 2011. These facts weigh heavily against a conclusion that AMD's motion was timely.

AMD contends that because its motion implicates the Commission's jurisdiction, the motion is *per se* timely. While a court may find the prejudice resulting from a late motion to intervene to be minimal when "compared with the importance of addressing the question of

subject matter jurisdiction" (*see Elliott Indus. v. BP America*, 407 F.3d 1091, 1103-04 (10th Cir. 2005), that does not necessarily mean that an intervention motion that raises a jurisdictional issue should always be granted. There are a variety of mechanisms for the Commission to resolve the jurisdictional questions raised by AMD's motion without granting intervention. For example, addressing Apple's motion to terminate will resolve the issue.

In sum, the timeliness factor weighs against granting AMD's motion.

2. Whether AMD Has an Interest in the Investigation

AMD has at least two potential interests in the investigation. First, AMD has an interest in some of the accused products. S3G has accused Apple products containing AMD components of infringing the asserted patents, and S3G's allegations depend at least in part on the functionality of AMD's products. Second, if AMD's claims of patent ownership were valid, AMD would have an interest in the intellectual property rights at issue in this investigation. We find that these factors weigh in favor of AMD's intervention.

3. Whether AMD's Interests May Be Impaired

Because some Apple products having AMD components might have been excluded if the Commission were to find a violation, AMD has an interest that may be impeded or impaired in this investigation. Further, if AMD's claims of patent ownership were valid, AMD would have the right to choose the companies it accuses of patent infringement. *See, e.g., Ortho Pharm. Corp. v. Genetics Inst.*, 52 F.3d 1026, 1031 (Fed. Cir. 1995) ("Hence the patent owner may freely license others, or may tolerate infringers . . ."). AMD has indicated that, given the choice, it would not pursue this investigation against Apple, one of its customers. Accordingly, AMD's potential property rights may be impeded and AMD's business relationship with Apple may be impaired by this investigation.

On the other hand, any potential impairment to AMD's interests by the present investigation is mitigated by the fact that AMD is simultaneously pursuing a quiet title action in the federal district court in Delaware. Any determinations concerning patent ownership that arise from the Delaware action would be binding at the Commission. Accordingly, we find that AMD's interests in this investigation are being protected in the district court litigation. This factor weighs against intervention.

4. Whether AMD Is Adequately Represented by Other Parties

We determine that respondent Apple has substantially overlapping interests with AMD. Apple has argued against an exclusion order against its products, including products containing chips from AMD. Apple has sufficient financial motivation to mount defenses against such an order and significant resources to fund its defense. Apple is also pursuing the same patent ownership theory as AMD. Further, Apple appears to have access to the necessary information, obtained from AMD by subpoena, to assert AMD's patent ownership theory. AMD Memo., Ex. 17, Zimmerman Decl. at ¶¶ 3, 19. Accordingly, we find that Apple has adequately represented AMD's interests in this investigation. This factor weighs against intervention by AMD.

5. Whether Allowing AMD to Intervene Will Cause Delay or Prejudice the Named Parties

Federal Rule of Civil Procedure 24(b)(3) encourages consideration of whether intervention will cause delay or prejudice to the rights of the other parties. Allowing AMD to intervene at this late stage in the litigation would cause delay and prejudice to the named parties. Congress has statutorily required that section 337 investigations should be concluded "at the earliest practicable time." 19 U.S.C. § 1337(b)(1). AMD argues, at least in the alternative, that if it is permitted to intervene, this investigation should be remanded to the ALJ for a decision on

patent ownership. AMD Memo. at 34. A remand would significantly delay the final resolution of this investigation. A delay in the final resolution of this investigation would prejudice Apple's right to a timely vindication of its importation activities. Because AMD is pursuing its alleged rights in another, more appropriate venue, whatever interest AMD may have in this investigation does not outweigh the potential prejudice and delay that may be caused by AMD's intervention.

In sum, we determine that AMD's motion is untimely; AMD's interests can be protected by Apple and by AMD's district court lawsuit; and allowing AMD to intervene at this late date will prejudice the parties. Accordingly, we determine that granting AMD's motion to intervene is not proper under the circumstances. *See* 19 C.F.R. § 210.19.

ii. AMD's and Apple's Motions to Terminate the Investigation

Both AMD and Apple have moved to terminate the investigation based on AMD's claims of patent ownership through AMD's subsidiary ATI. Apple's motion to terminate relies on the "evidence and arguments advanced by ATI" and AMD. Apple Memo. at 1-2. Accordingly, the two motions to terminate rise and fall together. For simplicity, we reference AMD's motion; however, the same analysis applies to Apple's motion.

AMD argues that the Commission lacks jurisdiction over this investigation because AMD's subsidiary, ATI, owns the asserted patents and declines to participate as a complainant. AMD Memo. at 1 (citing *SiRF Tech., Inc. v. Int'l Trade Comm'n*, 601 F.3d 1319, 1325-26 (Fed. Cir. 2010)). AMD claims that S3G's predecessor in interest, known both as S3 Incorporated ("S3") and as SONICblue Incorporated ("SONICblue"), assigned the patents to ATI when it sold its entire FireGL Business to ATI on March 30, 2001. AMD Memo. at 1. AMD argues that because S3G is not the true owner of the patents, S3G does not have standing to bring the complaint and this investigation must be terminated. AMD Memo. at 15-16.

With regard to the purchase of the FireGL assets, AMD relies upon an Asset Purchase Agreement between ATI and SONICblue, which states ATI acquired

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AMD Memo., Ex. 7, § 2.01. AMD contends that under this language, SONICblue sold ATI virtually everything connected to the FireGL business on March 30, 2001. AMD Memo. at 18. As explained below, AMD contends that the intellectual property represented in the patents asserted in this investigation was part of that sale.

AMD admits that the asserted patents had not issued at the time of the FireGL sale, but argues that the applications that lead to the '146 and '978 patents had been filed with the Patent Office at the time of the transaction. *Id.* at 19. AMD also notes that the '417 and '087 patents are descended from an application that was on file with the Patent Office at the time of the FireGL sale. *Id.* AMD claims that the patent applications in question were part of the FireGL business because those applications concerned texture compression and several of the FireGL products ATI acquired from SONICblue supported that technology. *Id.* at 20. AMD asserts that "SONICblue and ATI recently confirmed in writing that SONICblue assigned the asserted patents to ATI on March 30, 2001." AMD Memo. at 24. In support of that assertion, AMD points to a document signed September 6, 2011 (*id.*, Ex. 2) and recorded at the Patent Office on September 13, 2011 (*id.*, Ex. 25).

AMD further argues that S3G's claims to patent ownership are deficient. AMD notes that S3G's complaint relies on documents recorded at the Patent Office on May 7, 2002. AMD

Memo. at 7, 28. AMD contends the 2002 documents at the Patent Office reflect nothing more than an assignment of the specific patents listed on those documents from S3G's predecessor to S3G, and "[n]one of the asserted patents, or even any of the pending applications that issued as asserted patents, is identified or listed" on those documents. AMD Memo. at 2-3; *see also id.* at 28-30. AMD also criticizes a November 16, 2006 assignment of patents to S3G that expressly lists the asserted patents and was recorded at the Patent Office on July 15, 2011. *Id.* at 25-26, Ex. 4. AMD claims this assignment was ineffective because ATI had already acquired title to the patents as part of the March 2001 purchase of the FireGL business. *Id.* at 27.

S3G opposes the motions by AMD and Apple to terminate the investigation. S3G argues that its title to the patents is clear: the inventors assigned their interest in the patents to S3, now known as SONICblue, and SONICblue assigned rights in the patents to S3G on January 3, 2001. S3G Opp. at 1, 6. S3G claims it prosecuted the applications that led to the asserted patents and that its name appears on the face of each asserted patent as the assignee. S3G Opp. at 9. S3G further contends that the motions by AMD and Apple avoided two critical documents which clarify that S3G, not AMD, owns the asserted patents.

The first document is a schedule to the January 2001 transaction between SONICblue and S3G titled Schedule 3.14(a)(ii). S3G Opp., Ex. D at S3G00078472; AMD Memo., Ex. 15 at Reel: 012852 Frame: 0032. S3G says the schedule proves that AMD was wrong when it claimed that the documents recorded at the Patent Office in 2002 did not include the patent applications in question. According to S3G, Schedule 3.14(a)(ii) expressly lists the intellectual property involved in the assignment from SONICblue to S3G. The schedule lists several items with titles similar to the titles of the asserted patents. These items include U.S. Patent No. 4,956,431 ("the '431 patent") and two pending U.S. patent applications. S3G Opp. at 7. S3G claims that these

three items are part of a patent family that led to the patents asserted in this investigation. According to S3G, the two applications listed on the schedule later issued as the '146 patent and the '978 patent. *Id.* at 8. The applications that led to the '417 patent and the'087 patent are not listed on the schedule, says S3G, because they had not been filed at the time of the transaction. Nevertheless, S3G contends it owns rights in those latter two patents because they are descended from a patent and an application listed on Schedule 3.14(a)(ii).

The second document highlighted by S3G is a schedule to the March 30, 2001 transaction between SONICblue and ATI, titled Schedule 3.19(a). S3G Opp., Ex. H. S3G contends that Schedule 3.19(a) is an exhaustive list of intellectual property transferred from SONICblue to ATI, and the patent applications in question are not on that list. S3G argues that the schedule is exhaustive because the agreement between SONICblue and ATI states that "[[

]]" S3G Opp. at 12, Ex. G at 23 (emphasis by S3G). Schedule 3.19(a) also states on its face that it is a "[[ ]]" involved in the transaction. S3G Opp. at 11-12, Ex. H.

Viewing these two documents in the context of the two transactions of which they are a part, S3G argues that the documents show SONICblue sold off two distinct businesses in 2001: the FireGL business bought by ATI and the graphics chip business bought by S3G. S3G Opp. at 10. S3G contends that the "FireGL Business" was expressly carved out from the contract between SONICblue and S3G (S3G Opp. at 10, Ex. B at 4) and the "microprocessor" business (*i.e.*, chip business) was [[ ]] S3G Opp. at 10-11, Ex. G at 2.

S3G also attacks the sufficiency of the evidence in AMD's motion. S3G notes that AMD did not submit any declarations, affidavits, or other testimony from any of the individuals involved in the 2001 transfers. S3G Opp. at 3. S3G further objects to confirmation of assignment document submitted by AMD and dated September 6, 2011. *See* AMD Memo., Ex. 2. S3G argues that ATI unilaterally signed the document for SONICblue without SONICblue's knowledge. S3G characterizes the document as fabricated evidence that borders on professional misconduct. In contrast, S3G notes, the documents it relies upon to prove ownership of the patents were admitted into evidence by the ALJ. S3G Memo. at 9. In sum, S3G contends that it has clear title to the patents and therefore the Commission has jurisdiction over this investigation.

The IA also opposes AMD's motion to terminate the investigation. The IA argues that AMD has not proven that the transfer of assets from SONICblue to ATI included rights to the asserted patents. IA Opp. at 7. The IA notes that the intellectual property listed in the schedule associated with that transaction, Schedule 3.19(a), does not include any items from the patent family of the asserted patents. The IA contends that the absence of any evidence connecting the ATI agreement to the asserted patents raises "at least a serious question" as to whether the asserted patents were transferred to ATI. *Id.* at 8.

The IA further submits that the Commission is justified in assuming jurisdiction based on the complaint, accompanying exhibits, and the evidence in the record. The IA notes that during the hearing S3G's corporate representative testified that S3G owns the asserted patents, and Apple did not challenge that testimony. IA Opp. at 9; Weng Hr. Trans. at 194:10-195:16. Finally, the IA contends that the Commission can rely on the presumptions afforded by the

patent itself as to ownership rights in the patent. IA Opp. at 9 (citing *Certain Variable Speed Wind Turbines and Components Thereof*, Inv. No. 337-TA-641, Comm'n Op. (March 2, 2010)).

We find that the Commission would be deprived of jurisdiction if S3G, the complainant named in this investigation, did not own the asserted patents. *See SiRF Tech., Inc. v. Int'l Trade Comm'n*, 601 F.3d 1319, 1325-26 (Fed. Cir. 2010). However, as explained below, we determine that S3G holds title to the asserted patents and that the Commission's exercise of jurisdiction is proper.

The motions for termination assert an affirmative defense based on defective title to the asserted patents. *See Stanford Univ. v. Roche Molecular Sys.*, 583 F.3d 832, 840 (Fed. Cir. 2009). The party raising an affirmative defense has the burden of proving the defense by a preponderance of the evidence. *Jazz Photo Corp. v. Int'l Trade Comm'n*, 264 F.3d 1094, 1102 (Fed. Cir. 2001). Accordingly, it is the movants' burden to show that AMD owns the patents asserted in this investigation. In our view, the movants have not met that burden.

First, AMD has not submitted any declarations, affidavits, or other testimony supporting its theory of patent ownership or explaining the transaction it relies upon. Next, we are troubled that AMD's motion omitted any discussion of the two highly relevant documents cited by S3G: Schedule 3.14(a)(ii) and Schedule 3.19(a). The record indicates these schedules were in AMD's possession but AMD chose not to explain their relevance to the Commission. *See* AMD Memo., Ex. 15, Ex. 17. We find that these two schedules support a conclusion that SONICblue sold its rights in the asserted patents to S3G and not to AMD.

Further, AMD's argument that the FireGL transfer included an open-ended list of intellectual property not enumerated in the contract is not persuasive. The FireGL agreement states that SONICblue sold [[ ]].

See AMD Memo., Ex. 1 at 1. [[ ]] Viewed in context, the "[[ ]]" language indicates tha [[ ]] is not limited. However, that language does not mean that [[ ]] is itself unlimited. To the contrary, the language defining the [[ ]] is expressly limited: "[[ ]]" S3G Opp. at 12, Ex. G at 23 (emphasis by S3G). Further, Schedule 3.19(a) states on its face that it is a "[[ ]]" involved in the transaction. S3G Opp. at 11-12, Ex. H. No party disputes that the parent applications of the asserted patents that were pending at the time of the FireGL agreement are not on Schedule 3.19(a). Accordingly, we determine that AMD has not established ownership of the patents by a preponderance of the evidence.

Additionally, we are disturbed by AMD's assertion to the Commission that "SONICblue and ATI recently confirmed in writing that SONICblue assigned the asserted patents to ATI on March 30, 2001." *See* AMD Memo. at 24. In support of that assertion, AMD points to a document signed September 6, 2011 (*id.*, Ex. 2) and recorded at the Patent Office on September 13, 2011 (*id.*, Ex. 25). As shown in the images below, the same person signed the agreement on behalf of SONICblue and on behalf of ATI:

AGREED to on Behalf of SONICblue, Inc.

By: _____*

Print Name: Kevin O'Neil

Title: Director, Patents Legal ; ATI Technologies ULC

Date: Sept 6, 2011

* Executed on behalf of SONICblue, Inc. pursuant to power of attorney granted in paragraph 2 of the Bill of Sale and Assignment attached and incorporated as Schedule 2 hereto.

~~State~~ Province of Ontario
County of York

On September 6, 2011, before me Linda Lam [name of notary public] personally appeared Kevin O'Neil [name of signatory on behalf of SonicBlue, Inc.] personally known to me or proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that he/she executed the same in his authorized capacity, and that by his signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

_____

AGREED to on Behalf of ATI Technologies ULC

By: _____

Print Name: Kevin O'Neil

Title: Director, Patents Legal

Date: Sept 6, 2011

~~State~~ Province of Ontario
County of York

On September 6, 2011, before me Linda Lam [name of notary public] personally appeared Kevin O'Neil [name of signatory on behalf of ATI Technologies ULC] personally known to me or proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that he/she executed the same in his authorized capacity, and that by his signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

_____

AMD Memo., Ex. 2. AMD claims this endorsement was authorized by a power of attorney granted by SONICblue to ATI ten years ago for the purpose of completing the asset transfer. AMD Memo. at 25. However, we find that ATI's construction of that grant to be grossly unreasonable. AMD did not rebut S3G's assertion that SONICblue knew nothing about the purported agreement that ATI signed on SONICblue's behalf. Further, if AMD were correct that

it is authorized to sign statements interpreting substantive terms of its contract with SONICblue without SONICblue's knowledge, the contract would become a nose of wax for AMD to twist to its advantage upon its own whim. We decline to indulge AMD in that activity, and we discount the purported agreement signed on September 6, 2011.

In contrast to AMD's weak presentation on patent ownership, S3G has established a clear claim of patent ownership based on the January 3, 2001 documents transferring intellectual property from SONICblue to S3G. S3G Opp., Ex. D at S3G00078472; AMD Memo., Ex. 15 at Reel: 012852 Frame: 0032. These documents show that the '431 patent—the parent of every patent in the asserted patent family—was included in the transaction. S3G's agreement with SONICblue covered "patents . . . and patent applications (including docketed patent disclosures awaiting filing, reissues, divisions, continuations-in-part and extensions), patent disclosures awaiting filing determination, inventions and improvements thereto . . . ." S3G Memo., Ex. B at S3G00077878. Accordingly, S3G has established title to the asserted patents by virtue of the January 3, 2001 agreement with SONICblue.

In summary, we deny the motions by AMD and Apple to terminate the investigation because the motions fail to prove by a preponderance of the evidence that AMD owns the patents in question.

III. CONCLUSION

For the reasons set forth above, we determine that S3G has failed to prove a violation of section 337 and we adopt the underlying findings of the ALJ that are not inconsistent with this opinion. We further deny AMD's motion to file public interest comments out of time, grant AMD's motion to file a reply in connection with its motion to intervene and terminate, deny AMD's motion to intervene and terminate, and deny Apple's motion to terminate.

By order of the Commission.

James R. Holbein
Secretary to the Commission

Issued:

CERTAIN ELECTRONIC DEVICES WITH IMAGE PROCESSING SYSTEMS, COMPONENTS THEREOF, AND ASSORTED SOFTWARE **Inv. No. 337-TA-724**

PUBLIC CERTIFICATE OF SERVICE

I, James R. Holbein, hereby certify that the attached **Commission Opinion** has been served by hand upon, the Commission Investigative Attorney, Kecia J. Reynolds, Esq. and the following parties as indicated on **December 21, 2011.**

James R. Holbein, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainants S3 Graphics Co., Ltd. and S3 Graphics, Inc.:

Thomas L. Jarvis, Esq.
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901 New York Avenue, NW
Washington, DC 20001
P: 202-408-4000

( ) Via Hand Delivery
( ) Via Overnight Delivery
(X) Via First Class Mail
( ) Other:_____

On Behalf of Respondent Apple Inc.:

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1000 Marsh Road
Menlo Park, CA 94025
P: 650-613-7400

( ) Via Hand Delivery
( ) Via Overnight Delivery
(X) Via First Class Mail
( ) Other:_____

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of **CERTAIN ELECTRONIC DEVICES WITH IMAGE PROCESSING SYSTEMS, COMPONENTS THEREOF, AND ASSOCIATED SOFTWARE**	**Inv. No. 337-TA-724**

NOTICE OF COMMISSION DETERMINATION TO REVIEW A FINAL INITIAL DETERMINATION; SCHEDULE FOR FILING WRITTEN SUBMISSION ON THE ISSUES UNDER REVIEW AND ON REMEDY, THE PUBLIC INTEREST, AND BONDING

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has determined to review the final initial determination ("ID") issued by the presiding administrative law judge ("ALJ") in the above captioned investigation on July 1, 2011, finding a violation of section 337 (19 U.S.C § 1337). The Commission requests briefing from the parties on the issues under review and from the parties and the public on remedy, the public interest, and bonding, as indicated in this notice.

FOR FURTHER INFORMATION: Clark S. Cheney, Office of the General Counsel, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone 202-205-2661. Copies of non-confidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone 202-205-2000. Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on 202-205-1810. General information concerning the Commission may also be obtained by accessing its Internet server (*http://www.usitc.gov*). The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at *http://edis.usitc.gov*.

SUPPLEMENTARY INFORMATION: The Commission instituted this investigation on May 19, 2010, based on a complaint filed by S3 Graphics Co. Ltd. and S3 Graphics Inc. (collectively, "S3G"). 75 Fed. Reg. 38118 (July 1, 2010). The complaint alleged violations of section 337 of the Tariff Act of 1930 (19 U.S.C. § 1337) in the importation into the United States, the sale for importation, and the sale within the United States after importation of certain electronic devices with image processing systems, components thereof, and associated software by reason of infringement of various claims of United States Patent Nos. 7,043,087 ("the '087 patent");

6,775,417 ("the '417 patent"); 6,683,978 ("the '978 patent"); and 6,658,146 ("the '146 patent"). *Id.* The complaint named Apple Inc. of Cupertino, California ("Apple") as the only respondent. *Id.*

On July 1, 2011, the ALJ issued his final initial determination ("ID") in this investigation finding a violation of section 337 based on conclusions that certain Mac computers imported by Apple infringe claim 11 of the '978 patent and claims 4 and 16 of the '146 patent, that those patent claims are not invalid, that S3G has a domestic industry related to those patents, and that S3G satisfied the importation requirement. The ID found that a patent exhaustion defense relieved Apple of liability for some of its infringing products, but not others. The ID further found no violation with respect to the '087 and '417 patents. The ID concluded that certain Apple products infringe the '087 and '417 patents, but that the asserted claims in those patents are invalid. Along with the ID, the ALJ issued a recommended determination on remedy and bonding ("RD"). Complainant S3G, respondent Apple, and the Commission investigative attorney ("IA") filed petitions for review of the ID on July 18, 2011. S3G, Apple, and the IA each filed responses to the petitions for review on July 26, 2011.

Having examined the record of this investigation, including the ALJ's final ID, the petitions for review, and the responses thereto, the Commission has determined to review the final ID in its entirety.

The parties are requested to brief their positions on the issues under review with reference to the applicable law and the evidentiary record. In connection with its review, the Commission is particularly interested in the following issues:

(1) Please comment on the Commission's statutory authority to find a violation under 19 U.S.C. § 1337(a)(1)(B)(i) where direct infringement is asserted and the accused article does not meet every limitation of the asserted patent claim at the time it is imported into the United States.

(2) Please comment on the Commission's statutory authority to find a violation under 19 U.S.C. § 1337(a)(1)(B)(i) where an imported article is used in the United States to directly infringe a method claim, but where there is no evidence of contributory infringement or inducement of infringement on the part of the importer.

(3) Please comment on whether, in evaluating the scope of the Commission's authority, any significance should be attributed to the fact that 35 U.S.C. § 271(a) defines patent infringement in terms of a person who "makes, uses, offers to sell, or sells . . . or imports" a patented invention, while 19 U.S.C. § 1337(a)(1)(B) defines as unlawful only the actions of "importation" and "sale."

(4) Some ALJ and Commission decisions have found the requirements of section 337 to be satisfied so long as there is some "nexus" between the products imported and the alleged infringement. Please comment on the history and application of this nexus requirement in patent and non-patent cases. Please also address the continuing relevance of the nexus requirement, if any, after the 1988 amendments to section 337 of the Tariff Act of 1930.

(5) The ID found that Apple infringes claim 11 of the '978 patent when, *inter alia*, it "sells applications containing compressed DXT texture." (ID at 69.) Please identify all evidence in the record, if any, supporting this finding.

(6) Apple contends that the ALJ did not decide whether accused articles having graphics processing units ("GPUs") supplied by NVIDIA Corporation ("NVIDIA") infringe any asserted patent claims. (Apple Resp. Pet. at 62.) Please identify (a) the portions of the ID, if any, that show the ALJ addressed infringement relating to the NVIDIA GPUs; and (b) the evidence in the record, if any, that accused articles incorporating the NVIDIA GPUs infringe an asserted patent claim. Please also address whether review of this issue has been preserved.

(7) Please identify all evidence in the record, if any, that a person of ordinary skill in the art at the time of the asserted inventions would have been motivated to use headers in the invention disclosed in U.S. Patent No. 5,046,119 to Hoffert ("Hoffert").

(8) Please identify all evidence in the record, if any, that a person of ordinary skill in the art at the time of the asserted inventions would have been motivated to combine teachings from the 1995 article titled "Hardware for Superior Texture Performance," by Knittel et al., with the invention disclosed in Hoffert.

(9) The petitions raise the question of whether Apple's purchase of certain processing units from NVIDIA and Intel convey a right to practice the asserted patents. Please provide legal authority, if any, addressing the question of whether the authorized purchase of a patented component gives the purchaser the right to (a) use its own independent implementation of the patented technology, and (b) the right to use the purchased component in conjunction with other components that together utilize the patented technology. In the context of this issue, please provide factual explanations, based on the record, as to how the Mac OS X devices use combinations of licensed and unlicensed components and/or software to implement the technology alleged to infringe the asserted patent claims.

(10) The petitions raise the question of whether patent licenses to Intel and NVIDIA exhaust S3G's rights in the patents as to downstream purchasers from Intel and NVIDIA. Please address this argument in the context of this investigation in view of *LG Elecs. Inc. v. Hitachi Ltd.*, 655 F. Supp. 2d 1036, 1047-48 (N.D. Cal. 2009) ("the license agreement represented a sale for exhaustion purposes"), *Certain Semiconductor Chips with Minimized Chip Package Size and Products Containing Same*, No. 337-TA-630, ID at 153 (U.S.I.T.C. Aug. 28, 2009) (complainant "cannot enforce patent law remedies against Respondents as it relates to those [products] purchased from [complainant's] licensees thereafter"), and any other pertinent legal authorities. Please also comment on whether Apple has properly raised and preserved this argument.

(11) Please identify the distinctions, if any, between Apple's defense under an implied license theory and Apple's defense under a patent exhaustion theory.

(12) Please comment on the correct legal standard for determining whether an invention has been abandoned, suppressed, or concealed under 35 U.S.C. § 102(g).

(13) Please comment on the bond that should be set in this case should the Commission determine that a remedy and bond are appropriate. Please specifically address each of the bond amount issues identified by the ALJ in the ID at 286-87.

In connection with the final disposition of this investigation, the Commission may (1) issue an order that could result in the exclusion of the subject articles from entry into the United States, and/or (2) issue one or more cease and desist orders that could result in the respondent(s) being required to cease and desist from engaging in unfair acts in the importation and sale of such articles. Accordingly, the Commission is interested in receiving written submissions that address the form of remedy, if any, that should be ordered. If a party seeks exclusion of an article from entry into the United States for purposes other than entry for consumption, the party should so indicate and provide information establishing that activities involving other types of entry either are adversely affecting it or likely to do so. For background, see *In the Matter of Certain Devices for Connecting Computers via Telephone Lines*, Inv. No. 337-TA-360, USITC Pub. No. 2843 (December 1994) (Commission Opinion).

If the Commission contemplates some form of remedy, it must consider the effects of that remedy upon the public interest. The factors the Commission will consider include the effect that an exclusion order and/or cease and desist orders would have on (1) the public health and welfare, (2) competitive conditions in the U.S. economy, (3) U.S. production of articles that are like or directly competitive with those that are subject to investigation, and (4) U.S. consumers. The Commission is therefore interested in receiving written submissions that address the aforementioned public interest factors in the context of this investigation.

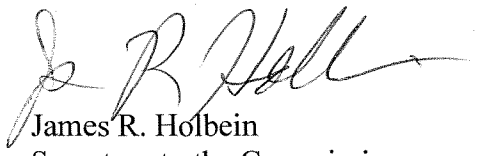
If the Commission orders some form of remedy, the U.S. Trade Representative, as delegated by the President, has 60 days to approve or disapprove the Commission's action. *See* Presidential Memorandum of July 21, 2005, 70 Fed. Reg. 43251 (July 26, 2005). During this period, the subject articles would be entitled to enter the United States under bond, in an amount determined by the Commission and prescribed by the Secretary of the Treasury. The Commission is therefore interested in receiving submissions concerning the amount of the bond that should be imposed if a remedy is ordered.

WRITTEN SUBMISSIONS: The parties to the investigation are requested to file written submissions on the issues identified in this notice. Parties to the investigation, interested government agencies, and any other interested parties are encouraged to file written submissions on the issues of remedy, the public interest, and bonding. Such submissions should address the ALJ's recommendation on remedy and bonding set forth in the RD. Complainants and the IA are also requested to submit proposed remedial orders for the Commission's consideration. Complainants are also requested to state the dates that each of the asserted patents are set to expire and the HTSUS numbers under which the accused products are imported. The written submissions and proposed remedial orders must be filed no later than close of business on Friday, September 16, 2011. Reply submissions must be filed no later than the close of business on Friday, September 23, 2011. No further submissions on these issues will be permitted unless otherwise ordered by the Commission.

Persons filing written submissions must file the original document and 12 true copies thereof on or before the deadlines stated above with the Office of the Secretary. Any person desiring to submit a document to the Commission in confidence must request confidential treatment unless the information has already been granted such treatment during the proceedings. All such requests should be directed to the Secretary of the Commission and must include a full statement of the reasons why the Commission should grant such treatment. *See* 19 C.F.R. § 210.6. Documents for which confidential treatment by the Commission is sought will be treated accordingly. All nonconfidential written submissions will be available for public inspection at the Office of the Secretary.

The authority for the Commission's determination is contained in section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337), and in sections 210.42-46 and 210.50 of the Commission's Rules of Practice and Procedure (19 C.F.R. §§ 210.42-46 and 210.50).

By order of the Commission.



James R. Holbein
Secretary to the Commission

Issued: September 2, 2011

CERTAIN ELECTRONIC DEVICES WITH IMAGE PROCESSING SYSTEMS, COMPONENTS THEREOF, AND ASSORTED SOFTWARE **Inv. No. 337-TA-724**

PUBLIC CERTIFICATE OF SERVICE

I, James R. Holbein, hereby certify that the attached **NOTICE** has been served by hand upon, the Commission Investigative Attorney, Kecia J. Reynolds, Esq. and the following parties as indicated on **September 2, 2011.**

James R. Holbein, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainants S3 Graphics Co., Ltd. and S3 Graphics, Inc.:

Thomas L. Jarvis, Esq.
FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP
901 New York Avenue, NW
Washington, DC 20001
P: 202-408-4000

( ) Via Hand Delivery
( ) Via Overnight Delivery
(X) Via First Class Mail
( ) Other:_____

On Behalf of Respondent Apple Inc.:

Chris R. Ottenweller, Esq.
ORRICK, HERRINGTON & SUTCLIFFE LLP
1000 Marsh Road
Menlo Park, CA 94025
P: 650-613-7400

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(X) Via First Class Mail
( ) Other:_____

PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of	
CERTAIN ELECTRONIC DEVICES WITH IMAGE PROCESSING SYSTEMS, COMPONENTS THEREOF, AND ASSOCIATED SOFTWARE	**Inv. No. 337-TA-724**

INITIAL DETERMINATION ON VIOLATION OF SECTION 337 AND RECOMMENDED DETERMINATION ON REMEDY AND BOND

Administrative Law Judge E. James Gildea

(July 1, 2011)

Appearances:

For the Complainants S3 Graphics Co. Ltd. and S3 Graphics Inc.:

Thomas Jarvis, Esq.; Donald Dunner, Esq.; John R. Alison, Esq.; Paul C. Goulet, Esq.; John M. Williamson, Esq.; Mike Kudravetz, Esq.; Jessica L. Cox, Esq.; John Crocetti, Esq.; and Aiden Skoyles, Esq. of Finnegan, Henderson, Farabow, Garrett & Dunner, LLP of Washington, D.C.

For the Respondent Apple Inc., a/k/a Apple Computer, Inc.:

Chris R. Ottenweller, Esq.; G. Hopkins Guy, III, Esq.; Vickie L Feeman, Esq.; Bas de Blank, Esq.; Jesse Y. Cheng, Esq.; Lillian J. Pan, Esq.; and An Doan, Esq. of Orrick, Herrington & Sutcliffe, LLP of Menlo Park, California.

Daniel N. Kassabian, Esq. of Orrick, Herrington & Sutcliffe, LLP of San Francisco, California.

Richard F. Martinelli, Esq. of Orrick, Herrington & Sutcliffe, LLP of New York, New York.

V. James Adduci, II, Esq.; Andrew F. Pratt, Esq.; and Jonathan J. Engler, Esq. of Adduci, Mastriani & Schaumberg, L.L.P. of Washington, D.C.

Eric Namrow, Esq.; and George Riley, Esq. of O'Melveny & Myers LLP of Washington, D.C.

For the Commission Investigative Staff:

Lynn I. Levine, Esq., Director; Thomas Fusco, Esq., Supervisory Attorney; and Kecia J. Reynolds, Esq., Investigative Attorney, of the Office of Unfair Import Investigations, U.S. International Trade Commission, of Washington, D.C.

PUBLIC VERSION

Pursuant to the Notice of Investigation, 75 Fed. Reg. 38118 (July 1, 2010), this is the Initial Determination of the Investigation in the Matter of Certain Electronic Devices with Image Processing Systems, Components Thereof, and Associated Software, United States International Trade Commission Investigation No. 337-TA-724. *See* 19 C.F.R. § 210.42(a).

With respect to Respondent Apple Inc., it is held that no violation of Section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337), has occurred in the importation into the United States, the sale for importation, or the sale within the United States after importation, of certain electronic devices with image processing systems, components thereof, and associated software by reason of infringement of claims 1 and 6 of United States Patent No. 7,043,087.

With respect to Respondent Apple Inc., it is held that no violation of Section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337), has occurred in the importation into the United States, the sale for importation, or the sale within the United States after importation, of certain electronic devices with image processing systems, components thereof, and associated software by reason of infringement of claims 7, 12, 15, and 23 of United States Patent No. 6,775,417.

With respect to Respondent Apple Inc., it is held that no violation of Section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337), has occurred in the importation into the United States, the sale for importation, or the sale within the United States after importation, of certain electronic devices with image processing systems, components thereof, and associated software by reason of infringement of claims 14 and 16 of United States Patent No. 6,683,978, but that a violation has occurred by reason of infringement of claim 11 of United States Patent No. 6,683,978.

With respect to Respondent Apple Inc., it is held that no violation of Section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337), has occurred in the importation into the United States, the sale for importation, or the sale within the United States after importation, of certain electronic devices with image processing systems, components thereof, and associated software by reason of infringement of claim 13 of United States Patent No. 6,658,146, but that a violation has occurred by reason of infringement of claims 4 and 16 of United States Patent No. 6,658,146.

It is further held that a domestic industry exists that practices U.S. Patent Nos. 7,043,087, 6,775,417, 6,683,978, and 6,658,146.

TABLE OF CONTENTS

The following abbreviations may be used in this Initial Determination:

JX	Joint exhibit
JXM	Joint Markman exhibit
CX	Complainants' exhibit
CXM	Complainants' Markman exhibit
CDX	Complainants' demonstrative exhibit
CPX	Complainants' physical exhibit
CFF	Complainants' proposed findings of fact
CCL	Complainants' proposed conclusions of law
CBr.	Complainants' initial post-hearing brief
CMBr.	Complainant's initial Markman brief
CRBr.	Complainants' reply post-hearing brief
CORFF	Complainants' objections to Respondent's proposed findings of fact
COSFF	Complainants' objections to Staff's proposed findings of fact
RX	Respondent's exhibit
RXM	Respondent's Markman exhibit
RDX	Respondent's demonstrative exhibit
RPX	Respondent's physical exhibit
RFF	Respondent's proposed findings of fact
RCL	Respondent's proposed conclusions of law
RBr.	Respondent's initial post-hearing brief
RMBr.	Respondent's initial Markman brief
RRBr.	Respondent's reply post-hearing brief
ROCFF	Respondent's objections to Complainants' proposed findings of fact
ROSFF	Respondent's objections to Staff's proposed findings of fact
SFF	Staff's proposed findings of fact
SCL	Staff's proposed conclusions of law
SBr.	Staff's initial post-hearing brief

SOCFF	Staff's objections to Complainants' proposed findings of fact
SORFF	Staff's objections to Respondent's proposed findings of fact
SRBr.	Staff's reply post-hearing brief
Tr.	Hearing transcript

I. BACKGROUND.

A. Institution and Procedural History of this Investigation.

By publication of a Notice of Investigation in the *Federal Register* on April 21, 2010, pursuant to subsection (b) of Section 337 of the Tariff Act of 1930, as amended, the Commission instituted Investigation No. 337-TA-724 with respect to U.S. Patent No. 7,043,087 ("'the '087 patent"), U.S. Patent No. 6,775,417 ("'the '417 patent"); U.S. Patent No. 6,683,978 ("the '978 patent"); and U.S. Patent No. 6,658,146 (the "'146 patent") to determine the following:

> whether there is a violation of subsection (a)(1)(B) of section 337 in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain electronic devices with image processing systems, components thereof, and associated software that infringe one or more of claims 1, 6, and 7 of the '087 patent; claims 1, 7, 8, 12, 13, 15, and 23 of the '417 patent; claims 11, 14, and 16 of the '978 patent; and claims 2, 4, 8, 13, 16, 18, and 19 of the '146 patent, and whether an industry in the United States exists as required by subsection (a)(2) of section 337[.]

75 Fed. Reg. 38118 (2010).

S3 Graphics Co., Ltd. and S3 Graphics, Inc. are named in the Notice of Investigation as the Complainants. *Id.* The Respondent named in the Notice of Investigation is Apple Inc. of Cupertino, California. *Id.* The Commission Investigative Staff of the Commission's Office of Unfair Import Investigations is also a party in this Investigation. *Id.*

On November 9, 2010, the Administrative Law Judge held a Markman hearing in order to permit the parties to present their positions with respect to the interpretation of certain claim language in the asserted patents. Complainants S3 Graphics Co., Ltd. and S3 Graphics, Inc. (collectively, "S3G"), Respondent Apple Inc. ("Apple"), and Staff were represented by counsel at the Markman hearing.

On February 11, 2011, the Administrative Law Judge issued an order construing the terms of the asserted claims of the patents at issue in this Investigation. (See Order No. 19 ("Markman Order").)

On March 11, 2011, the Administrative Law Judge issued an initial determination granting S3G's motion for summary determination that it has satisfied the economic prong of the domestic industry requirement. (*See* Order No. 29.) The Commission determined not to review the order. (*See* Notice of Commission Decision Not to Review an Initial Determination Granting Complainant's [sic] Motion for Summary Determination that It [sic] Satisfies the Economic Prong of the Domestic Industry Requirement (April 12, 2011).)

The evidentiary hearing on the question of violation of Section 337 began on March 29, 2011 and ended on April 7, 2011. S3G, Apple, and Staff were represented by counsel at the hearing.

On May 31, 2011, the Administrative Law Judge issued an initial determination granting S3G's motion for partial termination of the Investigation based on the withdrawal of S3G's allegations relating to claims 2, 8, 18, and 19 of U.S. Patent No. 6,658,146, claims 1, 8, and 13 of U.S. Patent No. 6,775,417, and claim 7 of U.S. Patent No. 7,043,087. (See Order No. 45.)

On June 14, 2011, Apple filed a request for judicial notice with respect to certain office actions from reexamination proceedings of two asserted patents before the U.S. Patent and Trademark Office. The Administrative Law Judge ordered that the submission be treated as a motion and assigned a motion docket number (724-047). (Order No. 46.) Both S3G and Staff opposed the motion. Apple further filed a motion requesting leave to file a reply (Motion Docket No. 724-048), which S3G opposed. The Administrative Law Judge declines to take official notice of the office actions submitted by Apple pursuant to Commission Rule 210.37(d) because,

inter alia, they are non-final actions still subject to a various levels of appeals. Motion Docket Nos. 724-047 and 724-048 are hereby DENIED.

B. The Parties.

1. Complainants S3 Graphics Co., Ltd. and S3 Graphics, Inc.

S3 Graphics Co., Ltd. is a Cayman Islands corporation having its principal place of business at Grand Cayman, Grand Cayman Islands, British West Indies. (Complaint at ¶ 6.) S3 Graphics Co., Ltd. holds all right, title, and interest in the Asserted Patents. (*Id.* at ¶ 2.)

S3 Graphics, Inc. is a Delaware corporation having its principal place of business in Fremont, California, and is a wholly owned subsidiary of S3 Graphics Co., Ltd. (*Id.* at ¶¶ 2, 6.) S3G provides graphics visualization technologies and GPU (graphics processing unit) products for mobile devices, desktop computers, and embedded systems. (*Id.* at ¶ 6.)

2. Respondent Apple Inc.

Apple Inc. is a California corporation having its principal place of business in Cupertino, California. (Compl. at ¶ 11.) Apple designs and sells a variety of electronic devices, including computers, smart phones, and computer tablets. (RBr. at 6.)

C. Overview of the Technology.

At issue are certain electronic devices with imaging processing systems, their components, and associated software. 75 Fed. Reg. 38118 (2010). These systems involve technology related to image compression and decompression. (JX-176 at 1.) Compression, a form of encoding, may involve the conversion of an image block from one format to a different format, thereby reducing the amount of data required to represent the image block. (*Id.* at 6.) Decompression, a type of decoding, increases the amount of data representing an image block. (*Id.*)

D. The Patents at Issue.

U.S. Patent No. 7,043,087.

This Investigation concerns U.S. Patent No. 7,043,087, entitled "Image Processing System" ("the '087 patent"), which resulted from U.S. Patent Application No. 10/893,084 filed on July 16, 2004. (JXM-4 at S3G00005694.) The '087 patent is a continuation of U.S. Patent Application No. 10/052,613 entitled "Fixed-Rate Block-Based Image Compression with Inferred Pixel Values" filed Jan. 17, 2002 and now U.S. Pat. No. 6,775,417, which is a continuation-in-part of U.S. Patent Application No. 09/351,930 entitled "Fixed-Rate Block-Based Image Compression with Inferred Pixel Values" filed Jul. 12, 1999 and now U.S. Pat. No. 6,658,146, which is a continuation of U.S. Patent Application No. 08/942,860 entitled "System and Method for Fixed-Rate Block-Based Image Compression with Inferred Pixel Values" filed Oct. 2, 1997 and now U.S. Pat. No. 5,956,431. (*Id.*) The '087 patent issued on May 9, 2006 and names Zhou Hong, Konstantine I. Iourcha, and Krishna S. Nayak as the inventors. (*Id.*) The patent was assigned to S3 Graphics Co., Ltd. (*Id.*)

The '087 patent discloses a system for image processing inclusive of an image block encoder, decomposer, and composer that allow image data to be compressed, indexed, mapped, decompressed, and output as a data file. (*Id.* at Abstract, 2:57-67.) The claims of the '087 patent are directed to image decoder engines. (*Id.* at 17:19-18:31.) Figure 7A, reproduced below, shows a block diagram of an image decoder system.

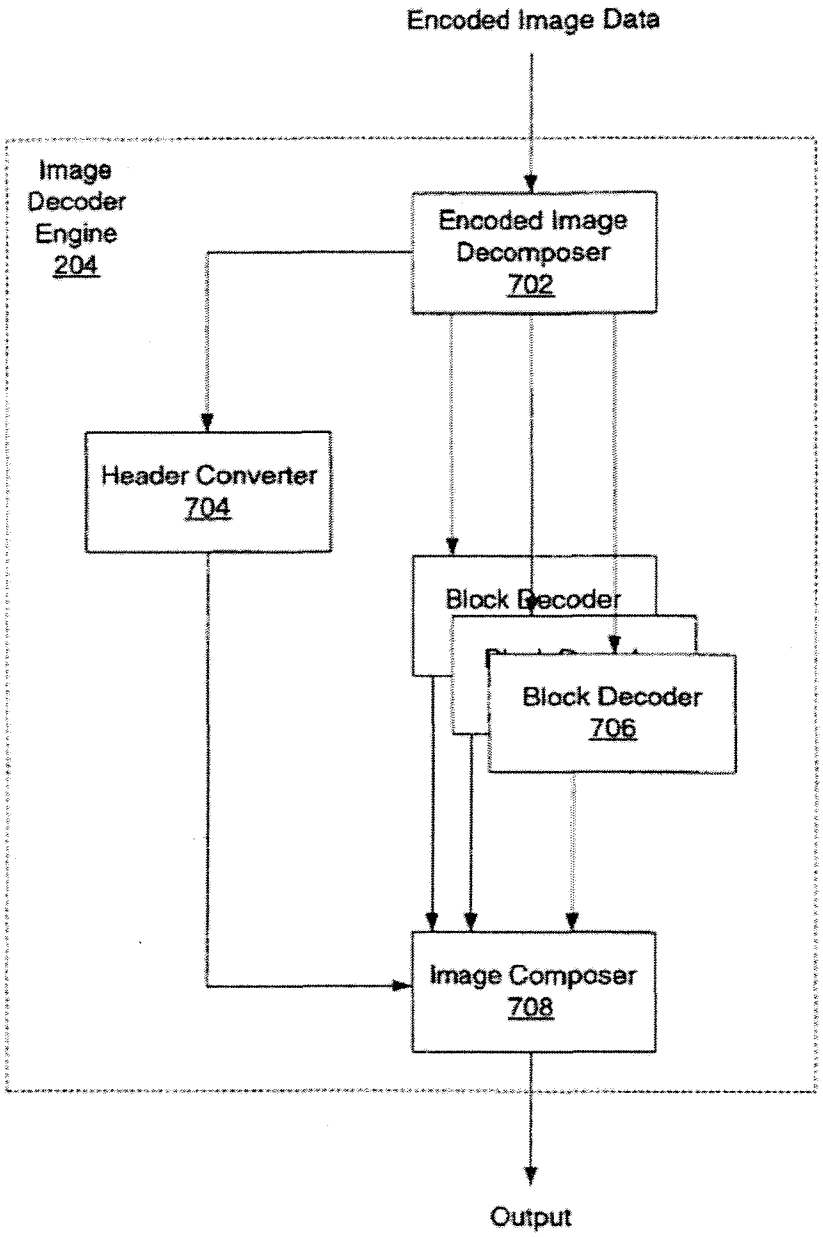

FIG. 7A

(JXM-4 at 3:45, Fig. 7A.) Another figure sets forth "a logic diagram illustrating an exemplary decoder unit. . . ."

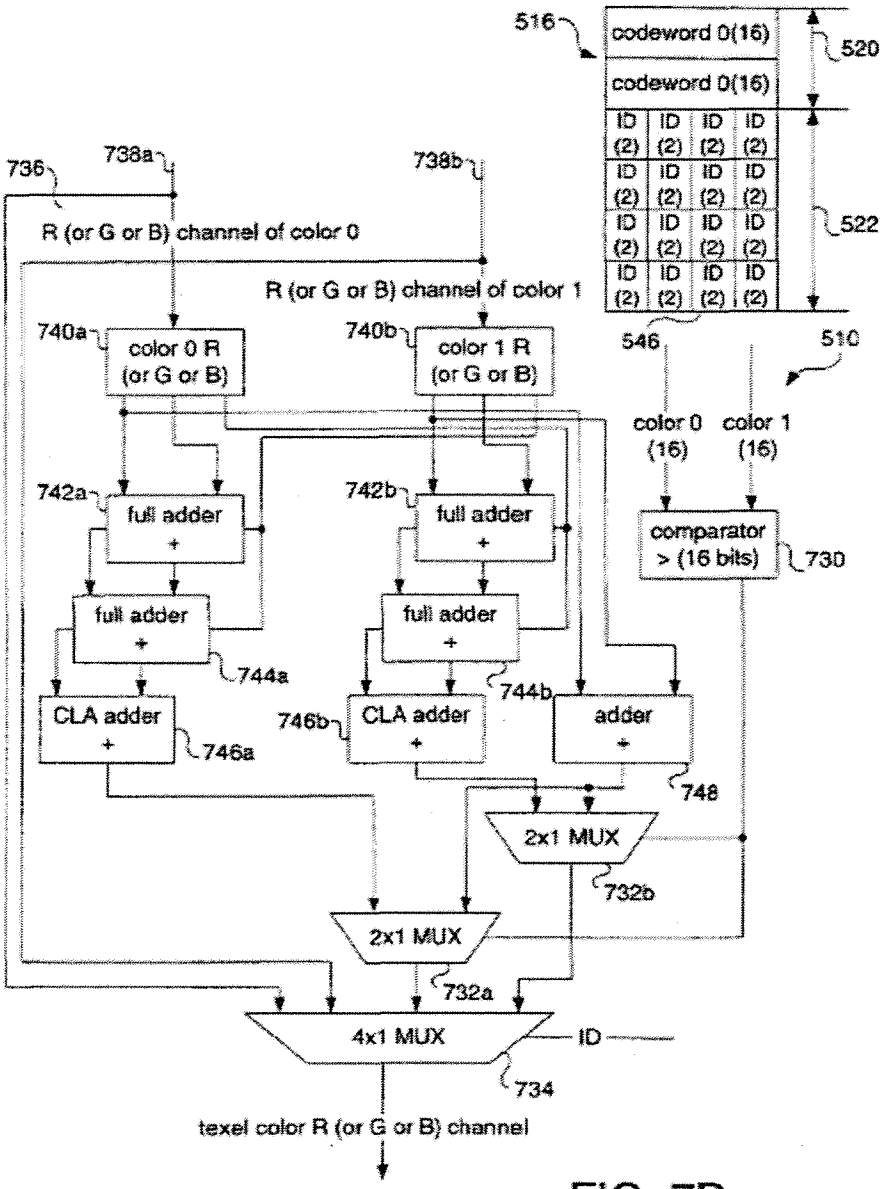

FIG. 7D

(*Id.* at 3:50-51, Fig. 7D.)

The '087 patent has eight claims, two of which are asserted: independent claim 1 and dependent claim 6. (CBr. at 7.) The asserted claims read as follows:

> **1**. An image decoder engine for decoding an encoded image data file, comprising:

an encoded image decomposer for decomposing the encoded image data file into a modified header and at least one compressed image block, each image block having at least one associated codeword and a plurality of image elements associated with an index value; and

at least one block decoder coupled to the encoded image decomposer for decompressing the at least one compressed image block into at least one decompressed image block by generating a set of quantized image data values and mapping the index value to a quantized image data value from the set of quantized image data values, the at least one block decoder further comprising,

at least one decoder configured for decompressing each of the at least one compressed image block to generate colors for each of the at least one compressed image block.

6. The image decoder engine of claim **1** wherein the at least one block decoder further comprises a block type detector configured for determining a block type for each of the at least one compressed image block based on the at least one associated codeword.

(JXM-4 at 17:18-18:24.)

U.S. Patent No. 6,775,417.

This Investigation concerns U.S. Patent No. 6,775,417, "Fixed Rate Block-Based Image Compression With Inferred Pixel Values" ("the '417 patent"), which resulted from U.S. Patent Application No. 10/052,613 filed on January 17, 2002. (JXM-3 at S3G00005665.) The '417 patent is a continuation of U.S. Patent Application No. 09/351,930 filed on July 12, 1999 now U.S. Patent No. 6,658,146, which is a continuation of U.S. Patent Application No. 08/942,860 filed Oct. 2, 1997, now U.S. Patent No. 5,956,431 issued Sep. 21, 1999. (*Id.*) The '417 patent issued on August 10, 2004 and names Zhou Hong, Konstantine I. Iourcha, and Krishna S. Nayak as the inventors. (*Id.*) The patent was assigned to S3 Graphics Co., Ltd. (*Id.*)

The '417 patent discloses an image processing system that provides for fixed-rate, block based image compression using inferred pixel values. (*Id.* at 2:49-50.) The '417 patent claims

are directed to, *inter alia*, image encoder engines, image decoder engines, and methods for fixed-rate block-based image compression of an original image. (*Id.* at 16:54-18:60.)

The '417 patent has thirty claims, four of which are asserted: independent claims 15 and 23, and dependent claims 7 and 12. (CBr. at 7.) Claims 7 and 12 are apparatus claims and claims 15 and 23 are method claims. The asserted claims of the '417 patent, along with underlying independent claims 1 and 8, read as follows:

> **1.** An image encoder engine for encoding an image, comprising:
>
> an image decomposer for decomposing the image into a header and at least one image block, each image block having a set of image elements and each image element having an original image data value;
>
> at least one block encoder for receiving each image block and for compressing each image block into an encoded image block by associating each original image data value of the image element with an index to a derived image data value in a set of quantized image date [sic] values; and
>
> an encoded image composer coupled to the block encoder for ordering the encoded image blocks into a data file.
>
> **7.** The image encoder engine of claim **1** wherein the block encoder further comprises a block type module for selecting an identifiable block type for the image block.
>
> **8.** An image decoder engine for decoding an encoded image data file, comprising:
>
> an encoded image decomposer for decomposing the encoded image data file into a modified header and at least one compressed image block, each image block having at least one associated codeword and a plurality of image elements associated with an index value;
>
> at least one block decoder coupled to the encoded image decomposer for decompressing the at least one compressed image block into at least one decompressed image block by generating a set of quantized image data values and mapping the index value to a quantized image data value from the set of quantized image data values; and
>
> an image composer for ordering the at least one decompressed image blocks in an output data file.

12. The image decoder engine of claim **8** wherein the at least one block decoder further comprises a block type detector for selecting a block type for each of the at least one compressed image block.

15. A method for fixed-rate block-based image compression of an original image, comprising the steps of:

decomposing the original image into a header and a plurality of image blocks each having a set of image elements with an original image data value;

computing at least one codeword from the original image data value for the set of image elements;

generating a set of quantized image data values including the at least one codeword and at least one image value derived from the at least one codeword; and

mapping the original image data value to one of the quantized image data values to produce an index value for each image element.

23. A method for fixed-rate block-based image decompression of an encoded image, comprising the steps of:

decomposing the encoded image of [sic] into a modified header and a plurality of encoded image blocks having at least one codeword and a plurality of image elements associated with an index value;

generating a set of quanitized [sic] image data values including the at least one codeword and at least one image value derived from the at least one codeword; and

mapping the index value for each image element to one of the quantized image data values.

(JXM-3 at 16:53-67, 17:19-37, 17:49-53, 17:61-18:6, 18:49-60.)

U.S. Patent No. 6,683,978.

This Investigation concerns U.S. Patent No. 6,683,978, entitled "Fixed Rate Block-Based Image Compression With Inferred Pixel Values" ("the '978 patent"), which resulted from U.S. Patent Application No. 09/442,114 filed on November 17, 1999. (JXM-2 at S3G00005636.) The '978 patent is a continuation of U.S. Patent Application No. 09/351,930 filed on July 12, 1999 now U.S. Patent No. 6,658,146, which is a continuation of U.S. Patent Application No. 08/942,860 filed Oct. 2, 1997, now U.S. Patent No. 5,956,431 issued Sep. 21, 1999. (*Id.*) The

'417 patent issued on January 27, 2004 and names Konstantine I. Iourcha, Krishna S. Nayak, and Zhou Hong as the inventors. (*Id.*) The patent was assigned to S3 Graphics Co., Ltd. (*Id.*)

The '978 patent discloses an image processing system that includes an image encoder system and an image decoder system that are coupled and a method for encoding an original image and for decoding the encoded image to generate a representation of the original image. (*Id.* at Abstract, S3G00005636).) The claims of the '978 patent are directed to data formats for representing an original image block. (*Id.* at 17:8-20:6.) The '978 patent has twenty-nine claims, three of which are asserted: independent claims 11 and 14; and dependent claim 16. (CBr. at 7.) The asserted claims read as follows:

> **11**. A data format for representing an original image block having a pixel color set, comprising:
>
> a codeword portion for storing at least one codeword;
>
> a bitmap portion for storing a set of indices, said set of indices includes an available index for representing a transparency identifier, the bitmap portion constructed by a bitmap construction module utilizing the codeword portion associated with the bitmap portion; and
>
> wherein said codeword defines a set of colors that approximate the pixel color set, and said indices map the pixel color set to at least one color in said set of colors.
>
> **14**. A data format for representing an original image block having a pixel color set, comprising:
>
> a codeword portion for storing at least one codeword; a bitmap portion for storing a set of indices;
>
> wherein said at least one codeword defines a set of colors that approximate the pixel color set, and said indices map the pixel color set to at least one color in said set of colors; and
>
> wherein said set of colors are computed using a geometric element fitted to said pixel color set so that said geometric element has a minimal moment of inertia.
>
> **16**. The data format of claim **15**, further including a header portion.

(JXM-2 at 17:54-65, 18:3-14, 18:31-32.) Claim 15, from which claim 16 depends, reads as follows:

> **15.** An encoded image data format for representing an original image partitioned into at least two image blocks, said image blocks each having a corresponding pixel color set, the data format comprising:
>
> at least two encoded image block portions, one of said encoded image block portions having a codeword portion for storing at least two codewords, and a bitmap portion for storing a set of indices, the bitmap portion constructed by a bitmap construction module utilizing the codeword portion associated with the bitmap portion; and
>
> wherein said at least two codewords define at least three colors that approximate the pixel color set of one of the original image blocks, and said indices map the pixel color set to at least one of said at least three colors.

(*Id.* at 18:15-30.)

U.S. Patent No. 6,658,146.

This Investigation concerns U.S. Patent No. 6,658,146, entitled "Fixed-Rate, Block-Based Image Compression With Inferred Pixel Values" ("the '146 patent) which resulted from U.S. Patent Application No. 09/351,930 filed on July 12, 1999, a continuation of U.S. Patent Application No. 08/942,850, filed Oct. 2, 1997, now U.S. Patent No. 5,956,431. (JXM-1 at S3G00005607.) The '146 patent issued on December 2, 2003 and names Konstantine I. Iourcha, Krishna S. Nayak and Zhou Hong as the inventors. (*Id.*) The patent was assigned to S3 Graphics Co., Ltd. (*Id.*)

The '146 patent discloses an image processing system inclusive of coupled encoder and decoder systems for compressing an original image block, mapping and indexing the data, and decompressing it. (*Id.* at Summary of Invention, S3G00005625-26.) The '146 patent claims are directed to, *inter alia*, methods for generating an encoded image of an original image and methods for compressing an original image. (*Id.* at 16:61-20:45.) The '146 patent has twenty-

two claims, three of which are asserted: independent claim 13 and dependent claims 4 and 16.

(CBr. at 7.) The asserted claims read as follows:

> **4**. The system of claim **3**, wherein the color quantizer further comprises:
>
> a block type module, coupled to receive the image block, for selecting a block type for the image block; and
>
> a codeword generation module for generating the least one codeword from the set of parameters generated by the selection module.
>
> **13**. A method of compressing an original image block having a first set of color points defined within a selected color space, comprising:
>
> fitting a geometric element to the first set of color points so that the geometric element includes a second set of color points having a minimal moment of inertia when fitted to the center of gravity of the first set of color points;
>
> computing a set of codewords from the second set of color points;
>
> computing a set of computed colors using the set of codewords;
>
> mapping each of the first set of color points to one of the computed colors or one of the codewords to produce an index for each of the first set of color points; and
>
> using the indices produced by the mapping each of the first set of color points and the set of codewords to represent the first set of color points.
>
> **16**. The method of claim **13**, wherein mapping further includes mapping a first set color point to a predefined index, if the first set color point represents an alpha value.

(JXM-1 at 17:19-26, 19:6-24, 19:30-32.) Claim 3, and underlying claim 1, from which claim 4 depends read as follows:

> **1.** A system for encoding an image, comprising:
>
> an image decomposer, coupled to receive an image, for breaking the image into one or more image blocks, each image block having a set of colors;
>
> at least one block encoder for receiving each image block and for compressing each image block to generate an encoded image block, wherein each block encoder includes a color quantizer for receiving each image block and for generating at least one codeword from which at least one quantizer having a selection module for computing a set of parameters from the set of colors, the at least one codeword derived from the set of parameters; and

an encoded image composer for receiving and ordering the encoded image blocks into a data file.

3. The system of claim **1**, wherein each block encoder comprises:

a bitmap construction module for mapping the colors of an image block to one of the at least one quantized colors.

(*Id.* at 17:14-18.)

E. The Products at Issue.

S3G accuses the two compression technologies: PVRTC and DXT. (CBr. at 11-12; RBr. at 17.)

DXT.

The accused Apple products accused of implementing DXT include all currently imported Mac computers running the Mac operating system OS X ("Mac OS X"), including the MacBook, MacBook Air, MacBook Pro, iMac, Mac mini, and Mac Pro (collectively, the "Mac OS X Devices"). (CBr. at 11-12; JX-157C at ¶¶3, 5; JX-159C at ¶3; COSFF 56; S3G Pre-hearing Brief at 17-19; S3G Pre-hearing Statement at 9.) The parties have stipulated that all the accused Mac OS X computers have the same features and operations for purposes of evaluating infringement. (JX-159C at ¶3.) The parties further agree that of the accused Mac OS X Devices, the currently imported MacBook, MacBook Air, and Mac mini include the NVIDIA GPU[1] (NVIDIA GeForce 320M), and that these three lines of Accused Products may be treated the same for purposes of infringement. (*Id.* at ¶4.)

[1] Apple notes that for the subset of the Apple OS X Devices containing the NVIDIA GPU, the NVIDIA GPU itself implements PVRTC whereas the { } codec implements DTX. (RRBr. at 99, Appendix A.)

PVRTC.

The Apple products accused of implementing PVRTC are the "iDevices" that run the iPhone operating system ("iOS"), including the currently imported iPhone 3GS, the iPhone 4, the iPad, the iPad 2, the iPod touch (3rd and 4th generations) (collectively, the accused "iOS Devices" or "iDevices"), as well as Apple's software development kit ("SDK") for the iOS ("iOS SDK"). (*Id.*; RBr. at 1, 17.) The iOS Devices include graphics cores from Imagination Technology plc and have the same features and operations for purposes of infringement. (JX-159C at ¶5-6.) The parties further stipulate that the current version of iOS SDK, the iOS SDK4, includes an iOS Simulator and tool called *texturetool*, version 9, whereas earlier versions of iOS SDK had *texturetool* version 8. (*Id.* at ¶7.) Versions 8 and 9 of *texturetool* may be treated the same for purposes of evaluating infringement. (*Id.*)

The Mac OS X Devices, iDevices, and iOS SDK may be collectively referred to herein as the "Accused Products."

II. JURISDICTION AND IMPORTATION.

In order to have the power to decide a case, a court or agency must have both subject matter jurisdiction, and jurisdiction over either the parties or the property involved. *See Certain Steel Rod Treating Apparatus and Components Thereof*, Inv. No. 337-TA-97, Commission Memorandum Opinion, 215 U.S.P.Q. 229, 231 (U.S.I.T.C., 1981). For the reasons discussed below, the Administrative Law Judge finds the Commission has jurisdiction over this Investigation.

Respondent Apple Inc. has responded to the Complaint and Notice of Investigation and has fully participated in the Investigation by, among other things, participating in discovery,

participating in the Markman and evidentiary hearings, and filing pre-hearing and post-hearing briefs. Accordingly, the Administrative Law Judge finds that Apple has submitted to the personal jurisdiction of the Commission and that the Commission has in rem jurisdiction over the Accused Products. *Certain Cloisonné Jewelry*, Inv. No. 337-TA-195, Initial Determination at 40-43 (U.S.I.T.C., March, 1985) (unreviewed).

Section 337 declares to be unlawful "[t]he importation into the United States, the sale for importation, or the sale within the United States after importation by the owner, importer, or consignee,[2] of articles" that infringe a valid and enforceable United States patent if an industry relating to the articles protected by the patent exists or is in the process of being established in the United States. *See* 19 U.S.C. §§ 1337(a)(1)(B)(i) and (a)(2). Pursuant to Section 337, the Commission shall investigate alleged violations of the Section and hear and decide actions involving those alleged violations.

To meet its burden of proof with respect to the importation element of Section 337, "[a] complainant need only prove importation of a single accused product. . . ." *Certain Purple Protective Gloves*, Inv. No. 337-TA-500, Order No. 17 at 5 (U.S.I.T.C., Sept. 23, 2004)) (unreviewed) ("*Protective Gloves*") (citing *Certain Integrated Circuits, Processes for Making Same, and Products Containing Same*, Inv. No. 337-TA-450, Order No. 15 at 6 (U.S.I.T.C., November 2, 2001)). "Sufficient involvement" in the importation of accused products has been found adequate to establish jurisdiction. *Certain Cigarettes*, at 8 (Commission has jurisdiction to act "if there is some nexus between a respondent's activities and the importation of the products accused of infringement"). Jurisdiction does not need to be "determined by reference to the site

[2] The Commission has expressly held that the "owner, importer, or consignee" requirement applies only to the "sale within the United States after importation" portion of the statute. *Certain Cigarettes and Packaging Thereof*, Inv. No. 337-TA-643, Comm'n Op. at 9-10 (U.S.I.T.C., Oct. 1, 2009) ("*Certain Cigarettes*").

of first infringement." *See Certain Sputtered Carbon Coated Computer Disks and Products Containing Same, Including Disk Drives* ("*Carbon Coated Disks*"), Inv. No. 337-TA-350, Comm'n Op. at 7 (U.S.I.T.C., October 27, 1993).

Apple has entered into a stipulation that it "has imported into the United States, sold for importation, and/or sold after importation into the United States . . . certain electronic devices[,]" including the MacBook, MacBook Air, MacBook Pro, iMac, Mac mini, MacPro, iPhone 3GS, iPhone 4, iPad, and 2nd, 3rd and 4th Generation iPod touch. (JX-157C at 1, 2. *See also* CFF-II.01-2 (undisputed).) For the "asserted encoder and decoder claims[,]" Apple disputes that it has sold for importation, imported, or sold after importation "related software including the iOS SDK (formerly known as iPhone SDK)." (*Id.* at 1.) Apple argues that because the Accused Products do not include, at the time of importation, all elements required to infringe the asserted patents, the Commission lacks jurisdiction. (RBr. at 23.) Apple explains that the iOS SDK software is only available for download from U.S. servers by users who have registered as application developers and paid a fee. (*Id.*) Apple further argues, with respect to S3G's data format claims (claims 11, 14, 16 of the '978 patent) that it does not use PVRTC-encoded or DXT-encoded images in its applications and that the imported "iOS Devices and Mac computer do not contain PVRTC- or DXT-encoded images." (*Id.* at 24.)

S3G responds that Apple's witness, Mr. Haun, testified {

} (CBr. at 17; CRBr. at 4-5; ROCFF II.06.) S3G further argues that Apple is incorrect and cites no supporting law to show that the importation requirement is not met unless all infringing elements are imported. (CRBr at 5.) According to S3G, the Commission has held in analogous situations that the importation requirement was met. (*Id.* at

5-6.) Because a user must purchase an undisputedly imported Apple device in order to download any Apple applications, S3G argues that there is a "clear nexus" between Apple's importation activity. (*Id.* at 6.) "Apple sells the imported iDevices and controls the sale of apps containing PVRTC encoded images so that when the two are combined, S3G's data format claims are infringed." (*Id.*) In addition, S3G argues that the evidence shows that Apple has sold imported applications that contain PVRTC encoded images or data formats. (*Id.* at 6-8; CBr. at 18.)

Staff argues that Apple "blurs the issues of jurisdiction and non-infringement." (SRBr. at 2.) According to Staff, Apple's stipulation that the Accused Products are imported is enough to provide the Commission with subject matter jurisdiction. (*Id.*)

The Administrative Law Judge agrees with Staff that Apple has blurred importation with infringement. For example, Apple's argument that "Mac computers have substantial uses other than running the iOS SDK" (RBr. at 24) finds its basis in a contributory infringement analysis, not a jurisdictional one. In such a situation, the Federal Circuit has specifically instructed the Commission to "assume jurisdiction" and evaluate the merits of the Investigation. *Amgen Inc. v. Int'l Trade Comm'n*, 902 F.2d 1532, 1536 (Fed. Cir. 1990).

Even if this were not the case, other administrative law judges have previously found that the importation requirement was met when hardware or software that was part of an infringing system was imported. *See, e.g., Certain Set-Top Boxes and Components Thereof*, Inv. No. 337-TA-454, Initial Determination at 7-8 (U.S.I.T.C., Nov. 8, 2002) (in instance where set-top boxes were imported with hardware and/or software that enabled the later downloading of software alleged to infringe, the administrative law judge rejected respondent's arguments that it did not import an infringing article and found that all of the accused set-top boxes alleged to be part of an infringing system or process met the importation requirement) (unreviewed in relevant part)

("Set-Top Boxes"). "Direct infringement does not have to precede importation for an exclusion order to reach components that contribute to the infringement of the patents-in-issue." (*Id.* at 304.) *Accord Certain Digital Satellite System (DSS) Receivers and Components Thereof*, Inv. No. 337-TA-392 ("*DSS Receivers*"), Initial Determination at 7-8 (U.S.I.T.C., October 20, 1997) (unreviewed in relevant part[3]); *Certain Digital Set-Top Boxes and Components Thereof*, Inv. No. 337-TA-712, Initial Determination at 16-17 (U.S.I.T.C, May 20, 2011). Thus Apple's arguments are without merit.

III. CLAIM CONSTRUCTION.

On February 11, 2011, the Markman Order issued construing certain disputed claim limitations of the asserted claims of all of the asserted patents. (*See* Order No. 19.) The constructions of those limitations for those asserted patents remaining in the Investigation are set forth below. The Administrative Law Judge further found at that time that all other claim terms were deemed undisputed and would be interpreted by the Administrative Law Judge in accordance with their ordinary meaning as viewed by a person of ordinary skill in the art. (*Id.* at 1-2.)

A. Level of Skill in the Art.

The Administrative Law Judge has already concluded that a person of ordinary skill in the art of the asserted patents "was a person with a bachelor's degree in computer science or electrical engineering and at least two years of experience in the field of image processing, inclusive of compression techniques." (Markman Order at 5.)

[3] It is noted that while the Commission stated that it took no position on the remaining, unreviewed issues in the final initial determination, it reached the merits of the Investigation and necessarily must have approved the administrative law judge's findings regarding importation. *DSS Receivers*, Notice of Final Commission Determination of No Violation of Section 337 of the Tariff Act of 1930 at 2 (U.S.I.T.C., December 4, 1997).

B. U.S. Patent No. 7,043,087.

1. **Claims 1, and 6**—"*codeword*"

The term "codeword" means "an n-bit data string that identifies a pixel property, such as color component, density, transparency, or other image data values." (Markman Order at 14.)

2. **Claims 1 and 6**—"*set of quantized image data values*"

The term "set of quantized image data values" means "a reduced set of values representing image data, such as color, density, and transparency." (*Id.* at 16.)

3. **Claims 1, and 6**—"*index*"

The term "index" in the context of claim 1 of the '087 patent means "an identifier for an image data value." (*Id.* at 19.)

4. **Claims 1, and 6**—"*image block*"

The term "image block" means "a defined image region composed of image elements." (*Id.* at 23.)

5. **Claims 1 and 6**—"*decompressed image block*"

The term "decompressed image block" means "an image block containing more bits than the compressed image block being decoded." (*Id.* at 24.)

C. U.S. PATENT NO. 6,775,417.

1. **Claims 7, 12, 15, and 23**—"*set of quantized image values/quantized image values*"

The term "set of quantized image data values/quantized image data values" means the following: "a reduced set of values representing image data, such as color, density, and transparency." (Markman Order at 27.)

2. **Claims 12, 15, and 23**—*"codeword"*

The term "codeword" means "an n-bit data string that identifies a pixel property, such as color component, density, transparency, or other image data values." (*Id.* at 27.)

3. **Claims 7, 12, 15, and 23**—*"index"*

The term "index" in the context of underlying independent claim 1 of the '417 patent means "an identifier for an image data value." (*Id.* at 28.)

4. **Claims 7, 12, 15, and 23**—*"image block"*

The term "image block" means "a defined image region composed of image elements." (*Id.*)

5. **Claims 7, and 23**—*"encoded image block"*

The term "encoded image block" as used in the '417 patent means "data that corresponds to an image block and can be decoded." (*Id.* at 30.)

6. **Claim 12**—*"decompressed image block"*

The term "decompressed image block" means "an image block containing more bits than the compressed image block from which decoded." (*Id.* at 31.)

D. U.S. PATENT NO. 6,683,978.

1. **Claims 11, 14, and 16**—*"codeword"*

The term "codeword" means "an n-bit data string that identifies a pixel property, such as color component, density, transparency, or other image data values." (Markman Order at 33.)

2. **Claims 11, 14, and 16**—*"index"*

The term "index" in the context of the asserted claims of the '978 patent means "an identifier for an image data value." (*Id.*)

3. **Claims 11, 14, and 16**—*"image block"*

The term "image block" means "a defined image region composed of image elements." (*Id.* at 33-34.)

4. **Claim 16**—*"encoded image block"*

The term "encoded image block" as used in the '978 patent means "data that corresponds to an image block and can be decoded." (*Id.* at 34.)

E. U.S. PATENT NO. 6,658,146.

1. **Claims 4, 13, and 16**—*"codeword"*

The term "codeword" means "an n-bit data string that identifies a pixel property, for example, a color component." (Markman Order at 37.)

2. **Claims 13 and 16**—*"index"*

The term "index" in the context of the asserted claims of the '146 patent means "an identifier for an image data value." (*Id.*)

3. **Claims 4, 13, and 16**—*"image block"*

The term "image block" means "a defined image region composed of image elements." (*Id.* at 38.)

4. **Claim 4**—*"encoded image block"*

The term "encoded image block" as used in the '146 patent means "data that corresponds to an image block and can be decoded." (*Id.*)

5. **Claims 13 and 16**—*"center of gravity"*

The term "center of gravity" to mean "the average pixel property of an image block." (*Id.* at 39.)

F. Agreed Constructions.

The parties have stipulated that the following terms in the asserted patents should be construed as follows:

1. **"mapping"** and **"associating"** should be given the same construction and should mean "given a value in a first set, correlating a corresponding value in a second set";
2. **"output data file"** should mean "a file containing the decompressed image blocks";
3. **"compressed image block"** should mean "an encoded image block that contains fewer bits than the original image block";
4. **"geometric element"** should mean "a shape such as a curve, plane, trapezoid, or the like"; and
5. **"fitting a geometric element/ geometric element fitted to said pixel color set/geometric element... fitted to center of gravity":** "fitting a geometric element" means "calculating a geometric element that approximates data" and the other two phrases can be construed accordingly.

(Markman Order at 39-40.)

IV. INFRINGEMENT DETERMINATION

A. Applicable Law

1. Direct Infringement.

"Determination of infringement is a two-step process which consists of determining the scope of the asserted claim (claim construction) and then comparing the accused product . . . to the claim as construed." *Certain Sucralose, Sweeteners Containing Sucralose, and Related Intermediate Compounds Thereof*, Inv. No. 337-TA-604, Comm'n Op. at 36 (U.S.I.T.C., April 28, 2009) (citing *Litton Sys., Inc. v. Honeywell, Inc.*, 140 F.3d 1449, 1454 (Fed. Cir. 1998)

"*Litton*"). An accused device literally infringes a patent claim if it contains each limitation recited in the claim exactly. *Litton*, 140 F.3d at 1454. Each patent claim element or limitation is considered material and essential. *London v. Carson Pirie Scott & Co.*, 946 F.2d 1534, 1538 (Fed. Cir. 1991). In a Section 337 investigation, the complainant bears the burden of proving infringement of the asserted patent claims by a preponderance of the evidence. *Enercon GmbH v. Int'l Trade Comm'n,* 151 F.3d 1376, 1384 (Fed. Cir. 1998).

If the accused product does not literally infringe the patent claim, infringement might be found under the doctrine of equivalents. The Supreme Court has described the essential inquiry of the doctrine of equivalents analysis in terms of whether the accused product or process contains elements identical or equivalent to each claimed element of the patented invention. *Warner-Jenkinson Co., Inc. v. Hilton Davis Chemical Co.*, 520 U.S. 17, 40 (1997). Under the doctrine of equivalents, infringement may be found if the accused product or process performs substantially the same function in substantially the same way to obtain substantially the same result. *Valmont Indus., Inc. v. Reinke Mfg. Co.,* 983 F.2d 1039, 1043 (Fed. Cir. 1993).

2. Indirect Infringement.

Induced Infringement.

"Whoever actively induces infringement of a patent shall be liable as an infringer." 35 U.S.C. § 271(b). A patentee asserting a claim of inducement must show (i) that there has been direct infringement and (ii) that the alleged infringer "knowingly induced infringement and possessed specific intent to encourage another's infringement." *Minnesota Mining & Mfg. Co. v. Chemque, Inc.*, 303 F.3d 1294, 1304-05 (Fed. Cir. 2002). The specific intent requirement for inducement necessitates a showing that the alleged infringer was aware of the patent, induced direct infringement, and that he knew or should have known that his actions would induce actual

direct infringement. *DSU Medical Corp. v. JMS Co., Ltd.*, 471 F.3d 1293, 1305 (Fed. Cir. 2006) (en banc in relevant part). The intent to induce infringement may be proven with circumstantial or direct evidence and may be inferred from all the circumstances. *Id.* at 1306; *Broadcom Corp. v. Qualcomm Inc.*, 543 F.3d 683, 699 (Fed. Cir. 2008).

Contributory Infringement.

35 U.S.C. § 271(c) sets forth the rules for contributory infringement:

> Whoever offers to sell or sells within the United States or imports into the United States a component of a patented machine, manufacture, combination, or composition, or a material or apparatus for use in practicing a patented process, constituting a material part of the invention, knowing the same to be especially made or especially adapted for use in an infringement of such patent, and not a staple article or commodity of commerce suitable for substantial noninfringing use, shall be liable as a contributory infringer.

35 U.S.C. § 271(c). Specifically with respect to Section 337 investigations, the Federal Circuit has held that "to prevail on contributory infringement in a Section 337 case, the complainant must show inter alia: (1) there is an act of direct infringement in violation of Section 337; (2) the accused device has no substantial non-infringing uses; and (3) the accused infringer imported, sold for importation, or sold after importation within the United States, the accused components that contributed to another's direct infringement." *Spansion, Inc. v. International Trade Comm'n*, 629 F.3d 1331, 1353 (Fed. Cir. 2010).

B. Analysis of the Accused Products with Respect to the '087 patent.

1. Direct Infringement.

S3G alleges that Apple literally infringes claims 1 and 6 of the '087 patent. (CBr. at 165.) S3G says Apple infringes these apparatus claims by virtue of its software decompressor in Rosasco codec and the hardware decompressor in the NVIDIA GPUs, both of which are in Mac computers. (*Id.*)

These two claims read as follows:

> **1**. An image decoder engine for decoding an encoded image data file, comprising:
>
> an encoded image decomposer for decomposing the encoded image data file into a modified header and at least one compressed image block, each image block having at least one associated codeword and a plurality of image elements associated with an index value; and
>
> at least one block decoder coupled to the encoded image decomposer for decompressing the at least one compressed image block into at least one decompressed image block by generating a set of quantized image data values and mapping the index value to a quantized image data value from the set of quantized image data values, the at least one block decoder further comprising,
>
> at least one decoder configured for decompressing each of the at least one compressed image block to generate colors for each of the at least one compressed image block.
>
> **6**. The image decoder engine of claim **1** wherein the at least one block decoder further comprises a block type detector configured for determining a block type for each of the at least one compressed image block based on the at least one associated codeword.

(JXM-4 at 17:18-18:24.) S3G adopts its arguments with respect to its allegation of infringement of claim 12 of the '417 patent as its argument that the Accused Products infringe claims 1 and 6 of the '087 patent. (CBr. at 165-166.)

Apple denies that any of the Accused Products infringe claims 1 and 6 of the '087 patent, for several reasons. First, according to Apple, claims 1 and 6 of the '087 patent, like claim 12 of the '417 patent, require "an encoded image decomposer for decomposing the encoded image data file into a modified header." (RBr. at 112.) Apple says that for the same reasons it discusses in arguing that PVRTC does not infringe claims 7 and 12 of the '417 patent, PVRTC also does not infringe claims 1 and 6 of the '087 patent. (*Id.*) Apple says that the PVRTC Decoders do not have a "block decoder" that decompresses a compressed image block by "generating a set of quantized image data values[,]" because the PVRTC Decoders, to the

contrary, simply calculate the color of each decoded pixel based on a set of equations, and inputs thereto. (*Id.*) Apple says that claims 1 and 6 of the '087 patent require "mapping the index value to a quantized image data value from the set," just as does claim 12 of the '417 patent. (*Id.*) However, Apple says a PVRTC modulation value is not an index, because it is not an "identifier" for a color or other image data value, but, instead, is merely one of several inputs to an equation that is used to calculate a color of a pixel. (*Id.* at 113.) Apple says a single modulation value can result in different colors for different pixels, depending on the values of other variables used to compute the modulation for an individual pixel, and usually identifies a fraction, not a color. (*Id.*) Therefore, argues Apple, it is not an "identifier" of an image data value, it is not mapped to a quantized image data value, and it is not an index, as that term has been construed. (*Id.*)

Apple further argues that the NVIDIA GPUs do not infringe claims 1 and 6 either, for the same reasons Apple mentions in its argument that they do not infringe claim 12 of the '417 patent. (*Id.*) First, says Apple, these GPUs do not include "an encoded image decomposer for decomposing the encoded image data file into a modified header" as required by claims 1 and 6. (*Id.*) Second, says Apple, the NVIDIA GPUs do not include "at least one block header" as required by claims 1 and 6. (*Id.*) According to Apple, this limitation in claims 1 and 6 of the '087 patent is identical to the limitation of claim 12 of the '417 patent, and for similar reasons, it is not infringed. (*Id.*) Lastly, says Apple, the NVIDIA GPUs do not decode DXT-encoded image data by first "generating a set of quantized image data values" and then "mapping the index value to a quantized image data value from the set of quantized image data values." (*Id.*) Instead, argues Apple, referring to testimony of Mr. Toksvig, the {

} (*Id.* at 113-114.)

With respect to the DXT decoder, Apple says that { } codec does not infringe claims 1 and 6, for the same reasons mentioned by Apple for why it does not infringe claim 12 of the '417 patent. (*Id.* at 114.) Apple argues that there is no evidence that { } codec has ever been used by a third party to decode a DXT-encoded image and that, even assuming that the { } codec were used to decode a DXT-encoded image, the { } codec still would not infringe claims 1 and 6 because it does not include "an encoded image decomposer for decomposing the encoded image data file into a modified header." (*Id.*) Apple says that this element of claims 1 and 6 of the '087 patent is identical to the encoded image decomposer limitation disclosed in claim 7 of the '417 patent and { } codec does not infringe the '087 claims for the same reasons that it does not infringe the '417 claims that have been argued elsewhere in its brief. (*Id.*)

Staff says that, in its opinion, the evidence establishes that Apple's implementation of PVRTC infringes claim 1 of the '087 patent by implementing a decoder in the software *texturetool* that is embodied in the Mac iOS SDK and iOS Simulator in Mac computers. (SBr. at 18.) Staff says the evidence shows that the iOS software decoder in SDK and in the Simulator are image decoder engines for decoding an encoded image data file in the PVRTC format. (*Id.* at 19.) Staff, relying on the testimony of Dr. Bystrom, says that all of the elements of claim 1 are met by the *texturetool* decoder in the iOS SDK and the iOS Simulator and that the evidence indicates that the Mac iOS software decoder receives header information with encoded image data to be decoded through the { } function call. (*Id.*) The encoded data is divided into compressed data blocks and a modified header containing such information

as height, width, and compression format, according to Staff, and this satisfies the first element of claim 1. (*Id.*) The second element of the claim is satisfied by the { } routine shown in JX-173C, where colors A and B are extracted from the compressed data blocks, along with 16 two-bit index values, in the case of four-bit pixel compression, says Staff. (*Id.*) The image blocks have two codewords and a plurality of image elements, associated with an index value, and the software decoder generates a set of quantized image data values, continues Staff; and these are described in the two routines of { } respectively. (*Id.*) Thus, contends Staff, all of the limitations of claim 1 are satisfied by the software decoder, *texturetool*, in the Mac iOS SDK and in the iOS Simulator. (*Id.*) Staff also says that the software code { } in the iOS decoder likewise infringes claim 1, because *texturetool* is used there too. (*Id.* at 19-20.)

As regards the Imagination hardware decoder, Staff says that this hardware has an image decoder engine for decoding an encoded image data file in the PVRTC format. Staff says that Dr. Bystrom opined that this { }—satisfies each element of claim 1 because it decomposes an encoded image into image data blocks and a modified header, which contains information such as height, width, and compression format, and the data blocks so compressed are used or read in the PVRTC decompress routine. (*Id.* at 20.) Staff says the decompress routine is described in { } citing JX-160C. (*Id.*) Also, argues Staff, in the { } in CX-135C, there are unpacked PVRTC data, the { } routines, which the OpenGLES function calls. (*Id.*) Staff says that each block has codewords and a plurality of image data elements associated with an index value which is illustrated in the technical reference manual for the { } (*Id.*) According to Staff, the codewords are

color A and color B, and there is a plurality of image elements labeled modulation data which are 16-bit index values. (*Id.*) Staff says this is shown in the hardware code module, { } as shown in JX-160C and { } at JX-163C. Also, argues Staff, the module { } in JX-175 C shows the extraction and translating of the 16 two-bit index values in the four-bit pixel coding type. (*Id.*)

Staff, relying on the testimony of Dr. Bystrom, to the exclusion of all of the competing testimony offered by Apple's witnesses, says Dr. Bystrom determined that the hardware decoder generated a set of quantized image values and mapped the index value to a quantized image data value from the set of quantized image data values. (*Id.* at 21.) Staff says that Dr. Bystrom pointed to four routines that perform the process of generating a set of quantized image data values and the mapping step, referring to source code where these routines are mentioned, and concludes that each of these modules supports Dr. Bystrom's opinion that the decoder in the Imagination hardware literally infringes claim 1 of the '087 patent. (*Id.*)

The Administrative Law Judge concludes that PVRTC does not infringe claims 1 and 6 of the '087 patent for same reasons discussed in concluding that PVRTC does not infringe claims 7 and 12 of the '417 patent, *infra* at IV(C)(b)(2). The '087 patent is a continuation in part of the '417 patent and, like it, involves block-based compression. As discussed below in connection with both the '417 and the '146 patents, PVRTC does not decompose images into blocks but rather down-samples an entire image and then creates delta images to try to match an original image, all in a manner that is substantially different from the invention disclosed in the asserted claims of the '087 patent.

The Administrative Law Judge further concludes that the accused OS X Devices, because they use the { } codec, infringe claims 1 and 6 of the '087 patent for the same reasons that

discussed in connection with the finding that they infringe claims 1 and 12 of the '417 patent, *infra* at IV(C)(a)(2). The Administrative Law Judge therefore concludes that the Mac OS X Devices infringe the asserted claims of the '087 patent, but the iDevices and iOS SDK do not.

2. **Indirect Infringement.**

S3G asserts that Apple induces third-party developers and consumers to infringe the "asserted decoding apparatus claims of the '087 patent" for the reasons it sets forth with respect to the '417 patent. (CBr. at 168.) S3G's discussion of the '417 patent incorporates its arguments with respect to the '146 patent. (CBr. at 162.)

Staff also argues that Apple induces game and application developers to infringe claim 1 of the '087 patent. (SBr. at 21.) Staff does not present any in-depth discussion of this issue, and further makes no mention of whether there is inducement with respect to claim 6. (*Id.* at 21, 24.)

Apple responds that in order to prove inducement a patentee must show that there has been direct infringement and that the alleged infringer "knowingly induced infringement and possessed specific intent to encourage another's infringement." (RBr. at 164 (citing *Minnesota Mining*, 303 F.3d at 1304-05).) Apple argues that to prove specific intent, S3G must show that Apple was aware of the asserted patents and had "an affirmative intent to cause direct infringement." (*Id.* (citing *DSU*, 471 F.3d at 1305-06).) Apple argues that the specific intent requires more than just intent to cause the acts that produce infringement and says that beyond that threshold knowledge, the inducer must have an affirmative intent to cause direct infringement. (*Id.* (citing *Kyocera Wireless Corp., v. U.S. Int'l Trade Comm'n*, 545 F.3d 1340, 1354 (Fed. Cir. 2008)).) Quoting from *Kyocera*, Apple says "providing customers with the system determination software, training them on implementation of their mobile devices,

providing software and firmware updates, offering customer support, furnishing promotional and technical documents for the accused [] chipsets, and recommending that its customers implement battery saving features[]" perhaps might show a general intention to cause acts the produced infringement, falls short of the necessary intent for showing inducement. (*Id.* at 165.) Apple argues that S3G has not shown any direct infringement and has failed to establish that Apple possessed the specific intent to encourage its customers to use the Accused Products in an infringing manner. (*Id.*) Apple argues that S3G is wrong in saying that certain applications when downloaded onto the Accused Products infringe the asserted patents because those applications are not part of the Accused Products when they are imported, but are available only through electronic downloads from the App Store on servers located in the United States. (*Id.*) Apple argues that S3G did not introduce evidence showing that any application creating infringement was ever actually downloaded by a customer or other third party. (*Id.* at 165-166.)

As an initial matter, the Administrative Law Judge notes that inasmuch as it has been determined above that Apple does not directly infringe any of the asserted claims of the '087 patent, there is no infringement by inducement, either. "[A] finding of inducement requires a threshold finding of direct infringement—either a finding of specific instances of direct infringement or a finding that the accused products necessarily infringe." *Lucent Technologies, Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1322 (Fed. Cir. 2009). This would apply to those instances in which Apple's products that implement PVRTC have been found not to infringe. Most of the evidence adduced by S3G relates to PVRTC.

With respect to Apple's implementation of DXT, the Administrative Law Judge found above that claims 1 and 6 of the '087 patent are literally infringed. At issue is whether Apple

was aware of the patent, induced direct infringement, and that Apple knew or should have known that its actions would induce actual direct infringement.

Here, the evidence shows that Apple was aware that there could be intellectual property issues with its use of texture compression and advised that S3, Inc. be contacted. (CX-579C.) The evidence further shows that Apple physically tests the encoders and decoders in its products, including the { } codec. (JX-54C at 94:15-95:22, 96:8 - 97:4 (Sandmel Depo).) In addition, Apple tests third party applications that "likely" use DXT format features. (*Id.*) The accused OS X Devices are designed to decompress DXT texture data when an application, such as a third party application, makes such a request. (*Id.* at 22:14-20.) However, S3G does not clearly enunciate how Apple induces third parties to implement DXT. (CBr. at 41 { } use of PVRTC), 42 { } use of PVRTC), 42-43 (third party testing on iDevices), 44 (general discussion of developer resources without specifics re DXT), 45 (examples re PVRTC).)

The Administrative Law Judge concludes that the evidence does not persuasively show that Apple induced infringement of claims 1 and 6 of the '087 patent with respect to DXT.

C. Analysis of the Accused Products with Respect to the '417 patent.

1. *Whether the claims of the '417 patent are infringed by Apple's implementation of S3TC/DXT.*

a) Claim 7.

S3G alleges that Apple literally infringes claim 7 of U.S. Patent No. 6,775,417 ("the '417 patent) through Apple's implementation of S3TC/DXT. (CBr. at 140.)

By way of background, in 1997 the prior owner of the asserted patents granted a license to Microsoft granting it the right to create a derivative version of S3TC. Microsoft called its

version DXT and incorporated it into Microsoft's DirectX. DXT is merely the name for texture compression functionality in DirectX. (RBr. at 21.)

S3G says Apple infringes claim 7 by way of its software compressor in the { } codec contained in the Mac OS X. (*Id.*) Claim 7 depends from independent claim 1. Claims 1 and 7 read as follows:

> **1.** An image encoder engine for encoding an image, comprising:
>
> an image decomposer for decomposing the image into a header and at least one image block, each image block having a set of image elements and each image element having an original image data value;
>
> at least one block encoder for receiving each image block and for compressing each image block into an encoded image block by associating each original image data value of the image element with an index to a derived image data value in a set of quantized image date [sic] values; and
>
> an encoded image composer coupled to the block encoder for ordering the encoded image blocks into a data file.
>
> **7.** The image encoder engine of claim **1** wherein the block encoder further comprises a block type module for selecting an identifiable block type for the image block.

(JXM-3 at 16:53-67, 17:19-21.) S3G's infringement argument in the case of claim 7 of the '417 patent relies on the arguments it made in support of its allegation that Apple infringes claim 4 of the '146 patent. (*See* CBr. at 140-141.) For example, S3G begins its discussion of infringement of claim 7 of the '417 patent with the statement "[s]ee discussion above of claim 4 of the '146 patent" and references Section III.A.2.a of its brief where S3G lays out its infringement arguments involving claim 4 of the '146 patent. (CBr. at 140.) In that section of its brief, S3G says that the Mac OS X running on the Mac computers contains a software encoder or an image encoder embedded in a function called { } for encoding an image file into DXT compressed format. In support of that statement, S3G cites to Dr. Richardson's testimony at pages 753-755 and 821 and to the Rosasco deposition (JX-53) at 21-22. By way of explanation,

S3G says the software compressor in the { } codec receives texture images having both compressed texture image data and header information characterizing the image data in the function call in { } (CBr. at 20, 140-141 (citing Tr. at 765, 823-824 (Richardson)).)

S3G says this software compressor extracts and uses the header information in the received texture image to identify individual blocks of four-by-four texels having respective colors. (*Id.* (citing Tr. at 755-756; JX-53C at 137-138 (Rosasco Depo)).) This argument as it pertains to claim 4 of the '146 patent, without any additional explanation, constitutes the basis for S3G's assertion that the Accused Products satisfy the first element of claim 7 of the '417 patent. (CBr. at 140.)

Next, S3G signals that its argument respecting the second element of claim 1 of the '146 patent suffices to show that the second element of claim 1 of the '417 patent is likewise satisfied. (CBr. at 141.) At page 20 of its initial brief, the portion of S3G's brief assumedly being referred to (pages numbers are not mentioned, only section numbers), S3G argues that the software composer performs three main steps to compress an image block: it determines the block type, it generates representative colors, and it maps texel colors to the representative colors to create index values. (CBr. at 20 (citing Tr. at 756, 826 (Richardson); JX-53C at 135-136 (Rosasco Depo)).)

After reciting the third element of claim 1, S3G again says, "[s]ee the discussion regarding claim 4 of the '146 patent." (*Id.* at 141.) At page 21 of S3G's initial brief there is discussion concerning claim 1 of the '146 patent and a statement by S3G that the software compressor orders the compressed texture image blocks in corresponding positions in an intended place of storage, such as memory in a computer. (CBr. at 21 (citing Tr. at 761

(Richardson)).) To illustrate the difficulty this method of S3G presents, it is instructive to quote the two respective claim elements. The third element of claim 1 of the '417 patent reads: "an encoded image composer coupled to the block encoder for ordering the encoded image blocks into a data file." (JX-2 at 16: 66-67.) The fourth element of claim 1 of the '146 patent reads: "an encoded image composer for receiving and ordering the encoded image blocks into a data file." (JX-2 at 17:7-8.) Simply directing the reader to look at a prior discussion about another claim of a different and distinct, even if similar, patent, without explaining or accounting for the differences between them, or demonstrating why those differences do not affect the merits of the argument, is presumptuous and invites perplexity that ill-serves the objective of rational persuasion, forcing the reader to spend inordinate time and effort trying to reconcile or bridge the difference between the claims in order to ascertain whether the evidence is sufficient to establish infringement despite these differences.

As regards asserted claim 7 itself, S3G, after quoting its language, says see the discussion regarding claim 4 of the '146 patent. (*Id.* at 141.) Assumedly, but given the brevity of this instruction, not certainly, S3G is referencing its argument concerning the preamble and first element of claim 4 (CBr. at 22-23), the latter portion of which has language similar to claim 7 of the '417 patent but also significant differences: claim 4 of the '146 patent discloses a system wherein a color quantizer comprises a block type module coupled to receive an image block, for selecting a block type; and claim 7 of the '417 patent involves an image encoder engine that comprises a block type module for selecting an identifiable block type for the image block. The argument that S3G makes regarding claim 4 is that the subject software compressor of *texturetool* determines whether a block has a transparency and should be encoded as such, and based on that determination, the "block" will be encoded or compressed using either four

representative colors or three representative colors plus transparency. (*Id.* at 22.) Based on that reasoning, S3G reasons that claims 1 and 7 of the '417 patent are infringed. (*Id.* at 141.)

Apple counters S3G's accusation by asserting that the { } codec is not an application that can be run by a Mac computer user, saying that, instead, it is merely a function call within the Mac OS (operating system) that, if summoned in a particular manner by an application and given data in a specific format, can be used to encode a DXT image. (*Id.* at 53-54.) As imported and sold by Apple, Mac computers do not include applications that call upon { } codec to encode an image, Apple says. (*Id.*) Nor does the { } codec satisfy the elements of claim 7 in other ways: the { } codec is not a software application, thus it is not capable of encoding DXT images, and Apple does not import or provide software applications that are capable of doing so. (*Id.* at 55.) Apple says it is unaware of anyone having ever used the { } codec to encode an image so as to satisfy claim 7's requirement of an "image encoder engine." (*Id.* at 55.)

Apple also says that the { } codec does not include "an image decomposer for decomposing the image into a header" as required by claim 7 (*see* JX-2 at 16:56, pertaining to claim 1, from which claim 7 depends), and the { } codec can only be used by an application that uses an appropriate OpenGL function, which, in any event, does not pass an image with a header to the { } codec for encoding. (*Id.*) Thus, says Apple, because the { } codec does not receive an image with a header, the { } codec does not satisfy the claimed "image decomposer for decomposing the image into a header" limitation. (*Id.*)

Apple says that in order to decode a DXT file on a Mac computer using the { } codec, an application has to make a call to an OpenGL function, such as *glTexImage2D*, which is provided with a pointer to the image data to be encoded and some additional information about

the image. (*Id.* (citing JX-53C at 71-74 (Rosasco Depo)).) Apple says that *glTexImage2D* is not provided an image file or an image with a header, and because OpenGL is not a flexible programming language, as would typically be used with a general purpose computer, there is no way for Apple to define additional OpenGL functions or to use OpenGL's existing functions with a header. (*Id.* at 45.) Apple says that Dr. Richardson confirmed that the { } codec does not include the claimed decomposer, referring to one of the demonstrative exhibits he prepared, CDX-632. (*Id.*) Demonstrative exhibits are not substantive evidence, as the parties were notified at the hearing (Tr. at 322, 2045), and therefore this statement of Apple's is not substantiated by this exhibit. However, Apple also does refer to source code for at least part of this contention. (*Id.* at 44-45.)

Apple also says that the format parameters that are passed by OpenGL are neither headers nor modified headers. (*Id.* at 47 (citing RFF 275.) Citing hearing testimony given by Jeremy Sandmel, Apple says that "a header to an image file is information about the image data that is stored with [it] in the file and is typically stored in the front of the file[,]" and says that Michael Toksvig agreed that "the header is part of the file." (*Id.* (citing Tr. at 2305 (Sandmel), 2220-21 (Toksvig)).) Therefore, Apple argues, the "header information" or "parameters" that S3G relies on for its infringement argument are not headers of an original or encoded image file, because they are not part of an image data file. (*Id.* (citing Tr. at 2220-21 (Toksvig); JX-53C at 97-98 (Rosasco Depo)).)

Apple says the asserted patents make it clear that an image's header has to be attached at the head of an image data file, points to Figure 5A of the '417 patent, and cites related language in the patent (JX-2 at 6:64-7:3) for support, noting that the original image (numbered **310** as shown in Figures 3A and 3B of the patent) includes an α-bit header **502** and β-bit image data **504**

that are input into the image decomposer **302** (also shown in Figures 3A and 3B). (*Id.* at 48.) "The image decomposer **302** decomposes the image **310** into the α-bit header and a plurality of blocks[,]" notes Apple, quoting from the patent. (*Id.* (quoting JX-2 at 7:1-3).)

Similarly, argues Apple, the S3G patents make it clear that a modified header must be attached or concatenated to the head of an encoded image file, referring to Figure 5B of the '417 patent showing a "Mod. Header 512" appearing to the left, or front (reading left to right), of an "ordered file having encoded image blocks 516…concatenated with the modified information 512 that is derived from the α-bit header 502 of the original image 310 (FIGS. 3A and 3B) to generate the encoded image data file that is the output of the image encoder engine 202 (FIG. 2)." (*Id.* (citing JX-2 at Fig. 5B and quoting from the patent at 11:11-16).)

Apple says the height, width, and format parameters that are passed by the OpenGL functions are separate from, and are not attached to, the image data that is to be encoded or decoded and, therefore, cannot be headers according to the claims of the asserted patents, citing testimony of Mr. Toksvig, who said they are separate, the former "sitting on the stack" and the latter, "sitting out in memory." (*Id.* at 48-49 (citing Tr. at 2218).)

S3G says that two OpenGL function calls are included in the Accused Products for invoking texture compression and decompression: *glCompressedTexImage2D()*, receives texture data in a compressed format for decompressing; and *glTexImage2D()* receives texture data in uncompressed format for compressing. (CRBr. at 16.) S3G says that both of these function calls receive information, through various parameters, including a pointer labeled "data," to the texture image and describe the texture image's data, such as height, width, and "internalformat," and these collectively specify a texture image. (*Id.* at 16-17.)

S3G argues that Apple does not dispute that OpenGL function calls receive an image in accordance with a set of parameters but only disputes that the image received includes a header—contending that *glTexImage2D* is not provided an image file or an image with a header, and that *glCompressedTexImage2D* is not provided an image file or an image with a header. (*Id.* at 17.) S3G says that Apple's reliance on Figure 5A of the '417 patent for its contention that a header has to be included with the image data does not support the proposition that the height, width, and format parameters included in the OpenGL function calls, together with the parameter that specifies image data, do not constitute a header. (*Id.*) According to S3G, Apple's contention that a header must be attached or concatenated to the image data is erroneous because the claims only require that a header is capable being decomposed from an image with which it is associated, thereby indicating that a header can exist apart from other image data. (*Id.* at 17-18 (citing JX-2 at 4:40-41, 11:36-39, 11:43-44, 11:54-60).)

S3G argues that Apple's reliance on Mr. Sandmel's and Mr. Toksvig's testimony that a header is necessarily the front part of a file should be rejected because they are not experts qualified to render opinions as to the meaning of header and because their statements are contrary to the express teaching of the asserted patents. As regards Apple's characterizations of Dr. Richardson's demonstratives as evidence that the { } codec does not include the claimed decomposer, this is erroneous because these demonstrative exhibits only illustrate specific aspects of Dr. Richardson's testimony and he never testified that a decomposer is absent from the { } codec. (*Id.* at 18-19.)

Staff believes that S3G has established that the software encoder in the { } codec in the Mac OS X operating system in Mac computers encodes three-dimension texture images using the DXT compression format that infringes claim 7. (SBr. at 55.) Staff quotes extensively

from the hearing testimony of Dr. Richardson (*id.* at 56-60) and concludes, on the basis of Dr. Richardson's testimony, that the { } codec receives an original image and separates the header information from the image data which is divided into image blocks, each of which is compressed by the { } function. (*Id.* at 60.) Staff says that the compression function plots the original data points in the RGB color space and two representative colors denominated color0 and color1 are selected and two interpolated colors are determined, {

} (*Id.*) Staff says that Dr. Richardson also opined that the {

} (*Id.*)

The Administrative Law Judge finds, based on the evidence, that S3G's and Staff's arguments, in the aggregate, are more persuasive than Apple's and concludes, for the reasons given by them, as mentioned above, that the accused OS X Devices' implementation of DXT literally infringes claim 7 of the '417 patent.

b) Claim 12.

S3G alleges that Apple literally infringes claim 12 of the '417 patent by virtue of the software decomposer in the { } codec and the hardware decomposer in the NVIDIA GPUs, both of which involve Mac computers. (CBr. at 140.) Claim 12 and underlying independent claim 8 read as follows:

> **8.** An image decoder engine for decoding an encoded image data file, comprising:
>
> an encoded image decomposer for decomposing the encoded image data file into a modified header and at least one compressed image block, each

image block having at least one associated codeword and a plurality of image elements associated with an index value;

at least one block decoder coupled to the encoded image decomposer for decompressing the at least one compressed image block into at least one decompressed image block by generating a set of quantized image data values and mapping the index value to a quantized image data value from the set of quantized image data values; and

an image composer for ordering the at least one decompressed image blocks in an output data file.

12. The image decoder engine of claim **8** wherein the at least one block decoder further comprises a block type detector for selecting a block type for each of the at least one compressed image block.

(JXM-3 at 17:22-37, 17:49-53.)

S3G says that the { } codec includes a software decomposer that is primarily based on a function or code module entitled { } for decompressing compressed DXT texture. (CBr. at 141 (citing Tr. at 764-765 (Richardson); JX-53C at 134 (Rosasco Depo)).) According to S3G, Mac computers include NVIDIA GPUs for decompressing compressed DXT textures. (*Id.* (citing JX-53C at 58-59 (Rosasco Depo); JX-55C at 205 (Sandmel Depo); JX-54C at 27-29 (Sandmel Depo)).) S3G believes that these assertions and the supporting evidence mentioned by it in its initial brief support S3G's assertion that the { } codec satisfies the preamble of claim 8. (*Id.*) S3G argues next that the { } codec software decompressor receives texture images consisting of both the compressed texture image data and header information that characterizes the image data and says that, once a compressed DXT texture is received, the software decompressor extracts and uses the header information in the received DXT texture to identify individual blocks. (*Id.*at 141-142 (citing Tr. at 765-766, 824 (Richardson)).) According to S3G, an NVIDIA GPU in the Mac computers operates with a GPU driver to receive an encoded or compressed image as specified by function *glCompressedTexImage2D()*, which includes both compressed texture image data and header

information characterizing that data. (*Id.* at 142 (citing Tr. at 2219-20 (Toksvig)).) S3G says that once a compressed DXT texture is received, the {

} (*Id.*)

For these reasons, S3G concludes that the "encoded image decomposer" aspect of the first element of claim 8 is satisfied. (*Id.* at 141-142.)

S3G says that, in DXT, a 64-bit compressed block represents a group of four-by-four pixels, or texels, having individual, or 16 colors. (*Id.* at 142 (citing Tr. at 870 (Richardson)).) The 64-bit compressed block includes two color codewords, color0 and color1, according to S3G, and this feature satisfies the provision that there be a codeword associated with each image block that is mentioned in the first element of claim 8. (*Id.* (citing Tr. at 740 (Richardson)).) Based on the order of these two codewords, the software decompressor in the { } codec decodes a block using either four representative colors or three representative colors plus transparency, and using two explicitly stored codewords, color0 and color1, the software decompressor interpolates either one or two additional representative colors, says S3G. (*Id.* at 142-143 (citing Tr. at 767-768 (Richardson)).) Index values are assigned accordingly, and the index value for each texel in a bitmap portion of the compressed DXT block is used to pick out one of the four representative colors, or in the alternative case, the three representative colors plus transparency, as the color for the texel in the decompressed image block. (*Id.* at 143 (citing Tr. at 768 (Richardson)).) To decode a given texel in a block, S3G says that the NVIDIA GPU extracts the two base representative colors from a compressed DXT texture image block and optionally interpolates a texel's color from the base colors by means of corresponding index values. (*Id.* (citing Tr. at 803-805 (Richardson), 2249-50 (Toksvig); JX-58C at 28-34 (Toksvig Depo)).) S3G says that, depending on the value corresponding to the texel, its color is mapped to

one of the two representative colors or to an interpolated color, as the case may be. (*Id.* (citing Tr. at 2253-54 (Toksvig)).) Based on these factors, S3G argues that the second element of claim 1 of the '417 patent is satisfied by the software decompressor of { } codec. (*Id.* at 142-143.)

S3G says that the { } codec software decompressor orders decompressed texture image blocks in the corresponding correct positions in the decompressed texture image and the NVIDIA GPU places decoded texture in the right positions in the output image thereby satisfying the last element of claim 8. (*Id.* at 143 (citing Tr. at 769-770, 874-875 (Richardson); JX-53C at 165-166 (Rosasco Depo)).)

Turning to the asserted claim 12, S3G says the software decompressor being discussed determines the block type by determining the order of the two explicitly stored color codewords, color0 and color1. (*Id.* at 144 (citing Tr. at 767-768 (Richardson); JX-53C at 168-169 (Rosasco Depo)).) The NVIDIA GPU also compares the two base representative colors in order to determine the block type, and decompresses the compressed DXT texture image block accordingly. (*Id.* (citing Tr. 803-804 (Richardson); JX-58C at 32-33 (Toksvig Depo)).) By virtue of these respective actions, S3G contends that claim 12 has been satisfied. (*Id.*)

Apple denies any infringement of claim 12 by its Accused Products. With respect to the { } codec, Apple says that claim 12 requires "an encoded image decomposer for decomposing the encoded image into a modified header and at least one compressed image block" and "at least one block decoder coupled to the encoded image decomposed for decompressing the at least one compressed image block into at least one decompressed image block." (RBr. at 61 (citing JX-2 (*note* 17:24-32)).) {

} (*Id.*) Apple says that the { } codec does not infringe claim 12 because it does not include a "decomposer for decomposing the encoded image data file into a modified header." (*Id.*)

Staff maintains that the evidence proves that the Mac OS X operating system includes a software decoder that decodes images in the DXT format. (SBr. at 65.) Staff says that the { } codec has a function call named { } for decoding an image file in the DXT format. (*Id.*) Staff reports that Dr. Richardson testified that claim 12 is literally infringed because the software decompressor comprises an image decoder engine that decodes encoded image data files by first extracting individual blocks from the encoded image and decomposing the encoded image into a modified header and compressed image blocks. (*Id.*) Staff says that each image block has two codewords and multiple image elements associated with an index value forming the bitmap portion or the 16 indices in each DXT block. (*Id.* at 65-66.) Staff says that quantized image data values for representative colors are generated and each index value is mapped to one of four colors; the block type for each of the image blocks is detected by comparing the magnitude of color0 and color1, and depending on their relative magnitudes a block type is determined with respect to whether it is four-colored or three-colored with transparency. (*Id.* at 65.) The process is applied to each of the compressed image blocks { } until all of the image blocks are decompressed and outputted as an image, according to Staff. (*Id.*)

As for Apple's reasons why claim 12 is not infringed by the { } codec, these are based on the same arguments advanced by Apple concerning claim 7, and for the same reasons discussed above in relation to claim 7 (*see* IV.C.*a*.2 *supra*), the Administrative Law Judge

concludes that the accused OS X Devices' implementation of DXT literally infringes claim 12 of the '417 patent.

c) Claim 15.

S3G alleges that Apple's Accused Products literally infringe claim 15 of the '417 patent when Apple tests the DXT decompression functionality in the { } codec. (CBr. at 140.) Claim 15 reads as follows:

> **15.** A method for fixed-rate block-based image compression of an original image, comprising the steps of:
>
> decomposing the original image into a header and a plurality of image blocks each having a set of image elements with an original image data value;
>
> computing at least one codeword from the original image data value for the set of image elements;
>
> generating a set of quantized image data values including the at least one codeword and at least one image value derived from the at least one codeword; and
>
> mapping the original image data value to one of the quantized image data values to produce an index value for each image element.

(JXM-3 at 17:61-18:6.)

For its argument that Apple infringes claim 15, S3G again says "See discussion above on claim 4 of the '146 patent." (CBr. at 144.) In one instance, when discussing claim 15's disclosure of a method for block-based image compression of an original image, S3G does add some additional argument—that DXT is fixed-rate, because every block of texels is compressed into 64 bits. (*Id.* (citing Tr. at 876-877 (Richardson)).) In all other instances during its recitation of how S3TC/DXT satisfies claim 15, S3G refers to its discussion on claim 4 of the '146 patent. Since S3G does not believe that its allegation of infringement of claim 15 warrants separate treatment or specific analysis, the arguments made by S3G concerning claim 4 of the '146 patent will not be repeated here.

Apple says there is no evidence that the { } codec is used to encode a DXT image. (RBr. at 64.) Furthermore, according to Apple, the { } codec does not perform the step of "decomposing the original image into a header." (*Id.*) Apple says that the { } codec can only be used by an application that uses OpenGL functions, and those functions do not provide an image header to be encoded. Apple says that because the { } codec can never receive an original image with a header, it cannot perform the step of "decomposing the original image with a header and therefore cannot perform the step of "decomposing the original image into a header." (*Id.*)

Staff believes the evidence establishes that the { } codec infringes claim 15. (SBr. at 68-69.) Staff says that claim 15 is directed to a method for fixed-rate block-based image compression of an original image consisting of the steps of decomposing the original image into a header and a plurality of image blocks each having a set of image elements with an original image data value, computing at least one codeword from the original image data value for the set of image elements, generating a set of quantized image data values including the at least one codeword and at least one image value derived from the at least one codeword, and mapping the original image data value to one of the quantized image data values to produce an index value for each image element. (*Id.* at 69.)

Apple's arguments regarding claim 15 are a repeat of its contentions regarding claim 7 and do not specifically address the additional limitation of claim 15 regarding fixed-rate block-based image compression. For the reasons discussed above with respect to whether claim 7 is infringed by { } codec, the Administrative Law Judge concludes that the OS X Devices also infringe claim 15 of the '417 patent based on Dr. Richardson's testimony with respect to the

added limitation of claim 15 (Tr. at 876-877) and the other evidence cited by S3G and Staff previously mentioned in the discussion of the infringement of claim 7.

d) Claim 23.

S3G alleges that Apple literally infringes claim 23 of the '417 patent when Apple tests the DXT decompression functionality in the software and hardware compressors. (CBr. at 140.) Claim 23 reads as follows:

> **23.** A method for fixed-rate block-based image decompression of an encoded image, comprising the steps of:
>
> decomposing the encoded image of [sic] into a modified header and a plurality of encoded image blocks having at least one codeword and a plurality of image elements associated with an index value;
>
> generating a set of quanitized [sic] image data values including the at least one codeword and at least one image value derived from the at least one codeword; and
>
> mapping the index value for each image element to one of the quantized image data values.

(JXM-3 at 18:49-60.)

For its argument in support of Apple's infringement of claim 23, S3G refers to its infringement argument concerning claim 12 of the patent (discussed above), adding one additional point: that DXT is fixed-rate because every block of 16 texels is compressed into 64 bits. (CBr. at 145 (citing Tr. at 876-877 (Richardson)).)

Apple, noting that claim 23 claims a decoder method with elements that are similar to the decoder apparatus of claim 12, says that the { } codec does not infringe claim 23 for the reasons mentioned by Apple in opposition to S3G's infringement allegation concerning claim 12. (RBr. at 66.) Apple also says there is no evidence that the { } codec is ever used by a third party to decode a DXT-encoded image. (*Id.* at 67.) In addition, according to Apple, the { }

codec does not perform the step of "decomposing the encoded image of [sic] into a modified header." (*Id.*) According to Apple, the { } codec can only be used by an application that uses OpenGL functions, which do not provide an encoded image with a modified header to be decoded and therefore the { } codec cannot and does not perform the claimed decomposing step. (*Id.*)

Staff, noting that claim 23 is a method claim corresponding to claim 12, argues that Staff's analysis of claim 12 is applicable with respect to whether claim 23 is infringed, apparently concluding, but not expressly stating, that claim 23 is infringed. (SBr. at 69-70.)

The Administrative Law Judge concludes that the accused OS X Devices' implementation of DXT literally infringes claim 23 of the '417 patent for the same reasons mentioned above.

The Administrative Law Judge therefore concludes that the Mac OS X Devices infringe the asserted claims of the '417 patent.

2. *Whether the claims of the '417 patent are infringed by Apple's implementation of PVRTC.*

a) Claim 7

S3G alleges that Apple's Accused Products that implement PVRTC literally infringe claim 7 of the '417 patent by virtue of the software compressor in *texturetool* which is included in iOS SDK. (CBr. at 154.) S3G adopts its argument with respect to Apple's alleged infringement of claim 4 of the '146 patent as its argument for showing that Apple infringes claim 7 of the '417. (*Id.* at 154-155.)

Apple says there are two limitations in claim 7 that *texturetool* does not satisfy: (1) that the original image must be decomposed into at least one image block and (2) that each image

block must have an original image data value. (RBR. at 50.) As to the first, Apple says that PVRTC does not decompose an original image into image blocks, citing testimony of PVRTC's inventor, Simon Fenney. (*Id.* at 51 (citing Tr. at 1235 (Fenney)).) Apple adds that Alex Kan, another witness, confirmed that his implementation of PVRTC, the *texturetool* program, does not decompose and image into blocks to be encoded. (*Id.* (citing Tr. at 2319 (Kan)).) Apple says that *downsampling* does not decompose an image into blocks and argues that the original image is used together with ImageA and ImageB for the purpose of determining modulation values, which involves a pixel-by-pixel procedure, in scan line order, across the entire image, and not block-by-block, and, therefore, an original image is not decomposed "into at least one image block." (*Id.*)

As to its second point, Apple says that *texturetool* does not decompose any image into an "image block having a set of image elements and each image element having an original image value." (*Id.*) Apple says that both Mr. Fenney and Mr. Kan testified that, contrary to S3G's allegation, the delta image generated in *texturetool* is the difference between the original image and the *upsampled* image and does not constitute the claimed "original image data value." (*Id.*) Apple argues that in order to overcome this impediment to its infringement allegation, S3G renamed the delta image as a "High-Contrast Original" for purposes of this Investigation, but this is erroneous because the delta image does not include original image values and is not high contrast. (*Id.* at 51-52 (citing Tr. at 2322-23 (Kan)).) Moreover, says Apple, {

} (*Id.*)

Apple says that the second element of claim 7 (note that claim 7 depends from claim 1 and it is actually the second element of that claim that Apple is referring to) requires a "block encoder" that receives and compresses each original image block using "a set of quantized image data value." (*Id.*) Apple says that *texturetool* does not "reduce" the number of colors used to encode an image and, therefore, does not generate a set of quantized image data values as required by claim 7. (*Id.*) Rather than "reduce" the number of colors used to encode an image, PVRTC calculates a specific color for each encoded pixel, using an equation of three variables, that can vary from one pixel to the next. (*Id.* at 52-53.) Therefore, according to Apple, because *texturetool* does not generate a set of quantized image data values, it does not "associat[e] each original image data value of the image element with an index to a derived image data value in a set of quantized image data values." (*Id.*at 53.)

Apple says that a PVRTC modulation value is not an identifier of a color or other image data value but is merely one of several inputs to the equations that is used to calculate a pixel's color and, for this reason, the "index" limitation of claim 7 is not satisfied, because that term has been construed to mean "an identifier for an image data value." (*Id.* (citing Tr. at 1941 (Fenney)).) Apple says that because the same modulation value can result in very different pixel colors, based on the values of other variables, the modulation value does not "identify "an image data value. (*Id.*)

Staff believes that the evidence shows that when an application developer downloads iOS SDK and simulator from Apple's developers' website or obtains it from the Apple App Store, the developer is able to use *texturetool* to encode a three-dimension texture image in the PVRTC format, and, therefore, the evidence establishes that the PVRTC format in *texturetool* infringes claim 7 of the '417 patent. (SBr. at 61.) Staff argues that Dr. Bystrom, citing source code for

texturetool, explained the compress function. According to Staff, Dr. Bystrom explained that the encoder processes an original image by separating the header information from the image data with an image decomposer that processes image data in four-by-four chunks or blocks of data. (*Id.* (citing Tr. at 595-603 (Bystrom)).) Staff says that once the image is decomposed, initial guesses at codewords, color A and color B, are made based on the block type, the quantizer, and the mapper. (*Id.*) In the initial guesses at the codewords, a "high contrast image" that is also referred to as a delta image is generated by *downsampling* the original image and then *upsampling* it to produce a low-resolution version of the image. (*Id.*) The delta, or high-contrast, image is used to make the initial guesses at the codewords. (*Id.*) The four-by-four blocks of the high-contrast image that corresponds exactly to the four-by-four blocks of the original version of the image are used to fill in the initial guesses in the initial guesses at Color A and Color B of the codeword portions of each of the compressed blocks. (*Id.* at 62.)

Next, according to Staff, a {

} color space. (*Id.*) Staff says Color A and Color B are determined from {

} (*Id.*) Staff says the process is also repeated to make initial guesses at the block type and bitmap until the final codewords, block types, and bitmaps are determined. (*Id.*)

According to Staff, in *texturetool* the block type is determined by the block type bit, a single bit, which is called the mod mode bit, that is reserved the block type. (*Id.*) If the mod mode bit is equal to 0, the block type is a four color block, and if it is equal to 1, the block type is three-color with alpha, or transparency. (*Id.*) Staff says that Dr. Bystrom {

} (*Id.*) Staff says that the two-bit value associated with the color point is then placed in the bitmap portion corresponding to the pixel's location in the block. (*Id.*) These steps are repeated for every pixel in the original image block and the bitmap portion is filled out for the compressed block. (*Id.*)

Staff says that after all of the blocks have been compressed, there is a refinement process where the entire compression process is repeated several times {

} to arrive at the final compressed image blocks and modified header, which are output by the image composer. (*Id.* at 63.) Staff says that Dr. Bystrom also described the compress function in *texturetool* when the block type is alpha or transparency as essentially the same process as with a four-color block. (*Id.*) In view of the "record evidence," argues Staff, S3G has established that each and every element of claim 7 of the '417 patent is satisfied, thus proving by a preponderance of the evidence that *texturetool* in the Mac computers infringe. (*Id.*)

Staff's argument relies on testimony of Dr. Bystrom exclusively—all of Staff's citations to the record are to Dr. Bystrom's testimony. In fairness, however, the merits of her testimony cannot be assayed in isolation, divorced from the competing testimony of other witnesses, such as Fenney, Kan, and Delp. The unexplained lack of parity in Staff's treatment of the evidence undermines the persuasiveness of Staff's argument.

The private parties' arguments are substantially the same as the ones they made regarding whether PVRTC infringes claim 4 of the '146 patent. Because S3G has elected to adopt its

discussion of claim 4 of the '146 patent as its argument that PVRTC infringes claim 7 of the '417 patent, and since an analysis of the parties' respective arguments on that subject is set forth in detail in Section IV.E., *infra*, there is no need to restate that analysis here. The Administrative Law Judge concludes for the reasons discussed in Section IV.E.2.a. below, the evidence does not demonstrate that the Accused Products, insofar as they include PVRTC, infringe claim 7 of the '417 patent.

b) Claim 12.

S3G alleges that Apple literally infringes claim 12 of the '417 patent by virtue of its implementation of PVRTC. Claim 12 is recited above (IV.C.*a.*2.), as is claim 8, from which claim 12 depends. S3G says that the iOS SDK (the software development kit for the iDevices operating system) satisfies the preamble of claim 8 because it includes a software decompressor in *texturetool* and a software decompressor in the iOS Simulator. (CBr. at 155 (citing Tr. at 346 (Bystrom); JX-65C at 103-104 (Kan Depo); JX-55C at 170-171 (Sandmel Depo)).) S3G says the iDevices include a software decompressor in the iOS and a hardware decompressor in the Imagination graphics cores and that the software decompressor in the iOS running in the iDevices, the software decompressors in *texturetool* and in the iOS Simulator are all the same. (*Id.* (citing Tr. at 347-350 (Bystrom) and 2350 (Kan)).) Thus, in each of these instances, the preamble of claim 8 is satisfied, according to S3G. (*Id.*)

S3G says the software decompressors in *texturetool*, the iOS Simulator, and the iOS receive texture images containing both compressed texture image data and header information characterizing the image data of similar function calls. (*Id.* at 155-156 (citing Tr. at 401 (Bystrom)).) The hardware decompressor in the iDevices that operate in association with a driver, receives a compressed texture image specified by *glCompressedTexImage2D()* that

includes compressed texture image data, and header information that characterizes the image data. (*Id.* (citing Tr. at 455-456 (Bystrom), 2219-20 (Toksvig)).) Once a compressed texture image is received, according to S3G, a graphics driver separates the header information and the compressed data and assigns them to different portions of the graphics core. (*Id.* at 156 (citing Tr. at 458 (Bystrom)).) According to S3G, the subject decompressors, by virtue of these actions, satisfy an initial segment of the first element of claim 8, according to S3G. (*Id.* at 155-156.)

S3G says that a 64-bit compressed block generated by PVRTC represents a four-by-four block of pixels, or texels, having, respectively, 16 colors and this block contains two color codewords, Color A and Color B and this satisfies the remaining segment of the first element of claim 8. (*Id.* at 156 (citing Tr. at 365-366 (Bystrom)).)

To decompress a texel, the software decompressors in the iDevices and iOS SDK generate a set of quantized image data values—a color A′ and a color B′ and, optionally, an interpolated color—by using colors A and B from the current block and corresponding colors from neighboring blocks. (*Id.*) Then a two-bit index value for each texel is mapped to either Color A′, Color B′, or an interpolated color, in order to reconstruct the color of the decompressed texel. (*Id.* at 157 (citing Tr. at 420 (Bystrom)).) {

} After that, a two-bit index value for the texel is mapped to either Color A′ or Color B′ or the interpolated color in order to reconstruct the color of the decompressed texel (*id.* (citing Tr. at 467 (Bystrom))), and according to S3G, the

foregoing demonstrates that the subject software and hardware decompressors satisfy the second element of claim 8 (*id.* at 156-157).

After each PVRTC block has been decompressed into a block, the software decompressor in the iDevices and iOS SDK composes all of the decompressed image blocks together to form a data structure for an output file or for viewing, and in the case of the hardware decompressor in Imagination graphics cores, it organizes the decompressed texture into an output image. Thus, according to S3G, the second and last element of claim 8 is satisfied. (*Id.* at 157.)

As for asserted claim 12, S3G says that the software decompressor found in the iDevices and iOS SDK detects the block type of the block containing the pixel being decoded, either by looking at the modulation mode bit or by looking at the first bit of the codewords for the colors A and B. (*Id.* at 157-158 (citing Tr. at 405 (Bystrom)).) Likewise, says S3G, the hardware decompressor in the Imagination graphics cores performs block-type detections for each texel (*id.* (citing Tr. at 461 (Bystrom))) and this can be done in two ways—the modulation mode bit in the PVRTC-encoded data structure signifies whether to use a four-color block type or a three-color-plus-transparency block type, thus demonstrating infringement of claim 12. (*Id.* at 158 (citing Tr. 462 (Bystrom)).)

Apple says that both the hardware decoder in the iOS Devices and Apple's software PVRTC decoders in the iOS and iOS SDK (the "PVRTC Decoders") that are accused of infringing essentially perform in the same fashion and can therefore be treated together for purposes of Apple's discussion of claim 12. (RBr. at 55.) Apple says these items do not infringe claim 12 for several reasons, the first being that they do not include an "encoded image decomposer for decomposing an encoded image data file into a modified header." (*Id.* at 56.) Apple argues that none of the PVRTC Decoders includes the required decomposer and none is

capable of decomposing a modified header from an encoded image data file, quoting testimony of Mr. Fenney, (Tr. at 1935-36) and Mr. Kan (Tr. at 2340). (*Id.*) Apple says that PVRTC Decoders only decode an encoded image through an appropriate OpenGL function, but the OpenGL program does not pass an encoded image data file with a modified header to the PVRTC Decoders. (*Id.*) According to Apple, the iOS Devices can only be used with OpenGL API, an industry standard for writing applications for producing computer graphics. (*Id.* at 44.) Apple says that OpenGL includes specific and predefined functions that must be used in graphic operations, but it cannot receive or pass to iDevices an image with a header, and therefore cannot satisfy claim 12 insofar as decomposing an encoded image into a header or a modified header. (*Id.* at 44, 56.) Apple says that the PVRTC Decoders do not include the claimed "encoded image decomposer" and is not capable of "decomposing the encoded image data file into a modified header." (*Id* at 56.)

In addition, according to Apple, the second element of claim 12 requires a "block decoder" for decompressing image blocks that have been decompressed, but the subject software decoders decode an {

} (*Id.* at 57.)

Apple argues that the second element of claim 12 requires a block decoder for decompressing compressed image blocks by generating a set of quantized image data values, and since "quantized image data values" has been determined to mean "a reduced set of values representing image data, such as color, density, and transparency[,]" PVRTC does not generate a set of quantized image data values, as Mr. Kan testified. (*Id.* (citing Markman Order; Tr. at 2340).) Because PVRTC does not generate a set of quantized image data values but, instead,

uses a series of equations having different values to generate a decoded color for each pixel, PVRTC does not satisfy this element of the claim. (*Id.*)

After the "set of quantized image data values" is generated, claim 12 requires "mapping the index value to a quantized image data value from the set of quantized image data values" but PVRTC Decoders do not perform this operation, argues Apple, saying that, instead, they decompress the image by calculating a specific color for each encoded pixel. (*Id.* at 57-58.) Citing to testimony of Mr. Kan, Apple argues that with PVRTC "the color is computed directly using the modulation equation" on a pixel-by-pixel basis, the calculation of which is based on three variables, as mentioned above, which can vary from one pixel to another, resulting in individualized pixels and therefore PVRTC does not map "the index value to a quantized image data value from the set of quantized image data values" as required by claim 12 (as it depends from claim 8).

Lastly, Apple argues that claim 12 requires an "index," meaning an "identifier for an image data value." (Order No. 19.) Apple says a modulation value is not an index because it is not an identifier for a color or other image data value; it is simply an input to an equation and can produce very different image data values. (*Id.* at 58.)

Staff believes that the evidence establishes that Apple's software and hardware decoders in the iOS Devices and in *texturetool* in the Mac personal computers infringes claim 12, and does so, it says, for the reasons it gives concerning infringement of claim 6 of the '087 patent, which is yet to be discussed herein. (SBr. at 68.) In that discussion, Staff said that Dr. Bystrom analyzed source code and determined that *texturetool* has a "block type indicator…[f]or example, the color mode bit that sits at the beginning of the codewords is one way to identify whether the image data will be treated as red, green, and blue or will be treated as having an

associated alpha component denoting transparency." (*Id.* at 23.) Also, in regard to claim 6 of the '087 patent, Staff says Dr. Bystrom confirmed that there was a block type indicator and that the routine { } determines block type. (*Id.*) Staff additionally said that the software code { } in the iOS decoder infringes claim 6 of the '087 patent and the infringement analysis is equally applicable to the iOS software decoder. (*Id.*) Staff says that the evidence shows that the software decoder that is the subject of claim 12 infringement allegation orders the decompressed image blocks in the { } function and, as respects the hardware decoder, Dr. Bystrom analyzed the relevant source code and determined that in the high-level module { } the decoder engine orders the blocks. (*Id.*)

The Administrative Law Judge concludes that the evidence does establish that the relevant Accused Products infringe claim 12 of the '417 patent because none of the PVRTC Decoders includes the required decomposer and none is capable of decomposing a modified header from an encoded image data file, as testified by Mr. Fenney (Tr. at 1935-36) and Mr. Kan (Tr. at 2340). The Administrative Law Judge agrees with Apple that PVRTC Decoders only decode an encoded image through an appropriate OpenGL function and the OpenGL program does not pass an encoded image data file with a modified header to the PVRTC Decoders. The Administrative Law Judge also concludes that the iOS Devices can only be used with OpenGL API which includes specific and predefined functions that must be used in graphic operations and cannot receive or pass to iDevices an image with a header, and therefore cannot satisfy claim 12 insofar as decomposing an encoded image into a header or a modified header. (*Id.* at 44, 56.)

The Administrative Law Judge further concludes that that the PVRTC Decoders do not include the claimed "encoded image decomposer" and are not capable of "decomposing the encoded image data file into a modified header." Finally, the Administrative Law Judge

concludes that the Accused Products that implement PVRTC do not satisfy the second element of claim 12 of the '417 patent which requires a "block decoder" for decompressing image blocks that have been decompressed, because they decode an entire image in scan-line order and because the Imagination hardware decodes four pixels at a time regardless of where the fall in a PVRTC storage block. (*Id.* at 57.)

c) Claim 15.

S3G alleges that Apple literally infringes claim 15 of the '417 patent by virtue of its implementation of PVRTC in the Accused Products. (*Id.* at 140, 158.) Claim 15 is recited above (IV.C.*a.*3.) S3G says that Apple infringes claim 15 when Apple tests the DXT compression functionality in the { } codec. (*Id.* at 140.) According to S3G, PVRTC satisfies all of the elements of claim 15 of the '417 patent for the same reasons given by S3G for how and why Apple's PVRT infringes claim 4 of the '146 patent with the added assertion that PVRTC is fixed-rate because every block of 16 texels is compressed into 64 bits. (*Id.* at 158.) Because S3G has elected to insert the statement, "*See* discussion above on claim 4 of the '146 patent[,]" when discussing infringement of each of the elements of claim 15, despite various differences in the language of the '146 and '417 patents and their asserted claims, the Administrative Law Judge, in turn, elects not to speculate about, or try to mine, which portions of S3G's '146 patent arguments S3G has reference to when discussing the various elements of claim 15.

Apple, in opposing S3G's allegation of infringement, points out that claim 15 discloses a method for fixed-rate block-based image compression of an original image, and like claim 7, requires decomposing an original image into blocks having the data of that portion of the original

image from which the block was decomposed.[4] (RBr. at 61-62.) It is Apple's contention that PVRTC does not decompose an image but, rather, down-samples it, by which Apple means the entire image is reduced in size by a process that discards some of the pixels that go into the composition of the image. (RBr. at 28-31.) This involves a rather elaborate process that includes up-sampling the down-sampled image and generating what Apple calls a delta image, the purpose of which is to try to match the up-sampled image to the original. (*See* RBr. at 30-37.) The Administrative Law Judge has considered S3G's opposing argument (CBr. at 35-36) but concludes that the down-sampling process performed by PVRTC is not the same as decomposing an original image, and the portions of the specification cited by S3G do not sustain its argument. More to the point, the specification for the '146 patent includes the following passage:

> The image decomposer **315** also breaks, or decomposes, the original image **310** into R number of image blocks, where R is some integer value. The number of image blocks an original image **310** is broken into may depend on the number of image pixels. For example, in a preferred embodiment an image **310** comprised of A image pixels by B image pixels will typically be (A/4)*(B/4) blocks, where A and B are integer values. For example, where an image is 256 pixels by 256 pixels, there will be 64x64 blocks. In other words, the image is decomposed such that each image block is 4 pixels by 4 pixels (16 pixels). Those skilled in the art will recognize that the number of pixels or the image block size may be varied, for example, m x n pixels, where m and n are positive integer values."

(JX-4 at 5:5-19.) This language of the inventors is consistent with the dictionary definition of breaking up or separating something into its basic components or parts—the number of image blocks in which the original image "is broken into" depending on the number of pixels in the original image. However, that is not what PRTC does when it down-samples: it discards pixels

[4] The parties have not proposed a claim construction for the word "decompose" or any of its variants; however, it is generally defined to mean: "to break up or separate into basic components or parts." (Webster's New World Dictionary, 4th Ed.)

and thereby reduces the size of the original image without separating, or breaking, the image into component parts.

Apple says that because claim 15, like claim 7, requires generating a set of quantized image data values and mapping the original image data values to one of these quantized colors and also requires that the quantized image data values be generated before the mapping step. (*Id.* at 62.) Apple argues that these steps have to be performed in specific order; the quantized image data values have to be generated before, and not during or after, the mapping step. (*Id.* 62-63.) According to Apple, this requires the existence of both the original image data and the quantized image data values prior to mapping. (*Id.* at 63.)

Apple contends that *texturetool*, the only accused PVRTC encoder, does not infringe claim 15, first, because it does not decompose an image into image blocks, having original image values, for encoding, because *texturetool* does not encode image blocks, as mentioned above. (*Id.*)

Second, Apple says *texturetool* does not generate a set of quantized image data values, meaning a "reduced set of values representing image data, such as color, density, and transparency." (*Id.* (quoting Markman Order).) Apple repeats its argument made elsewhere and repeatedly in its post-hearing brief that PVRTC encodes each pixel through a process that involves down-sampling and then up-sampling and generating delta images, etc., but never generates a "reduced set of values representing image data values." (*Id.*)

Third, Apple says that there is no infringement of claim 15 because PVRTC encoding does not generate a "set of quantized image data values" and does not map the original data value to one of the quantized image data values. (*Id.*) Apple argues that claim 15 requires "mapping the original image data value to one of the quantized image data values to produce an

index value for each image element[,]" but, as construed, "index" means "an identifier for an image data value." The modulation value generated by PVRTC is not an index because it is not an identifier for a color or other image data value, but is merely one of several inputs to the equation used to calculate a pixel's color and can actually produce different colors. (*Id.* at 63-64.)

Staff concludes, for the same reasons as claim 7, that PVRTC infringes claim 15. (SBr. at 68-69.) Staff says Drs. Richardson and Bystrom testified that the encoding scheme in *texturetool* is block-based and fixed-rate and therefore infringes claim 15. (*Id.* at 68.)

The Administrative Law Judge concludes that PVRTC Decoders do not infringe claim 15 of the '417 patent for the same reasons they do not infringe claim 7 and as discussed with respect to the '146 patent in Section IV.E.2.a below.

d) Claim 23.

S3G alleges that Apple literally infringes claim 23 of the '417 patent by virtue of its implementation of PVRTC. (*Id.* at 140, 158-159.) In doing so, S3G relies on the same arguments it makes in alleging that PVRTC infringes claim 12, with the added assertion that PVRTC involves fixed-rate decompression. (*Id.* at 159.)

Apple responds that PVRTC Decoders do not infringe claim 23 for the reasons given by Apple with respect to claim 12 of the '417 patent. (RBr. at 64.) Apple says that, like claim 12, claim 23 requires decompressing the encoded image of [sic] into a modified header...." (*Id.* at 65 (citing JX-2).) Because, according to Apple, the PVRTC Decoders do not receive an encoded image that includes a modified header and do not decompose a modified header from an encoded image, they do not infringe. (*Id.*) And like claim 12, says Apple, claim 23 requires first generating a set of quantized data values and then mapping an index value to one of quantized

values, which is not done by the PVRTC Decoders. (*Id.*) Instead, with the PVRTC Decoders, the image data value for each pixel is calculated according to a formula, the inputs of which will vary from one pixel to the next and therefore the PVRTC Decoders do not generate a reduced set of image data values to decode an image. (*Id.*)

Apple also says that claim 23 requires an "index," which is "an identifier for an image data value" and a PVRTC modulation value is not an index because it does not identify a color or other image data value. (*Id.*) Instead, argues Apple, a modulation value is merely one of several inputs to the equation used to calculate a pixel's color and is not an "identifier" for an image data value. (*Id.* at 65-66.)

Staff believes that Apple's implementation of PVRTC software decoder in its mobile devices and in *texturetool* in iOS SDK, iOS Simulator in Mac computers, and in the Imagination hardware decoder in the iOS mobile devices infringe claim 23, for the same reasons given by Staff in regard to its contention that these products infringe claim 12. (SBr. at 69-70.)

The Administrative Law Judge concludes that PVRTC Decoders do not infringe claim 23 for the same reasons they do not infringe claim 7 and as discussed with respect to the '146 patent in Section IV.E.2.a below.

Based on the above findings, the Administrative Law Judge concludes that the accused iDevices and iOS SDK do not infringe the asserted claims of the '417 patent.

3. Induced Infringement.

S3G asserts that Apple induces third-party developers and consumers to infringe the asserted claims of the '417 patent. (CBr. at 162.) S3G's discussion of the '417 patent incorporates its arguments with respect to the '146 patent. (*Id.*)

Staff also argues that Apple induces game and application developers to infringe claims 7 and 12 of the '417 patent. (SBr. at 63-64, 68.) Staff's arguments primarily focus on PCRTC and *texturetool*. (*Id.*) Staff does not address inducement with respect to claims 15 and 23 of the '417 patent. (SBr. at 69-70.)

Apple responds that in order to prove inducement a patentee must show that there has been direct infringement and that the alleged infringer "knowingly induced infringement and possessed specific intent to encourage another's infringement." (RBr. at 164 (citing *Minnesota Mining*, 303 F.3d at 1304-05).) Apple argues that to prove specific intent, S3G must show that Apple was aware of the asserted patents and had "an affirmative intent to cause direct infringement." (*Id.* (citing *DSU*, 471 F.3d at 1305-06).) Apple argues that the specific intent requires more than just intent to cause the acts that produce infringement and says that beyond that threshold knowledge, the inducer must have an affirmative intent to cause direct infringement. (*Id.* (citing *Kyocera*, 545 F.3d at 1354).) Quoting from *Kyocera*, Apple says "providing customers with the system determination software, training them on implementation of their mobile devices, providing software and firmware updates, offering customer support, furnishing promotional and technical documents for the accused [] chipsets, and recommending that its customers implement battery saving features[]" perhaps might show a general intention to cause acts the produced infringement, falls short of the necessary intent for showing inducement. (*Id.* at 165.) Apple argues that S3G has not shown any direct infringement and has failed to establish that Apple possessed the specific intent to encourage its customers to use the Accused Products in an infringing manner. (*Id.*) Apple argues that S3G is wrong in saying that certain applications when downloaded onto the Accused Products infringe the asserted patents because those applications are not part of the Accused Products when they are imported, but are available

only through electronic downloads from the App Store on servers located in the United States. (*Id.*) Apple argues that S3G did not introduce evidence showing that any application creating infringement was ever actually downloaded by a customer or other third party. (*Id.* at 165-166.)

As an initial matter, the Administrative Law Judge notes that inasmuch as it has been determined above that Apple does not directly infringe any of the asserted claims of the '417 patent, there is no infringement by inducement, either. "[A] finding of inducement requires a threshold finding of direct infringement—either a finding of specific instances of direct infringement or a finding that the accused products necessarily infringe." *Lucent Technologies, Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1322 (Fed. Cir. 2009). This would apply to those instances in which Apple's products that implement PVRTC have been found not to infringe. Most of the evidence adduced by S3G relates to PVRTC.

With respect to Apple's implementation of DXT, the Administrative Law Judge found above that the asserted claims of the '417 patent are literally infringed. At issue is whether Apple was aware of the patent, induced direct infringement, and that Apple knew or should have known that its actions would induce actual direct infringement.

Here, the evidence shows that Apple was aware that there could be intellectual property issues with its use of texture compression and advised that S3, Inc. be contacted. (CX-579C.) The evidence further shows that Apple physically tests the encoders and decoders in its products, including the { } codec. (JX-54C at 94:15-95:22, 96:8 - 97:4 (Sandmel Depo).) In addition, Apple tests third party applications that "likely" use DXT format features. (*Id.*) The accused OS X Devices are designed to decompress DXT texture data when an application, such as a third party application, makes such a request. (*Id.* at 22:14-20.) However, S3G does not clearly enunciate how Apple induces third parties to implement DXT. (CBr. at 41 {

} use of PVRTC), 42 ({ } use of PVRTC), 42-43 (third party testing on iDevices), 44 (general discussion of developer resources without specifics re DXT), 45 (examples re PVRTC).)

The Administrative Law Judge concludes that the evidence does not persuasively show that Apple induced infringement of the asserted claims of the '417 patent with respect to DXT.

D. Analysis of the Accused Products with Respect to the '978 patent.

S3G alleges that Apple literally infringes claims 11, 14, and 16 of the '978 patent. (CBr. at 131. S3G says that Apple infringes these claims when it tests the functionality in the software compressor in the { } codec to create compressed DXT texture, when it tests the functionality in the software decompressor in the { } codec and the hardware decompressor in the NVIDIA GPU using compressed DXT texture, and when it sells applications containing compressed DXT texture. (*Id.* (citing Tr. at 841 (Richardson)).) The asserted '978 claims and claim 15, from which asserted claim 16 depends, read as follows:

> **11**. A data format for representing an original image block having a pixel color set, comprising:
>
> a codeword portion for storing at least one codeword;
>
> a bitmap portion for storing a set of indices, said set of indices includes an available index for representing a transparency identifier, the bitmap portion constructed by a bitmap construction module utilizing the codeword portion associated with the bitmap portion; and
>
> wherein said codeword defines a set of colors that approximate the pixel color set, and said indices map the pixel color set to at least one color in said set of colors.
>
> **14**. A data format for representing an original image block having a pixel color set, comprising:
>
> a codeword portion for storing at least one codeword; a bitmap portion for storing a set of indices;
>
> wherein said at least one codeword defines a set of colors that approximate the pixel color set, and said indices map the pixel color set to at least one color in said set of colors; and

wherein said set of colors are computed using a geometric element fitted to said pixel color set so that said geometric element has a minimal moment of inertia.

15. An encoded image data format for representing an original image partitioned into at least two image blocks, said image blocks each having a corresponding pixel color set, the data format comprising:

at least two encoded image block portions, one of said encoded image block portions having a codeword portion for storing at least two codewords, and a bitmap portion for storing a set of indices, the bitmap portion constructed by a bitmap construction module utilizing the codeword portion associated with the bitmap portion; and

wherein said at least two codewords define at least three colors that approximate the pixel color set of one of the original image blocks, and said indices map the pixel color set to at least one of said at least three colors.

16. The data format of claim **15**, further including a header portion.

(JXM-2 at 17:54-65, 18:3-14, 18:15-32.)

1. *Infringement with respect to Apple's implementation of S3TC/DXT.*

a) Claim 11.

Regarding claim 11, S3G says that "DXT texture compression format defines a format where original image blocks having original pixel colors are represented [,]" thereby satisfying the preamble of claim 11. (CBr. at 131 (citing Tr. at 852-853 (Richardson)).) In DXT, a 64-bit compressed block includes a codeword portion having two codewords, color0 and color1, according to S3G. (*Id.* at 132 (citing Tr. at 853 (Richardson)).) S3G says that this 64-bit compressed block has a bitmap portion that includes 16 two-bit indices that correlate the colors of texels in a 16-texel block to one of the representative or interpolated colors. (*Id.*) Also according to S3G, this 64-bit compressed block signifies whether it has been compressed with or without a transparency, according to the order in which the codewords appear. (*Id.*) Based on the block type, two codewords can be used to determine if a given block has four representative

colors or three representative colors and transparency, S3G says. (*Id.* (citing Tr. at 742-743, 855-856 (Richardson)).)

Apple counters that S3G does not identify any accused encoded "data format" or "encoded image data format" to compare to the asserted claims and says S3G has not identified a specific DXT-encoded image that meets all of the elements of the asserted claims. (RBr. at 132.) Apple argues that S3G only alleges that generic DXT-encoded images infringe claim 11 of the '978 patent. (*Id.*) Apple says the company does not create or import such images and the evidence shows that none of its applications for Mac computers includes DXT-encoded images. (*Id.* at 133.) Apple says that claim 11 requires a DXT-encoded image with "a transparency identifier" but since S3G failed to identify any DXT-encoded image that includes a transparency value, S3G has not met its burden of proving infringement. (*Id.*)

In reply to Apple, S3G says that Apple ignores evidence in testimony furnished by its own corporate witness who said that Apple tested the texture functionalities in the Accused Products. (CRBr. at 51 (citing JX-54C at 94 (Sandmel Depo); JX-55C at 197-198, 201-202 (Sandmel Depo); JX-61C at 155, 157 (Drebin Depo); Tr. at 2371 (Haun)).) S3G says that during such testing, Apple necessarily would have created or used DXT compressed texture images thereby infringing the asserted data format claims of the '978 patent. (*Id.*) Moreover, argues S3G, Apple sells applications that include DXT texture, and this, too, constitutes an infringement. (*Id.* (citing Tr. at 841 (Richardson), 644 (Bystrom); JX-56C (Hendry Depo)).) S3G says the evidence also shows that Apple induces third-party developers and consumers to infringe the data format claims. (*Id.*)

Apple says that S3G's infringement allegations are specious, inasmuch as S3G's sole basis for charging infringement is Apple's alleged testing of the functionality of the { }

codec and its alleged sales of applications containing DXT textures, while citing no evidence that any such testing or sales actually occur or do so within the United States, and simply relying on testimony from Dr. Richardson that Apple infringes when it tests. (*Id.*) Apple says S3G is relying on speculative evidence, which is not sufficient to prove infringement. (*Id.*)

Staff concludes that the evidence proves that Apple infringes claim 11 in its implementation of DXT as supported by Dr. Richardson's testimony that his analysis of the compression and decompression in { } codec and in the NVIDIA GPU confirms that all of the elements of data format claims are met. (SBr. at 76-77.) Staff recounts that Dr. Richardson testified that, in the decompressor, information in the format covered by claim 11 is extracted and decompressed, codewords and a bitmap for storing them are generated, indices are produced that point to one of four representative colors defined by two codewords, and each index maps to one of the original 16 colors where each pixel is assigned the most representative one of 16 colors. (*Id.* at 77.)

The Administrative Law Judge concludes that the testimony of Dr. Richardson which is cited by S3G and Staff, together with the testimony cited by S3G given by Messrs. Sandmel, Drebin, and Haun, mentioned above, is sufficient to demonstrate that Apple infringes claim 11 when it tests the functionality in the software compressor in the { } codec to create compressed DXT texture, when it tests the functionality in the software decompressor in the { } codec and the hardware decompressor in the NVIDIA GPU using compressed DXT texture, and when it sells applications containing compressed DXT texture. As for Apple's remonstrance that S3G's evidence does not include certain particulars about Apple's testing, such as whether it occurred in the United States, Apple has acknowledge that it has its principal place of business in Cupertino, California (RBr. at 6), and there is no evidence that it has testing

facilities somewhere else. Apple's own employee witnesses from California confirmed that testing was done and these are witnesses uniquely subject to Apple's control to be examined if it felt that their testimony would have shown that testing was not done in the United States. Even though the burden of proof is upon S3G, that burden is simply a preponderance of the evidence and not proof beyond a reasonable doubt. The evidence that has been recounted and is relied upon by S3G is sufficient to establish that the OS X Devices infringe claim 11 of the '978 patent.

b) Claim 14.

S3G adopts its argument with respect to claim 11 of the '978 patent as its argument that Apple infringes the preamble and the first three elements of claim 14 of the '978 patent, and adopts its argument with respect to claim 13 of the '146 patent as its argument that Apple infringes the last element of claim 14 of the '978 patent. (CBr. at 132-133.)

Apple argues that S3G failed to identify or accuse any specific DXT-encoded image but, instead, alleges that generic DXT-encoded images infringe claim 14, which requires an image "wherein [a] set of colors are computed using a geometric element fitted to [a] pixel color set." (*Id.* at 135-136.) Apple says that S3G failed to identify any particular DXT-encoded image or show how it uses a geometric element fitted to a pixel color set; and having failed in this regard, has ultimately failed to carry its burden of proof. (*Id.* at 136.)

Staff believes the evidence demonstrates that Apple's implementation of DXT infringes claim 14 of the '978 patent based on Dr. Richardson's testimony that the { } codec has a data format that includes a codeword portion that satisfies the first element, a bitmap portion that satisfies the second and third elements requiring that at least one codeword define a set of colors that approximate the pixel color set, as well as indices that map the pixel color set to at least one color in the set of colors. (SBr. at 79.) As for the last element of claim 14, Staff says that Dr.

Richardson showed that the { } codec encoder, the Color A, Color B, and the { } that most closely represents the { } (*Id.*) This { } argues Staff, is the geometric element with a minimal moment of inertia, and therefore the last element is also satisfied. (*Id.*)

The Administrative Law Judge concludes, for the same reasons discussed in the previous section regarding claim 11 and Section IV(E)(1)(b), *infra*, regarding claim 13 of the '146 patent, that Apple infringes claim 14 of the '978 patent through its implementation of DXT in the Accused Products.

c) Claim 16.

S3G adopts its argument with respect to claim 11 of the '978 patent as its argument that Apple satisfies all of the elements of claim 15, from which claim 16 depends. (CBr. at 133.) With respect to the limitations of claim 16 apart from the ones subsumed from claim 15, S3G says that DXT compressed textures in Mac computers include a header that identifies texture format, height, width, etc. (*Id.* (citing Tr. at 2242-44 (Toksvig), 765, 824, 836-864 (Richardson)).)

Apple argues that S3G did not identify a particular DXT-encoded image or show how it includes a header portion. (RBr. at 136.) Instead, argues Apple, the evidence establishes that DXT images that are encoded by { } codec do not have a header portion and therefore do not infringe claim 16. (*Id.* at 136-137 (citing Tr. at 2158-59 (Delp), 2306-07 (Sandmel), 2216-17, 2220-21 (Toksvig)).)

Staff believes that Apple infringes claim 16 by reason of the DXT compression format that uses encoded image data representing original images, partitioned into at least two image blocks with corresponding pixel color sets, contained in Mac computers. (SBr. at 82.) Staff

argues that Dr. Richardson successfully testified that the relevant software and hardware have codewords that are in a compressed DXT texture block and define a set of at least three colors approximating an original pixel color set from each original image block and also shows that each of the 16 pixels in a block is mapped to one of a set of quantized image data values by means of a two-bit index. (*Id.*) Staff says that Dr. Richardson pointed out the header portion in { } codec and in the relevant hardware. (*Id.*)

The Administrative Law Judge concludes, for the same reasons discussed in the section regarding claim 11, *supra,* that Apple's implementation of DXT in the Accused Products meets all the limitations of underlying claim 15 of the '978 patent, as well as the additional limitation of claim 16. Therefore, Administrative Law Judge concludes that Apple infringes claim 16, for the reasons expressed by S3G and Staff and the evidence mentioned by them with respect to the header portion of Apple's product, and finds that Apple's arguments do not overcome the evidence adduced by S3G.

The Administrative Law Judge therefore concludes that the Mac OS X Devices infringe the asserted claims of the '978 patent.

2. *Infringement with respect to Apple's implementation of PVRTC.*

a) Claim 11.

S3G alleges that Apple literally infringes claims 11, 14 and 16 of the '978 patent when Apple tests or uses the texture compression functionality in *texturetool* to create compressed PVRTC texture (CBr. at 134 (citing JX-55C at 197-198 (Sandmel Depo); JX-61C at 157 (Drebin Depo))), when it tests the texture decompression functionality in the iDevices using compressed PVRTC texture (*id.* (citing JX-55C at 197-198, 201-202, JX-6 157)), and when it sells or offers

to sell software applications containing compressed PVRTC texture through its App Store (*id.* (citing Tr. at 644-646 (Bystrom); JX-63C at 17-18 (Haun Depo))).

S3G says the PVRTC texture compression format defines a format by which original image blocks having original pixel colors are represented, satisfying the preamble of claim 11. (*Id.* at 134-135.) According to S3G, in PVRTC each 64-bit compressed block has two color codewords, color A and color B, thereby satisfying the first element of the claim. (*Id.* at 135 (citing Tr. at 398, 413 (Bystrom)).)

S3G says that in PVRTC the 64-bit compressed block has 16 two-bit indices that mate colors to corresponding texels in a block of 16 texels to a representative color (Color A′ or Color B′ and one or more interpolated colors generated from Color A′ or Color B′. (*Id.* at 135 (citing Tr. at 378-379, 397-398 (Bystrom)).) Also, argues S3G, the 64-bit compressed block indicates whether a four-by-four block of an original texture image was compressed with a transparency, as indicated by way of a reserved bit in the 64-bit compressed block and these facts establish that PVRTC satisfies the second element of the claim. (*Id.* (citing Tr. at 397-398 (Bystrom)).) And S3G argues that PVRTC satisfies the third, and final, element of the claim because the two color codewords, Color A and Color B, can be used to determine four representative colors, or three colors plus a transparency. (*Id.* (citing Tr. at 463 (Bystrom)).)

Apple argues that a PVRTC modulation value is not an index because it does not identify a color or other image data value but, instead, is merely one of several inputs to an equation used to calculate the color of a pixel. (RBr. at 133.) Apple says that because a particular modulation value can produce different colors for every pixel, depending on the other values in the equation in which it is used, it does not "identify" an image data value and is not an index, according to its construed definition—"an identifier for an image data value." (*Id.*) Apple also says that PVRTC

modulation values do not "map a pixel color set to at least one color in said set of colors." (*Id.* at 133-134.) Apple further argues that S3G has not identified or accused any PVRTC-encoded image having a transparency, and whether PVRTC does so depends on whether an encoded image includes a transparency; therefore, S3G has not met its burden of proving an encoded "data format" that includes a set of indices actually representing a transparency identifier" as required by the claim. (*Id.* at 134.)

Staff is of the opinion that the PVRTC data format in Apple's mobile devices and in *texturetool* use an image compression format that infringes claim 11. (SBr. at 77.) According to Staff's reasoning, Dr. Bystrom testified the software and hardware implementations of PVRTC have original image blocks with 16-pixel color sets that can be represented in an RGB color space and in both the compression and decompression software and hardware there are codewords representing a Color A and a Color B and there is also a bitmap for storing 16-bit index values that might include a transparency identifier in the three-color plus transparency block type, although doing so in different ways. (*Id.*at 77-78.) Staff says that the relevant software and hardware use codewords, Color A and Color B, to define a set of colors, such as Color A′ and Color B′, and potentially an interpolated color, all of which constitute quantized colors that approximate a pixel color set in the original image blocks and indexes and maps the pixel color set to at least one color in the set. (*Id.* at 78.)

The Administrative Law Judge concludes that S3G has not sustained its burden of proof and has not overcome Apple's argument that a modulation value constitutes an "index" because, as such, it is not "an identifier for an image data value." Accordingly, the Administrative Law Judge concludes that the evidence does not establish that Apple's implementation of PVRTC in the Accused Products infringes claim 11 of the '978 patent.

b) Claim 14.

S3G maintains that the evidence it cites in support of its argument that Apple infringes claim 11 of the '978 patent also supports its contention that Apple likewise infringes the preamble and first three elements of claim 14 and that its argument that Apple infringes claim 13 of the '146 patent also supports S3G's allegation that Apple likewise infringes the last element of claim 14. (CBr. at 136.) Apple disputes S3G's allegation of infringement for the reasons it gave for its claim of non-infringement of claim 11, mentioned in the preceding discussion. (RBr. at 133-134.) Apple says that claim 14 additionally requires that a "set of colors are computed using a geometric element fitted to said pixel color set[]" and makes it clear that the "pixel color set" means the colors in the "original image block." (*Id.* at 134-135.) Apple contends that PVRTC-encoded data is not created by fitting a geometric element to the colors of the original image but, instead, by {

} used in generating a delta image that does not include an original "set of colors" from "an original image block." (*Id.* at 135.)

Staff believes that the evidence establishes that Apple infringes claim 14 as alleged by S3G based on the testimony of Dr. Bystrom. (SBr. at 80.) Staff argues that Dr. Bystrom's testimony shows that all of the elements of the claim are satisfied. (*Id.*)

The Administrative Law Judge concludes that the preponderance of the evidence does not establish that the Accused Products, to the extent they implement PVRTC, infringe claim 14. Apple's combined arguments with respect to claims 11 and 14, and the evidence it points to in support thereof, have not been overcome by the arguments and evidence pointed to by S3G and Staff.

c) Claim 16.

S3G says that the evidence it cites in support of its argument that Apple infringes claim 11 of the '978 patent also supports its contention that Apple likewise infringes claim 15 (from which claim 16 depends) and says that, as implemented in the iDevices and the iOS SDK, a PVRTC compressed texture includes a header portion that identifies texture format, height, width, etc. (CBr. at 136-137 (citing Tr. at 476-480 (Bystrom)).) Apple repeats the arguments it raised in opposing S3G's infringement allegations regarding claims 11 and 14 and argues further that claim 16 requires that the asserted "encoded image data format" "includ[es] a header portion[,]" but PVRTC's *texturetool's* default setting does not generate a header and S3G has not identified any PVRTC "encoded image data format" in which the default was changed and a header was created. (RBr. at 136.) Therefore, according to Apple, S3G has not met its burden of proof with respect to claim 16's "encoded image data format" (subsumed by dependence from claim 15) that includes a "header portion." (*Id.*)

Staff, relying on the testimony of Dr. Bystrom, concludes that Apple infringes claim 16. (SBr. at 82-83.)

The Administrative Law Judge concludes that the preponderance of the evidence does not establish that the Accused Products, to the extent they implement PVRTC, infringe claim 16 of the '978 patent. The Administrative Law Judge finds that Apple's combined arguments with respect to claims 11, 14, and 16 and the evidence it points to in support thereof are persuasive.

In accordance with the above findings, the Administrative Law Judge concludes that the accused iDevices and iOS SDK do not infringe the asserted claims of the '978 patent.

3. Induced Infringement.

S3G asserts that Apple induces third-party developers to use *texturetool* to compress an image into PVRTC format, to decompress a compressed PVRTC texture for preview purposes, and to test applications containing compressed PVRTC texture. (CBr. at 137.) S3G relies on its arguments offered to support of its allegation that Apple indirectly infringes the asserted claims of the '146 patent. (*Id.*)

Staff also argues that Apple induces game and application developers to infringe claims 11, 14, and 16 of the '978 patent by using the iOS SDK to compress three-dimensional images in the PVRTC format when creating applications to be sold through the App Store. (SBr. at 78, 80, 83.) Staff does not present any in-depth discussion of this issue. (*Id.*)

Apple responds that in order to prove inducement a patentee must show that there has been direct infringement and that the alleged infringer "knowingly induced infringement and possessed specific intent to encourage another's infringement." (RBr. at 164 (citing *Minnesota Mining*, 303 F.3d at 1304-05).) Apple argues that to prove specific intent, S3G must show that Apple was aware of the asserted patents and had "an affirmative intent to cause direct infringement." (*Id.* (citing *DSU*, 471 F.3d at 1305-06).) Apple argues that the specific intent requires more than just intent to cause the acts that produce infringement and says that beyond that threshold knowledge, the inducer must have an affirmative intent to cause direct infringement. (*Id.* (citing *Kyocera*, 545 F.3d at 1354).) Quoting from *Kyocera*, Apple says "providing customers with the system determination software, training them on implementation of their mobile devices, providing software and firmware updates, offering customer support, furnishing promotional and technical documents for the accused [] chipsets, and recommending that its customers implement battery saving features[]" perhaps might show a general intention to

cause acts the produced infringement, falls short of the necessary intent for showing inducement. (*Id.* at 165.) Apple argues that S3G has not shown any direct infringement and has failed to establish that Apple possessed the specific intent to encourage its customers to use the Accused Products in an infringing manner. (*Id.*) Apple argues that S3G is wrong in saying that certain applications when downloaded onto the Accused Products infringe the asserted patents because those applications are not part of the Accused Products when they are imported, but are available only through electronic downloads from the App Store on servers located in the United States. (*Id.*) Apple argues that S3G did not introduce evidence showing that any application creating infringement was ever actually downloaded by a customer or other third party. (*Id.* at 165-166.)

As an initial matter, the Administrative Law Judge notes that inasmuch as it has been determined above that Apple does not directly infringe any of the asserted claims of the '978 patent, there is no infringement by inducement, either. "[A] finding of inducement requires a threshold finding of direct infringement—either a finding of specific instances of direct infringement or a finding that the accused products necessarily infringe." *Lucent Technologies, Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1322 (Fed. Cir. 2009). This would apply to those instances in which Apple's products that implement PVRTC have been found not to infringe. Most of the evidence adduced by S3G relates to PVRTC.

With respect to Apple's implementation of DXT, the Administrative Law Judge found above that claims 11, 14, and 16 of the '978 patent are literally infringed. At issue is whether Apple was aware of the patent, induced direct infringement, and that Apple knew or should have known that its actions would induce actual direct infringement.

Here, the evidence shows that Apple was aware that there could be intellectual property issues with its use of texture compression and advised that S3, Inc. be contacted. (CX-579C.)

The evidence further shows that Apple physically tests the encoders and decoders in its products, including the { } codec. (JX-54C at 94:15-95:22, 96:8 - 97:4 (Sandmel Depo).) In addition, Apple tests third party applications that "likely" use DXT format features. (*Id.*) The accused OS X Devices are designed to decompress DXT texture data when an application, such as a third party application, makes such a request. (*Id.* at 22:14-20.) However, S3G does not clearly enunciate how Apple induces third parties to implement DXT. (CBr. at 41 { } use of PVRTC), 42 { } use of PVRTC), 42-43 (third party testing on iDevices), 44 (general discussion of developer resources without specifics re DXT), 45 (examples re PVRTC).)

The Administrative Law Judge concludes that the evidence does not persuasively show that Apple induced infringement of claims 11, 14 and 16 of the '978 patent with respect to DXT.

E. Analysis of the Accused Products with Respect to the '146 patent.

S3G accuses Apple of literally infringing claims 4, 13, and 16 of the '146 patent. (CBr. at 19.) There are two different texture compression technologies that are the subjects of S3G's infringement allegations: PVRTC (PowerVR Texture Compression) and DXT (S3TC/DXT). (CBr. at 8-14; RBr. at 17-22.) S3G alleges that both of them use block-based compression techniques. (CBr. at 9.) The Accused Products include Apple's Mac computers that run the Mac operating system, version X ("OS X"), Apple's iDevices that run iPhone operating system (the "iOS"), and Apple's software development kit ("SDK") for the iOS. (*Id.* at 11; Section I.E. above.) The accused Apple Mac OS X computers include MacBook, MacBook Air, MacBook Pro, iMac, Mac mini, and Mac Pro (collectively, the "Mac OS X Devices"). (*Id.*) The accused "iDevices" include various models of the iPhone, iPad, and iPod touch. (*Id.*) The iOS SDK allows application developers to write applications for mobile devices. (*Id.*) According to S3G,

Apple implements DXT in the accused Mac OS X Devices and implements PVRTC in the accused iDevices and in the iOS SDK. (CBr. at 12.)

S3G alleges that Apple literally infringes claim 4 of the '146 patent. Claim 4 depends from claim 3, which depends from independent claim 1. All three claims are shown below:

> **1.** A system for encoding an image, comprising:
>
> an image decomposer, coupled to receive an image, for breaking the image into one or more image blocks, each image block having a set of colors;
>
> at least one block encoder for receiving each image block and for compressing each image block to generate an encoded image block, wherein each block encoder includes a color quantizer for receiving each image block and for generating at least one codeword from which at least one quantizer having a selection module for computing a set of parameters from the set of colors, the at least one codeword derived from the set of parameters; and
>
> an encoded image composer for receiving and ordering the encoded image blocks into a data file.
>
> **3.** The system of claim **1**, wherein each block encoder comprises:
>
> a bitmap construction module for mapping the colors of an image block to one of the at least one quantized colors.
>
> **4.** The system of claim **3**, wherein the color quantizer further comprises:
>
> a block type module, coupled to receive the image block, for selecting a block type for the image block; and
>
> a codeword generation module for generating the least one codeword from the set of parameters generated by the selection module.

(JXM-1 at 16:61-17:8, 17:14-26.)

1. *Infringement with respect to Apple's implementation of DXT.*

a) Claim 4.

S3G alleges that the Mac OS X running on Mac computers includes a system with a software encoder or an image encoder engine embodied in a function called { } for encoding an image file into DXT compressed format, thereby satisfying the preamble of

claim 1. (CBr. at 19 (citing Tr. at 753-755 (Richardson); JX-53C (Rosasco Depo) at 21-22, 32, 73).)

According to S3G, the software compressor in the { } codec receives texture images that contain both compressed image data and header information that characterizes the image data in a function call that is in { } (*Id.* at 20 (citing Tr. at 765, 823-824 (Richardson)). S3G says that the software compressor extracts and uses header information in the received image to identify blocks of four-by-four pixels of various colors and, therefore, satisfies the first element of claim 1. (*Id.* (citing Tr. at 755-756 (Richardson); JX-53C at 137-138 (Rosasco Depo)).)

The software compressor, says S3G, performs three main steps to compress an image block: it determines the block type, it generates a set of representative colors, and it maps colors to the representative colors by a set of index values, thereby fulfilling one segment of the second element of claim 1. (*Id.* (citing Tr. at 756, 826 (Richardson); JX-53C at 135-136 (Rosasco Depo)).)

According to S3G, the software compressor generates representative colors by calculating { } having an average of 16 colors, in an image block composed of a group of four-by-four texels. (*Id.* (citing Tr. at 757 (Richardson); JX-53C at 138-139 (Rosasco Depo)).) From this { } thereby defining a three-dimensional color space for that image block, from which are derived two base representative colors and two interpolated colors. (*Id.* at 20-21 (citing Tr. at 757-759, 837-838 (Richardson); JX-53C at 138-140, 142-143 (Rosasco Depo)).) By this process, the remaining segment of the second element of the claim is satisfied, according to S3G. (*Id.* at 21.)

Next, the software compressor orders the compressed texture image blocks into matching positions in a storage area, such as computer memory, thus satisfying the third and final element of claim 1, says S3G. (*Id.* at 21-22 (citing Tr. at 761-764, 813-832 (Richardson); JX-53C at 165, 173-177 (Rosasco Depo)).)

As for claim 3, S3G says that each of the representative and interpolated colors is assigned an index value, and a texel in the block is then mapped to the nearest one of the representative colors and assigned a corresponding value, thereby satisfying that claim as well. (*Id.* at 22 (citing Tr. at 760, 833-834 (Richardson); JX-53C at 145-151 (Rosasco Depo)).)

Turning to claim 4, S3G says that the software compressor determines whether a block includes a transparency and whether the block should be encoded as having four representative colors or as having three representative colors plus a transparency, thus fulfilling the preamble and first element of this claim. (*Id.* (citing Tr. at 756, 834-835 (Richardson); JX-53C at 152 (Rosasco Depo)).) As for the second, and last, element, S3G says that, as discussed in reference to claim 1, the three-dimensional color space that was there described is used to determine two representative colors (color0 and color1) that constitute codewords, and this procedure satisfies that element as well. (*Id.* at 23 (citing Tr. at 758-759, 835-836 (Richardson); JX-53C at 138-139 (Rosasco Depo)).)

Apple says that the DXT encoder does not infringe claim 4[5] because the { } codec is itself not an application and cannot be used to encode an image without a user creating or adding software to pass image data to it. Apple says that the { } codec is not "coupled to" an image source "to receive an image" and, therefore, does not infringe "Claim 7 [sic] of the '146 Patent." (RBr. at 119-120 (citing Tr. at 2309 (Sandmel)).) In making this assertion, Apple refers

[5] Apple intermingles its arguments with respect to the '146 and '417 patents and in the process refers to claim 7 of the '417 patent, when discussing claim 4 of the '146 patent. (RBr. at 119.)

to, and relies on, its argument concerning non-infringement of claim 7 of the '417 patent. (*Id.* (citing RBr. at 43-50, 53-55).)

In its argument concerning non-infringement of claim 7 of the '417 patent, Apple says that, insofar as the asserted "encoder" claims require "decomposing the [original] image into a header" and the asserted "decoder" claims require "decomposing an encoded image file into a modified header[,]" the iOS Devices, iOS Simulator, NVIDIA GPU, and { } codec can only be used with the OpenGL API, a computer language that has specific predefined functions that have to be used in graphics operations. (*Id.* at 43-44.) Apple notes that OpenGl API is an industry standard for writing applications that produce computer graphics and that Mac computers use OpenGL, while the iOS Devices use OpenGL ES, a subset for embedded systems. (*Id.* at 44.) Apple says that OpenGL API provides functions that applications must call in order to perform texture compression or decompression operations in the accused devices. (*Id.*) By itself, the Mac OS does not include a method for encoding or decoding DXT data, absent an application that that calls for OpenGL compressed texture routines, says Apple. (*Id.*)

Apple says that in order to decode a DXT file on a Mac computer using the { } codec, an application must make a call to an OpenGL function, such as *glTexImage2D*, which is provided with a pointer to the image data to be encoded, including some descriptive information about the image. (*Id.* (citing JX-53C at 71-74 (Rosasco Depo)).) Apple claims that *glTexImage2D* is not provided an image filer or an image containing a header, and because OpenGL is not a flexible programming language, as would typically be used with a general purpose computer, there is no way for Apple to define additional OpenGL functions or to use OpenGL's existing functions with a header. (*Id.* at 45.) Apple says that Dr. Richardson, one of S3G's experts, confirmed that { } codec does not include the claimed decomposer, in

support of which Apple refers to one of the demonstrative exhibits used by him, CDX-632. (*Id.*) Demonstrative exhibits are not substantive evidence, as the parties were notified at the hearing (Tr. at 322, 2045), and therefore this statement of Apple's is not substantiated by this exhibit. However, Apple also does refer to source code for at least part of this contention. (*Id.* at 44-45.)

Apple says that in order to use the accused NVIDIA GPU or { } codec to decode an image that has been encoded by DXT, an application first has to make a request to an OpenGL function, such as *glCompressedTexImage2D*. (*Id.* (citing Tr. at 2215-16 (Toksvig), 2303 (Sandmel), 1939-40 (Fenney), 2158 (Delp); JX-54C at 27 (Sandmel Depo)).) According to Apple, *glCompressedTexImage2D* provides a pointer to the encoded image data and to some descriptive information about the image, but not to the image file itself or to a header for it. (*Id.* at 45-46.) Apple bolsters this argument by referring to a demonstrative exhibit, CDX-632, which is not substantive evidence (Tr. at 322, 2045) and therefore cannot be considered. (*Id.* at 46.) Apple, however, also refers to applicable source code for validation of this assertion. (*Id.*)

Apple also says that the format parameters that are passed by OpenGL are neither headers nor modified headers. (*Id.* at 47 (citing RFF 275).) Citing hearing testimony given by Mr. Sandmel, Apple argues that "a header to an image file is information about the image data that is stored with [it] in the file and is typically stored in the front of the file[,]" and says that Mr. Toksvig agreed that "the header is part of the file." (*Id.* (citing Tr. at 2305 (Sandmel) and 2220-21 (Toksvig)).) Therefore, Apple argues, the "header information" or "parameters" that S3G relies on for its infringement argument are not headers of an original or encoded image file since they are not part of an image data file. (*Id.* (citing Tr. at 2220-21 (Toksvig); JX-53C at 97-98 (Rosasco Depo)).)

Apple says the asserted patents make it clear that an image's header has to be attached at the head of an image data file, and Apple points to Figure 5A of the '417 patent and cites to related language in the patent (JX-2 at 6:64-7:3) for support, noting that the original image (numbered 310 as shown in Figures 3A and 3B of the patent) includes an α-bit header 502 and β-bit image data 504 that are input into the image decomposer 302 (also shown in Figures 3A and 3B). (*Id.* at 48.) "The image decomposer 302 decomposes the image 310 into the α-bit header and a plurality of blocks[,]" notes Apple, quoting from the patent. (*Id.* (quoting JX-2 at 7:1-3).)

Similarly, argues Apple, the S3G patents make it clear that a modified header must be attached or concatenated to the head of an encoded image file, referring to Figure 5B of the '417 patent showing a "Mod. Header 512" appearing to the left, or front (reading left to right), of an "ordered file having encoded image blocks 516…concatenated with the modified information 512 that is derived from the α-bit header 502 of the original image 310 (FIGS. 3A and 3B) to generate the encoded image data file that is the output of the image encoder engine 202 (FIG. 2)." (*Id.* (citing JX-2 at Fig. 5B and quoting from the patent at 11:11-16).)

Apple claims that the height, width, and format parameters that are passed by OpenGL functions are separate from, and are not attached to, the image data that is to be encoded or decoded and, therefore, are not headers as claimed in the asserted patents, citing testimony of Mr. Toksvig who said they are separate, with the former "sitting on the stack" and the latter, "sitting out in memory." (*Id.* at 48-49 (citing Tr. at 2218).)

Apple argues that S3G's witness Dr. Richardson included in his demonstrative exhibit CDX-673—without any basis for doing so—an encoded data file, with a modified header, in order to suggest that the NVIDIA GPU infringes; whereas, Mr. Toksvig, the inventor of the NVIDIA patent, and the architect of the NVIDIA GPU, disputed Dr. Richardson, saying the

NVIDIA GPU never receives an encoded image file with a modified header. (*Id.* at 49.) Mr. Toksvig said that under his invention the width, height, border, border size, and similar information are separated from the data and there is no need to break them apart, since "the twine have never met." (*Id.* at 49-50 (citing Tr. at 2225 (Toksvig)).)

With respect to this portion of Apple's argument, S3G says that two OpenGL function calls are included in the Accused Products to invoke texture compression and decompression functionalities: one, *glCompressedTexImage2D()*, receives texture data in a compressed format for decompressing, and the other, *glTexImage2D()*, receives texture data in uncompressed format for compressing. (CRBr. at 16.) S3G says that both of these function calls receive information, through various parameters, including a pointer labeled "data," to the texture image and describe the texture image's data, such as height, width, and "internalformat," and, collectively, specify a texture image. (*Id.* at 16-17.)

S3G argues that Apple does not dispute that OpenGL function calls receive an image as specified by the parameters, collectively, but only disputes that the received image includes a header—contending that *glTexImage2D* is not provided an image file or an image with a header, and that *glCompressedTexImage2D* is not provided an image file or an image with a header. (*Id.* at 17.) S3G says that Apple's reliance on Figure 5A of the '417 patent for its contention that a header has to be included with image data does not support Apple's argument that the height, width, and format parameters involved in the OpenGL function calls, together with the parameter that specifies image data, are not a header. (*Id.*) According to S3G, Apple's contention that a header must be attached or concatenated to the image data is erroneous because the claims only require that a header is capable of being decomposed from an associated image, thereby

disclosing that a header can exist apart from other image data. (*Id.* at 17-18 (citing JX-2 at 4:40-41, 11:36-39, 11:43-44, 11:54-60).)

S3G argues that Apple's reliance on Mr. Sandmel's and Mr. Toksvig's testimony that a header is necessarily the front part of a file should be rejected because they are not experts qualified to render opinions as to the meaning of header and because their statements are contrary to the express teaching of the asserted patents. As for Apple's characterizations of Dr. Richardson's demonstratives as evidencing that { } codec does not include the claimed decomposer, this is erroneous because these demonstrative exhibits only illustrate specific aspects of Dr. Richardson's testimony and he never testified that a decomposer is absent from the { } codec. (*Id.* at 18-19.)

Staff believes that the evidence establishes that the DXT encoder in the Mac OS { } codec infringes claim 4 of the '146 patent. (SBr. at 94-95.) Staff says that Dr. Richardson, after examining relevant source code, testified that the software encoder has an image decomposer that separates the image into image blocks of four-by-for pixels that have a set of colors that constitute the original colors of the un-encoded image. (*Id.* at 94.) Staff says that Dr. Richardson explained that the encoder engine compresses each image block into an encoded image by generating two base representative colors and two interpolated representative colors for each image block and that each pixel color point is mapped to one of the four representative colors with an associated index. (*Id.*)

Staff says the codewords, Color A and Color B are derived from the color parameters (*id.* at 94-95), and the block encoder includes a color quantizer, which derives at least one quantized color involving a selection module computing a set of parameters referring to a theoretical ellipsoid in the RGB color space (*id.* at 95).

Staff says Dr. Richardson confirmed that the { } codec provides for an encoded image composer for ordering the image blocks in an output file, as further discussed by Staff with respect to claim 7 of the '417 patent. (*Id.*) Staff believes that Dr. Richardson confirmed that the { } codec provides for a bitmap module for mapping the colors of the image block to the quantized colors, producing a two-bit index value for each pixel. (*Id.*) The { } codec includes a block type identifier that selects a block type for the image block from codewords to determine if there is a transparency present, Staff notes, and for all of these reasons the evidence establishes that claim 4 is infringed by the software encoder in the { } codec in Mac personal computers. (*Id.*)

The Administrative Law Judge finds that, based on the evidence, S3G's and Staff's arguments are more persuasive than Apple's and concludes, for the reasons given by them, as mentioned above, that the Accused Products, to the extent they implement DXT, literally infringe claim 4 of the '146 patent. The fact that { } codec is not itself an application is irrelevant and immaterial; the issue is whether the Mac computers having OS X include a system for encoding an image, etc., and Apple has not refuted S3G's evidence that it does. Apple's lengthy discussion about what constitutes a header, where header data must reside, and how OpenGL function calls handle parameters associated with image data is divorced from the actual language of claims 1, 3, or 4 of the '146 patent, and is likewise irrelevant.

b) Claim 13.

S3G alleges that Apple literally infringes claim 13 of the '146 patent. Independent claim 13 reads as follows:

> **13**. A method of compressing an original image block having a first set of color points defined within a selected color space, comprising:

> fitting a geometric element to the first set of color points so that the geometric element includes a second set of color points having a minimal moment of inertia when fitted to the center of gravity of the first set of color points;
>
> computing a set of codewords from the second set of color points;
>
> computing a set of computed colors using the set of codewords;
>
> mapping each of the first set of color points to one of the computed colors or one of the codewords to produce an index for each of the first set of color points; and
>
> using the indices produced by the mapping each of the first set of color points and the set of codewords to represent the first set of color points.

(JXM-1 at 19:6-24.)

S3G contends that the Mac OS X running on Mac computers includes a system consisting of a software encoder or an image encoder engine embodied in a function called { } for encoding an image file into DXT compressed format (CBr. at 23 (citing Tr. at 753-755 (Richardson); JX-53C at 21-22 (Rosasco Depo))), according to the preamble of claim 13. S3G says that this system includes a software compressor that generates representative colors by { } (*Id.*) S3G also cites its argument regarding claim 4 of the patent, according to which that { } (*Id.* (citing Tr. at 758-759 (Richardson); JX-53C at 138-143 (Rosasco Depo)).) S3G believes that this statement and the evidence alluded to are sufficient to establish that Apple's product satisfies the first element of claim 13. (*Id.*)

S3G says the { } are used to determine the two base representative colors (color0 and color1) so as to satisfy the second element of the claim. (*Id.* at 23-24 (citing Tr. at 838 (Richardson)).) According to S3G, the two base representative colors are used to generate interpolated representative colors and this, in turn,

satisfies the third element. (*Id.* at 24 (citing Tr. at 759-760 (Richardson); JX-53C at 138-139 (Rosasco Depo)).)

Lastly, S3G says that each texel in the block is mapped to the nearest one of the representative colors and is assigned a corresponding index value; that the index values for the 16 texels and the two base representative colors are stored as a compressed texture image block; and, therefore, the last two elements of the claim are satisfied. (*Id.*)

Apple counters that claim 13 is a method claim and can only be infringed by an accused device that performs all of the claimed steps, contending that its arguments with respect to the non-infringement of claim 7 of the '417 patent—because there is no evidence that the { } codec is ever used to encode a DXT image—also apply to S3G's allegation that claim 13 of the '146 patent is infringed. (*Id.* at 121.)

Staff believes that S3G established, through the testimony of Dr. Richardson, that the { } codec in the Mac OS X satisfies all of the elements of claim 13. (SBr. at 97-98 (citing Tr. at 836-840 (Richardson)).)

S3G responds that the evidence shows that Apple itself tested the compression and decompression functionalities of the { } codec and, by such testing, infringed method claim 13. (CRBr. at 23 (citing Tr. at 820 (Richardson); JX-54C at 94 (Sandmel Depo)).)

The Administrative Law Judge concludes that the evidence cited by S3G and Staff, noted above, is sufficient to establish that Apple's OS X Devices literally infringe claim 13 with respect to their implementation of DXT.

c) Claim 16.

S3G alleges that Apple literally infringes claim 16 of the '146 patent. Claim 16 depends from claim 13 and reads as follows:

> **16**. The method of claim **13**, wherein mapping further includes mapping a first set color point to a predefined index, if the first set color point represents an alpha value.

(JXM-1 at 19:30-32.)

According to S3G, if a block type comprises a transparency and three colors, the index value "10" will be assigned the value of the transparency. (CBr. at 30 (citing Tr. at 463 (Bystrom)).)

Apple's response to S3G's infringement allegation, insofar as claim 16 is concerned, is the same argument Apple makes in response to S3G's infringement argument concerning claim 13. (RBr. at 120-121.)

Staff says that because claim 16 is directed to the method claim 13 with additional mapping involving a first set color point to a predefined index, if the first set color point represents an alpha value, its prior analysis concerning claim 13 applies. As regards the additional mapping element of claim 16, Staff believes the evidence shows that, in the DXT encoder, the block type is determined and in a case where a transparency is present, the pixel point will be assigned a predetermined two-bit value. (SBr. at 99 (citing Tr. at 840-841 (Richardson)).)

The Administrative Law Judge concludes that the evidence cited by S3G and Staff, noted above, is sufficient to establish that the accused OS X Devices literally infringe claim 16 of the '146 patent with respect to their implementation of DXT.

Based on the above findings, the Administrative Law Judge concludes that the accused Mac OS X Devices infringe the three asserted claims of the '146 patent.

2. *Infringement with respect to Apple's implementation of PVRTC*

a) Claim 4.

S3G alleges that the Accused Products that implement PVRTC literally infringe claim 4 of the '146 patent by virtue of the Kan codec that is included in the iOS SDK as part of the *texturetool*. (CBr. at 26 (citing Tr. at 352, 354 (Bystrom)).) S3G says that Apple infringes the preamble of claim 1 because its iOS SDK includes a software encoder known as *texturetool* that provides PVRTC with compression functionality for encoding an image into PVRTC format. (CBr. at 27 (citing Tr. at 345 (Bystrom); JX-65C at 103-104, 143 (Kan Depo)).)

S3G says the software compressor in *texturetool* receives an original uncompressed image that has a header containing such information as height and width of pixels and uses the information to identify the individual blocks[6] thereby satisfying the first element of claim 1. (*Id.* (citing Tr. at 476-480 (Bystrom)).)

S3G says that the software compressor in *texturetool* encodes image blocks, satisfying the first portion of the second element of claim 1, generates {

} (*Id.* at 28 (citing Tr. at 495 (Bystrom)).) (S3G also notes that in this regard, depending on the block type, {

} (*Id.* (citing Tr. at 495 (Bystrom)).)

S3G says that once Color A and Color B, the modulation values, and the block type have been calculated for each image block, the encoded image blocks are ordered into 64-bit PVRTC chunks, thus satisfying the third and final element of claim 1. (*Id.* (citing Tr. at 496 (Bystrom)).)

[6] Recall that claim 4 depends from claim 3 which depends from claim 1.

As to claim 3, S3G says that *texturetool's* software compressor determines which of the quantized colors, including Color A' and Color B', and the {

} (*Id.* (citing Tr. at 496 (Bystrom)).)

As to claim 4 itself, S3G says that *texturetool* fills out the {

} (*Id.*) {

}

of this claim. (*Id.* at 29 (citing Tr. at 491 (Bystrom)).)

Apple says that the accused devices do not infringe claim 4 of the '146 patent for the same reasons it gave for why they do not infringe claim 7 of the '417 patent, citing to the portion of its brief that discusses its non-infringement assertions regarding that patent. (RBr. at 117.) Apple argues that, like claim 7 of the '417 patent, claim 4 requires an image decomposer that will break the received image into image blocks having a set of colors, quoting the first element of claim 1 of the '146 patent. (*Id.*) Apple says that the parties agree that this element requires that the "image decomposer" receive an original image and "break" it into blocks with original image values. (*Id.* at 118 (citing Tr. at 2117-18 (Delp)).) Apple argues that contrary to Dr. Bystrom, *texturetool* does not decompose an original image into blocks with original image values, and says that as noted with respect to its argument regarding claim 7 of the '417 patent, *texturetool* encodes the original image by first *downsampling* it and afterwards *upsampling* and processing it, on a pixel-by-pixel basis. Apple argues that at no point in the encoding process

does *texturetool* perform the claimed step of breaking the original image "into one or more image blocks, each having a set of colors[,]" says Apple. (*Id.*)

S3G responds that in PVRTC an encoded block includes a color A codeword, a color B codeword, a block type bit, and 16 two-bit indices. (CRBr. at 12 (citing CDX-265, which, being a demonstrative exhibit, is not substantive evidence[7]).) S3G says that Apple, in arguing that PVRTC does not decompose an image into {

} For example, says S3G, in *texturetool* a code module called {

} (*Id.* at 12-13 (citing Tr. at 529-530 (Bystrom)).) According to S3G, Dr. Delp apparently did not closely examine that source code, while Mr. Kan consciously skipped over this portion of the code when he described the module { } (*Id.* (citing Tr. at 2326-27 (Kan)).)

Staff concludes that Apple's iOS SDK software encoder in texturetool infringes claim 4, based on Dr. Bystrom's infringement analysis with respect to claim 7 of the '417 patent, which Staff says is equally applicable to claim 4 of the '196 patent. (SBr. at 95.) As for claim 7 of the '417 patent, Staff says that Dr. Bystrom explained in her hearing testimony that the encoder processes an original image by separating the header information from the image data with an image decomposer that processes image data in four-by-four chunks, or blocks, of data. (SBr. at 61 (citing Tr. at 595-603 (Bystrom)).) Once the image is decomposed, {

} (*Id.*)

In the initial guesses at codewords a "high contrast image," also referred to as a delta image, is

[7] (Tr. at 322, 2045.)

generated by *downsampling* the original image and then *upsampling* to produce a low resolution version of the image, argues Staff. (*Id.*) Staff says the low resolution version and the original image combine to form the delta image, which is used to make the initial guesses at the codewords. (*Id.*) Four by four pixel blocks of the high contrast image that correspond exactly to four-by-four blocks of the original version of the image are used to fill in the initial guesses at colors A and B of the codeword portions of each of the compressed blocks, Staff says. (*Id.*)

Following that, a {

} (*Id.*) Colors A and B are determined from the best-fit line, and this process is repeated for each of the four-by-four blocks until an initial guess at colors A and B is made for the entire image, according to Staff. (*Id.*) This process is also repeated to make initial guesses at the block type and bitmap until finally the final codewords, block types, and bitmaps are determined, concludes Staff. (*Id.*)

Staff says that in *texturetool* the block type is determined by a single block-type bit, referred to as the mod mode bit, that is reserved for this purpose. (*Id.*) If the mod mode bit is equal to 0, the block type is a four-color block; if it is equal to 1, the block type is composed of three colors and a transparency. (*Id.*) Once the block type has been determined, quantization occurs, pixel points are mapped to the nearest quantized color, and a two-bit value associated with a particular color point is placed in a bitmap portion corresponding to the pixel's location in the block, argues Staff. (*Id.*)

Staff argues that these steps are repeated for every pixel in the original image block and the bitmap portion is filled out for the compressed block. (*Id.*) After all of the blocks have been

[8] RGB signifies the colors red, green, blue.

compressed, there is a refinement process by which the entire compression process is repeated several times and the error is determined, {

} to arrive at the final compressed image blocks and a modified header, which are output by the image composer. (*Id.*) Thus, according to Staff, the evidence established that each and every element of claim 7 of the '417 patent is satisfied (and likewise each element of claim 4 of the '146 patent) is satisfied by a preponderance of the evidence. (*Id.* at 61-63, 95-96.)

Dr. Bystrom's testimony regarding infringement extensively relies on source code. She points to a function named { } and says it provides evidence of "stepping over blocks in the original image." (Tr. at 530 (Bystrom).) Her relevant testimony, as cited by S3G in its reply brief (CRBr. at 12-13), by way of responding to Apple's assertion that its texturetool does not include a decomposer, coupled to receive an image," is set out below:

> Q. Dr. Bystrom, could you return to the source code and analyze the updateModulationError?
> A. Yes, so I have also identified the {
>
> }
> I will ask the Court to turn with me to page 1219. And this is in the same exhibit. I put this portion of the code on the ELMO. {
>
> } And to give the Court evidence of this, I would like the Court to turn to page 1220.

(*See* CRBr. at 12-13.)

In opposition, Mr. Kan testified that {

} (Tr. at 2325-26 (Kan).) {

} (*Id.* at 2327 (Kan).) The modulation values obtained do not identify any property or characteristic of the original pixels they pertain to; they are only inputs to an equation that is used to calculate a color. (*Id.*)

In light of Mr. Kan's testimony, the supporting testimony of Dr. Delp, and other evidence pointed to by Apple, it cannot be concluded that there is a preponderance of evidence that proves that *texturetool* of PVRTC, as found in the Accused Products, infringes claim 4 of the '146 patent. The evidence, as it exists in the record, is at least, if not more, supportive of Apple's contention that PVRTC does not include "an image decomposer, coupled to receive an image, for breaking the image into one or more image blocks, each having a set of colors" according to independent claim 1 of the '146 patent, from which asserted claim 4 depends. Although S3G does address this point in its reply brief (*see* CRBr. at 12-13), it does not do so directly and substantively, such as by explaining any discrediting factors or pointing to any countervailing testimony, either direct or circumstantial. Rather, S3G responds that Dr. Delp "apparently did not closely examine the source code" and "Mr. Kan consciously skipped over" relevant portions of the source code when he described the module { } (CRBr. at 12-13.) What the specific source code that S3G is referring to, beyond that which was initially identified by Dr. Bystrom in her testimony, is not mentioned by S3G. In the final analysis, S3G's reply argument does not overcome Mr. Kan's testimony (*see* Tr. at 2325-28 (Kan)).

For her part, although Dr. Bystrom discussed looping and stepping over original blocks with respect to the { } and referred to source code where this information is located, her testimony does not sufficiently explain her thought process as to how these steps demonstrate that PVRTC breaks (decomposes) a *received* (i.e., original—*see* JX-at 5:50, 6:16, Figs. 3A and 3B) image that is the subject of claim 1 of the '146 patent (*see* JX-4 at 16:61) into one or more image blocks. She does not explain how these source code entries demonstrate a process by which a *received* image, as recited in claim 1, is itself decomposed.

According to Mr. Kan, modulation values are inputs to an equation that generates an output pixel by blending the results of *upsampling* the *downsampled* A and B images and, in doing so, { } (Tr. at 2325 (Kan).) Mr. Kan testified that *texturetool* does not determine modulation values for an image block. (Tr. at 2326: 13-14 (citing source code starting at line 761).) S3G has not adequately demonstrated that Dr. Bystrom's testimony, or any of the other evidence, for that matter, refutes Mr. Kan's statement. The issue, for purposes of infringement, is whether PVRTC encodes a *received* image by means of an image decomposer, coupled to receive an image, for breaking the image into one or more image blocks. S3G has not adequately described how the evidence it points to demonstrates PVRTC does this so as to achieve infringement. There are missing links in the evidence pointed to by S3G and the conclusion that PVRTC decomposes the *received* image into one or more image blocks has not been adequately demonstrated.

The Administrative Law Judge concludes, for the foregoing reasons, that the evidence does not demonstrate that the Accused Products, to the extent that they include PVRTC, infringe claim 4 of the '146 patent.

b) Claim 13.

S3G alleges that Apple literally infringes claim 13 of the '146 patent by its implementation of PVRTC. (CBr. at 26, 29-30.) Claim 13 is quoted above. According to S3G, the software composer in *texturetool* encodes an image into PVRTC format in accordance with claim 13's preamble. (*Id.* at 29 (citing Tr. at 346 (Bystrom); JX-65C at 103-104, 177 (Kan Depo)).) Insofar as the first element of the claim, S3G says that the software composer generates an initial guess of Color A and Color B by {

} in what S3G calls a high-contrast original image. (*Id.* (citing Tr. at 484 (Bystrom)).) Each of the {

} the first element of the claim is met. (*Id.* at 29-30 (citing Tr. at 485 (Bystrom)).)

S3G says that the second element of claim 13 is met by the software composer in *texturetool* because Color A and Color B base colors, which constitute a set of codewords, are computed from points on a line in the color space. (*Id.* (citing Tr. at 550-552 (Bystrom)).) S3G says that the third element of claim 13 is met by the software composer in *texturetool* because Color A and Color B' and a possible intermediate color, which together constitute a set of computed colors, are calculated from Color A and Color B, which are codewords. (*Id.* at 30 (citing Tr. at 552-554 (Bystrom)).) According to S3G, the fourth element of the claim is also satisfied because the subject software composer assigns a two-bit index value corresponding to the closest quantized color to a particular location of a bitmap for the pixel being encoded. (*Id.* (citing Tr. at 554-555 (Bystrom)).) Lastly, according to S3G, the Color A and Color B base colors and the modulation values form the encoded image blocks. (*Id.* (citing Tr. at 501).)

Apple argues that the language of claim 13 makes it clear that the "first set of color points" are colors of "an original image block," whereas, *texturetool* does not fit a geometric element to the colors of an original image block. (RBr. at 120.) According to Apple, Dr. Bystrom was only able to demonstrate that *texturetool* fits { } and Apple says that a delta image does not have a "set of color points" from "an original image block" as is required by claim 13. (*Id.* at 120-121.)

Also, according to Apple, claim 13 requires that the encoding process "produce an index," meaning "an identifier for an image data value," and a PVRTC modulation value is not an index because it is not an identifier for a color or other image data value but, instead, is merely one of several inputs to the equation that is used to calculate a pixel's color. (*Id.* at 121.) Therefore, Apple says that *texturetool* does not "produce an index" as is required by claim 13. (*Id.*)

S3G responds that the delta image contains rough components of texels in the original image and that fitting the geometric element to the rough components of texels in the original image is still fitting to the texels in the original image. (CRBr. at 23.) Moreover, says S3G, the 16 pixels in the block are contained in the { } (*Id.*) As for Apple's argument that modulation values in PVRTC are not index values, S3G says this argument is not valid in light of testimony of Dr. Delp and Mr. Kan to the contrary. (*Id.* (citing Tr. at 2349-50 (Kan)).)

Apple counters S3G by quoting testimony of Dr. Delp, who said that there are two things wrong with Dr. Bystrom's evidence regarding PVRTC implementation: *one,* an original image is not decomposed into blocks and, *two,* the { } operation is not done on the

original image. (RRBr. at 61 (citing Tr. at 2098 (Delp)).) Further quoting Dr. Delp, Apple says that he disagreed with her conclusion that fitting a set of points to values in the delta image satisfies the first element of claim 13 that requires fitting a geometric element to the first set of data points. (*Id.* (citing Tr. at 2120 (Delp)).) Apple notes that, according to Dr. Delp, fitting a set of data points to a delta image is not the same as fitting a geometric element to the first set of color points. (*Id.* (citing Tr. at 2121 (Delp)).)

In addition, Apple argues that in order to establish infringement of claim 13, S3G had to show that each step of the claimed method is actually performed in the United States and that Apple's alleged testing of testing of *texturetool* is the sole basis for S3G's infringement allegation of this claim. (*Id.* at 62.) Apple says that because there is no evidence that Apple's testing performs the claimed steps of claim 13 or that this testing even occurs in the United States, there can be no finding of infringement. (*Id.*) Apple says that the deposition testimony regarding testing that S3G relies on actually shows that Apple does not test any texture compression functionality on the iPhone. (*Id.* (citing JX-55C at 197-198 (Sandmel Depo)).)

Staff believes that the encoder in the iOS SDK in Mac personal computers infringes claim 13 based on Dr. Bystrom's testimony. Staff says that she explained that the encoder divides the image being encoded into blocks of pixels representing colors in the original image and each pixel is made up of a red, green, or blue component which defines the color of the pixel in the RGB color space. (SBr. at 98 (citing Tr. at 547-557 (Bystrom)).) The encoder uses a

{

} (*Id.*) Staff says that Dr. Bystrom confirmed that that the encoder uses codewords that are determined from the geometric element and that set

of colors is also computed from those codewords and each pixel is then mapped to one of the colors represented by the codewords in a bitmap. (*Id.*) In view of Dr. Bystrom's testimony in this regard, Staff concludes that each element of claim 13 is satisfied by the encoder in *texturetool* in the Mac personal computers. (*Id.* at 99.)

The Administrative Law Judge concludes that the Accused Products, to the extent they implement PVRTC, do not infringe claim 13 of the '146 patent, for the reasons stated above with respect to claim 4.

c) Claim 16.

S3G alleges that Apple literally infringes claim 16 of the '146 patent because of its implementation of PVRTC, and in support cites the same reasons that it argued in connection with claim 13, adding that if the block type is three-color plus transparency, index "10" will represent a transparent value. (CBr. at 26, 29-30.) Claim 16 is quoted above.

The Administrative Law Judge concludes that the Apple's implementation of PVRTC in the Accused Products does not infringe claim 16 of the '146 patent, for the reasons stated above regarding claim 4.

Based on the findings above, the Administrative Law Judge concludes that the accused iDevices and iOS SDK do not infringe the three asserted claims of the '146 patent.

3. Induced Infringement.

S3G argues that Apple induces third-party developers to directly infringe the asserted patents because they directly infringe encoding apparatus of claim 4 of the '146 patent when they use the software encoder in *texturetool* to compress an image into PVRTC format. (CBr. at 41.) S3G says that third-party developers directly infringe encoding method claims 13 and 16 of the

'146 patent when they compress an image into PVRTC format and incorporate the compressed image in a software application and also when they test the applications containing compressed PVRTC images. (*Id.*) For example, argues S3G, third-party developer Veiled Games, Inc. ("Veiled Games") { } (*Id.* (citing JX-69 at 19-20 (Wright Depo)).) S3G says that some of Veiled Games's applications {

} (*Id.* at 41-42 (citing JX-69C at 11-13; JX-66C at 25 (McMahon Depo)).) S3G says that Veiled Games { } (*Id.* (citing JX-69C at 19-20).) S3G says that Veiled Games {

} (*Id.* at 42 (citing JX-66C at 8-9 (McMahon Depo)).)

S3G says third-party developer Intermap Technologies ("Intermap") has developed a map-viewer application called AccuTerra, which it sells through the App Store. (*Id.* (citing JX-68C at 10-12, 22-22 (Oseth Depo)).) S3G says that AccuTerra allows users to download maps from the App Store. (*Id.* (citing JX-68C at 30, 32-33).) {

} (*Id.* (citing JX-68C at 47, 65, 67-68).) Intermap, according to S3G, {

} (*Id.* (citing JX-68C at 41-42).) S3G says that Intermap {

} (*Id.* (citing JX-68C at 42).)

S3G argues that when third-party developers test certain aspects of their applications, they must run their applications on an iDevice, as opposed to Apple's iOS Simulator because the iOS Simulator does not provide all the same functionality as the iDevices. (*Id.* (citing JX-63C at 75 (Haun Depo)).) The iOS Simulator does not contain an accelerometer and if a developer wishes to test an application that uses an accelerometer, or any of the other functionality missing

from the iDevices, the developer must test the application on an iDevice. (*Id.* (citing JX-63C at 76).)

S3G argues that Apple induces the third-party developers to perform the infringing activities by providing support to them. (*Id.* at 43.) S3G says, by way of example, that Apple operates an App Store and an iOS Developer Program that oversees application development for the App Store. (*Id.*) S3G says that a third-party developer may become a member of Apple's iOS Developer Program to submit its applications to the App Store for distribution by paying an annual fee of $99 to Apple and agreeing to the terms and conditions of the iOS Developer Program. (*Id.* (citing JX-63 at 59-61).) S3G says that Veiled Games {

} (*Id.* (citing JX-66C at 33).)

S3G says terms and conditions are set forth in the iPhone Developer Program Agreement and under that agreement a third-party developer can sell its application through the App Store and receive seventy percent of the revenue. (*Id.* (citing JX-63C at 190, 205-206; JX-66C at 33).) Apple provides support to third-party developers by, among other things, providing technical documentation, development tools, sample code, technical notes, technical questions and answers, and direct engineering support services. (*Id.* (citing JX-63C at 48).) S3G says Apple runs a developer website at *http://developer.apple.com*. (*Id.* (citing JX-63C at 55).) S3G, by way of example, S3G says that when third-party developer Intermap {

} (*Id.* at 43-44 (citing JX-68C at 49-50).) In addition, argues S3G, Veiled Games {

} (*Id.* at 44 (citing JX-66C at 45-46).)

S3G says that Apple also runs the Apple developer forums on a website that allows third-party developers "to interchange ideas and questions about working with Apple technologies and platforms." (*Id.* (citing JX-63C at 147-148).) According to S3G, Apple hosts worldwide developer conferences in which Apple representatives give presentations regarding various technology topics, some of which deal with texture compression and decompression. (*Id.* (citing JX-63C at 91, 94).) S3G says Apple makes videos of these presentations available on its developer website. (*Id.* (citing JX-63C at 90-93).) In addition to the third-party developer support just described, S3G says the members of the iOS Developer Program receive help and guidance from engineers within the developer technical support group at Apple for technical questions, such as debugging application code. (*Id.* (citing JX-63C at 13, 53-54, 63; JX-55C at 196-197 (Sandmel Depo)).) S3G says that Veiled Games, {

} (*Id.* (citing JX-69C at 16).) S3G says, {

} (*Id.* at 45 (citing JX-69C at 18).) S3G says that {

} (*Id.* (citing JX-69C at 18).)

S3G argues that Apple had knowledge of the asserted patents at least as early as December 17, 2009 when its employee {

} (*Id.* (citing CX-579C at APPLES3G00841251).) {

} (*Id.* (citing CX-579C at APPLES3G00841244).) S3G argues that Apple has had

notice of the S3TC patents at issue at least since the May 28, 2010 filing date of the Complaint in this Investigation. (*Id.*)

Apple responds that in order to prove inducement a patentee must show that there has been direct infringement and that the alleged infringer "knowingly induced infringement and possessed specific intent to encourage another's infringement." (RBr. at 164 (citing *Minnesota Mining*, 303 F.3d at 1304-05).) Apple argues that to prove specific intent, S3G must show that Apple was aware of the asserted patents and had "an affirmative intent to cause direct infringement." (*Id.* (citing *DSU*, 471 F.3d at 1305-06).) Apple argues that the specific intent requires more than just intent to cause the acts that produce infringement and says that beyond that threshold knowledge, the inducer must have an affirmative intent to cause direct infringement. (*Id.* (citing *Kyocera*, 545 F.3d at 1354).) Quoting from *Kyocera*, Apple says "providing customers with the system determination software, training them on implementation of their mobile devices, providing software and firmware updates, offering customer support, furnishing promotional and technical documents for the accused [] chipsets, and recommending that its customers implement battery saving features[]" perhaps might show a general intention to cause acts the produced infringement, falls short of the necessary intent for showing inducement. (*Id.* at 165.) Apple argues that S3G has not shown any direct infringement and has failed to establish that Apple possessed the specific intent to encourage its customers to use the Accused Products in an infringing manner. (*Id.*) Apple argues that S3G is wrong in saying that certain applications when downloaded onto the Accused Products infringe the asserted patents because those applications are not part of the Accused Products when they are imported, but are available only through electronic downloads from the App Store on servers located in the United States.

(*Id.*) Apple argues that S3G did not introduce evidence showing that any application creating infringement was ever actually downloaded by a customer or other third party. (*Id.* at 165-166.)

Staff argues that S3G has established that Apple induces game and application developers to infringe claims 4, and 13 of the '146 patent by using iOS SDK to compress three-dimensional images in the PVRTC format when creating applications to be sold through the App Store. (SBr. at 96, 99.) Staff does not provide any independent analysis. (*Id.*) In addition, Staff does not submit any discussion with respect to indirect infringement of claim 16 of the '146 patent. (*Id.* at 99-100.)

As an initial matter, the Administrative Law Judge notes that inasmuch as it has been determined above that Apple does not directly infringe any of the asserted claims of the '146 patent, there is no infringement by inducement, either. "[A] finding of inducement requires a threshold finding of direct infringement—either a finding of specific instances of direct infringement or a finding that the accused products necessarily infringe." *Lucent Technologies, Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1322 (Fed. Cir. 2009). This would apply to those instances in which Apple's products that implement PVRTC have been found not to infringe. Most of the evidence adduced by S3G relates to PVRTC.

With respect to Apple's implementation of DXT, the Administrative Law Judge found above that claims 4, 13, and 16 of the '146 patent are literally infringed. At issue is whether Apple was aware of the patent, induced direct infringement, and that Apple knew or should have known that its actions would induce actual direct infringement.

Here, the evidence shows that Apple was aware that there could be intellectual property issues with its use of texture compression and advised that S3, Inc. be contacted. (CX-579C.) The evidence further shows that Apple physically tests the encoders and decoders in its products,

including the { } codec. (JX-54C at 94:15-95:22, 96:8 - 97:4 (Sandmel Depo).) In addition, Apple tests third party applications that "likely" use DXT format features. (*Id.*) The accused OS X Devices are designed to decompress DXT texture data when an application, such as a third party application, makes such a request. (*Id.* at 22:14-20.) However, S3G does not clearly enunciate how Apple induces third parties to implement DXT. (CBr. at 41 { } use of PVRTC), 42 { } use of PVRTC), 42-43 (third party testing on iDevices), 44 (general discussion of developer resources without specifics re DXT), 45 (examples re PVRTC).)

The Administrative Law Judge concludes that the evidence does not persuasively show that Apple induced infringement of claims 4, 14, and 16 of the '146 patent with respect to DXT.

V. VALIDITY

A. Background

One cannot be held liable for practicing an invalid patent claim. *See Pandrol USA, LP v. AirBoss Railway Prods., Inc.*, 320 F.3d 1354, 1365 (Fed. Cir. 2003). However, patent claims are presumed valid. 35 U.S.C. § 282. A respondent that has raised patent invalidity as an affirmative defense must overcome the presumption by "clear and convincing" evidence of invalidity. *Checkpoint Systems, Inc. v. United States Int'l Trade Comm'n*, 54 F.3d 756, 761 (Fed. Cir. 1995). Further, as stated by the Federal Circuit in *Ultra-Tex Surfaces, Inc. v. Hill Bros. Chem. Co.*:

> when a party alleges that a claim is invalid based on *the very same references* that were before the examiner when the claim was allowed, that party assumes the following additional burden:
>
> > When no prior art other than that which was considered by the PTO examiner is relied on by the attacker, he has the added burden of overcoming the deference that is due to a qualified government agency

> presumed to have properly done its job, which includes one or more examiners who are assumed to have some expertise in interpreting the references and to be familiar from their work with the level of skill in the art and whose duty it is to issue only valid patents.

Ultra-Tex Surfaces, Inc. v. Hill Bros. Chem. Co., 204 F.3d 1360, 1367 (Fed. Cir. 2000) (emphasis added) (quoting *American Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1359 (Fed. Cir. 1984) "*American Hoist*").

B. Anticipation.

A determination that a patent is invalid as being anticipated under 35 U.S.C. § 102 requires a finding, based upon clear and convincing evidence, that each and every limitation is found either expressly or inherently in a single prior art reference. *See Celeritas Techs. Inc. v. Rockwell Int'l Corp.*, 150 F.3d 1354, 1361 (Fed. Cir. 1998). Anticipation is a question of fact, including whether a limitation, or element, is inherent in the prior art. *In re Gleave*, 560 F.3d 1331, 1334-35 (Fed. Cir. 2009). The limitations must be arranged or combined the same way as in the claimed invention, although an identity of terminology is not required. *Id.* at 1334 ("the reference need not satisfy an *ipsissimis verbis* test"); MPEP § 2131.

In addition, the prior art reference's disclosure must enable one of ordinary skill in the art to practice the claimed invention "without undue experimentation."[9] *Gleave,* 560 F.3d at 1334-35. A prior art reference that allegedly anticipates the claims of a patent is presumed enabled; however, a patentee may present evidence of nonenablement to overcome this presumption. *Impax Labs., Inc. v. Aventis Pharmaceuticals Inc.*, 468 F.3d 1366, 1382 (Fed. Cir. 2006). "[W]hether a prior art reference is enabling is a question of law based upon underlying factual findings." *Gleave,* 560 F.3d at 1335.

[9] This is not to be confused with the standards for enablement to support issuance of a patent claim under 35 U.S.C. § 112. *Gleave,* 560 F.3d at 1334.

Priority of Invention.

If a respondent comes forward with clear and convincing evidence of a prior invention that is alleged to invalidate an asserted patent, a complainant may seek to rebut this evidence by establishing an earlier priority date. *See, e.g., Dow Chemical Co. v. Astro-Valcour, Inc.*, 267 F.3d 1334, 1339 (Fed. Cir. 2001) (explaining burdens of proof and production when validity of patent challenged under Section 102(g) in context of summary judgment). Under 35 U.S.C. § 102(g)(2), priority of invention "goes to the first party to reduce an invention to practice, unless the other party can show that it was the first to conceive the invention and that it exercised reasonable diligence in later reducing that invention to practice. *Price v. Symsek*, 988 F.2d 1187, 1190 (Fed. Cir. 1993). "Conception is the touchstone of inventorship, the completion of the mental part of invention." *Burroughs Wellcome Co. v. Barr Laboratories, Inc.*, 40 F.3d 1223, 1227-28 (Fed. Cir. 1994). It is the mental formation of a definite and permanent idea of the complete and operative invention as it is to be applied in practice. *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1376 (Fed. Cir. 1986).

"Conception is complete only when the idea is so clearly defined in the inventor's mind that only ordinary skill would be necessary to reduce the invention to practice, without extensive research or experimentation." *Burroughs*, 40 F.3d at 1227-28. "A conception must encompass all of the claimed invention." *Singh v. Brake*, 317 F.3d 1334, 1340 (Fed. Cir. 2003). "Because it is a mental act, courts require corroborating evidence of a contemporaneous disclosure that would enable one skilled in the art to make the invention." (*Id.*) The inventor "must provide independent corroborating evidence in addition to his own statements and documents." *Hahn v. Wong*, 892 F.2d 1028, 1032 (Fed. Cir. 1989). "[B]ecause of the danger in post-hoc rationales by an inventor claiming priority, the court requires objective evidence to corroborate an inventor's

testimony concerning his understanding of the invention." *Invitrogren Corp. v. Clontech Labs.*, Inc., 429 F.3d 1052, 1065 (Fed. Cir. 2005). The burden of proof on respondent after a complainant comes forward with corroborated evidence of conception and diligent reduction to practice remains that of clear and convincing evidence. *Technology Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1327-29 (Fed. Cir. 2008).

1. '417 Patent.

a) Priority Date.

S3G says it is undisputed that the priority date for all of the asserted patents is October 2, 1997, when U.S. Patent Application No. 08/942,860, which issued as U.S. Patent No. 5,956,431 on September 21, 1999, was filed. (CBr. at 54-55 (citing Tr. at 2433-35, 2452 (Richardson)).) S3G says that the asserted patents have the same three inventors, all of patents feature an unbroken priority chain from that primal patent, and all of the asserted claims are supported by that patent's specification. (*Id.*) Apple does not challenge the priority date stated by S3G; nor does Staff. Therefore, the Administrative Law Judge concludes that the priority date of the '417 patent, and the other asserted patents, is October 2, 1997.

b) Claims 7, 12, 15 and 23 in light of Hoffert.

(1) *Apple asserts that the Hoffert patent is prior art.*

Apple says that each of the limitations of claims 7, 12, 15, and 23 of the '417 patent except those applying to "headers" and "block type" was included in prior art invented by Eric Hoffert and his colleagues while working for Apple from 1989 to 1991, while they were developing a video and image compression system referred to as "Road Pizza," eventually patented as U.S. Patent No. 5,046,119 ("Hoffert" or the "Hoffert patent") and incorporated in

Apple's Quick Time. (RBr. at 67.) Apple says that the Patent Office did not consider Hoffert during the prosecution of the asserted patents. (*Id.* at 68.) Apple says that Hoffert teaches each core concept in the asserted patents, including the following: decomposing an image into blocks for processing on a block-by-block basis; selecting two codewords per block; computing two inferred colors from the codewords to make four quantized colors, using a formula copied by the asserted patents; mapping the original colors in the block to the four quantized colors using a two-bit index; and storing the codewords and two-bit indexes as a compressed image block. (*Id.*)

Apple says that S3G did not challenge the foregoing statements and that S3G's validity expert, Dr. Richardson, conceded that all of the core concepts of the asserted compression scheme are found in Hoffert, admitting that the only limitations missing from Hoffert are "headers" and "block type." (*Id.* (citing Tr. at 2439-42 (Richardson)).) Apple says Mr. Hoffert and Dr. Delp demonstrated by their testimony that each limitation of the asserted patents is covered by Hoffert. (*Id.* at 69.)

S3G disputes that Hoffert is prior art, but not its date with respect to the issue of priority. (CBr. at 163-164.)

The Administrative Law Judge concludes that Hoffert has a priority date of March 16, 1990. (RX-535 at APPLE00070159.)

(2) *Apple asserts that the header elements claimed in the '417 patent are inherently present in Hoffert.*

Apple says the header elements claimed in the '417 patent are inherent in the Hoffert patent. Apple says a header is data attached to a file, typically at the beginning, providing information about the file. (*Id.* at 70.) According to Apple, when it was developing a compression scheme for Road Pizza, use of headers in video and image compression schemes

was commonplace—they were used in JPEG, the international standard for photographic compression, and MPEG, a like standard for video compression. (*Id.*) Apple says Mr. Hoffert explained that headers were the mechanism for interpreting an image or video and were needed to decode images. (*Id.*) Dr. Delp testified that headers are ubiquitous and have been around for a long time: the first time he used one on image files was in the 1970s. (*Id.*) Dr. Delp said he was teaching his students about headers in the 1980s, and by the 1990s, students from a typical undergraduate program in electrical engineering would have known about headers and how to use them. (*Id.* at 70-71.)

Apple says that Konstantine Iourcha, one of the '417 patent inventors, testified in a deposition that image files often have headers, and Apple maintains that S3G does not dispute that by 1997 it was commonly known to use headers with compressed image files in order to provide information needed to understand how to interpret an image or video being decoded. (*Id.* at 71.) Apple remarks that Mr. Hoffert, when asked why he did not refer to headers in his patent, said they were obvious because most, if not all, of the image and video compression techniques that his team was working with were using headers. (*Id.*) Apple mentions compression systems and formats it claims were well known and in use before the Hoffert patent that used headers, such as IFF, Utah RLE, TIFF, GIF, GIF89a, PICT, and JPEG. (*Id.*)

Apple also says that a limitation is inherent in the prior art if there is a sufficient description to enable one or more embodiments that necessarily include or result in the limitation. (*Id.*) According to Apple, one of the embodiments in Hoffert requires headers, because it mentions compression and decompression in a general purpose computer, which requires headers for managing files. (*Id.*) Dr. Delp testified that with general purpose computers or "open" systems, different types and sizes of image files can be used and headers provide

information that is necessary to encode or decode the image. (*Id.* at 72-73.) Moreover, argues Apple, because headers provide information necessary to decode the image, such as the size of the compressed image and the compression technique that was used, which was not part of the original image, headers of compressed images are necessarily modifications of original headers, because they include other information. (*Id.* at 73.) Apple says that Mr. Iourcha agreed that when a file is converted from one image format to another, the header would most likely be modified. (*Id.*)

Apple says it is inherent that a header has to be separated from image data before compression or decompression occurs and that Hoffert teaches compressing and decompressing image data, and not the header, one block at a time. (*Id.*) Apple says that in Hoffert image data is separated from any headers before encoding or decoding. (*Id.*) Apple says S3G is wrong in saying that headers are not inherent in Hoffert because they are not needed for Hoffert's hardware embodiment. (*Id* at 74.) Apple says that a dedicated hardware system is only one of Hoffert's embodiments, and notes that the invention's compression system can also be used with general purpose computers with ordinary programming. (*Id.*) Apple says the law of inherency does not mean that an element or feature has to apply to for all embodiments, only one. (*Id.*)

S3G argues that Hoffert cannot anticipate or render obvious the claims of the asserted patents for two reasons. First, it does not explicitly teach all of the limitations of the asserted patents, and second, it is directed to a fundamentally different type of compression technology. (CBr. at 68.) S3G disputes that Hoffert discloses a header and says that Dr. Delp admitted that the header limitations of the asserted claims are not explicitly mentioned in Hoffert. (*Id.* (citing Tr. at 1690).) S3G says that Hoffert expressly teaches, as its preferred embodiment, the use of a closed, hardware-based system without headers. (*Id.* at 68-69 (citing Tr. at 2442-43

(Richardson), 1473-74, 1690, 1732-33 (Delp)).) Furthermore, Dr. Delp did not say that headers would be inherent or necessary in hardware-based systems and even admitted that headers are not needed in closed systems, argues S3G. (*Id.* at 69 (citing Tr. at 1713-14).) The fact that Dr. Delp testified that it was his opinion that headers are necessary for managing files in an open software system, does not, according to S3G, make them inherent in the event that Hoffert were implemented in software applications (*id.* (citing Tr. at 2442, 2561-62 (Richardson))) because "[i]nherent anticipation requires that the missing descriptive material is necessarily present, not merely probably, or possibly present, in the prior art." (*Id.* (quoting *Therasense, Inc. v. Becton, Dickinson & Co.*, 593 F.3d 1325, 1332 (Fed. Cir. 2010)).)

S3G contends that, contrary to Dr. Delp's opinion, the evidence shows that headers are not required in software-based systems for several reasons. First, the software at issue in this Investigation can compress and decompress files without headers, as for example, *texturetool* is a software application that runs on a general purpose open system, such as a Mac computer, and is capable of compressing and decompressing images without headers and gives the user a choice of whether or not to employ headers. (*Id.* (citing Tr. at 1336-37 (Delp)).) Second, relevant literature at the time of Hoffert confirms that headers were optional. (*Id.* at 70 (citing an article by Beers confirming that in the latter half of the 1990s, textures were frequently placed in dedicated memory because it was essential that the data be quickly accessed for rendering).) For this reason, argues S3G, there was no need at the time of Hoffert to move textures around or manage them and no need for them to have headers. (*Id.*) S3G notes that Dr. Richardson explained that when placed in dedicated memory, the location of texture data was fixed and known by the system and there was no need for them to have headers. (*Id.* (citing Tr. at 2437-38).)

A third reason, according to S3G, is the fact that numerous compression formats do not contain headers, such as the CCITT fax compression standard, the CGI format, and Amiga system. (*Id.* (citing Tr. at 2479 (Richardson)).) A fourth reason, says S3G, is that the Normile patent that Dr. Delp relies on to show the existence of headers at the time of Hoffert cautions that there are situations when headers are disadvantageous: the use of headers with certain blocks, such as no-change blocks, adds "block header overhead" and increases the number of bits. (*Id.* (citing Tr. at 1792 (Delp)).) According to S3G, Dr. Delp himself pinpoints the critical weakness in Apple's inherency argument: the fact that the prior art could, not has to, have a header. (*Id.* at 71.) S3G says Apple provided no evidence that proves a header is necessary or required to implement the system described in the Hoffert patent, and, therefore, the header limitations of the '417 patent are not inherent in Hoffert. (*Id.*)

Apple responds that the evidence shows that headers are necessary, and therefore inherent, in Hoffert's embodiment for general purpose computers because Hoffert states: "The compressing and decompressing of the present invention may be done using ordinary programming in any of a plurality of commercially available microprocessors." (RRBr. at 31 (quoting RX-535 at 3:21-24).) Apple says that elsewhere the Hoffert specification says: "the invented compression and decompression may be performed in a general purpose computer, such as a microprocessor, under control of a program. Ordinary programming may be used to implement the invented method." (*Id.*) Apple quotes Dr. Delp, who said that a general software system running on a computer would have to have a header in order to make use of the Hoffert invention. (*Id.* (citing Tr. at 1456-58).) Apple says that S3G (and Staff) ignore Hoffert's software embodiment in their briefs. (*Id.*) Apple says Dr. Richardson only addressed Hoffert's hardware embodiment and, even then, did not explain why Hoffert's hardware embodiment

would not require headers. (*Id.* at n. 6.) His answer was limited to a system described in prior art where textures are stored in dedicated memory, which Apple says constitutes an unsupported conclusion because other prior art specifically teaching the use of dedicated memory for textures is irrelevant to Hoffert's implementation on a general purpose computer using ordinary programming techniques. (*Id.*)

Apple says that Dr. Richardson merely stated that if Hoffert's compression system were used in a general purpose computer, without specifying whether ordinary programming was being used, headers would "not necessarily' be present, but provided no basis for this conclusion. (*Id.* at 32 (citing Tr. at 2561-62).) Apple says that both S3G and Staff limited their attention to Hoffert's hardware embodiment, claiming it does not require headers, but Apple says that the Federal Circuit has held that a finding of inherency only requires proof that one embodiment requires the feature in question. (*Id.* (citing *Toro Co. v. Deere & Co.*, 355 F.3d 1313, 1321 (Fed. Cir. 2004); *In re Schreiber*, 128 F.3d 1473, 1478 (Fed. Cir. 1997)).)

Apple argues that S3G's assertion, that because *texturetool* can compress images on an Apple computer without headers this is proof headers are not necessary in Hoffert's software implementation, is faulty because *texturetool* is not an example of an ordinary programming technique for a general purpose computer as alluded to in Hoffert. (*Id.* at 32-33.) This is because, as Dr. Delp testified, *texturetool* runs "in a very constrained application scenario[]" and encodes images to be used only with specific OpenGL functions that pass specific parameters to the functions and this is an example of a specialized programming technique in a highly constrained environment. (*Id.*) Apple says that S3G mischaracterizes Dr. Delp's testimony because when he said that Hoffert could have a header, he was taking into account both hardware

and software embodiments and simply reflecting the fact that the required use of headers is dependent on which embodiment is pursued.

Staff says that the only elements of the asserted claims that are disputed to have been anticipated by Hoffert are the header and block type limitations. (SBr. at 33, 73-74.)[10] Staff says that Dr. Delp testified that headers were known in the 1980s, that in 1997 persons of ordinary skill in the relevant were using headers with JPEG image technology, and that if one were to decompress images in the system described in Hoffert in software on a general purpose computer a header would have to be present. (*Id.* at 34.) Staff says that Dr. Delp retreated from this statement on cross-examination because he acknowledged that software implementation of DXT in the Apple Mac computers, which are general purpose computers, do not necessarily include headers. Therefore Staff argues that Dr. Delp's opinion must be rejected. (*Id.*) Staff concludes that Dr. Richardson's testimony and supporting evidence are more convincing than Dr. Delp's. (*Id.*)

It is well established that a patent is presumed valid and a person asserting its invalidity has the burden of proving by clear and convincing evidence that the patent is invalid, regardless of whether alleged prior art was before the Patent Office. *Microsoft*, __U.S.__, slip op. at 14-18. It was Apple's burden to prove that Hoffert expressly or inherently disclosed all of the elements of the asserted claims. The parties dispute whether Hoffert discloses a header. Apple says that a header is inherently present and offered evidence to that effect with testimony from Dr. Delp and documentary materials referred to by him. S3G offered countervailing testimony from Dr. Richardson supported by documentary materials referred to by him. Apple says that Dr.

[10] Staff, as do the private parties, sets out detailed arguments for one of the asserted patents and references those arguments when addressing the same or similar issue in the case of another patent. For example, Staff's argument regarding the validity of the '417 patent in light of Hoffert refers to and basically adopts the argument on that issue as it pertains to the '087 patent.

Richardson's conclusion that headers were not necessarily required to be used on a general purpose computer was conclusory and he did not provide any basis for this assertion. (RRBr. at 32.) In order to gauge the merit of Apple's denigration of Dr. Richardson's statement, the testimony itself should be examined. It was given during cross-examination, as follows:

> [Q.] If, just if the Hoffert compression system were used on a general purpose computer, headers would be necessary, would they not?
> A. Not necessarily.
> Q. There are multiple examples, are there not, of the use of headers in compression systems that are employed on general purpose computers?
> A. There are certainly examples, yes.
> Q. Thank you.

(Tr. at 2561-62.) At that point a luncheon recess was taken. When proceedings were resumed an hour later, Apple's counsel went into another area of inquiry and did not follow up the quoted line of inquiry. Dr. Richardson answered precisely the question he was asked on cross-examination, as any witness would be expected to do. Apple had the opportunity to pursue the matter in a myriad of ways if it wanted to, but chose to cease the line of inquiry of its own volition. Therefore, Apple's statement that Dr. Richardson did not provide supporting reasons for his answer, given the circumstances in which the statement was made, is not a basis for disregarding his testimony. As long as Apple had the burden of proving clearly and convincingly that Hoffert anticipated and rendered invalid the asserted patents, it bore the risk of not meeting its burden of proof if Dr. Richardson's statement was allowed to stand, untested, on its own merits, subject only to countervailing testimony of Dr. Delp. It is clear from *Microsoft Corp. v. i4i Ltd.* that Apple had to adduce sufficient facts to carry its burden of proving invalidity. On the state of this record, it essentially comes down to a question of two credible experts, Drs. Delp and Richardson, rendering opposing conclusions about a technical *factual* matter. Apple has not demonstrated why Dr. Delp's testimony, in the face of the countervailing

testimony of Dr. Richardson, is superior enough to satisfy the clear and convincing standard of proof required of Apple. The fact that S3G also did not follow up with a request to Dr. Richardson on this point is of no moment, since it was not its burden to disprove the allegation; it was Apple's burden to prove it.

The Administrative Law Judge concludes that the evidence does not demonstrate, clearly and convincingly, that Hoffert satisfies the header limitation of the asserted claims of the '417 patent.

(3) *Apple asserts that Hoffert discloses the "block type" elements of the '417 patent.*

Apple says that the term "block type" has to be given its plain and ordinary meaning because it was not offered as a disputed term at the Markman hearing, noting that the Markman Order, at 1-2, states that terms not construed are "deemed undisputed and shall be interpreted...in accordance with their ordinary meaning[s] as viewed by a person of ordinary skill in the art." (RBr. at 74.) Dr. Delp testified that a "block type refers to the characteristics of a block, an image block." (Tr. at 1460-61.) Apple says the specification of the '417 patent gives examples of a block type but does not evidence any special meaning or definition for the term. Apple quotes a passage from the patent, JX-2 at 8:15-24, and emphasizes its last sentence: "Those of ordinary skill in the art will readily recognize that selecting a block type for each image is not intended to be limiting in any way." (*Id.* at 75.) Apple says Dr. Richardson admitted the quoted passage only gives examples of block types and does not limit the patent to them. (*Id.*)

Apple says Hoffert teaches four encoding types for image compression, including a four-by-four 16-bit block of one color, blocks also having one color but 24 bits, a block of two colors

and 48 bits, and a block of four colors and 64 bits. (*Id.* (citing RX-535 at Fig. 2).) Apple says Hoffert teaches that each four-by-four block is evaluated "to determine which four types of compression/encoding should be used." (*Id.* (citing RX-535 at 3:27-29)).) Apple says that each of the encoding types yields a different block type. (*Id.* at 75-76.) Apple, referring to Hoffert Figure 10, argues that it discloses a decompression apparatus that includes a "Block Type Indentification Circuit" and says that each compressed image block includes two bits in the first codeword, indicating the encoding type of the block. (*Id.* at 76 (referring to Hoffert Figs. 1, 10).) Apple continues: "The 'block type identification circuit' selects the block type for each compressed image block based on the two bits stored in the codeword[.]" (*Id.* (quoting from RX-535 at 11:28-32).) Apple says Hoffert discloses how blocks are decoded differently based on block type and how different numbers associated with particular colors are used to decode different block types. (*Id.* at 76-77 (quoting from RX-535 at 9:38-52).)

Apple argues that Dr. Richardson conceded that Hoffert discloses a "block type identification circuit" for selecting a block type for an image block yet still insisted that Hoffert does not disclose selecting the claimed block type because it does not select "between embodiments of the invention." (*Id.* at 77.) Apple says that he is wrong about this, for two reasons. First, claims 7 and 12 of the '417 patent do not require selecting between block types but only "selecting an identifiable block type" (claim 7) and "selecting a block type " (claim 12). (*Id.*) Second, Dr. Richardson was basing his opinion on a unique construction of the term "block type" that is different from its plain and ordinary meaning and he admitted on cross-examination that the asserted patents do not limit the meaning to the two disclosed embodiments. (*Id.* (citing Tr. at 2557-58).) Moreover, says Apple, Dr. Richardson could not account for the explicit expression of "block type" and "block type identification circuit" in Hoffert, and given the plain

and ordinary meaning of "block type," Hoffert clearly teaches the limitation this term, as mentioned in the '417 patent, imparts. (*Id.*)

S3G contends that Hoffert does not teach the block type limitations of the asserted claims. (CBr. at 71.) S3G says the specifications of the asserted patents are explicit in describing the use of a block type indicator and teach, among other things: use of a first block type having four opaque colors; the optional use of a second block type with three opaque colors and a transparent color; the block types are both encoded and decoded according to the same patented compression and decompression system; and a block type detector configured to determine the block type based on the codeword. (*Id.* at 72 (citing Tr. at 2443 (Richardson)).) S3G says that these teachings carry over to the claims because the claim language requires that the different block types that can be selected have to practice the claimed compression methodology, citing, by way of example, claim 12 of the '417 patent. (*Id.*) S3G argues that claim 8, from which claim 12 depends, says that each image block has to have "at least one associated codeword and a plurality of image elements associated with an index value." (*Id.* (citing JX-2 at 12:30-31 (the '417 patent)).)

S3G argues that Hoffert does not disclose these limitations but, instead, describes four different compression schemes and teaches that each block in a frame will be encoded with the compression scheme that is most suitable for that block. (*Id.* at 73.) S3G, noting Apple's reference to an alleged block type detector in Hoffert that identifies which of the four different compression schemes is used for a given block, says that neither Hoffert nor Apple's proposed mapping satisfies the claim limitations. (*Id.*) S3G says that Apple does not allege that any of the four compression schemes identified in Hoffert, other than one involving four colors (Type 11), anticipates the asserted claims, and thus the claimed limitations requiring a selection between

blocks is not met. (*Id.*) S3G argues that a statement by Dr. Delp implying that Hoffert permits a user to choose the four-color type coding exclusively overlooks that fact that if that occurs, the block type indicator bits identified by Apple are not needed and the claim limitation respecting block type indicator is not satisfied. (*Id.* at 73-74.)

Apple replies that it is beyond dispute that Hoffert teaches a "block type identification circuit" and the use of two bits of a codeword to identify a block type. (RRBr. at 34.) Apple says the specification of the '417 patent uses the term "block type" in its plain and ordinary sense, and none of the block type limitations require selecting between blocks that practice the claimed invention; rather, the block type limitations of the asserted claims only require the selection of an identifiable block type so the compressor can know how to encode, or the decompressor can know how to decode, the image. (*Id.*) Apple says that Hoffert expressly refers to "block type" and even discloses a "block type identification circuit" because it expressly teaches the use of two bits to identify a block type, which, under the plain and ordinary meaning of "block type," satisfies the '417 patent. (*Id.*) Apple says that even under S3G's artificial construction of "block type," Hoffert still anticipates because it teaches selecting between (i) a two-color block that includes two codewords and a plurality of image elements associated with a single-bit index value, and (ii) a four-color block that includes two codewords and a plurality of image elements associated with a two-bit index value. (*Id.*)

Although Staff concludes that Hoffert does not anticipate the '417 patent with respect to the block type indicator limitation (SBr. at 33-34, 73-74), Staff does not provide a reason for reaching that conclusion; rather, Staff's argument is based solely on the conclusion that the evidence does not demonstrate that Hoffert satisfies the header limitation.

The Administrative Law Judge concludes that the evidence demonstrates that Hoffert does satisfy the block type element of the '417 patent, for the reasons stated by Apple, mentioned above. S3G's argument unduly constrains the patent to exemplary embodiments despite the specification's admonition that "selecting a block type for each image is not intended to be limiting in any way." (JX-2 at 8:22-23.) Dr. Delp testified that a "block type refers to the characteristics of a block, an image block." (Tr. at 1460-61.) Hoffert does this: it teaches that each four-by-four block is evaluated "to determine which four types of compression/encoding should be used." (RX-535 at 3:27-29.) Hoffert discloses a decompression apparatus that includes a "Block Type Indentification Circuit" and each compressed image block includes two bits in the first codeword, indicating the encoding type of the block.

Because the Administrative Law Judge found above that Hoffert does not disclose the header limitation of the asserted claims of the '417 patent, the Administrative Law Judge concludes that Hoffert is not an anticipatory reference.

c) Claims 7, 12, 15 and 23 in light of QuickTime.

(1) *Whether QuickTime was in public use or on sale in this country before the priority date of the asserted patents.*

Apple alleges that its QuickTime invention, which it says has been in continuous public use since late 1991, anticipates and thereby renders invalid the asserted claims of the '417 patent. (RBr. at 77.) Apple argues that QuickTime is prior art under 35 U.S.C. § 102(b) because it was in on sale and in public use more than a year before the October 2, 1997 priority date of the asserted patents. (*Id.* at 78.) Apple says that the first version of QuickTime, Version 1.0, was officially released to the public in December 1991 (*id.* at 78 (citing Tr. at 1226-27 (Batson))) and

starting in 1992, Apple sold QuickTime 1.0 as part of the QuickTime Starter Kit, a collection of tools and sample content for allowing non-developers to explore QuickTime. (*Id.*)

Apple says QuickTime 1.0 achieved instant success and acceptance in the market and by the time of the Macworld conference in 1992 many people were using QuickTime 1.0 and incorporating it into their applications. (*Id.*) Apple says that early QuickTime products included movie-editing tools and interactive CDs that mixed text with video content. (*Id.*) By June 1993 it was publicly reported that a million copies of QuickTime had been distributed, making it the most widely accepted multimedia operating system technology in Apple's history. (*Id.*) Apple says it has made QuickTime available to the public on a continuous basis since its introduction and it still remains a popular product. (*Id.*) Apple says that every day more than a million people download QuickTime from Apple's website.

Apple argues that QuickTime 1.0 is prior art under 35 U.S.C. § 102(b) because it is a product that was in public use and on sale more than one year before October 1997 the effective date of the asserted patents, and therefore argues that the issue here is whether QuickTime 1.0 "embodied"—as opposed to disclosed—the inventions of the asserted patents. (*Id.* at 79 (citing *Abbott Labs. V. Geneva Pharms. Inc.*, 182 F.3d 1315, 1319 (Fed. Cir. 1999)).)

S3G argues that Apple did not carry its burden of proving that QuickTime is prior art because Apple did not produce any publication that described the product's specific features. (CBr. at 74-75.) S3G argues that the only documentary evidence directly illustrating the features in QuickTime 1.0 is the source code, but the source code relied upon by Mr. Batson in giving his testimony was found only in "debug" software that was not compiled into a QuickTime 1.0 commercial product publication. (*Id.* at 75.) S3G argues that for this reason Apple cannot establish the features that were actually present in QuickTime by clear and convincing evidence.

(*Id.*) S3G says that the evidence establishes that QuickTime was a continually changing product and, despite Apple's assertion that QuickTime's video codec implemented the compression and decompression scheme codenamed "Road Pizza" in the Hoffert patent, the evidence shows that the two were different. (*Id.* at 75-76.) S3G argues that Apple's reference to confidential document relating to "Road Pizza" as proof that certain of its features were included in QuickTime is faulty for that reason, as well as for the fact that various proposed hardware features were never completed. (*Id.*) The only other documentation identified by Apple for proof of its anticipation claim is "Inside Macintosh" which does not describe QuickTime 1.0, says S3G. (*Id.* at 76 (citing Tr. at 1718-19 (Delp), 2450-51 (Richardson)).) In short, argues S3G, Apple cannot point to any documentary evidence actually describing the QuickTime 1.0 product. (*Id.* at 77.)

S3G says that the evidence Apple relies on for its QuickTime anticipation defense was confidential and not available to persons of ordinary skill in the art at the time. (*Id.*) Apple cannot prove that QuickTime was the subject of a prior sale because the QuickTime license agreement shows that Apple retained title to the product. (*Id.*) Nor, argues S3G, can Apple establish prior use of QuickTime, inasmuch as Mr. Casanova's testimony that he had demonstrated QuickTime in 1990 was uncorroborated and is therefore insufficient and, furthermore, his testimony was contradicted by Messrs. Batson and Hoffert. (*Id.* (citing Tr. at 1131, 1152-53 (Hoffert)).) Also, argues S3G, Mr. Hoffert's testimony about anticipatory use of QuickTime was likewise uncorroborated and generally pertained to pre-release versions of QuickTime that were kept confidential because they were subject to strict non-disclosure agreements and, therefore, not available to the general public. (*Id.* (citing Tr. at 1132-33 (Hoffert)).)

Apple replies that the evidence conclusively proves that QuickTime 1.0 was offered for sale and in public use by 1992, five years before the filing date of the asserted patents. (RRBr. at 35.) With respect to S3G's argument that Apple retained title in its licenses, Apple responds that this is not material because "a commercial transaction arranged as a 'license' or a 'lease' of a product or a device...may be tantamount to a sale (*e.g.*, a standard computer software license), whereupon the bar of § 102(b) would be triggered because 'the product is ...just as immediately transferred to the 'buyer' as if it were sold." (RRBr. at 36 (citing *Ninton v. NASD*, 336 F.3d 1373, 1377-78 (Fed. Cir. 2003)).) Apple, quoting the following passage from the Patent Act—"[a] person shall be entitled to a patent unless...the invention was...in public use... in this country, more than one year prior to the date of the application for patent[]"—says the company presented undisputed evidence that QuickTime 1.0 was officially released to the public by January 1992 at the Macworld conference and members of the public thereupon began using it and incorporating it into their applications. (*Id.*) Also, argues Apple, it presented evidence of early QuickTime 1.0-based products, including movie-editing tools and interactive CDs that mixed text with video content, demonstrating that QuickTime 1.0 was in public use long before S3G filed its patents. (*Id.*)

Staff says that Apple has not shown, to the degree required, the release date of QuickTime 1.0. (SBr. at 37.)

The Administrative Law Judge concludes that the evidence pointed to by Apple is sufficient to at least establish that QuickTime was on sale and in public use prior to October 2, 1997, the priority date of the asserted patents.

(2) *Whether the header element claimed in the '417 patent was present in QuickTime.*

Apple says that Mr. Hoffert testified that QuickTime includes the four-color block compression scheme and incorporates the use of different block types in accordance with his patent and therefore every element of proof discussed in regard to the Hoffert patent applies with equal force to QuickTime. (*Id.* at 79 (citing Tr. at 1133).) Apple claims that S3G concedes that QuickTime implemented every element of the '417 patent except the "header" and "block type" limitations and that Dr. Richardson was wrong in concluding that those limitations were not present as well. (*Id.* at 80.)

Apple says that QuickTime 1.0 satisfied the header limitation of the '417 patent because headers were necessary so an application could understand how to interpret the image or video that was being decoded (*id.* (citing Tr. at 1110-11, 1182-86 (Hoffert))) and notes that Mr. Batson, an initial member of the team that developed QuickTime, described how, during compression, the header information for an uncompressed picture or movie was used to configure the compressor, and the data was separated, or decomposed, from the header and fed into the compressor. (*Id.*) Apple says Mr. Bateson described how QuickTime created a new header that included information about the compressor, for the compressed image. (*Id.* (citing Tr. at 1242, 1242-5).) Apple says it also produced documentation showing that QuickTime used headers and that both the *Inside Macintosh: QuickTime* reference manual ("*Inside Macintosh*") and the Image Compression Manager ERS specification ("ERS") describe a data structure called "ImageDescription" that included data such as dimensions, resolution, and compression format. (*Id.* at 81.) Apple says that the QuickTime source code also shows that headers were modified and were decomposed from the original or encoded image file before the data was compressed or decompressed. (*Id.* at 81-82 (citing Tr. at 1669, 1672 (Delp)).)

Apple says that Dr. Richardson's opinion that QuickTime does not have a header is based solely on his statement that he "[has] seen no convincing evidence actually what is in QuickTime 1.0" and whether the documents cited by Apple in support of its assertions about QuickTime are in fact linked to it, but this does not rebut the testimony of Messrs. Bateson and Hoffert who said that Apple's product has headers. (*Id.*) Apple reinforces this contention by referring to QuickTime source code and the testimony of Dr. Delp, who said that the documentation produced by Apple clearly and unambiguously shows the use of headers in QuickTime 1.0. (*Id.* at 82.) Apple says Dr. Richardson did not dispute that the documents and source code produced by Apple reflect the use of headers. (*Id.*)

S3G responds that QuickTime 1.0 does not anticipate claims 7, 12, 15, and 23 of the '417 patent because it does not teach a header or the claimed "block type module for selecting an identifiable block type for the image block," or the "block type detector for selecting a block type for each of the at least one compressed image blocks." (CRBr. at 67.) S3G says that Apple has not shown that there is a header in QuickTime 1.0 because the testimony of Messrs. Hoffert, Cassanova, and Batson was not corroborated, but has to be under Federal Circuit law. (CRBr. at 33 (citing *Lacks Industries Inc. v. McKecnie Vehicle Components USA, Inc.*, 322 F.3d 1335, 1349-50 (Fed. Cir. 2003)). S3G maintains that the evidence cited by Apple is not clear and convincing because Apple produced no publication that describes the specific features of QuickTime 1.0. (CBr. at 75.) S3G says the only documentary evidence directly illustrating the features of QuickTime 1.0 is the source code, but says that Mr. Batson who testified on Apple's behalf admitted that much of the source code he and Apple referred to for Apple's invalidity allegation was found only in "debug" software that was not compiled into QuickTime's product documentation. (*Id.*)

S3G argues that Apple's witnesses testified that QuickTime 1.0 originally included five different codecs, including a video codec that Apple claimed implemented a compression and decompression scheme identified as "Road Pizza," a codename for Mr. Hoffert's compression and decompression algorithm. (*Id.* at 75-76.) S3G says the evidence at the hearing showed that QuickTime was continually being changed and that the video codec in QuickTime 1.0 was different from the compression and decompression scheme described in the "Road Pizza" documentation. (*Id.* at 76 (citing Tr. at 1133-34, 1155 (Hoffert) and comparing it with Tr. at 1720-21 (Delp)).) S3G says that both the Apple video codec and "Road Pizza" were different from the compression scheme in Hoffert. (*Id.* (citing Tr. at 1721-23 (Delp), 1137-39, 1155 (Hoffert), 2451 (Richardson)).) Despite these differences, says S3G, Apple suggests that certain features were present in QuickTime 1.0 by pointing to confidential documents that describe early "Road Pizza" implementations that are different from QuickTime 1.0 and various proposed hardware implementations that were never completed. (*Id.*) S3G says that the only other document Apple identifies that is related to QuickTime 1.0 is the "Inside Macintosh: QuickTime" reference book. (*Id.* (citing Tr. at 1485-87 (Delp)).) S3G argues that it is "beyond dispute" that this book does not describe QuickTime 1.0. (*Id.* at 76-77 (citing Tr. at 1261-63 (Batson), 1192-93 (Hoffert), 1694-95 (Delp), 2450-51 (Richardson)).) S3G says Apple did not establish by clear and convincing evidence the features that were actually present in QuickTime 1.0 because there is no documentary evidence. (*Id.* at 77.)

Staff believes that Apple has failed to show that QuickTime 1.0 with the Road Pizza algorithm is prior art. (SBr. at 74.) Staff says that although Mr. Casanova testified that QuickTime ran on the Road Pizza algorithm, he could not confirm the release date for QuickTime, implying that it was 1991. (*Id.* at 38.) Staff says Mr. Hoffert acknowledged that his

patent discloses only four types of coding schemes whereas QuickTime has seven types which are different. (*Id.*) He also testified that he was not sure which codecs and which versions were in QuickTime 1.0, and therefore Staff argues that his testimony is not reliable. (*Id.*) With respect to Mr. Batson's testimony, Staff says he revealed that the decompress function in QuickTime that Apple relies on for anticipation was not in the product because the source code Apple referred to as the foundation for its evidence was part of a debug routine that was not included in the compiled (assembled) program; therefore Dr. Delp's opinion, which was based on Mr. Batson's testimony, was faulty. (*Id.*)

The Administrative Law Judge concludes that the evidence is not sufficient to demonstrate that QuickTime 1.0 included all of the elements of the asserted claims of the '417 patent, including the header limitation. Dr. Richardson's testimony (Tr. 2450-51) raises serious questions about Apple's basis for its allegation and the questions he raises cannot be resolved in Apple's favor by the testimony of the other witnesses relied on by Apple. To be clear and convincing evidence, much more is necessary: there must be evidence demonstrating that the alleged prior art included every element of the asserted patent(s) and was known or used by the public. But Apple's evidence involves discrepant and uncorroborated testimony that is partly based on a faulty recitation of source code, leaving unanswered and subject to speculation material questions about the contents and origination dates of the documentary evidence relied on by Apple.

(3) *Whether the block type element claimed in the '417 patent was present in QuickTime.*

Apple says that Mr. Hoffert testified that QuickTime 1.0 was able to encode an image block in different ways, such as a run length constant color block, a four-color block, a full color

block, and a multimap block. (RBr. at 82 (citing Tr. at 1133-34, 1152 (Hoffert)).) How these blocks are encoded and decoded, says Apple, is shown in the documentation describing the Road Pizza algorithm as implemented in QuickTime 1.0, including the "colorcell++paper." (*Id.* (citing Tr. at 1146, 1152 (Hoffert)).) Apple says that Mr. Hoffert and the other inventors of Road Pizza used the term "block type" to refer to different types of encoding in QuickTime 1.0 and this conforms to the ordinary meaning of "block type." Apple says that the only countervailing evidence there is on this issue is Dr. Richardson's testimony that he saw no convincing evidence of what was actually included in QuickTime 1.0 and therefore was not convinced that the claimed block type was encompassed within it. (*Id.* at 83 (citing Tr. at 2448-49 (Richardson)).) Apple argues that this is only conclusory testimony, not rebuttal evidence, because it is devoid of any factual content. (*Id.*)

S3G says that QuickTime does not teach the "block type" elements of the asserted claims of the '417 patent. (CRBr. at 39-40.) S3G says that choosing between one encoding scheme that allegedly practices the claims and a plurality of others that do not does not satisfy the "block type" requirement and points to Dr. Richardson's testimony that the evidence relied on by Apple does not demonstrate what is actually included in QuickTime. (*Id.* at 40 (citing Tr. at 2448-49 (Richardson)).)

Staff says that the evidence does not establish clearly and convincingly that the "block type" element of the '417 patent is satisfied, for the same reasons Staff has asserted in support of its contention that the header element is not satisfied.

The Administrative Law Judge concludes, as in the case of the header element, and for the same reasons, that the evidence does not demonstrate, clearly and convincingly, that QuickTime 1.0 disclosed the "block type" element of the asserted claims of the '417 patent.

Although Apple complains that Dr. Richardson's testimony is conclusory, it is noted that what he said was that Apple presented insufficient evidence demonstrating that QuickTime 1.0 taught the claimed block type limitation of the asserted claims. (Tr. at 2448-49 (Richardson).) The evidence that Apple relies on in opposition to Dr. Richardson does not show otherwise. Apple's evidence involves discrepant and uncorroborated testimony that is partly based on a faulty recitation of source code, leaving unanswered and subject to speculation material questions about the contents and origination dates of the documentary evidence relied on by Apple.

The Administrative Law Judge therefore concludes that QuickTime 1.0 does not anticipate claims 7, 12, 15 and 23 of the '417 patent.

d) Claims 7, 12, 15, and 23 in light of Drebin.

(1) *Whether Drebin is prior art.*

Apple says that the invention described in U.S. Patent No. 7,058,218 ("Drebin"), which was filed on September 28, 1998, and issued to Robert Drebin and colleagues at Silicon Graphics, Inc. ("SGI") in 2006, was conceived and reduced to practice at least by November 12, 1996. Thus, Apple claims the invention described in Drebin ("the Drebin Invention") precedes the asserted patents' effective filing date of October 2, 1997 by ten months. (RBr. at 83-85.) Apple says that Drebin is prior art under 35 U.S.C. § 102(g)(2).[11] Apple says that S3G is not contending that Drebin was abandoned, suppressed, or concealed. (*Id.*)

S3G argues that the Drebin patent was filed on September 28, 1998, well after October 2, 1997, the effective filing date of the asserted patents. (CRBr. at 24.) S3G argues that Apple's legal theory that the Drebin patent is prior art because it is a prior invention under 35 U.S.C. § 102(g)(2) has been rejected by the Federal Circuit in *Sun Studs, Inc. v. ATA Equip. Leasing, Inc.*,

[11] Although Apple states that Drebin is prior art under Section 102(g)(2), it is clear from their post-hearing brief that they are referring to the alleged prior invention that is described in Drebin.

872 F.2d 978, 983 (Fed. Cir. 1989). (*Id.*) In that case, the court said: "[T]he effective date of a reference United States patent as prior art is its filing date in the United States...not the date of conception or actual reduction to practice of the invention claimed or the subject matter disclosed in the reference patent." *Sun Studs*, 872 F.2d at 983. *Sun Studs* concerned 35 U.S.C. § 102(g)(1), pertaining to interference actions, and not § 102(g)(2); therefore the Administrative Law Judge finds that that decision, insofar as it contrasts and discusses the different evidentiary issues respecting § 102(g)(1) and § 102(e), is not germane to the circumstances under consideration here. *Id.* Moreover, the Administrative Law Judge notes that the statute explicitly states that: "In determining priority of invention under this subsection, *there shall be considered not only the respective dates of conception and reduction to practice of the invention*, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other." 35 U.S.C. § 102(g)(2) (emphasis added).

S3G argues that Apple's claim in its post-hearing brief, that conception and reduction to practice in software by November 12, 1996 occurred while Mr. Drebin worked on the Bali project at SGI, is a change from Apple's prehearing allegation that Mr. Drebin conceived and reduced to practice his invention by September 12, 1996 and has no support in the record. (CRBr. at 25 (citing Apple's prehearing brief at 188).) S3G says testimony of a prior invention by another requires corroboration and argues that if Mr. Drebin had conceived and reduced to practice the invention recited in the asserted claims with a software simulation, that fact would be demonstrable by the source code. (*Id.*) None was produced, nor its absence explained. (*Id.*) S3G argues that in lieu of source code Apple relies on the testimony of Mr. Peercy, incomplete and largely undated high level block diagrams, and an undated webpage attached to the Migdal declaration, all of which fail to corroborate Apple's allegations. (*Id.* at 25-26.)

S3G elsewhere argues that, as a matter of law, Drebin is not prior art because Mr. Drebin acknowledged that the teachings of the pertinent patent did not exist when he left SGI in February 1998 and, therefore, S3G says that 35 U.S.C. § 102(g)(2)does not apply. (CBr. at 55.) S3G says Apple has to look to the inventors' activities before the priority date of the asserted patents and the evidence shows that neither the inventors nor SGI developed all of the elements of the claimed invention before October 2, 1997. (*Id.* at 56.) S3G says Mr. Drebin refused to assist in the application for the Drebin patent after he left SGI, because there were additions made after he left SGI in February 1998, and, therefore, some of what is taught in the patent was not there at the time he left. The project that Mr. Drebin and his colleagues at SGI were working on before his departure was called "Bali" and concerned { } (*Id.* (citing Tr. at 1197 (Peercy)).) But, argues S3G, Apple has not shown by sufficient evidence that Mr. Drebin and his coworkers conceived, and diligently reduced to practice, the invention that is claimed in the asserted patents before October 2, 1997, and even if Apple had shown that they had, SGI abandoned, suppressed, and concealed the Bali work. (*Id.* at 56.)

S3G says that because Apple cannot prove prior invention through Mr. Drebin's uncorroborated testimony, Apple attempts to supply corroboration through the testimony of Mr. Peercy, hearsay statements of Messrs. Migdal and Airey, and SGI's Bali documents. (*Id.* at 57.) S3G argues that there are significant holes in Apple's claim of invalidity by reason of Drebin because there is no corroborating source code that discloses the pertinent elements of the asserted claims of the '417 patent. (*Id.*) S3G says that when Mr. Drebin left SGI in 1998 he joined another graphics hardware firm, ArtX, and headed up work on a GPU (graphics processing unit) project named "Dolphin" for the Nintendo Game Cube. (*Id.*) {

} (*Id.* at 57-58.) Apple responds that an inventor's testimony can be corroborated by a non-inventor percipient witness or documents, both of which Apple has produced. (RBr. at 87.)

The Federal Circuit has held that section 102(g)(2) "relates to prior inventorship by another in this country" and "retains the rules governing the determination of priority of invention." *Kimberly-Clark Corp. v. Johnson v. Johnson*, 745 F.2d 1437, 1444 (Fed. Cir. 1984). As such, an interested party claiming his own prior inventorship must proffer evidence corroborating that testimony. *See e.g.*, *Sandt Technology, Ltd. V. Resco Metal & Plastics Corp.*, 264 F.3d 1344, 1350 (Fed. Cir. 2001); *Thomson, S.A. v. Quixote Corp.*, 166 F.3d 1172, 1176 (Fed. Cir. 1999). Here, the evidence shows Mr. Drebin is both an employee of Respondent Apple and an inventor of the Drebin Invention. (Tr. at 1267:9-17, 1268:9-13, 1298:11-17, 1299:13-25, 1301:20-1302:5.) Thus, the Administrative Law Judge finds Mr. Drebin's testimony regarding conception and reduction to practice must be corroborated.[12] Based on the parties' arguments set forth above, the issue of whether the Drebin Invention is prior art comes down to whether there is sufficient corroboration of Mr. Drebin's testimony to satisfy the quantum of evidence required by 35. U.S.C. § 102(g)(2).

Conception is the mental formation of a definite and permanent idea of the complete and operative invention as it is to be applied in practice. *Hybritech, Inc.*, 802 F.2d at 1376.

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[12] S3G argues that Apple has failed to show that the alleged prior invention was diligently reduced to practice. (CBr. at 56.) S3G is incorrect. Section 102(g) states that in determining priority of invention "there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception b the other." 35 U.S.C. 102(g)(2). Here, Apple argues that the alleged prior invention was conceived and reduced to practice at least by November 12, 1996, approximately ten months before the effective filing date of the asserted patents. (RBr. at 83-83.) Because the prior invention was allegedly conceived and reduced to practice before the effective filing date of the asserted patents, the statute does not require a showing of diligence.

"Conception is complete only when the idea is so clearly defined in the inventor's mind that only ordinary skill would be necessary to reduce the invention to practice without extensive research or experimentation." *Burroughs*, 40 F.3d at 1228. Reduction to practice requires that an invention be sufficiently tested to demonstrate that it will work for its intended purpose. *Kimberly-Clark*, 745 F.2d at 1445 (citing *Barmag Barmer Maschinenfabrik AG v. Murata Machinery, Ltd.*, 731 F.2d 831, 838 (Fed. Cir. 1984)). To determine whether an interested party's testimony has been sufficiently corroborated, the Federal Circuit applies a "rule of reason" analysis. In applying the "rule of reason" analysis, all pertinent evidence is examined in order to determine whether the testimony presented is credible. *Price v. Symsek*, 988 F.2d 1187, 1194-95 (Fed. Cir. 1993). "[E]ach corroboration case must be decided on its own facts with a view to deciding whether the evidence as a whole is persuasive." *Cooper v. Goldfarb*, 154 F.3d 1321, 1331 (Fed. Cir. 1998).

(a) *Whether Mr. Peercy's testimony corroborates Mr. Drebin's testimony regarding conception and reduction to practice of the Drebin Invention*

Apple argues that Mr. Peercy, who worked with Mr. Drebin on the Bali project, corroborated Mr. Drebin's statements about the compression system he developed and the fact that his invention was conceived and reduced to practice before November 12, 1996. (RBr. at 87 (citing Tr. at 1199 (Peercy)).) Apple says that a top-level block diagram, dated November 15, 1996, for an R-Chip that was responsible for texturing in the Bali system, corroborates Mr. Drebin's testimony that he built and tested his texture compression system before that date and provides a detailed discussion about what is shown in the diagram. (*Id.* at 87-92.)

S3G counters that Mr. Peercy's testimony does not corroborate Mr. Drebin because Mr. Peercy made no statement about the date that Mr. Drebin completed his invention. (CRBr. at 26.) Mr. Peercy estimated that the top-level block diagram of the R-Chip would have been developed at the middle to end of the architectural phase of the Bali project. (Tr. at 1205 (Peercy).) S3G says that the top-level block diagram of the R-Chip dated November 15, 1996 is contemporaneous with a meeting that occurred at the start of the design phase of the Bali project, and not at the point at which the project was finished. (*Id.*) Moreover, argues S3G, {

} (*Id.* (citing Tr. at 1204-05, 1214 (Peercy)).) S3G says that Mr. Peercy testified that he had provided Mr. Drebin with {

} (*Id.* (citing Tr. at 1198-99, 1211-12 (Peercy)).) S3G says Mr. Peercy's software would have been just as useful in a traditional two-color Color Cell Compression ("CCC") scheme as in Mr. Drebin's alleged four-color scheme, and Apple has not claimed that CCC anticipates the asserted patents. According to S3G, Mr. Peercy's testimony fails to show that Mr. Drebin conceived or reduced to practice anything more than a traditional CCC compression scheme. (*Id.*) For these reasons, S3G argues that Mr. Peercy's testimony is not corroborating. (*Id.*)

Staff says that the evidence does not demonstrate that the Drebin patent is prior art or that Mr. Drebin conceived his invention earlier than the date assigned in the patent. (SBr. at 36.) Staff concludes that Mr. Peercy's testimony does not corroborate Mr. Drebin with respect to an earlier conception date because Mr. Peercy acknowledged that Mr. Drebin's compression system developed during the Bali project { } (*Id.*

(citing Tr. at 1208-10 (Peercy)).) Also, according to Staff, Mr. Peercy admitted that the Bali project was secret and confidential, and he said {

} (*Id.* at 36-37 (citing Tr. at 1211 (Peercy)).) Instead, argues Staff, Mr. Peercy admitted that the algorithm he provided to Mr. Drebin {

} which Staff believes is not corroboration of a reduction of the invention in the Drebin patent to practice. (*Id.*)

For the reasons pointed out by S3G and Staff and the evidence cited by them, the Administrative Law Judge concludes that the testimony of Mr. Peercy does not corroborate Mr. Drebin's testimony that his invention was made on or before of November 12, 1996, or any other date prior to October 2, 1997. Notably, the evidence shows that the software that Mr. Peercy developed for the Bali project {

} (Tr. at 1211-12 (Peercy).) Also, the Administrative Law Judge finds that the SGI block diagram does not demonstrate a reduction to practice in software or hardware and does not provide details about the { } (*See* Tr. at 1214:2-13 (Peercy).)

(b) Whether the Migdal declaration corroborates Mr. Drebin's testimony regarding conception and reduction to practice of the Drebin Invention

S3G argues that the declaration of Mr. Migdal, who did not testify at the hearing, relied on by Apple to corroborate Mr. Drebin's claims, is inadequate for the task, noting that Mr. Migdal is also a named inventor on the Drebin patent and his testimony, like Mr. Drebin's, is not sufficient to prove prior invention. (CBr. at 58.) "Given that the Federal Circuit has deemed inventor testimony unreliable evidence," Mr. Migdal's declaration should be accorded no weight,

argues S3G. (*Id.* at 59.) Moreover, says S3G, Mr. Migdal's declaration, dated December 21, 1999, purports to confirm a priority date more than three years earlier, September 10, 1996 (or November 12, 1996), and is fortified by the following three exhibits—an undated copy of an internal SGI webpage; an email from David Wang, dated September 10, 1996, purporting to reference an internal SGI webpage; and an undated and incomplete portion of source code, which does not disclose texture compression. (*Id.*) Although Mr. Migdal is not a party and is not shown to have an interest in this Investigation, his declaration, relied on by Apple, was made as a co-inventor to the Patent Office in support of the Drebin patent, and therefore he had an interest in the subject matter of his declaration and is therefore subject to the corroboration rule. *See Thomson*, 166 F.3d at 1176.

S3G argues that the declaration and its accompanying exhibits do not establish the Drebin patent's conception or reduction to practice, for various reasons. (CBr. at 59.) First, the only one of these exhibits that has a date is the Wang email, which does not refer to the compression algorithm of the Drebin patent, only describes the characteristics of basic CCC, and concludes with the statement—"[w]e think CCC is our minimum requirement for texture compression." (*Id.* (citing Tr. 2424-25 (Richardson)).) Thus, argues S3G, this email makes no reference to any compression method other than CCC itself, which was already generally appreciated; therefore S3G concludes that it is not corroborative evidence. (*Id.*)

Next, S3G says that the SGI webpage printout exhibit ("Exhibit 1") does not mention the date of its creation and does not indicate that it is the same webpage referenced in the Wang email. (*Id.* at 60.) S3G argues that, assuming that the undated, hearsay Exhibit 1 was actually produced from SGI's internal website, the relevant evidence does not demonstrate that the

printed version of the webpage was the same version that existed on the internal SGI website on September 10, 1996 (or November 12, 1996). (*Id.*)

S3G contends that examination of the Migdal declaration and its supporting documents reveals that Exhibit 1 cannot be the SGI webpage that existed on the date of the Wang email, because, although the Wang email purports to quote from the "conclusion" portion of the SGI webpage, clear and unmistakable differences exist between the quotations in the Wang email and Exhibit 1, referring to CDX-1037.[13] (*Id.* at 60-61.) A comparison of the two does reveal differences in text, such as "transmit" in the Wang e-mail versus "transfer" in Exhibit 1, and continuing, respectively, "grouping" versus "quantization," "is" versus "can be," "is our last resort" versus "can come into rescue" and "to" versus "for." (*Id.*) These unexplained differences suggest that the Wang e-mail and Exhibit 1 represent different versions of the text therein mentioned and creates doubt about whether they are contemporaneous. S3G also says these discrepancies pointed out by Dr. Richardson raise doubts about the reliability of Exhibit 1 to the Migdal declaration for several reasons. (CBr. at 60-61.)

First, according to S3G, the webpage printout attached to the Migdal declaration has two sections following the "Conclusion"—"Source Code" and "Bob Drebin's New CCC Algorithm," but no documentation has been produced showing when these sections were added. (*Id.* at 61.) Nor is there any way to determine when the other sections of the webpage that appear before "Conclusion," particularly "Modified CCC," Progressive CCC," and "Simulation Results," were added. The lack of any date or version number on the website printout attached to the Migdal declaration, coupled with discrepancies (not specified by S3G) in certain text, makes impossible

[13] CDX-1037C is not itself substantive evidence but is useful as an adjunct to Dr. Richardson's testimony because it highlights the verbal discrepancies. The Migdal exhibits themselves confirm that what is depicted in CDX-1037C is substantively supported by documentary evidence.

any verification of what information was specifically included on SGI's internal website on September 10, 1996, says S3G, and therefore the Migdal declaration cannot be corroborated and does not provide clear and convincing evidence of a conception date of September 10, 1996, for the Drebin prior art. (*Id.*)

Second, according to S3G, the evidence fails to establish that Drebin was reduced to practice before the effective date of the asserted patents. (*Id.*) S3G argues that, despite the fact that Mr. Drebin in his hearing testimony references the webpage printout that accompanied the Migdal declaration, no simulation results were ever provided to the Patent Office or offered in evidence at the hearing. (*Id.* (citing Tr. 1311-14 (Drebin)).) S3G says that Mr. Drebin acknowledged that the segment of source code referred to in Exhibit 3 of the Migdal declaration is undated and incomplete, and does not describe compression, decompression, or the purported invention. (*Id.* (citing Tr. at 1331-32, 1339-40 (Drebin)).) Even if this source code were relevantly dated, says S3G, Mr. Drebin admitted that it does not comprise a complete program, does not compile, and does not describe compression. (*Id.* (citing Tr. at 1331-32 (Drebin), 2428 (Richardson)).) Instead, argues S3G, the source code describes a function called "to565," which does not appear to exist; a main function; a "ReadImg" function; a "WriteImg" function; and parts of a quantize function. (*Id.* (citing Tr. at 2427-28 (Richardson)).) However, according to S3G, the minimum requisites for a compression algorithm that practices the claimed invention are receiving an original image, dividing it into blocks, generating colors, generating indexes, and outputting compressed blocks. (*Id.* at 62-63 (citing Tr. at 2428-29 (Richardson)).) At best, says S3G, the source code referred to by Apple only shows the steps of outputting an uncompressed image, leaving Mr. Migdal's declaration deficient as far as being corroboration for Mr. Drebin's testimony. (*Id.* at 63.)

S3G argues that the SGI documents are top-level architecture, block documents—not circuit schematics—and do not identify the functions that lie within the blocks. (*Id.* at 65.) S3G says that the "decompressor" block was the element of the Bali project that was to handle compressed textures, but it does not itself inform how its decompression is accomplished. (*Id.*) According to S3G, there are no dates shown in these SGI block diagrams and the texture un-packer block diagrams were not part of the specification nor submitted in support of the Drebin patent while it was before the Patent Office. (*Id.*) Also, says S3G, the SGI documents reflect that they were works in progress and not complete ideas—for example, there is no indication what the three empty boxes shown in the supporting block diagram represent. (*Id.*)

Staff also maintains that the evidence that Drebin's invention was conceived and reduced to practice as of the date asserted by Apple is not clear and convincing. (SBr. at 37.)

The Administrative Law Judge concludes that the Migdal declaration does not corroborate that Mr. Drebin and his colleagues conceived and reduced to practice the Drebin Invention on or before November 12, 1996, or any other date prior to October 2, 1997. In particular, the Administrative Law Judge finds the Migdal declaration does not provide sufficient details with respect to the dates of the accompanying exhibits or the content of the source code to demonstrate clearly and convincingly that the Drebin Invention was fully conceived at that point in time. Additionally, the Administrative Law Judge finds that provenance dates are omitted in the case of two of the exhibits and that there are verbal discrepancies in what purports to be contemporaneous quotations between two of the supporting exhibits. (Tr. at 2425:8-2426:7 (Richardson); RX-418 at APPLES3G00499230-32, 234-35; RX-549 at APPLES3G02275626-27. *See also* CDX-1037C.)

Mr. Drebin testified that the patent that bears his name was "authored" after he left SGI in the spring of 1998 and that there was confidential information added after he departed SGI. (Tr. at 1318, 1320 (Drebin).) The Administrative Law Judge finds that there are gaps and omissions of important details, and too much need for supposition, to conclude that the invention that Mr. Drebin was working on was fully conceived, let alone reduced to practice, by the time he left SGI in February 1998. Mr. Drebin's testimony itself, casts doubt on Apple's allegation of priority, and this deficiency is not resolved by Mr. Migdal's declaration and the purport of the documents attached to it. Although Apple argues that reliance on the totality of the evidence is important, and appropriate (RRBr. at 41), the Administrative Law Judge notes the problem here is that the evidence is, at best, arguable, rather than clear and convincing. The evidence shows the source code exhibit is incomplete, lacking features such as compression and decompression. (Tr. at 1332 (Drebin).) Additionally, although Mr. Drebin testified that he was familiar with the printout of the webpage that was attached to the Migdal declaration and concluded that it had to exist prior to December 21, 1999, as suggested by S3G (Tr. at 1331 (Drebin)), because he did not leave SGI until February 1998, according to his recollection, there remains a question whether the webpage was in existence in 1996 or any time before October 2, 1997. In hindsight, Mr. Drebin may believe that the invention that is the subject of his patent was fully realized before he left SGI, but his statements and actions at the time suggest otherwise.

(c) Whether the Airey declaration corroborates the conception date of Drebin.

S3G argues that the declaration made by John Airey and relied upon by Apple, also fails to corroborate Mr. Drebin's conception-date claim. (CBr. at 63.) Mr. Airey's declaration, remarks S3G, was submitted in support of a different SGI patent, not asserted as prior art in this

case, on which he and Mr. Drebin are two of the named inventors. (*Id.*) S3G argues that, although Airey's patent application is generally directed to image processing systems, the content of the application has no bearing on texture compression, texture decompression, or the subjects of the asserted patents but instead is directed to the use of floating point numbers in rasterization and frame buffers. (*Id.* at 64 (citing Tr. at 2431 (Richardson)).) S3G says that not only does the Airey declaration make no mention of texture compression, it does not even attempt to establish an invention date, for itself or the Drebin patent. (*Id.*) According to S3G, the Airey declaration and patent are not relevant at all to this case. (*Id.*)

According to S3G, the Airey declaration describes an SGI off-site meeting about the Bali project (out of which Drebin arose) and has attached to it notes purporting to be from that meeting. (*Id.*) S3G argues that SGI's own actions confirm that the Airey declaration and documents are irrelevant for corroborating Drebin because they previously were not produced in support of the Drebin patent application; nor do they explain how compression or decompression are performed. (*Id.*) Staff inferentially agrees. (SBr. at 35-37, 73-74.)

The Administrative Law Judge concludes that the Airey declaration is not corroborative evidence that the invention of the Drebin patent was conceived and reduced to practice on or before November 12, 1996, or any other date prior to October 2, 1997.

(d) *Conclusion.*

Based on the above findings, the Administrative Law Judge concludes that the totality of the evidence is not clear and convincing that the Drebin Invention was made before the priority date of the asserted patents. The Administrative Law Judge finds that Mr. Drebin's statements are not corroborated by sufficient detailed and specific evidence.

(2) *Whether Drebin was abandoned, suppressed, or concealed.*

S3G argues that the Bali project that led to Drebin was either abandoned, suppressed, or concealed, or all of these. (CBr. at 66.) S3G says that the Bali project {

} (*Id.* (citing Tr. at 1208-10 (Peercy)).) S3G says that while the Bali project was under development, SGI withheld the project's details from the public. (*Id.*) S3G says that neither Apple nor Mr. Drebin have explained why SGI waited until September 28, 1998 to file an application for the Drebin patent and says that what apparently spurred it to do so was the discovery of S3's invention of S3TC. (*Id.*) According to S3G, these facts demonstrate that SGI abandoned, suppressed, and concealed the Bali project and it is Apple's burden to demonstrate through clear and convincing evidence that the facts are otherwise. (*Id.*)

Apple, citing *Apotex USA, Inc. v. Merck & Co., Inc.*, 254 F.3d 1031, 1037 (Fed. Cir. 2001), argues that because Apple presented clear and convincing evidence of prior invention under 35 U.S.C. § 102(g), it is S3G's burden "to produce evidence sufficient to create a genuine issue of material fact as to whether the prior inventor has suppressed or concealed the invention." (RRBr. at 43.) Inasmuch as Apple's evidence for prior invention has been rejected, it does not follow that the burden of going forward has shifted to S3G. Nevertheless, S3G responds that the evidence indicates that the Drebin project (Bali) was abandoned, suppressed, or concealed

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(CRBr. at 30 (citing RX-548 at APPLES3G02278731-733, Tr. 1208-10 (Peercy)).) S3G says

{ } (*Id.* at 31 (citing Tr. at 1216-18

(Peercy)).) S3G suggests that what actually prompted SGI to eventually file the Drebin patent application was its discovery of S3's invention of S3TC, which SGI wanted to cover. (*Id.*)

The Administrative Law Judge concludes that even if the Drebin Invention was conceived and reduced to practice before the priority date of the asserted patents, which it was not, the evidence shows that the Drebin Invention was concealed, suppressed, or abandoned prior to the priority date of the asserted patents. Even if it were assumed that Drebin had been reduced to practice on or before November 12, 1996, the evidence does not explain or account for the lapse between that date and the date of the Drebin patent application, September 28, 1998. (RX-418 at APPLES3G00499222, RBr. at 83.) Apple contends that, according to *Apotex*, 254 F.3d at 1038, the fact that SGI eventually sought patent protection defeats any contention that the inventor actively abandoned his invention. (RRBr. at 43.) That overstates the court's holding. The *Apotex* court noted that, even though the prior inventor may have suppressed or concealed the pertinent invention between the reduction to practice and the patent application, this failure was overcome by the inventor's *resumption of activity* before the second inventor's date of conception. *Id.* at 1039-40. That is not the case here. The Administrative Law Judge finds that the evidence does demonstrates, clearly and convincingly, that SGI did not actively pursue the Drebin Invention either consistently or at least resumed doing so up to the priority date of the asserted patents. Therefore the Administrative Law Judge concludes that the Drebin Invention does not fulfill the requirements of 35 U.S.C. Section 102(g)(2).

(3) *Whether Drebin teaches the header limitation of the asserted patents.*

Apple contends that Drebin discloses, either expressly or inherently, every limitation of the asserted claims of the '417 patent. (RBr. at 96.) According to Apple, Dr. Richardson only

identified one feature, the use of headers, as being missing from Drebin and claims that S3G concedes that Drebin teaches every other element. (*Id.* (citing Tr. at 2435 (Richardson), 1580-94 (Drebin)).) Apple argues that, just as in the case of Hoffert, *supra*, the use of headers in image and video compression systems was commonplace by the early 1990s, and by 1996 when Mr. Drebin made his invention, the use of headers had become more common. (*Id.*) Apple argues that Drebin discloses that its system may be performed in either software or hardware. (*Id.* at 97.) Apple says Dr. Delp testified that if the compression scheme of Drebin is implemented in software, which is an open system, headers are necessary to manage the image files. (*Id.* (citing Tr. at 1595-96 (Delp)).) According to Apple, not only is a header inherent in software but so too is the fact that a header would be separated from the image data before compression or decompression occurs. (*Id.*) Apple says that Drebin teaches compressing and decompressing one block of image data at a time, the blocks of data being necessarily separated from the header before the blocks are encoded or decoded. (*Id.*)

Apple says that Dr. Richardson testified that the hardware embodiment in Drebin does not require a header, but Apple argues that his testimony was based on "the same flawed analysis" he applied to Hoffert. (*Id.*) Apple says that Dr. Richardson did not dispute Dr. Delp's testimony that the Drebin software embodiment on a general purpose computer using common programming necessarily requires a header. (*Id.*) Apple contends that if a feature is required for one embodiment, it is inherent even though it may not be necessary for other embodiments. (*Id.*)

S3G says the Drebin patent does not teach the header limitations of the asserted patents and that Dr. Delp agreed that the "header" limitations in the asserted claims are not explicitly present in Drebin. (CBr. at 67.) S3G argues that neither is a header necessarily, and therefore inherently, present in Drebin despite Dr. Delp's testimony. (*Id.* at 67 (citing Tr. at 2435

(Richardson)).) S3G argues that in the first place, the software at issue in this Investigation can compress and decompress files without headers—for example, *texturetool* is a software application that runs on a general purpose open system Mac computer and is capable of, and in fact is programmed for, compressing and decompressing images with or without a header. (*Id.* at 69 (citing Tr. at 1636-37 (Delp)).) S3G says that Dr. Richardson testified that in the era of the Drebin Invention, textures were placed in dedicated memory and the location of the texture data was fixed and known by the system in which it was employed. (*Id.* at 70 (citing Tr. at 2437-38 (Richardson)).) S3G says numerous compression formats do not use headers: CCITT fax compression standard, the CTI format, the Amiga system, for example. (*Id.*) S3G says that even the Normile patent that Apple relies on to show the existence of headers cautions that there are situations when a header is disadvantageous. (*Id.*) S3G argues that the Normile patent teaches that the use of a header with certain blocks, such as a no-change block, adds block header "overhead" and increases the number of bits. (*Id.* (citing Tr. at 1792 (Delp)).) Ultimately, argues S3G, Dr. Delp pointed out the error of Apple's inherency argument when he testified that that "the prior art could have a header" (as opposed to saying it did or would have), and this is not sufficient to prove that the missing element is inherent. (*Id.* at 71.) S3G argues that Apple has not provided evidence that proves that a header is necessary or required to implement the system described in Drebin. (*Id.*)[14]

Staff, although it disputes that Drebin is prior art, does not specifically discuss whether Drebin inherently discloses a header as far as meeting the header element of the '417 patent. (SBr. at 73-74.)

[14] S3G's argument cited here actually concerns the Hoffert patent, but S3G adopts that same argument in the section of its brief that addresses the issue of inherency of a header in the case of the Drebin patent. (CBr. at 67.)

The Administrative Law Judge found above that the Drebin Invention is not prior art to the '417 patent. Even if this were not the case, the Administrative Law Judge concludes that the evidence does not demonstrate clearly and convincingly that Drebin explicitly or inherently anticipates the header element that is disclosed in the asserted claims of the '417 patent. No one testified that Drebin explicitly discloses a header; Dr. Richardson testified for various reasons, and gave multiple examples, that a header is not inherent in Drebin; and Dr. Delp, while testifying that a header could be present in the prior art did not definitively demonstrate that it necessarily must be so. At a minimum, the Administrative Law Judge finds there is a reasonable dispute between the experts about whether a header was necessarily included in Drebin. Thus, the Administrative Law Judge finds that Apple's evidence on this point is not clear and convincing.

2. '087 Patent.

a) Claims 1 and 6 in light of Hoffert.

Apple says that it presented clear and convincing evidence that Hoffert teaches every element of claims 1 and 6 of the '087 patent and contends that S3G concedes that Hoffert teaches the fundamental features of the compression and decompression scheme of the asserted patents. (RBr. at 114-115 (citing to Apple's invalidity argument with respect to the '417 patent).) Once again, Apple contends that Dr. Richardson only disputed whether Hoffert teaches the "header" limitations of claims 1 and 6 and the "block type" limitation of claim 6. (*Id.* at 115.) Apple says that the evidence shows Hoffert teaches "a block type detector configured for determining a block type for each of the at least one compressed image block based on the at least one associated codeword" as claimed in claim 6 of the '087 patent. (*Id.* (citing its argument with respect to the '417 patent.) Apple says that the asserted claims of the '087 patent include the

same header element as the '417 patent—an encoded image decomposer for decomposing the encoded image data file into a modified header. (*Id.*) Apple argues that it presented clear and convincing evidence that this header element is inherent in Hoffert. (*Id.* (citing its argument with respect to the '417 patent).)

S3G argues that none of Apple's asserted references teaches each element of the asserted claims. (CBr. at 168 (citing its argument with respect to the '146 patent).) S3G says claim 1 of the '087 patent requires a "modified header" that is not present in Hoffert and for this reason claim 1 is not anticipated by Hoffert. (*Id.* (citing its argument with respect to the '146 patent).) S3G says that claim 6 of the '087 patent requires a "modified header" that is not present in Hoffert and also requires a "block type detector" that is not present either. (*Id.* (citing its argument with respect to the '146 patent).)

Staff says the only dispute is whether Hoffert anticipates the header and block type indicator limitations of the asserted '087 patent claims. (SBr. at 33.) Staff says that there is a dispute between Drs. Delp and Richardson about whether headers are required for software applications in general purpose computers. (*Id.* at 34.) In Staff's view Dr. Richardson's testimony was more persuasive particularly given the fact that Dr. Delp retreated from an overly broad generalization when confronted with his non-infringement opinions regarding software implementations of DXT on Apple Mac general purposes computers, which do not use headers. (*Id.*)

The Administrative Law Judge concludes, for the reasons stated above with regard to the '417 patent, that the evidence does not clearly and convincingly demonstrate that Hoffert satisfies the header limitations of claims 1 and 6 of the '087 patent but does clearly and

convincingly demonstrate that Hoffert satisfies the "block type" limitation of claim 6. Therefore, Hoffert does not anticipate claims 1 and 6 of the '087 patent.

b) Claims 1 and 6 in light of QuickTime.

Apple says that it presented clear and convincing evidence that QuickTime teaches every element of claims 1 and 6 of the '087 patent and that S3G concedes that QuickTime implemented every element of the asserted claims of the '087 patent except the "header" limitation of claims 1 and 6 and the "block type" limitation of claim 6. (RBr. at 115 (citing to Apple's invalidity argument with respect to the '417 patent).) Apple says that S3G's expert only disputed whether QuickTime implements these two limitations. (*Id.* (citing Tr. at 2447-49 (Richardson)).) Apple says its evidence that QuickTime teaches every other element of the asserted claims of the '087 patent is not disputed. (*Id.* (citing its argument with respect to the '417 patent).) Apple argues that its evidence given with respect to the '417 patent also establishes, clearly and convincingly, that QuickTime implements that header limitations of claims 1 and 6 of the '087 patent and block type limitation of claim 6. (*Id.*)

S3G argues that none of Apple's asserted references teaches each element of the asserted claims. (CBr. at 168 (citing its argument with respect to the '146 patent).) S3G says claim 1 of the '087 patent requires a "modified header" that is not present in QuickTime and for this reason claim 1 is not anticipated by QuickTime. (*Id.* (citing its argument with respect to the '146 patent).) S3G says that claim 6 of the '087 patent requires a "modified header" that is not present in QuickTime and also requires a "block type detector" that is not present either. (*Id.* (citing its argument with respect to the '146 patent).)

Staff says Mr. Hoffert acknowledged that his patent discloses only four types of coding schemes, whereas QuickTime has seven types which are different, and also testified that he was not sure which codecs and which versions were in QuickTime 1.0. (SBr. at 38.) Therefore Staff concludes his testimony is not reliable. (*Id.* at 38.) Staff argues that Mr. Batson testified that the decompress function in QuickTime that Apple relies on for anticipation was not in the product because the source code Apple referred to as the foundation for its evidence was part of a debug routine that was not included in the compiled (assembled) program. (*Id.*) Staff therefore reasons that Dr. Delp's opinion based on it was faulty, resulting in inadequate evidence. (*Id.*)

The Administrative Law Judge concludes for the reasons stated above regarding the '417 patent that the evidence fails to demonstrate clearly and convincingly that QuickTime 1.0 anticipates either the header or the block type limitations disclosed in the asserted claims of the '087 patent.

c) Claims 1 and 6 in light of Drebin.

Apple alleges that claims 1 and 6 of the '087 patent are anticipated by Drebin. (RBr. at 116.) Apple claims that S3G concedes that Drebin teaches every aspect of the compression and decompression scheme of the asserted claims except the header, and that S3G's expert only disputed whether Drebin teaches the header limitation of claims 1 and 6. (Id. (citing Tr. at 2435 (Richardson)).) Apple relies on the arguments it made in support of its allegation that Drebin anticipates the asserted '417 patent claims to support its allegation that claims 1 and 6 of the '087 patent are anticipated by Drebin. (*Id.*)

S3G asserts that claim 1 of the '087 patent requires a "modified header" that is not present in Drebin and therefore is not anticipated. (CBr. at 168.)

Staff does not believe there is clear and convincing evidence that Drebin anticipates the '087 patent. (SBr. at 35.) Staff says that Apple's expert Dr. Delp opined that Drebin inherently discloses a header and block type indicator because the Drebin codec can be implemented in software. (*Id.*) Staff argues that Dr. Delp, on cross-examination, retreated from that position when he was confronted with an opposing opinion regarding non-infringement. (*Id.*) Staff says that Dr. Delp's opinion regarding the presence of the block type limitation in Drebin is unconvincing because he admitted that Drebin is a fixed-rate system which does not necessarily need a block type indicator; therefore his opinion that a block type indicator is inherently present in Drebin must be rejected. (*Id.* at 36.)

Staff says that the testimony of Messrs. Drebin and Peercy do not remedy Dr. Delp's failed testimony because Mr. Drebin refused to sign a declaration in support of the Drebin patent application on the basis that it was filed after he left SGI and other subject matter was added. (*Id.* at 36.) Staff says that Apple's and Mr. Drebin's assertions that he conceived and reduced to practice the Drebin patent invention earlier than the date assigned to the patent are not supported by the evidence. (*Id.*) Staff argues that Mr. Drebin was unable to produce any document to corroborate an earlier date for his invention than the patent application's filing date. (*Id.*) As for Mr. Peercy's testimony, Staff says he admitted on cross-examination that Mr. Drebin's compression system in the Bali project {

} (*Id.*) Staff also says that Mr. Peercy confirmed that {

} (*Id.* at 37.) Staff contends that the documents that Apple relies on for corroboration of Mr. Drebin's testimony are not signed and are not directly related to the subject matter disclosed in the Drebin patent. (*Id.*) Staff says the excerpt

of source code that is attached to the Migdal declaration in support of the Drebin patent is undated and does not have any compression functions. (*Id.*) For these reasons, Staff believes that Apple's allegation that Drebin is prior art is not supported by clear and convincing evidence.

The Administrative Law Judge found above that Drebin is not prior art. (*See* Section V.B.1.d) above.) The Administrative Law Judge further concludes for the reasons stated above for the '417 patent that the evidence fails to demonstrate clearly and convincingly that Drebin anticipates the asserted claims of the '087 patent.

3. '146 Patent.

a) Claim 4 in light of Hoffert.

Apple contends that the evidence is clear and convincing that Hoffert teaches every element of claim 4 of the '146 patent. (RBr. at 121.) Apple says that S3G concedes that Hoffert teaches the fundamental features of the compression and decompression schemes of the asserted patents. (*Id.* (citing and adopting its allegations that the '417 patent is anticipated by Hoffert).) Apple says that, at the hearing, S3G's expert only disputed whether Hoffert teaches the "block type" limitations of claim 4. (*Id.* (citing Tr. at 2439-42 (Richardson)).) Apple says claim 4 includes the following block type element—a block type module, coupled to receive the image block, for selecting a block type for the image block. (*Id.* at 121-122.) Referring to its arguments that Hoffert anticipates the asserted '417 patent claims, Apple argues that Hoffert also anticipates claim 4 of the '146 patent. (*Id.*)

S3G argues that Hoffert cannot anticipate or render obvious the claims of the asserted patents for two reasons. First, Hoffert does not explicitly teach all of the limitations of the asserted patents, and second, it is directed to a fundamentally different type of compression technology. (CBr. at 68.) S3G disputes that Hoffert discloses a header and says that Dr. Delp

admitted that the header limitations of the asserted claims are not explicitly mentioned in Hoffert. (*Id.* (citing Tr. at 1690).) S3G says that Hoffert expressly teaches a preferred embodiment that uses a closed, hardware-based system without headers. (*Id.* at 68-69 (citing Tr. at 2442-43 (Richardson), 1473-74, 1690, 1732-33 (Delp)).) Furthermore, Dr. Delp did not say that headers would be inherent or necessary in hardware-based systems and even admitted that headers are not needed in closed systems, argues S3G. (*Id.* at 69 (citing Tr. at 1713-14).) The fact that Dr. Delp testified that it was his opinion that headers are necessary for managing files in an open software system, does not, according to S3G, make them inherent should Hoffert be implemented in software applications (*id.* (citing Tr. at 2442, 2561-62 (Richardson))) because "[i]nherent anticipation requires that the missing descriptive material is necessarily present, not merely probably, or possibly present, in the prior art." (*Id.* (citing *Therasense,* 593 F.3d at 1332).)

S3G contends that, contrary to Dr. Delp's opinion, the evidence shows that headers are not required in software-based systems for several reasons. First, the software at issue in this Investigation can compress and decompress files without headers. (*Id.* (citing Tr. at 1336-37 (Delp)).) For example, *texturetool* is a software application that runs on a general purpose open system Mac computer and is capable of compressing and decompressing images without headers and gives the user a choice of whether or not to employ headers. (*Id.*) Second, relevant literature at the time of Hoffert confirms that headers were optional. (*Id.* at 70 (citing a Beers article confirming that in the latter half of the 1990s, textures were frequently placed in dedicated memory because it was essential that the data be quickly accessed for rendering).) For this reason, argues S3G, there was no need at the time of Hoffert to move textures around or manage them and no need for them to have headers. (*Id.*) S3G notes that Dr. Richardson explained that

when placed in dedicated memory, the location of texture data was fixed and known by the system and there was no need for them to have headers. (*Id.* (citing Tr. at 2437-38).)

A third reason, according to S3G, is the fact that numerous compression formats do not contain headers, such as the CCITT fax compression standard, the CGI format, and Amiga system. (*Id.* (citing Tr. at 2479 (Richardson)).) A fourth reason, says S3G, is the fact that the Normile patent that Dr. Delp relies on to show the existence of headers at the time of Hoffert cautions that there are situations when headers are disadvantageous. (*Id.* (citing Tr. at 1792 (Delp)).) Normile teaches that use of headers with certain blocks, such as no-change blocks, adds "block header overhead" and increases the number of bits. (*Id.*) According to S3G, Dr. Delp himself pinpoints the critical weakness in Apple's inherency argument: the fact that the prior art could, but does not have to, have a header. (*Id.* at 71.) S3G says Apple provided no evidence that proves a header is necessary or required to implement the system described in the Hoffert patent, and, therefore, the header limitations of the '146 patent are not inherent in Hoffert. (*Id.*)

Staff says that the evidence does not show that Hoffert anticipates claim 4 of the '146 patent because Hoffert does not expressly or inherently disclose the claimed header. (SBr. at 33.)[15] Staff discounts Dr. Delp's testimony that headers would have to be used to decompress images in general purpose computers, contending that he retreated from that position when he was confronted on cross-examination with his non-infringement opinions regarding software implementations of DXT on the Apple Mac general purpose computers. (*Id.* at 34.) Staff argues that Dr. Richardson, in contrast to Dr. Delp, testified that Hoffert does not necessarily include

[15] Although this section of Staff's brief concerns the '087 patent, Staff refers to and adopts that same argument in reference to claim 4 of the '146 patent.

headers in the decompression system disclosed therein. (*Id.*) Staff finds Dr. Richardson's testimony more convincing than Dr. Delp's.

The Administrative Law Judge concludes that the evidence does not demonstrate, clearly and convincingly, that Hoffert satisfies the header limitation of asserted claim 4 of the '146 patent for the reasons stated above regarding the '417 patent.

b) Claim 4 in light of QuickTime.

Apple alleges that the evidence is clear and convincing in demonstrating that QuickTime teaches every element of claim 4 of the '146 patent and says that S3G only contests whether QuickTime implements the "block type" limitation. (RBr. at 122.) Adopting its arguments with respect to the '417 patent, Apple says the same reasoning and evidence also establishes that claim 4 of the '146 patent was anticipated by QuickTime. (*Id.*)

S3G argues that Apple was not able to prove by clear and convincing evidence that QuickTime is prior art. (CBr. at 74.) S3G says that the first version of QuickTime was 1.0 and says that Apple did not produce any published references that described the specific features of QuickTime 1.0, nor were any of the witnesses who testified aware of any published references. (*Id.* at 75 (citing Tr. at 1695 (Delp)).) According to S3G, the only documentary evidence directly illustrating the features of QuickTime 1.0 is its source code. (*Id.* (citing Tr. at 1702 (Delp), 1230, 1235 (Batson)).) However, according to S3G, the source code relied upon by Apple and Dr. Delp to demonstrate that QuickTime 1.0 anticipated claim 4 was a debug segment that was not compiled into the commercial product's reference. (*Id.* (citing Tr. at 1494-98 (Otenweller)).) S3G says Apple cannot establish by clear and convincing evidence what features were actually in QuickTime 1.0. (*Id.*)

By way of example, S3G says that Apple's witnesses testified that QuickTime 1.0 originally included five different codecs, including a "video codec", and Apple alleged that the video codec implemented a compression and decompression scheme given the code name "Road Pizza." (*Id.* at 75-76.) This, according to Apple, was the name given to Mr. Hoffert's compression and decompression algorithm; however, argues S3G, the evidence indicates that QuickTime was a continually changing product and the video codec in QuickTime 1.0 was different from the compression and decompression scheme described in the "Road Pizza" documentation. (*Id.* at 76 (citing Tr. at 1702, 1720-21 (Delp), 1133-34, 1155 (Hoffert)).) S3G contends that the documents pointed to by Apple either involve different versions of QuickTime or various proposed hardware implementations that were not completed. (*Id.* (citing Tr. at 1718-19 (Delp), 1154 (Hoffert)).) According to S3G, the only other documentation identified by Apple that relates to QuickTime is the "Inside MacIntosh: QuickTime" reference book, which does not describe QuickTime 1.0. (*Id.* (citing Tr. at 1485-86, 1694-95 (Delp), 1261-63 (Batson) 1192-93 (Hoffert), 2450-51 (Richardson)).) Consequently, S3G contends that Apple was not able to establish by clear and convincing evidence what features were actually in QuickTime 1.0. (*Id.* at 76-77.)

Staff opposes Apple's contention that claim 4 of the '146 patent was anticipated by QuickTime 1.0. (SBr. at 37-39.) Staff says that Mr. Hoffert acknowledged that his patent discloses only four types of coding schemes, whereas QuickTime has seven types that are different, and also testified that he was not sure which codecs and which versions were in QuickTime 1.0, and therefore his testimony is not reliable. (*Id.*) With respect to Mr. Batson's testimony, Staff says he revealed that the decompress function in QuickTime that Apple relies on for anticipation was not in the product because the pertinent source code was part of a debug

routine that was not included in the compiled (assembled) program and therefore Dr. Delp's reliance on it was faulty. (*Id.*)

The Administrative Law Judge concludes that the evidence is not sufficient to demonstrate that QuickTime 1.0 included all of the elements of claim 4 of the '146 patent, including the header limitation. Dr. Richardson's testimony (Tr. 2450-51) raises serious questions about Apple's basis for its allegation and the questions he raises are not resolved in Apple's favor by the testimony of Apple's other witnesses. Apple's evidence involves discrepant and uncorroborated testimony that is partly based on a faulty recitation of source code, leaving unanswered and subject to speculation material questions about the contents and origination dates of the documentary evidence relied on by Apple.

c) Claims 4, 13, and 16 in light of Drebin.

Apple says it presented clear and convincing evidence that Drebin teaches each element of claims 4, 13, and 16 of the '146 patent and says that S3G concedes that Drebin teaches every aspect of the compression and decompression scheme of the asserted patents except the headers. (RBr. at 122.) For the same reasons that it alleges that Drebin anticipates the asserted claims of the '417 patent, Apple says that Drebin anticipates claims 4, 13, and 16 of the '146 patent. (*Id.*) Apple claims that Dr. Richardson's only basis for rejecting Drebin as anticipating the asserted '146 patent claims was Drebin's failure to disclose a header. (*Id.* (citing Tr. at 2435 (Richardson)).)

S3G disputes Apple's assertion that Drebin is prior art. (CBr. at 54-55.) S3G claims that Apple does not dispute that all of the asserted claims are entitled to a priority date of October 2, 1997. (*Id.* at 54.) S3G argues that, as a matter of law, Drebin is not prior art because Mr. Drebin acknowledged that the teachings of the patent that bears his name did not exist when he left SGI

in February 1998; therefore, S3G says that 35 U.S.C. § 102(g)(2)does not apply. (CBr. at 55.) S3G says Apple has to look to the inventors' activities before the priority date of the asserted patents and the evidence shows that neither the inventors nor SGI developed all of the elements of the claimed invention before October 2, 1997. (*Id.* at 56.) S3G says Mr. Drebin refused to assist in the Drebin patent application after he left SGI, because there were later additions made and therefore some of what is taught in the patent post-dated his departure. (*Id.*) The Bali project that Mr. Drebin and his colleagues at SGI were working on before his departure concerned { } (*Id.* (citing Tr. at 1197 (Peercy)).) But, argues S3G, Apple has not shown by sufficient evidence that Mr. Drebin and his coworkers conceived, and diligently reduced to practice, the invention that is claimed in the asserted patents before October 2, 1997, and even if Apple had shown that they had, SGI abandoned, suppressed, and concealed the work that Drebin and his colleagues had done on Bali. (*Id.* at 56.)

S3G says that because Apple cannot prove prior invention through Mr. Drebin's uncorroborated testimony, Apple attempts to supply corroboration through the testimony of Mr. Peercy, hearsay statements of Messrs. Migdal and Airey, and SGI's Bali documents. (*Id.* at 57.) S3G argues that there are significant holes in Apple's claim of invalidity by reason of Drebin because there is no corroborating source code that discloses the pertinent elements of the asserted claims. (*Id.*) S3G says that when Mr. Drebin left SGI in 1998 he joined another graphics hardware firm, ArtX, and headed up work on a GPU (graphics processing unit) project named "Dolphin" for the Nintendo Game Cube. (*Id.*) {

} (*Id.* at 57-58.)

Staff says that the evidence does not demonstrate that the Drebin patent is prior art or that Mr. Drebin conceived his invention earlier than the date the Drebin application was filed. (SBr. at 36.) Staff concludes that Mr. Peercy's testimony does not corroborate Mr. Drebin's because Mr. Peercy acknowledged that Mr. Drebin's compression system developed during the Bali project { } (*Id.* (citing Tr. at 1208-10 (Peercy)).) Also, according to Staff, Mr. Peercy admitted that the Bali project was secret and confidential and said that {

}

(*Id.* at 36-37 (citing Tr. at 1211 (Peercy)).) Instead, argues Staff, Mr. Peercy admitted that the {

} which Staff believes is not corroboration of a reduction to practice the invention in the Drebin patent. (*Id.*)

Apple responds that an inventor's testimony can be corroborated by a non-inventor percipient witness or documents, both of which Apple has produced. (RBr. at 87.) The issue comes down to whether there is sufficient corroboration of Mr. Dreben, an employee of Apple, to satisfy the quantum of evidence required under 35 U.S.C. § 102(g)(2).

The Administrative Law Judge concludes that the evidence is not clear and convincing that the invention disclosed in Drebin was made before the priority date of the asserted patents and was not abandoned, suppressed or concealed. Mr. Drebin's statements are not corroborated by sufficient detailed and specific evidence. For reasons pointed out by S3G and Staff, and evidence cited by them, the Administrative Law Judge concludes that the testimony of Mr. Peercy does not corroborate Mr. Drebin's testimony that his invention was made on or before November 12, 1996, or any other date prior to October 2, 1997. The software that Mr. Peercy

developed for the Bali project did not compress or decompress data or calculate a set of colors from codewords. (Tr. at 1211-12 (Peercy).) The SGI block diagrams do not demonstrate a reduction to practice in software or hardware and do not provide details about the { } The Administrative Law Judge concludes that Drebin is not prior art to the '146 patent.

4. '978 Patent.

a) Claims 11, 14, and 16 in light of Drebin.

Apple applies the anticipation arguments it made for the '417 patent to claims 11, 14, and 16 of the '978 patent. (RBr. at 137.) Apple says that the Drebin patent teaches every aspect of the compression and decompression scheme of the asserted patents except headers, and says further that S3G's expert did not assert that Drebin failed to teach any element of claims 11 or 14. (*Id.*) Apple says that Drebin teaches each element of claim 16 and S3G's expert only disputed whether Drebin teaches the "header" limitation of claim 16. (*Id.*)

S3G does not specifically address claims 11 and 14 of the '978 patent, but says that even if Drebin were prior art, it does not anticipate claim 16 because it does not teach the header limitation. (CBr. at 138-39; CRBr. at 52.) S3G says that the parties agree that Drebin does not expressly teach a header and says that Apple's contention that Drebin inherently discloses a header because of its software embodiment is not true. (*Id.*) S3G and Staff also rely on arguments made in connection with the other asserted patents to oppose Apple's anticipation allegations with respect to the '978 patent. (*Id.*; SRBr. at 29.)

The Administrative Law Judge concludes for the same reasons mentioned above for finding that Drebin does not anticipate any asserted claims of the '417 patent that it does not anticipate claims 11, 14, and 16 of the '978 patent.

b) Claim 16 in light of Hoffert.

Apple alleges that Hoffert teaches every element of claim 16. (RBr. at 137.) Apple says that S3G concedes that Hoffert teaches the fundamental features of the compression and decompression scheme of the asserted patents (citing its arguments regarding the same issue in relation to the '417 patent) except the "header" limitation. (*Id.* (citing Tr. at 2439-42 (Richardson)).) Just as with the '417 patent, Apple says claim 16 inherently includes a header element. (*Id.*)

S3G counters that Hoffert does not teach the header limitation of claim 16 because, first, the parties agree that Hoffert does not expressly include that element. (CRBr. at 53-54 (citing Tr. at 1690 (Delp), 1157 (Hoffert), 2440-41 (Richardson)).) S3G says that Apple's assertion that Hoffert inherently includes a header, based on Dr. Delp's testimony that headers are necessary in an open system where different types and sizes of images can be used, is erroneous because it ignores relevant counter-examples of systems that do not use headers. (*Id.* at 54.) S3G argues that inherent anticipation means that the missing element must *necessarily* be present whereas Dr. Delp only opined that headers were *possibly* present in the software based systems that he discussed. (*Id.*) S3G points out that the software at issue in this Investigation can compress and decompress files without using headers. (*Id.*) For example, says S3G, *texturetool* is a software application that runs on general purpose open system Mac computers and is capable of compressing and decompressing images with or without a header--in fact it is programmed to provide the user with the choice of compressing images with or without a header. (*Id.* (citing Tr. at 1336-37 (Delp)).)

S3G says that the academic literature at the time of the invention shows that headers were optional. (*Id.* at 55.) Dr. Richardson explained that because textures were placed in dedicated

memory, the location of the texture data was fixed and known by the system, even if was executed in software. (*Id.* at 55 (citing Tr. at 2437-38 (Richardson)).) Consequently, argues S3G, there was no need for textures to be moved around or "managed" and there was no need for textures to have a header. (*Id.* (citing Tr. at 2437-38 (Richardson)).)

S3G says that numerous third-party compression formats do not contain headers, such as the CCITT compression standard and the CGI format, both of which are discussed in the Carlson article that Dr. Delp relied on. (*Id.* (citing Tr. at 1796-97 (Delp)).) According to S3G, the Amiga system, which uses a general purpose processor, does not contain headers, either. (*Id.* (citing Tr. at 2479 (Richardson)).) S3G says that Dr. Delp relied on the Normile patent to show the existence of headers, but Normile cautions that there are situations when a header is disadvantageous. (*Id.* (citing Tr. at 1790-92 (Delp)).) S3G points out that Dr. Delp testified that "the prior art could have a header[]" and argues that this is not sufficient to show that headers are necessary, as is required to demonstrate inherent anticipation. (*Id.* at 55-56.) Thus, argues S3G, headers are neither expressly nor inherently present in Hoffert. (*Id.* at 56.)

Staff also concludes that the evidence does not demonstrate that Hoffert includes a header and therefore finds that it does not anticipate claim 16. (SBr. at 87.)

The Administrative Law Judge concludes, for the same reasons that Hoffert does not anticipate the asserted claims of the '417 patent, that Hoffert does not anticipate claim 16 of the '978 patent. (*See* Section V.B.1.b) above.) The Administrative Law Judge finds that Hoffert does not expressly include the header limitation; nor does the evidence in its totality establish that Hoffert inherently discloses a header.

c) Claim 16 in light of QuickTime.

Apple contends that QuickTime teaches every element of claim 16 of the '978 patent for the same reasons that it asserts that QuickTime anticipates the asserted claims of the '417 patent. (RBr. at 138.) Apple says that S3G's expert only disputed whether QuickTime implemented the claimed header limitation. (*Id.*)

S3G disputes that QuickTime teaches any of the elements of claim 16 for the same reasons it discussed for the '146 patent. (*See also* Section V.A.1.c), *supra.*) Staff also concludes that the evidence is not clear and convincing that QuickTime 1.0 anticipates claim 16. (SBr. at 87.)

The Administrative Law Judge concludes, for the reasons discussed above with respect to the '417 patent that QuickTime does not anticipate claim 16 of the '978 patent.

C. Obviousness.

Under 35 U.S.C. § 103(a), a patent is valid unless "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made" to a person having ordinary skill in the art. 35 U.S.C. § 103(a). The ultimate question of obviousness is a question of law, but "it is well understood that there are factual issues underlying the ultimate obviousness decision." *Richardson-Vicks Inc. v. Upjohn Co.*, 122 F.3d 1476, 1479 (Fed. Cir. 1997) (citing *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17 (1966) ("*Graham*")).

After claim construction, "[t]he second step in an obviousness inquiry is to determine whether the claimed invention would have been obvious as a legal matter, based on underlying factual inquiries including: (1) the scope and content of the prior art, (2) the level of ordinary skill in the art, (3) the differences between the claimed invention and the prior art; and (4)

secondary considerations of non-obviousness." *Smiths Indus. Med. Sys., Inc. v. Vital Signs, Inc.*, 183 F.3d 1347, 1354 (Fed. Cir. 1999) (citing *Graham*, 383 U.S. at 17). The existence of secondary considerations of non-obviousness does not control the obviousness determination: a court must consider "the totality of the evidence" before reaching a decision on obviousness. *Richardson-Vicks*, 122 F.3d at 1483.

The Supreme Court recently clarified the obviousness inquiry in *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 389 (2007) ("*KSR*"). The Supreme Court said:

> When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. *Sakraida* and *Anderson's-Black Rock* are illustrative–a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.
>
> Following these principles may be more difficult in other cases than it is here because the claimed subject matter may involve more than the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement. Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis should be made explicit.
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> * * *
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> The obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation, or by overemphasis on the importance of published articles and the explicit content of issued patents. The diversity of inventive pursuits and of modern technology counsels against limiting the analysis in this way. In many fields it may be that there is little discussion of obvious techniques or combinations, and it often may be the case that market demand, rather than scientific literature, will drive design trends. Granting patent protection to advances that would occur in the ordinary course without real innovation retards progress and may, in the case of patents combining previously known elements, deprive prior inventions of their value or utility.

KSR, 550 U.S. at 417-19.

The Federal Circuit has since held that when a patent challenger contends that a patent is invalid for obviousness based on a combination of several prior art references, "the burden falls on the patent challenger to show by clear and convincing evidence that a person of ordinary skill in the art would have had reason to attempt to make the composition or device, or carry out the claimed process, and would have had a reasonable expectation of success in doing so." *PharmaStem Therapeutics, Inc. v. ViaCell, Inc.*, 491 F.3d 1342, 1360 (Fed. Cir. 2007) (citations omitted).

> The TSM[16] test, flexibly applied, merely assures that the obviousness test proceeds on the basis of evidence--teachings, suggestions (a tellingly broad term), or motivations (an equally broad term)--that arise before the time of invention as the statute requires. As *KSR* requires, those teachings, suggestions, or motivations need not always be written references but may be found within the knowledge and creativity of ordinarily skilled artisans.

Ortho-McNeil Pharmaceutical, Inc. v. Mylan Laboratories, Inc., 520 F.3d 1358, 1365 (Fed. Cir. 2008).

1. '417 Patent.

a) Claims 7, 12, 15, and 23 in light of Hoffert, QuickTime, and the knowledge of persons of ordinary skill in the art.

Apple argues that not only are claims of the '417 patent invalid under 35 U.S.C. § 102, they are also invalid under 35 U.S.C. § 103. (RBr. at 98.) Apple says that Hoffert, discussed above, explicitly teaches every limitation of the asserted claims except "headers," and argues that the evidence shows that QuickTime includes headers. (*Id.* at 99.) Apple says that Hoffert issued in 1991 around the time that QuickTime 1.0 was first placed in public use, six years before the

[16] TSM means teaching, suggestion, motivation.

effective date of the asserted patents. (*Id.* at 99-100.) According to Apple, one of ordinary skill in the art would have had several years in which to recognize the use of headers in QuickTime and combine them with the teachings of Hoffert. (*Id.*) Apple argues that both Hoffert and the asserted patents involve image compression and Hoffert teaches compressing video data frame-by-frame, each frame being a separate image, thus being a form of image compression. (*Id.* at 100.) Apple claims that Drs. Delp and Richardson acknowledged that video and image compression are related fields. (*Id.* at 100-101 (citing Tr. at 1409 (Delp), 2514 (Richardson)).) According to Dr. Delp, a person of ordinary skill in the relevant art would have been familiar with image compression, video compression, and texture compression and would have taken ideas from video compression and applied them to image compression and vice versa, as was the case, for example with Hoffert, where ideas taken from image compression were applied to video compression. (*Id.* at 101.) Apple argues that the S3G engineers simply added a well-known feature to Hoffert, which was in itself an unimaginative and predictable combination. (*Id.*)

S3G replies that Apple has failed to provide a meaningful reason to combine Hoffert and QuickTime 1.0 and that these references teach away from the claimed invention and combinations with each other. (CRBr. at 67-68.) S3G argues that Apple misrepresents Dr. Richardson's testimony because he said that his background as an expert in image compression—not video compression—was relevant to the subject matter of his testimony. (*Id.* at 42.) S3G says that there are differences between video compression and image compression. (*Id.* at 44.) Furthermore, Hoffert and QuickTime 1.0 lack important features of the claimed invention, such as random access and fixed-rate compression, and thus they teach away from the claimed invention. (*Id.*) S3G argues that texture compression is a special type of image compression, and textures differ from video and other images because they are three dimensional

renderings for creating more photorealistic objects in a three dimensional environment. (CBr. at 83.) Therefore, argues S3G, they have different requirements and different constraints than general purpose images or video. (*Id.* (citing Tr. at 1409 (Delp), 332-333, 335-338 (Bystrom), 291-293 (Weng), 1198 (Peercy), 1335 (Drebin), 2456-58 (Richardson)).)

S3G says that three-dimensional renderings require textures to be accessed quickly and efficiently, (*id.* at 83-84 (citing Tr. at 2455-56 (Richardson))), and unlike general purpose images and video, each frame is independently composed by the computer, which means that for every object that appears on a screen, a computer must generate a wire frame, add color, textures, lighting, shading, etc., repeatedly. (*Id.* at 84.) Because a typical three dimensional scene may require dozens of frames per second, the computational requirements for three-dimensional renderings are extreme. (*Id.* (citing Tr. at 337-339 (Bystrom)).) S3G says that one of the ways a three-dimensional rendering can be made more efficiently is by decompressing only the portions that will be visible in a frame, but because it is difficult to know in advance what portion of a compressed texture will be needed, the ability to quickly pick out a specific portion of a texture from any part of the compressed file is critical. (*Id.* (citing Tr. at 2456 (Richardson), 291-93 (Weng)).) This, says S3G, is what random access facilitates, and the invention claimed in the asserted patents is directed to a compression and decompression system that allows for fast and efficient random access. (*Id.* (citing Tr. at 2455, 2458-59, 2515-16 (Richardson), 1749-50 (Delp)).) Random access and fixed-rate compression are not features associated with general purpose or video images and Hoffert therefore teaches a variable-rate compression scheme without random access, argues S3G. (*Id.* at 85 (citing Tr. at 1098-1100, 1147, 1157 (Hoffert)).) Fast random access is not necessary in video compression, S3G says, and it is not unusual or

disadvantageous that most video compression systems must decompress an entire image in order to display any portion of it. (*Id.* (citing Tr. at 291-293 (Weng), 1098, 1155-56 (Hoffert)).)

S3G argues that despite the different requirements of three-dimensional compression and decompression, all of the combinations that Dr. Delp opined render the asserted patents obvious feature variable-rate compression schemes that preclude efficient random access that is at the heart of the claimed invention. (*Id.*) S3G argues that Dr. Delp's embrace of variable-rate compression schemes for establishing obviousness is an about-face from Apple's position during the *Markman* hearing, when it attempted to read limitations into the claims by repeatedly stressing every criticism and rejection of these same variable-rate compression schemes that are described in the specifications of the asserted patents. (*Id.*) S3G argues that Dr. Delp was unable to explain this discrepancy and therefore suggests that random access is necessary in video playback as well. (*Id.* at 86.) S3G says that Dr. Delp explained this position by stating that "random access" is important in video because it is desirable to be "able to play video from one spot to another spot." (*Id.* (citing Tr. at 1648 (Delp)).) However, according to S3G, this only means that it is desirable to play video from one frame to another, not that every frame must be substantially or entirely decoded. (*Id.*) This is not random access in the context of texture decompression, in which case there needs to be the ability to locate and decode a portion of a single frame, argues S3G but, instead, is an ability to skip to a particular frame in a sequence of frames. (*Id.*) S3G contends that Dr. Delp's later suggestion that random access in the context of a portion of an image is necessary for video editing is unsupported by, and inconsistent with, the evidence. (*Id.*) S3G argues that, contrary to Dr. Delp's expressed opinion, a person of ordinary skill in the art developing a texture compression system for three-dimensional rendering would not look to variable-rate general-purpose image or video compression systems, because variable-

rate compression cannot facilitate efficient random access necessary for three-dimensional renderings. (*Id.* (citing Tr. at 2454, 2458-59, 2461, 2471-72, 2485 (Richardson), 1752 (Delp)).) S3G argues that during the prosecution of the Drebin patent application, the patent examiner cited a patent related to Hoffert in making a rejection, but the Drebin applicants were able to successfully traverse by arguing that Hoffert was directed to video compression, while Drebin was directed to texture mapping. (*Id.* at 87.) S3G argues that this shows the examiner recognized the distinction between compression systems designed for three-dimensional texture rendering and general purpose image or video compression. (*Id.*)

S3G argues that every reference relied on by Dr. Delp teaches away from the claimed invention and goes against the stated goals of the asserted patents. (*Id.* at 87-88 (citing Tr. at 2464-65 (Richardson)).) S3G says that "[e]ntropy encoding is a type of variable-rate lossless compression," whereas "JPEG encoding is a variable-rate lossy compression scheme." (*Id.* at 88 (citing Tr. at 1752, 175, 1763 (Delp), 2460, 2560 (Richardson)).) S3G contends that at the time of the inventions in the asserted patent claims, "the art was moving toward variable-rate compression schemes, which are generally unsuitable for fast random access and texture decompression." (*Id.* (citing Tr. at 2485 (Richardson)).) S3G says that Dr. Delp ignored the fact that Mr. Hoffert's own writings teach away from what Dr. Delp has opined. (*Id.*) For example, Mr. Hoffert criticized the use of fixed-rate encoding. (*Id.* at 89 (citing RX-470C at APPLESE3G00493743).) S3G argues that Mr. Hoffert disputed that every block should be a fixed size and adopted instead a variable-rate encoding scheme. (*Id.* (citing Tr. at 1146-48 (Hoffert) and 1758-60 (Delp)).) S3G argues that this position and teaching of Mr. Hoffert explains why the Hoffert patent does not disclose random access. (*Id.* (citing Tr. at 1098-1100,

1155-56 (Hoffert)).) Consequently, argues S3G, Hoffert and QuickTime 1.0 teach away from the claimed inventions of the asserted patents, a fact that Dr. Delp ignores. (*Id.*)

S3G argues that, despite the Hoffert patent's declaration that "type 11" (four color) blocks achieve excellent results, Mr. Hoffert was aware of and discussed certain problems with the traditional CCC (color cell compression) and his "type 11 system." (*Id.* at 90 (citing Tr. at 1803-04 (Delp), 2482-83 (Richardson)).) The common problem is what is called isoluminance-duochrominance, where a set of pixels from a block that have the same luminance value, but have more than one chrominance value, when converted to RGB space, produce two different colors, and when encoded by the original CCC encoding scheme all of the pixels are incorrectly encoded as the same color. (*Id.* (citing Tr. at 1157-58 (Hoffert), 2483 (Richardson)).)

Another problem that Hoffert identified with the original CCC scheme was nonlinear color, according to S3G, where pixels from a block are clustered at multiple points in an RGB color space and there is no way to satisfactorily fit a line through all of the points and to encode the pixels with either two points (traditional CCC) or four points (Hoffert's type 11) along a line. (*Id.* at 91.) S3G says that Dr. Delp ignored the fact that Hoffert "does not disclose that there is any quality problem with his compression scheme[,]" concluding that Type 11 compression achieves excellent results; even assuming that a person of ordinary skill was aware of quality problems involving Mr. Hoffert's scheme, the evidence shows that such a person would not combine references in the manner suggested by Dr. Delp. (*Id.*) S3G argues that Mr. Hoffert and his cohort of engineers at Apple concluded that the solution to such problems was not to compress pixels in intractable blocks. (*Id.* (citing Tr. at 1159-63 (Hoffert), 1804-05 (Delp)).) S3G says that this solution teaches away from the claimed invention because the inventors needed a system that would provide for fixed-rate compression of every block—not a variable-

rate system that would not encode some blocks—and the evidence demonstrates that persons well beyond ordinary skill in the art (Hoffert *et al.*) not only would not combine the references mentioned by Dr. Delp, but instead recommended avoiding compression altogether. (*Id.* at 91-92.)

Apple's response to S3G's argument regarding the '417 patent addresses the subjects of whether Hoffert and QuickTime 1.0 render "headers" and "block type," as taught in the asserted patents, obvious. (RRBr. at 45-42.) Apple says that it presented a prima facie case of obviousness based on the combination of Hoffert with QuickTime 1.0 and having done so, it is S3G's burden to show non-obviousness. (RRBr. at 46-47.) Apple argues that the combination of Hoffert's codec (compressor and decompressor) with QuickTime 1.0 headers is simply an arrangement of old elements where each element performs the same function it had been known to perform and yields no more than one would expect from such arrangement. (*Id.* at 47.) Apple says that the Hoffert codec "decomposes" an image into blocks and encodes or decodes each block using quantized image data values and a set of indexes and these functions are not changed by the simple act of using a header with the images. (*Id.* at 48.) Apple says the combination of Hoffert and QuickTime 1.0 is particularly strong because they are in the same field and address the same problem, QuickTime being a multimedia software application providing compression functionality and the Hoffert invention having been embodied in QuickTime. (*Id.*) Apple says that any person working in image or video compression would have been exposed to both Hoffert and the QuickTime product, as well as the extensive documentation relating to QuickTime. (*Id.* at 49.) Apple argues that S3G's obviousness analysis ignores the purpose of the header and instead hinges on whether the prior art is related to the problem of "fast texture compression." (*Id.*) Apple argues that there is no evidence in the specification of the asserted

patents, or otherwise, linking the use of headers with achieving "fast texture compression." (*Id.*) The problem actually motivating the patentee may be only one of many problems addressed by the patent's subject matter, argues Apple, and any problem or need in the field of endeavor at the time of the invention and addressed by the patent can provide a reason for combining elements. (*Id.*) Here the problem was providing height, width, and other information about the images compressed and decompressed using the techniques disclosed in the asserted patents, and because it was known that headers were a common way to provide information about an image file, Apple argues that this solution was obvious. (*Id.*)

Apple says it presented a prima facie case of obviousness, based on the combination of Hoffert with the knowledge of a person of ordinary skill regarding headers. (RRBr. at 49.) According to Apple, "combining Hoffert with the QuickTime 1.0 headers, such as simply arranging old elements or application of a known technique, is equally applicable to combining Hoffert with the knowledge of one of ordinary skill regarding use of headers in image compression systems." (*Id.* at 49-50.) Apple argues that a person of ordinary skill in the art would have been familiar with headers, their function and how to use them, the witnesses having agreed that the purpose of a header is to provide information about an image. (*Id.* (citing Tr. at 1452-53 (Delp), 2217-18 (Toksvig), 2305 (Sandmel), 376-377 (Bystrom)).) Apple says that headers are used in the asserted patents in a conventional manner to provide information about an image and it would have been obvious to use such well known technology for its intended purpose to achieve S3G's claimed invention. (*Id.* at 50.)

Apple, in reply to S3G's argument that variable-rate systems are not suitable for fast image compression and teach away from the claimed invention because they are not suitable for fast random access and texture compression, argues that this is an "attempt to reduce the field of

image and video compression into balkanized cells of sequestered researchers oblivious to research around them," whereas the evidence demonstrates that image and video compression are related fields and those of skill in the art regularly draw on techniques in one or the other field. (*Id.* at 51.) Citing *KSR*, Apple argues that the "Supreme Court rejected the assumption 'that a person of ordinary skill attempting to solve a problem will be led to only those elements of prior art designed to solve the same problem.'" (*Id.*) Apple argues that use of a header to provide height, width, and other information about an image was a known design choice and the fact that there may have been other available choices does not make the selection of a header any less obvious. (*Id.* at 52.)

Apple also argues that persons of ordinary skill in the art possessed knowledge about headers for video and compression systems at that time and therefore would have been motivated to combine headers with Hoffert for the purpose of conveying information about the image data file. (RBr. at 102.) Apple says that using a header with Hoffert does not require anything new, and the asserted patents themselves simply appended header information to the original or encoded image data. (*Id.*) Furthermore, argues Apple, the functions of the elements of this combination would not have been altered by doing so, because the header simply provides information about the file, such as size and format and the compression scheme still encodes and decodes blocks using representative colors. (*Id.*) In addition, according to Apple, an article by Carlson in 1991, reporting the results of his survey of computer graphics encoding systems and data storage formats for computer generated or sampled images, mentions numerous compression algorithms and compressed image formats with headers and provides motivation for one of ordinary skill in the art to use a header with the compression scheme disclosed in Hoffert. (*Id.* at 102-103.) Carlson specifically cites both CCC and BTC, which Apple argues is the

fundamental technology underlying Hoffert's compression and decompression techniques. (*Id.* at 103.)

Staff contends that Apple's obviousness arguments regarding the combination of Hoffert and QuickTime 1.0 must be rejected because it is not known which codecs were in QuickTime. (SBr. at 40-41.) As for Hoffert, Staff says that although it agrees with Dr. Delp that the use of headers was well known prior to 1997, their use was not necessarily included in the compression and decompression schemes disclosed in Hoffert because Hoffert used dedicated hardware to implement his Type 11 compression and decompression scheme and in this type of scheme headers are not necessary. (*Id.*) Thus Staff does not believe that the evidence is clear and convincing that a person of ordinary skill in the art would have had a basis for adding a header to Hoffert. (*Id.* at 41.)

The Administrative Law Judge concludes that the asserted claims of the '417 patent were obvious in light of Hoffert. Although Hoffert does not disclose a header, it is readily apparent from the evidence that headers were generally known and appreciated by those skilled in the relevant art at the time the '417 patent was filed. Dr. Richardson's testimony that headers are not always useful and there may be reasons, such as the creation of excessive data overhead, for ruling them out in a given situation only demonstrates that headers are not inherently necessary in Hoffert. That is not a basis for concluding, however, that headers were not known or appreciated by persons of ordinary skill in the art. S3G's argument that Hoffert teaches away from the invention of the asserted patents is too narrowly drawn. Persons of skill in the art are just as capable of inductive reasoning as they are of deductive reasoning. As the Supreme Court said in *KSR*, "[t]he [appeals court] first erred in holding that courts and patent examiners should look only to the problem the patentee was trying to solve. Under the correct analysis, any need

or problem known in the field and addressed by the patent can provide a reason for combing elements.... Second, the appeals court erred in assuming that a person of ordinary skill in the art attempting to solve a problem will be led only to those prior art elements designed to solve the same problem.... It is common sense that familiar items may have obvious uses beyond their primary purposes, and a person of ordinary skill often will be able to fit teachings of multiple patents together like pieces of a puzzle." *KSR,* 550 U.S. at 402. The evidence is plentiful that headers were a practical and basic method for processing images—including compressing and decompressing—that common sense suggests that headers would be a useful, if not necessary, way for managing compression and decompression techniques.

With respect to S3G's other contention that Hoffert does not teach the claimed "block type module for selecting an identifiable block type for the image block" (CRBr. at 67), Hoffert teaches that "each 4 x 4 pixel block is first evaluated to determine which of 4 types of compression/encoding should be used." (RX-0535 at 3:27-29 (the Hoffert patent).) Each of the encoding types results in a different block type, according to the specification. (*Id.*) Hoffert teaches four types of compression (*id.* at Fig. 2 at APPLESG00070160) and decompression by means of a decompression apparatus (*id.* at Fig. 10, 11:60-66). Hoffert teaches how the blocks are decoded differently depending on block type and how different numbers of colors are used to decode different block types. (*Id.* at 9:38-52.) The Administrative Law Judge rejects S3G's contention that "block type" as recited in the asserted patents is restricted to the embodiments disclosed therein. (*See* Tr. at 2445-46 (Richardson).) The specification of the asserted patents do not contain language that supports Dr. Richardson's assertion that block type is limited in the way Dr. Richardson describes and therefore the Administrative Law Judge concludes that Hoffert does satisfy the block type limitation of the asserted patents.

For these reasons, the Administrative Law Judge concludes that Hoffert when combined with the knowledge of persons of ordinary skill in the art renders each of claims 7, 12, 15, and 23 of the '417 patent obvious. The only element missing from Hoffert is the header, a feature well known to persons of ordinary skill in the art at the time. (Tr. at 1183 (Hoffert), 1451-55 (Delp).)

As far as Apple's argument that Hoffert in combination with QuickTime 1.0 demonstrates the use of headers, that is based on Apple's belief that QuickTime 1.0 discloses the use of headers. However, the evidence has, *inter alia*, been found insufficient to establish that QuickTime 1.0 itself includes headers, as discussed above with respect to Apple's anticipation claim with respect to QuickTime 1.0 and that portion of Apple's argument is therefore rejected.

b) Claims 7, 12, 15, and 23 in light of Drebin and the knowledge of persons of ordinary skill in the art.

Apple argues that the teachings of Drebin when combined with the knowledge of persons of ordinary skill in the art at that time render the asserted claims of the '417 patent invalid as being obvious. (RBr. at 103.)

S3G argues that Drebin is not prior art, for reasons S3G lays out in opposition to Apple's anticipation allegation, and says that therefore Drebin cannot be combined with any other references to render the asserted claims obvious. (CBr. at 83.) S3G further responds that Apple failed to provide a meaningful reason to combine Drebin with the knowledge of one of ordinary skill in the art. (CRBr. at 67-68.) The reference teaches away from the claimed invention and combination and therefore would not have been obvious. (*Id.*) Staff disagrees that Drebin in view of the knowledge in the art renders the asserted '417patent claims obvious. (SBr. at 75.)

The Administrative Law Judge concludes that the evidence does not demonstrate clearly and convincingly that Drebin is prior art to the asserted patents, for the reasons discussed above

regarding anticipation. Therefore, Apple's allegation of invalidity by reason of 35 U.S.C. § 103 in view of Drebin either alone or in combination with other teachings is rejected.

c) Claims 7, 12, 15, and 23 in light of Hoffert and Normile.

Apple maintains that the combination of U.S. Patent 5,822,465 ("Normile") with Hoffert renders each of the asserted claims of the '417 patent obvious. (RBr. at 103 (citing Tr. at 1663-64 (Delp)).) Apple says that Normile, which was filed on June 7, 1995, has a priority date of September 1, 1992. According to Apple, Normile teaches the use of various headers with compressed image files, for example in Figure 10 of the patent, which shows prefatory headers preceding other image data appearing across a row of such information. (*Id.* at 103-104 (citing RX-537 at APPLES3G00070714 (the Normile patent)).) Apple says the "frame header contains the image size in width and height" and information about the frame type. (*Id.* at 104 (citing RX-537 at 22:8-19.)

According to Apple, a person of ordinary skill in the art would have been motivated to combine the headers disclosed in Normile with the compressed files of Hoffert. (*Id.* (citing Tr. at 1677 (Delp)).) Apple points out that Normile cites to Hoffert on its face and argues that this suggests that a person of ordinary skill would not consider Normile's headers to be novel or unique but instead would have been motivated to combine the teachings of Normile with those of Hoffert to use the Normile header with the Hoffert compressed image files to convey information about the file. (*Id.* (citing Tr. at 1677-78 (Delp)).) In fact, argues Apple, the Normile inventors were apparently so familiar with commonality of headers that they did not include them in any of their almost 100 claims. (*Id.*)

Apple says that during the prosecution of the '978 patent the patent examiner said that Normile teaches "a header portion" and rejected claim 16 over the combination of Normile with

another image compression reference. (*Id.*) The '978 patent applicants did not traverse that issue, which Apple argues reinforces the obviousness of combining Normile with Hoffert. (*Id.*) Apple says that it likewise follows that Normile teaches the header limitations of the '417 patent and the patent applicants' silence in the face of the patent examiner's rejection of claim 16 of the '978 patent is a tacit admission of their agreement with the examiner's statement. (*Id.* at 104-105.)

S3G says that there are no obvious combinations of references cited by Apple that invalidate the asserted claims. (CBr. at 163.) S3G maintains that the prior art, including that pointed to by Apple, was moving away from the teachings of the asserted claims—away from fixed-rate block-based compression schemes and towards variable-rate wavelet and transform compression schemes. (*Id.* at 87-89.) S3G argues that the goal of the inventors of the asserted patents was compression. (*Id.* at 92.) Headers increase the amount of overhead, the size of the information stream, contrary to one of the purposes of compression: to reduce the number of bits used to either store or transmit an image. (*Id.*) Therefore, argues S3G, adding headers to the compressed information increases the file size by the amount of the header's overhead. (*Id.*) S3G argues that Normile taught away from the claimed invention because it describes a variable-rate, vector quantization system which the inventors of the asserted patents pointed out is disadvantageous in a texture compression system. (*Id.* at 95 (citing Tr. at 1782-86 (Delp), 2471 (Richardson)).) S3G says that Normile requires codebooks that are sent separate from the indexes and that one of the objects of the invention of Normile is to provide an apparatus and method for efficiently generating codebooks by vector quantization. (*Id.*) S3G argues that given that object of Normile, it would not have been obvious to combine it with Hoffert because Normile teaches vector quantization, codebooks, and lookup tables, which are not advantageous

for texture compression. (*Id.*) S3G argues that Normile also teaches away from headers because it describes situations where headers are actually a detriment and are not used, because they increase the number of bits necessary to manage headers. (*Id.*) S3G argues that Hoffert's internal memos explicitly state that vector quantization would not be a good idea and therefore teach away from a combination of Hoffert and Normile. (*Id.* at 95-96.)

Apple responds that S3G's argument relies on conclusory statements by Dr. Richardson who said that he does not agree that Normile rendered the asserted claims obvious. (RRBr. at 52-53 (citing Tr. at 2474 (Richardson)).)

Staff argues that Apple's argument with respect to Hoffert in combination with Normile fails to show that Hoffert inherently discloses a header portion. (SBr. at 74.) Staff argues that headers are not necessary for the dedicated hardware Hoffert uses; therefore one of ordinary skill with a full knowledge of headers would not be motivated to use headers in the Hoffert system. (SBr. at 74.) Staff also says that the compression scheme in Normile is unrelated to the compression and decompression scheme recited in the asserted claims and therefore a person of ordinary skill in the art would not have had reason to combine the Hoffert and Normile patents to arrive at the invention claimed in the asserted claims. (*Id.* at 74-75.)

S3G's argument, that the goal of the inventors of the asserted patents is contrary to the teachings of the prior art because compression is at odds with headers inasmuch as headers require additional overhead (CBr. at 92), is somewhat strange in light of the fact that the asserted claims feature headers themselves. Naturally headers require their own—and therefore add—data to a system that makes use of them, but that does not lead to the conclusion that they should not be employed or that a person of skill in the art would rule them out of consideration. Headers, as the evidence demonstrates, perform the useful function of conveying information

about an image for processing, and a person of ordinary skill in the relevant art may find headers useful when designing texture image compression and decompression schemes, even three-dimensional ones. S3G focuses on one disadvantage to headers, but that explanation is not enough to overcome Apple's contention that the use of headers in connection with image compression and decompression schemes was obvious. S3G argues from a very narrow perspective that fixed-rate block base random access compression and decompression rules out entirely any consideration of using headers in the design of image compression by persons of ordinary skill in the art, and this is not supported by the evidence or by the instruction of the Supreme Court in *KSR*.

Staff relies on Dr. Richardson's statement that a header is not necessarily present in Hoffert because it was his recollection that the embodiment described in Hoffert was for dedicated hardware. (SBr at 33 (citing Tr. at 2442 (Richardson)).) The Hoffert patent includes 26 claims, 25 of which are methods and one, claim 18, which is an apparatus. (RX-535.) The Hoffert specification states: "[T]he invented compression and decompression may be performed in a general purpose computer, such as a microprocessor, under control of a program. Ordinary programming may be used to implement the invented method. The compression and decompression may *also* be performed by 'hardwired' logic." (*Id.* at 9:58-64 (emphasis added).) Therefore, the Administrative Law Judge finds that Staff's reasoning in this regard is faulty.

The Administrative Law Judge concludes that the combination of Hoffert and Normile renders asserted claims 7, 12, 15, and 23 of the '417 patent obvious and therefore invalid under 35 U.S.C. § 103.

d) Secondary Considerations of Non-Obviousness.

S3G argues that the objective indicia of non-obviousness show that the asserted claims are not obvious. (CBr. at 78.) First, S3G argues that the prior art taught away from the invention. (*Id.* at 78.) In particular, S3G argues, relying on the testimony of its expert, Dr. Richardson, that the prior art was moving towards variable rate compression, which was generally not suitable for fast random access and texture compression. However, as Dr. Richardson admits, the asserted claims are not limited to texture compression or random access. (Tr. at 2517:9-2518:6, 2516:16-2517:8.) Thus, the Administrative Law Judge finds that S3G has failed to show that the prior art taught away from the claimed invention.

Second, S3G argues that there was industry acceptance of and acquiescence to the invention. (CBr. at 78-79.) Specifically, S3G argues that the claimed invention has obtained industry acceptance by being incorporated as the preferred compression technique into Microsoft's Direct X. (*Id.* at 79.) S3G also argues that its competitors, including AMD/ATI, Imagination, Intel, and NVIDIA, all incorporate S3TC into their products. (*Id.*) Further, S3G argues that NVIDIA advises all users of the S3TC OpenGL extensions that a license may be required and that Imagination understands that a license is required if S3TC is used outside of Microsoft Windows. (*Id.*) In support, S3G primarily relies on the testimony of Dr. Richardson. Dr. Richardson, however, testified only that it was his "understanding" that there was industry acceptance and that it was his "understanding" that S3G's competitors all incorporate S3TC/DXT. (Tr. at 2486:8-12, 20-25.) Dr. Richardson does not explain either what he based his statement on or what the invention was that the industry accepted (*i.e.*, The use of headers? The use of block types? Or something else?). Although Dr. Richardson was designated as an expert witness by S3G, his testimony in this regard is not expert testimony, it is lay testimony outside of

the expertise for which Dr. Richardson was designated an expert. Because Dr. Richardson provides no basis for his "understanding," including any explanation as to how the conduct of his employment at 4i2i from 1995 to 2000 or his professorship at the Robert Gorden University from 1993 to the present enabled him to arrive at his conclusions. Thus, the Administrative Law Judge finds that S3G has not shown that Dr. Richardson's testimony is rationally based on his perception or based on his personal knowledge of the matter. Accordingly, the Administrative Law Judge finds that Dr. Richardson's testimony regarding industry acceptance and acquiescence does not satisfy Federal Rules of Evidence 602 and 701 and should be accorded no weight. Moreover, even if Dr. Richardson's testimony was to be credited, the Administrative Law Judge finds S3G has failed to show that any alleged industry acceptance was due to the merits of the claimed invention. *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 306 (Fed. Cir. 1985) ("Case law requires that a nexus be established between the merits of the claimed invention and the evidence proferred [sic] on secondary considerations, if the evidence on secondary considerations is to be given substantial weight in the calculus of obviousness/nonobviousness."); *Simmons Fastener Corp. v. Illinois Tool Works, Inc.*, 739 F.2d 1573, 1575 (Fed.Cir.1984), *cert. denied,* 471 U.S. 1065 (1985). The evidence shows that S3G's competitors use S3TC/DXT in their products { } pursuant to S3's licensing agreement with Microsoft. Thus, S3G's competitors' use of S3TC/DXT may simply be due to the { } and not the merits of the claimed invention. Accordingly, for the reasons above, the Administrative Law Judge finds S3G has failed to show that there was industry acceptance of and acquiescence to the invention.

Third, S3G argues that the invention itself, as well as the products using the invention, has experienced commercial success. (CBr. at 79.) S3G argues that it was a substantial

commercial success for the claimed invention to be incorporated into DirectX, as part of Microsoft's Windows operating systems as the preferred compression technique.[17] (*Id.* at 79-80.) S3G also argues that the fact that its S3TC compression technique is incorporated into the computers of the world's largest suppliers of personal computers and nearly all graphics chips used in personal computers since 1998, evinces commercial success. (*Id.* at 80.)

At the outset, the Administrative Law Judge notes generally that S3G's arguments regarding commercial success are misplaced. S3G appears to argue that because its S3TC/DXT compression technique is widely used, both in Microsoft Windows products via DirectX and in graphics chips incorporated into personal computers, the claimed invention has met with commercial success. However, contrary to S3G's argument, wide-spread use does not necessarily equate with commercial success. This is especially true in this instance where the evidence suggests that the wide-spread use of S3TC/DXT may be due simply to the fact that a company can use S3TC/DXT in its products { } pursuant to S3's licensing agreement with Microsoft.

In support of its arguments, S3G again relies heavily on the testimony of Dr. Richardson. Dr. Richardson testified at the hearing in this Investigation that, based on "statements from public figures around the time that the technology was released[,]" it was his "understanding" that the claimed invention was commercially successful. (Tr. at 2487:1-9.) Dr. Richardson never named the public figures on which he relied, nor did he quote any statements purportedly from them during his testimony. Nor did Dr. Richardson state what their relationship to the industry or to S3 was, whether they were associated with S3G or not, whether they were

[17] Contrary to S3G's argument, Dr. Richardson never testified that it was a commercial success for the claimed invention to be incorporated in Microsoft's DirectX. The portions of Dr. Richardson's transcript which S3G cites do not support its argument. (*See* CBr. at 80 (citing Tr. at 2487:10-15; CFF-III.D.4.33, which refers to Tr. at 2487:22-24).)

promotional or marketing statements, what factors were considered by the speakers as their bases for such statements, and what if any bases they may have had for concluding that the perceived success was related to the invention. Dr. Richardson also did not cite any documentary evidence of the statements on which he relied. (*Id.*) Although Dr. Richardson was designated as an expert witness by S3G, his testimony in this regard is not expert testimony, it is lay testimony outside of the expertise for which Dr. Richardson was designated an expert. Because there is no evidence regarding the "statements from public figures" on which Dr. Richardson relies or any basis in evidence for Dr. Richardson's "understanding," the Administrative Law Judge finds that S3G has not shown that Dr. Richardson's testimony is rationally based on his perception or based on his personal knowledge of the matter. Thus, the Administrative Law Judge finds that Dr. Richardson's testimony regarding commercial success does not satisfy Federal Rules of Evidence 602 and 701 and should be accorded no weight.

Moreover, even if Dr. Richardson's testimony was to be credited, the Administrative Law Judge finds S3G has failed to "establish a nexus between the evidence [of commercial success] and the merits of the claimed invention." *In re Huai-Hung Kao*, 639 F.3d 1057, 1069 (Fed. Cir. 2011). Notably, "if commercial success is due to an element in the prior art, no nexus exists." *Tokai Corp. v. Easton Enterprises, Inc.*, 632 F.3d 1358, 1369-70 (Fed. Cir. 2011). *See also*, *Huai-Hung Kao*, 639 F.3d at 1068-69; *Western Union Co. v. Moneygram Payment Systems, Inc.*, 626 F.3d 1361, 1373 (Fed. Cir. 2010) ("It cannot therefor claim any commercial success that arose from features of the system found in the prior art as a consideration for non-obviousness of its claimed invention."). S3G and Dr. Richardson argue only that the claimed invention as a whole has achieved commercial success. Neither S3G nor Dr. Richardson provide any evidence of commercial success tied to those features of the claimed invention not found in the prior art.

Thus, the Administrative Law Judge finds S3G has failed to show the required nexus. Accordingly, for the reasons above, the Administrative Law Judge finds that S3G has failed to show that the claimed invention has achieved commercial success.

Fourth, S3G argues that there was a long-felt but unfilled need for the invention. (CBr. at 80.) In support, S3G relies on the testimony of Dr. Richardson who stated that it was his "understanding," based on "a number of statements by leading figures in the industry[,]" that there was a long felt but unfilled need for the claimed invention. (Tr. at 2487:25-6.) Although Dr. Richardson testified that his opinion was based on statements by leading figures in the industry, Dr. Richardson never named any of the individuals or quoted any of the specific statements on which he relied. Nor did Dr. Richardson ever explain how the alleged statements support his opinion that there was a long-felt but unfilled need for the claimed invention. Additionally, Dr. Richardson never explained what recognized, persistent need existed at the time the S3TC/DXT technology was released. While an expert need not disclose the basis of his opinions, a court is under no obligation to credit an expert's unsupported testimony. (Fed. R. Evid. 703; *Structural Polymer Group, Ltd. v. Zoltek Corp.*, 543 F.3d 987, 997-98 (8th Cir. 2008) ("Under Federal Rule of Evidence 703, "an expert may rely on otherwise inadmissible hearsay in forming [her] opinion if the facts and data upon which [she] relies are of a type reasonably relied upon by experts in the field. … As a rule, questions regarding the factual underpinnings of the expert's opinion affect the weight and credibility of her testimony."); *Cedar Petrochemicals, Inc. v. Dongbu Hannong Chemical Co., Ltd.*, 2011 WL 182056, *11 (S.D.N.Y. 2011)("Questions over whether there is a sufficient factual basis for an expert's testimony … 'go to weight'."). In this case, the Administrative Law Judge finds Dr. Richardson's testimony is so devoid of support as to render it entirely unpersuasive. Moreover, the Administrative Law Judge finds that S3G

has failed to establish a nexus between the alleged evidence of long-felt need and the merits of the claimed invention. *Ashland Oil, Inc.*, 776 F.2d at 306. Accordingly, the Administrative Law Judge finds that S3G has failed to show a long-felt but unfiled need for the claimed invention.

Fifth, S3G argues that others in the industry were unable to make the invention and that this fact supports a finding of non-obviousness. (CBr. at 80.) S3G argues that {

} failed to develop the product. (*Id.*) S3G also argues that SGI was also attempting to develop hardware with texture compression in its Bali project, but that SGI abandoned the project { } (*Id.*) In support of its argument that others tried and failed to achieve the claimed invention, S3G relies on the testimony of Dr. Richardson. However, Dr. Richardson only testified that he had an opinion as to whether others tried and failed to achieve the claimed invention, not as to what that opinion actually was. (*See* Tr. at 2495:2-5.) Similarly, with regard to { } project, Dr. Richardson provides only conclusory, unsupported testimony. Particularly, Dr. Richardson testified that the { } project "was attempting to solve the same technical need, [but] didn't achieve success." (Tr. 2495 at 9-14.) However, Dr. Richardson never identified what that technical need was or what it was the same as. (*Id.*) Moreover, although Dr. Richardson was designated as an expert, his testimony regarding whether others in the industry were unable to make the invention is lay testimony. Because Dr. Richardson provides no basis for his opinion, the Administrative Law Judge finds that S3G has not shown that Dr. Richardson's testimony is rationally based on his perception or based on his personal knowledge. Thus, the Administrative Law Judge finds Dr. Richardson's testimony on this matter does not satisfy the Federal Rules of Evidence 602 and

701. (Fed. R. Evid. 602, 701.) Accordingly, the Administrative Law Judge finds that S3G has failed to show that others in the industry were unable to make the claimed invention.

Sixth, S3G argues that the fact that others licensed the invention confirms that the asserted patents are valid. (CBr. at 81.) S3G argues that many large companies in the industry have licensed the invention, including Microsoft, Sony, Nintendo, and { } (*Id.*) In support of its argument, S3G relies on the testimony of Dr. Richardson who stated that the fact that Microsoft, Sony, Nintendo, and { } the claimed invention supports his opinion of non-obviousness, because it "shows that they considered it to be effective and valid and novel technology that they required to use." (Tr. at 2495:24-2496:3.) Dr. Richardson is not an expert on licensing and was not designated as such in this Investigation. Thus, Dr. Richardson's unsupported opinion fails to satisfy Federal Rules of Evidence 703. (Fed. R. Evid. 703.) To the extent Dr. Richardson's testimony regarding licensing may be considered lay testimony, there is no evidence that Dr. Richardson's testimony is rationally based on his perception or based on his personal knowledge of the matter. Thus, as lay testimony, Dr. Richardson's testimony violates Federal Rules of Evidence 602 and 701. (Fed. R. Evid. 602, 701.) Accordingly, the Administrative Law Judge finds that S3G has failed to show that the fact that others license its invention supports a finding of non-obviousness.

Seventh, S3G argues that there was initial skepticism aimed at the invention and unexpected results. (CBr. at 81.) S3G argues that when Microsoft was selecting a texture compression system for DirectX, Microsoft evaluated multiple systems, including S3TC. S3G argues that Microsoft was initially skeptical of the reports it heard regarding the performance of S3TC texture compression and did not expect the results that were achieved. (*Id.*) S3G argues that when Microsoft engineers came to S3's facility to validate S3TC, they were very impressed.

(*Id.*) In support of its argument, S3G relies on the testimony of Dr. Richardson who stated that it was his opinion that there was skepticism and unexpected results. (Tr. at 2496:8-14.) Dr. Richardson's opinion is based solely on the testimony of Dr. Weng. (Tr. at 2496:4-17.) Dr. Weng's testimony in turn is based solely on what he was told by { } (Tr. at 208:6-17.) Specifically, Dr. Weng testified as follows:

> Q. Has anyone ever told you what Microsoft said when they first saw S3TC?
>
> A. In my discussion with our { } he indicated to me that there was {
>
> } Microsoft decided to license the technology because they were very impressed by the technology.

(Tr. at 208:6-17.) Dr. Richardson's testimony with regard to initial skepticism is not expert testimony, it is lay testimony. As such it must be rationally based on Dr. Richardson's perception or based on his personal knowledge of the matter. (Fed. R. Evid. 602, 701.) As is clear from the testimony cited above, Dr. Richardson's opinion is not based on his personal knowledge or perception but rather the knowledge of sometime twice removed. Because Dr. Richardson's opinion is based on uncorroborated hearsay, the Administrative Law Judge finds that Dr. Richardson's testimony fails to satisfy the Federal Rules of Evidence 602 and 701 and therefore, should be accorded no weight. Accordingly, the Administrative Law Judge finds that S3G has failed to show that there was initial skepticism aimed at the claimed invention and unexpected results.

Eighth, S3G argues that there were statements of acclaim for S3TC when it was released that support a finding of non-obviousness. (CBr. at 81.) In particular, S3G asserts that on March 24, 1998, Paul Finnegan, group managing director at Rage Software PLC stated, "This is totally cool and is going to enhance the game-play experience significantly." (*Id.*) S3G also asserts that

in 2003, Simon Fenney observed that "the quality of the S3TC system is generally much higher than that given by CCC." (*Id.*) S3G further asserts that Microsoft praised the claimed technology stating that "we chose to incorporate S3's technology into DirectX because it delivers the best image quality, provides a developer-friendly implementation process and could be easily and cost effectively implemented in hardware." (*Id.* at 81-82.) As previously stated, case law requires that there be a nexus between the merits of the claimed invention and the evidence proffered on secondary considerations. *Ashland Oil, Inc.*, 776 F.2d at 306. Here, S3G provides absolutely no evidence tying the alleged statements of acclaim with the merits of the claimed invention. Accordingly, the Administrative Law Judge finds that S3G has not shown statements of acclaim that would support a finding of non-obviousness.

2. '087 Patent.

Apple says that for the same reasons that the asserted claims of the '417 patent are obvious based on one or more combinations of prior art involving Hoffert, Drebin, QuickTime, Normile and the knowledge of persons of ordinary skill in the art, claims 1 and 6 of the '087 patent are likewise obvious. (RBr. at 116.)

S3G responds that the objective evidence confirms non-obviousness, citing the reasons it argued regarding the '146 patent. (CBr. at 169.)

Staff contends that Apple's obvious arguments regarding the combination of Hoffert and QuickTime 1.0 must be rejected because it is not known which codecs were in QuickTime. (SBr. at 40-41.) As for Hoffert, Staff says that although it agrees with Dr. Delp that the use of headers was well known prior to 1997, their use was not necessarily included in the compression and decompression schemes disclosed in Hoffert. (*Id.*) Hoffert used dedicated hardware to implement his Type 11 compression and decompression scheme and in this type of scheme

headers are not necessary. (*Id.*) Thus Staff does not believe that the evidence is clear and convincing that a person of ordinary skill in the art would have had a basis for adding a header to Hoffert. (*Id.* at 41.)

Staff argues that Apple's combination of Hoffert with Normile fails because Hoffert does not inherently disclose a header portion. (SBr. at 74.) Staff argues that Hoffert uses dedicated hardware that does not require headers; therefore one of ordinary skill with a full knowledge of headers would not be motivated to use headers in the Hoffert system. (*Id.*) Staff also says that the compression scheme in Normile is not related to the compression and decompression scheme recited in the asserted claims and therefore a person of ordinary skill in the art would not have had reason to combine the Hoffert and Normile patents. (*Id.* at 74-75.)

Staff similarly argues, with respect to Hoffert in combination with the knowledge of persons of ordinary skill in the art, that because Hoffert used a dedicated hardware scheme that did not require headers, one of ordinary skill in the art would not have been motivated to combine known use of headers with Hoffert. (SBr. at 41.)

The Administrative Law Judge concludes, for the reasons discussed above in connection with the '417 patent, that the combination of Hoffert with the knowledge of a person of ordinary skill in the art and the combination of Hoffert with Normile both render the asserted claims of the '087 patent obvious and invalid under 35 U.S.C. § 103. For the same reasons given in the '417 patent analysis with respect to the issue of obviousness, the Administration Law Judge concludes that Drebin is not prior art and the evidence does not demonstrate that QuickTime 1.0 included headers. Therefore, insofar as Apple contends that combining either Drebin or QuickTime 1.0 or both of them with Hoffert renders the asserted patents obvious, that claim is rejected.