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:

[[

]]

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

---

[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:

> [[
>
>]]

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

[[

]]

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: [signature] *

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.

[signature]

AGREED to on Behalf of ATI Technologies ULC

By: [signature]

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.

[signature]

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.
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

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