IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF DELAWARE

INTELLECTUAL VENTURES I LLC, et al.,	)	
Plaintiffs,	)	
v.	)	Civ. No. 11-792-SLR
CANON INC., et al.,	)	
Defendants.	)	

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Jack B. Blumenfeld, Esquire and Julia Heaney, Esquire of Morris, Nichols, Arsht & Tunnell LLP, Wilmington, Delaware. Counsel for Defendants. Of Counsel: Nicholas M. Cannella, Esquire and Michael P. Sandonato, Esquire of Fitzpatrick, Cella, Harper & Scinto.

MEMORANDUM OPINION

Dated: April 10, 2014
Wilmington, Delaware

ROBINSON, District Judge

I. INTRODUCTION

On September 9, 2011, plaintiffs Intellectual Ventures I, LLC and Intellectual Ventures II, LLC (collectively "IV") filed suit in this district against defendants Canon Inc., Canon U.S.A., Inc. (collectively "Canon"), Olympus Corporation, Olympus Corporation of the Americas, Olympus America Inc., and Olympus Imaging America Inc. (collectively "Olympus") alleging infringement of nine patents: U.S. Patent Nos. 5,754,348 ("the '348 patent"), 6,121,960 ("the '960 patent"), 6,221,686 ("the '686 patent"), 6,023,081 ("the '081 patent"), 6,979,587 ("the '587 patent"), 5,844,264 ("the '264 patent"), 6,181,836 ("the '836 patent"), 6,412,953 ("the '953 patent), and 7,733,368 ("the '368 patent"). (D.I. 1) All claims and counterclaims asserted between IV and Olympus were dismissed with prejudice on December 11, 2012. (D.I. 78) IV voluntarily withdrew its claims as to two of the patents (D.I. 81), and filed a second amended complaint against Canon on January 7, 2013 adding U.S. Patent No. 7,365,298 ("the '298 patent"). (D.I. 89) Six patents ("the patents-in-suit") remain asserted in the present case.

IV I and II are limited liability companies organized and existing under the laws of the State of Delaware, with their principal place of business in Bellevue, Washington. (D.I. 1 at ¶¶ 1-2) IV I owns the '348 patent. (*Id.* at ¶¶ 15) IV II owns the '081, '960, '686, '587, and '298 patents. (*Id.* at ¶¶ 19, 21, 25, 29; D.I. 89 at ¶ 21) Canon Inc. is a corporation organized and existing under the laws of Japan, with its principal place of business in Tokyo, Japan. (*Id.* at ¶ 3) Canon U.S.A., Inc. is a corporation organized and existing under the laws of New York, with its principal place of business in Lake

Success, New York. (Id. at ¶ 4) It makes, manufactures, and/or sells the accused products. (*Id.* at ¶ 19)

Presently before the court are IV's motion for summary judgment of infringement (D.I. 163); Canon's motion for summary judgment of non-infringement (D.I. 168); IV's motion for summary judgment of no obviousness (D.I. 163); and Canon's motion for summary judgment of invalidity (D.I. 167). Additionally, Canon has filed a *Daubert* motion to exclude certain expert testimony of Dr. Martin Afromowitz and Dr. Dan Schonfeld. (D.I. 217) IV has filed motions to exclude testimony of Canon's experts on obviousness (D.I. 219) and of Canon's expert Dr. Fossum concerning Canon's testing of sample parts (D.I. 221). The court has jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

II. STANDARDS OF REVIEW

A. Summary Judgment

"The court shall grant summary judgment if the movant shows that there is no genuine dispute as to any material fact and the movant is entitled to judgment as a matter of law." Fed. R. Civ. P. 56(a). The moving party bears the burden of demonstrating the absence of a genuine issue of material fact. *Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 415 U.S. 574, 586 n.10 (1986). A party asserting that a fact cannot be—or, alternatively, is—genuinely disputed must support the assertion either by citing to "particular parts of materials in the record, including depositions, documents, electronically stored information, affidavits or declarations, stipulations (including those made for the purposes of the motions only), admissions, interrogatory answers, or other

materials," or by "showing that the materials cited do not establish the absence or presence of a genuine dispute, or that an adverse party cannot produce admissible evidence to support the fact." Fed. R. Civ. P. 56(c)(1)(A) & (B). If the moving party has carried its burden, the nonmovant must then "come forward with specific facts showing that there is a genuine issue for trial." *Matsushita*, 415 U.S. at 587 (internal quotation marks omitted). The court will "draw all reasonable inferences in favor of the nonmoving party, and it may not make credibility determinations or weigh the evidence." *Reeves v. Sanderson Plumbing Prods., Inc.*, 530 U.S. 133, 150 (2000).

To defeat a motion for summary judgment, the non-moving party must "do more than simply show that there is some metaphysical doubt as to the material facts." *Matsushita*, 475 U.S. at 586-87; *see also Podohnik v. U.S. Postal Service*, 409 F.3d 584, 594 (3d Cir. 2005) (stating party opposing summary judgment "must present more than just bare assertions, conclusory allegations or suspicions to show the existence of a genuine issue") (internal quotation marks omitted). Although the "mere existence of some alleged factual dispute between the parties will not defeat an otherwise properly supported motion for summary judgment," a factual dispute is genuine where "the evidence is such that a reasonable jury could return a verdict for the nonmoving party." *Anderson v. Liberty Lobby, Inc.*, 411 U.S. 242, 247-48 (1986). "If the evidence is merely colorable, or is not significantly probative, summary judgment may be granted." *Id.* at 249-50 (internal citations omitted); *see also Celotex Corp. v. Catrett*, 411 U.S. 317, 322 (1986) (stating entry of summary judgment is mandated "against a party who fails to make a showing sufficient to establish the existence of an element essential to that party's case, and on which that party will bear the burden of proof at trial").

B. Infringement

A patent is infringed when a person "without authority makes, uses or sells any patented invention, within the United States . . . during the term of the patent." 35 U.S.C. § 271(a). A two-step analysis is employed in making an infringement determination. *See Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995). First, the court must construe the asserted claims to ascertain their meaning and scope. *See id.* Construction of the claims is a question of law subject to de novo review. *See Cybor Corp. v. FAS Techs.*, 138 F.3d 1448, 1454 (Fed. Cir. 1998). The trier of fact must then compare the properly construed claims with the accused infringing product. *See Markman*, 52 F.3d at 976. This second step is a question of fact. *See Bai v. L & L Wings, Inc.*, 160 F.3d 1350, 1353 (Fed. Cir. 1998).

"Direct infringement requires a party to perform each and every step or element of a claimed method or product." *BMC Res., Inc. v. Paymentech, L.P.*, 498 F.3d 1373, 1378 (Fed. Cir. 2007), *overruled on other grounds by* 692 F.3d 1301 (Fed. Cir. 2012). "If any claim limitation is absent from the accused device, there is no literal infringement as a matter of law." *Bayer AG v. Elan Pharm. Research Corp.*, 212 F.3d 1241, 1247 (Fed. Cir. 2000). If an accused product does not infringe an independent claim, it also does not infringe any claim depending thereon. *See Wahpeton Canvas Co. v. Frontier, Inc.*, 870 F.2d 1546, 1553 (Fed. Cir. 1989). However, "[o]ne may infringe an independent claim and not infringe a claim dependent on that claim." *Monsanto Co. v. Syngenta Seeds, Inc.*, 503 F.3d 1352, 1359 (Fed. Cir. 2007) (quoting *Wahpeton Canvas*, 870 F.2d at 1552) (internal quotations omitted). A product that does not

literally infringe a patent claim may still infringe under the doctrine of equivalents if the differences between an individual limitation of the claimed invention and an element of the accused product are insubstantial. *See Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 24 (1997). The patent owner has the burden of proving infringement and must meet its burden by a preponderance of the evidence. *See SmithKline Diagnostics, Inc. v. Helena Lab. Corp.*, 859 F.2d 878, 889 (Fed. Cir. 1988) (citations omitted).

When an accused infringer moves for summary judgment of non-infringement, such relief may be granted only if one or more limitations of the claim in question does not read on an element of the accused product, either literally or under the doctrine of equivalents. *See Chimie v. PPG Indus., Inc.*, 402 F.3d 1371, 1376 (Fed. Cir. 2005); *see also TechSearch, L.L.C. v. Intel Corp.*, 286 F.3d 1360, 1369 (Fed. Cir. 2002) ("Summary judgment of noninfringement is ... appropriate where the patent owner's proof is deficient in meeting an essential part of the legal standard for infringement, because such failure will render all other facts immaterial."). Thus, summary judgment of non-infringement can only be granted if, after viewing the facts in the light most favorable to the non-movant, there is no genuine issue as to whether the accused product is covered by the claims (as construed by the court). *See Pitney Bowes, Inc. v. Hewlett–Packard Co.*, 182 F.3d 1298, 1304 (Fed. Cir. 1999).

"[A] method claim is not directly infringed by the sale of an apparatus even though it is capable of performing only the patented method. The sale of the apparatus is not a sale of the method. A method claim is directly infringed only by one practicing

the patented method." *Joy Technologies, Inc. v. Flakt, Inc.*, 6 F.3d 770, 775 (Fed. Cir. 1993). Therefore, "an accused infringer must perform all the steps of the claimed method, either personally or through another acting under his direction or control." *Akamai Technologies, Inc. v. Limelight Networks, Inc.*, 692 F.3d 1301, 1307 (Fed. Cir. 2012).

With respect to apparatus claims, "to infringe a claim that recites capability and not actual operation, an accused device 'need only be capable of operating in the described mode.'" *Finjan, Inc. v. Secure Computing Corp.*, 626 F.3d 1197, 1204 (Fed. Cir. 2010) (citing *Intel Corp. v. U.S. Int'l Trade Comm'n*, 946 F.2d 821, 832 (Fed. Cir. 1991). However, if an apparatus claim requires "software [to] be configured in a particular way to infringe," infringement does not occur merely because the apparatus could be used in an infringing fashion. *Finjan*, 626 F.3d at 1204-05.

For there to be infringement under the doctrine of equivalents, the accused product or process must embody every limitation of a claim, either literally or by an equivalent. *Warner-Jenkinson*, 520 U.S. at 41. An element is equivalent if the differences between the element and the claim limitation are "insubstantial." *Zelinski v. Brunswick Corp.*, 185 F.3d 1311, 1316 (Fed. Cir. 1999). One test used to determine "insubstantiality" is whether the element performs substantially the same function in substantially the same way to obtain substantially the same result as the claim limitation. *See Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605, 608 (1950). This test is commonly referred to as the "function-way-result" test. The mere showing that an accused device is equivalent overall to the claimed invention is

insufficient to establish infringement under the doctrine of equivalents. The patent owner has the burden of proving infringement under the doctrine of equivalents and must meet its burden by a preponderance of the evidence. *See SmithKline Diagnostics, Inc. v. Helena Lab. Corp.*, 859 F.2d 878, 889 (Fed. Cir. 1988) (citations omitted).

C. Anticipation

Under 35 U.S.C. § 102(b), "[a] person shall be entitled to a patent unless the invention was patented or described in a printed publication in this or a foreign country . . . more than one year prior to the date of the application for patent in the United States." The Federal Circuit has stated that "[t]here must be no difference between the claimed invention and the referenced disclosure, as viewed by a person of ordinary skill in the field of the invention." *Scripps Clinic & Research Found. v. Genentech, Inc.*, 927 F.2d 1565, 1576 (Fed. Cir. 1991). In determining whether a patented invention is explicitly anticipated, the claims are read in the context of the patent specification in which they arise and in which the invention is described. *Glaverbel Societe Anonyme v. Northlake Mktg. & Supply, Inc.*, 45 F.3d 1550, 1554 (Fed. Cir. 1995). The prosecution history and the prior art may be consulted if needed to impart clarity or to avoid ambiguity in ascertaining whether the invention is novel or was previously known in the art. *Id.* The prior art need not be ipsissimis verbis (i.e., use identical words as those recited in the claims) to be anticipating. *Structural Rubber Prods. Co. v. Park Rubber Co.*, 749 F.2d 707, 716 (Fed. Cir. 1984).

A prior art reference also may anticipate without explicitly disclosing a feature of

the claimed invention if that missing characteristic is inherently present in the single anticipating reference. *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1268 (Fed. Cir. 1991). The Federal Circuit has explained that an inherent limitation is one that is necessarily present and not one that may be established by probabilities or possibilities. *Id.* That is, "[t]he mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Id.* The Federal Circuit also has observed that "[i]nherency operates to anticipate entire inventions as well as single limitations within an invention." *Schering Corp. v. Geneva Pharms. Inc.*, 339 F.3d 1373, 1380 (Fed. Cir. 2003). Moreover, recognition of an inherent limitation by a person of ordinary skill in the art before the critical date is not required to establish inherent anticipation. *Id.* at 1377.

An anticipation inquiry involves two steps. First, the court must construe the claims of the patent in suit as a matter of law. *Key Pharms. v. Hercon Labs Corp.*, 161 F.3d 709, 714 (Fed. Cir. 1998). Second, the finder of fact must compare the construed claims against the prior art. *Id.* A finding of anticipation will invalidate the patent. *Applied Med. Res. Corp. v. U.S. Surgical Corp.*, 147 F.3d 1374, 1378 (Fed. Cir. 1998).

III. DISCUSSION

A. The '348 Patent

The '348 patent, titled "Method for Context-Preserving Magnification of Digital Image Regions," was filed on May 14, 1996 and issued on May 19, 1998. The '348 patent is directed to a method for digital image magnification in a graphical user interface that allows simultaneous viewing of the magnified image and its unmagnified context. ('348 patent, abstract) It addresses the problem faced by a user who

"experiences difficulty discerning small details and would like to view a portion of the image in a magnified format." (*Id.* at col. 1:12-14) Asserted claims 1-4 of the '348 patent are directed to magnifying a selected region of a digital image in a graphical user interface, and superimposing the magnified image window – a "floating plane region" – over the selected region of the original image to preserve the context of the selected region. Claim 1 is reproduced below.

> A method of digital image magnification in a graphical user interface, the method comprising: selecting for magnification a selected region of an original image in the graphical user interface; and superimposing on the original image a floating plane region in the graphical user interface containing a magnified image of the selected region, wherein the floating plane region has an area larger than an area of the selected region and smaller than an area of the original image, such that the selected region of the original image is magnified and viewed while preserving the context of the selected region.

(*Id.* at col. 5:16-26)

1. Infringement

IV alleges that Canon's products, which include certain combinations of zoom features and focus modes, infringe independent claim 1 and dependent claims 2-4 of the '348 patent. The accused cameras include (1) AF-Point Zoom in Center Autofocus ("AF") mode, (2) AF-Point Zoom in Face Detect AF mode, or (3) MF-Point Zoom in Manual Focus ("MF") mode. (D.I. 184, ex. 107 ¶¶ 44-45) AF-Point Zoom is a feature that, in certain circumstances, will magnify a portion of the displayed image appearing in the AF frame when the shutter button is depressed halfway. (D.I. 183, ex. 75 at CAN27949; D.I. 184, ex. 113 at ¶ 51) The MF-Point Zoom feature is similar to the AF-Point Zoom feature, but it operates in the MF mode, and can in certain

circumstances, magnify a portion of an image in the AF frame. (D.I. 183, ex. 71 at CAN19303; D.I. 184, ex. 113 at ¶¶ 13-14)

Canon offers argument under its proposed construction of the limitation "floating plane." As the court did not adopt Canon's proposed construction, instead construing the limitation as "a window over a digital image that contains a magnified image of a region of the digital image," there exists a genuine issue of material fact as to whether the accused products meet this limitation. The parties then focus their arguments on how the selected region is identified by the zoom features in the limitation, "selecting for magnification a selected region of an original image in the graphical user interface." Under the court's construction of this limitation, "choosing which part of the image on the screen to magnify," there exists a genuine issue of material fact as to whether the zoom features satisfy this limitation. Therefore, Canon's motion for summary judgment of non-infringement is denied.[1]

2. Invalidity

Canon asserts that claims 1-4 are invalid as anticipated by the Japanese Publication No. 4-142661, titled "Information Processing Apparatus," ("Sano") published on May 15, 1992 (D.I. 173, ex. 25), and/or the United States Patent No. 5,818,455, titled "Method and Apparatus for Operating on the Model Data Structure of an Image to Produce Human Perceptible Output Using a Viewing Operation Region Having Explicit Multiple Regions," ("Stone") filed on April 26, 1995 and issued on October 6, 1998. (D.I. 173, ex. 26)

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[1]As IV did not respond to Canon's doctrine of equivalents argument, summary judgment is granted in this regard.

The preamble of claim 1 of the '348 patent reads "[a] method of **digital image magnification** in a graphical user interface . . . ." ('348 patent, col. 5:16-17) (emphasis added) The parties dispute whether the term "digital image magnification" limits claim 1 of the '348 patent. During prosecution of the '348 patent application, applicants distinguished claim 1 from the prior art based on the preamble. Both parties cite to *Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801 (Fed. Cir. 2002), for the principle that "clear reliance on the preamble during prosecution to distinguish the claimed invention from the prior art transforms the preamble into a claim limitation because such reliance indicates use of the preamble to define, in part, the claimed invention." *Id.* at 808-09.

In the present case, the examiner rejected claims 1 and 3 under 35 U.S.C. § 102(b) because "claims 1 and 3 clearly structurally read on either of the [eight] references cited." (D.I. 172, ex. 11 at IVCANON200) Applicant amended claim 1 to add the limitation "in the graphical user interface" to two steps in the body of the claim. (*Id.* at IVCANON210-14) The applicant argued that "none of the references cited by the examiner disclose a method of digital image magnification in a graphical user interface." (*Id.* at IVCANON212) In distinguishing Brill, a reference which "discloses a magnifying marker for a [physical] game board . . . as used in lotto games such as bingo," the applicant emphasized that "claim 1 is directed to a method of **digital** image magnification, and includes, for example, 'superimposing on the original image a floating plane region **in the graphical user interface**.'" (*Id.* at IVCANON212-13) (emphasis in original) Contrary to Canon's argument, the court concludes that the

preamble is limiting because the applicant emphasized both "digital image magnification" and "in the graphical user interface" in distinguishing the invention from the prior art.

The parties' experts dispute the meaning of "digital image." Dr. Feiner opines that "a POSA reading the '348 patent would understand the claimed method to apply to the magnification of **any** digital image data, regardless of how it is stored or represented in memory." (D.I. 176, ex. 68 at ¶ 115) (emphasis in original) In contrast, Dr. Schonfeld opines that "the plain and ordinary meaning of the claim term 'digital image magnification' is magnification of a discrete, multi-dimensional representation of visual information.'" (D.I. 190, ex. 130 at ¶ 97)[2]

a. The Sano reference

Sano discloses a display system, which enlarges and displays a part of an image displayed on a monitor. (D.I. 173, ex. 25 at 2) More specifically, it discloses an information processing apparatus used to display "a whole page of a document," and a "virtual loupe," which may then be used to "enlarge and display" a part of such document. (*Id.* at 4)

Canon's expert, Dr. Feiner, opines that "Sano discloses superimposing on the original image a floating plane region containing a magnified image of the selected region, as shown in [f]igure 2," which figure shows an enlargement of a portion of a document. (D.I. 176, ex. 68 at ¶ 79) Canon offers attorney argument to criticize Dr. Schonfeld's opinion that "[t]he Sano reference does not disclose '[a] method of digital

[2]To the extent that this dispute is one of claim construction, the parties must identify it as such and the court will construe the limitation.

image magnification' because the alleged 'magnification' is performed on documents that include characters." (*See* D.I. 190, ex. 130 at ¶ 327) At deposition, Dr. Schonfeld testified that bit map images would "generally" be a digital image. (D.I. 175, ex. 59 at 73:9-13) The identified expert disagreement represents a genuine issue of material fact, therefore, Canon's motion for summary judgment of invalidity is denied in this regard.

b. The Stone reference

Stone discloses a method of operating a processor control machine using a viewing operation region to magnify a selected region of an original image. (D.I. 173, ex. 26, abstract, 4:56-5:29) The parties' experts each look to the Stone specification to support their respective definitions of "digital image magnification." (*See* D.I. 190, ex. 130 at ¶ 99; D.I. 176, ex. 68 at ¶¶ 116-117) This disagreement is sufficient to raise a genuine issue of material fact. Therefore, Canon's motion for summary judgment of invalidity as to the '348 patent is denied.

B. The '960 Patent

The '960 patent, titled "Touch Screen Systems and Methods," was filed on August 28, 1997 and issued on September 19, 2000. It claims priority to provisional application no. 60/024,780 filed on August 28, 1996, which claims priority to provisional application no. 60/028,028 filed on October 9, 1996, which claims priority to provisional application no. 60/036,195 filed on January 21, 1997. The '960 patent is directed to touch screens that can simultaneously display a keyboard-type image superimposed on a background image. (*See* '960 patent, col. 1:16-19) The '960 patent relates to a

technique of superimposing images called "variable-pixel control," which technique employs "logical operators" to determine which pixels are used to display the keyboard image and which are used to display the main image. (*See id.* at cols. 2:8-12, 4:33-41) IV alleges that Canon infringes claims 1, 7, 12, 19-20, 26, and 28-30 of the '960 patent through the function panel in Canon's accused products. (D.I. 192 at 10) The claims representative of the disputes on summary judgment are reproduced below.

> 1. A screen peripheral system, comprising:
> a computing device for providing a main image; and
> a touch-activated input device for generating and displaying a composite image visible to a user of the screen peripheral system, the touch-activated input device comprising a plurality of pixels, the composite image simultaneously including:
> a representation of at least one key, the representation of at least one key activating an input function; and
> the main image provided by the computing device, the representation of at least one key being laid over the main image;
> wherein the screen peripheral system implements variable-pixel control to form the representation of at least one key and to form the main image, the variable-pixel control causing pixels selected to form the representation of at least one key in the composite image to depend on and be activated simultaneously with pixels selected to form the main image, such that the main image and the representation of at least one key are displayed simultaneously to form the composite image;
> further wherein the variable-pixel control includes logical operators to provide different blending/merging effects such that individual pixels of the touch-activated input device can be dedicated simultaneously to both the main image and the representation of at least one key.

('960 patent, col. 12:2-29)

> 12. The screen peripheral system of claim 1, wherein the composite image includes a blended shadow of the representation of at least one key and the main image, or a clear space around a blended area to highlight the area of

blending.

(*Id.* at col. 13:17-22)

19. A method of superimposing a representation of at least one key over a main image provided by a computing device, the method comprising:
(a) using variable-pixel control to form a representation of at least one key, the representation of at least one key activating an input function, and to form the main image, the variable-pixel control causing pixels selected to form the representation of at least one key to be activated simultaneously with pixels selected to form the main image; and

(b) generating and displaying a composite image visible to a user of the screen peripheral system, the composite image simultaneously including the representation of at least one key and the main image produced by the computing device, the representation of at least one key being superimposed on the main image;

wherein the variable-pixel control allows individual pixels to be dedicated simultaneously to both the main image and the representation of at least one key.

(*Id.* at col. 13:46-64)

26. A screen peripheral system, comprising:
means for computing, the means for computing providing a main image;
means for displaying a composite image visible to a user of the screen peripheral system, the means for displaying also being for input to the means for computing, wherein the means for displaying comprises a plurality of pixels, the composite image simultaneously including: a representation of at least one input zone, the representation of at least one input zone activating an input function; and
the main image provided by the means for computing, the representation of at least one input zone being laid over the main image;
wherein pixels selected to form the representation of at least one input zone are activated simultaneously with pixels selected to form the main image, such that the main image and the representation of at least one input zone are

> displayed simultaneously to form the composite image; further wherein individual pixels of the means for displaying can be dedicated simultaneously to both the main image and the representation of at least one input zone.

(*Id.* at col. 14:31-56)

1. Infringement[3]

IV asserts that the '960 patent is infringed by Canon's PowerShot SD3500 IS camera and by several models of Canon's Vixia camcorders. (D.I. 184, ex. 107 at ¶ 37) The accused products have a graphical user interface with a touch panel display. (*Id.* at ¶ 67) They also have the ability to superimpose graphical images over a main image in the display. (*See id.* at ex. 113 at ¶¶ 82-85) Canon argues that independent claim 19 and dependant claim 20 of the '960 patent are not infringed because the accused products do not include the limitation "a representation of at least one key, the representation of at least one key activating an input function."

To support this argument, Canon's expert, Dr. Feiner, concludes without analysis[4] that the aforementioned limitation is not met by the accused PowerShot

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[3]Canon also argued that independent claims 1 (and dependant claims 7 and 12) and 26 (and dependant claims 28-30) were not infringed for various reasons. Per the claim construction order, the court found a limitation of claim 1 indefinite, therefore, the court cannot complete a meaningful infringement analysis. *See Markman*, 52 F.3d at 976. Additionally, the claims are invalid and, therefore, not infringed. *Exergen Corp. v. Wal–Mart Stores, Inc.*, 575 F.3d 1312, 1320 (Fed. Cir. 2009) ("invalid claim[s] cannot give rise to liability for infringement") (citation omitted); *Wahpeton Canvas Co. v. Frontier, Inc.*, 870 F.2d 1546, 1553 (Fed. Cir. 1989) (if an independent claim is not infringed, any claim depending thereon is not infringed).

[4]The court notes that it has been provided with declarations which, according to Canon, "merely restate[] the opinions already expressed in [the] expert reports in a more concise manner." (*See, e.g.*, D.I. 184, ex. 113 at ¶ 3) However, these declarations do not cite to the expert's reports or provide enough analysis for the court to determine whether the expert's conclusions are actually appropriate or supported by

SD3500 IS camera because "[t]ouching either inside or outside the 'Recording Pixels' or 'Set image recording size' labels merely has the effect of causing the overlaid image of displayed information to disappear, i.e., it does not provide or activate any input function." (D.I. 184, ex. 113 at ¶ 65) Dr. Feiner's declaration also criticizes the opinions of Dr. Schonfeld, including that the accused products meet the above limitation "because they 'include composite images that comprise a combination of a background image and an image of an input button for activation of the touch panel screen.'" (*Id.* at ¶ 63) (citing to D.I. 184, ex. 107 at ¶ 70) Attorney argument and conclusory expert opinions are insufficient to meet Canon's burden of showing that there is no genuine issue of material fact. Canon's motion is denied in this regard.

Canon also argues that the "Rec. Programs" screen area of the Vixia camcorders identified by Dr. Schonfeld on the menu screen is at most an "input zone" or "button," but not a "key" as required by the claim. (D.I. 182 at 19-20) As the issue of whether "input buttons" constitute "keys" is one of claim construction, the court determines that the '960 patent does not distinguish "keys" from "buttons" (as Canon suggests in support of its non-infringement position), but instead uses them interchangeably. This is consistent with the specification which teaches that, "embodiments of the invention contemplate i/o devices with full, partial, reduced-key, alphanumeric or non-alphanumeric keyboards comprising one or more 'keys,' 'buttons,'

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the expert's reports. These declarations also increase the burden on the opposing party as the party must review the declarations to determine whether they are consistent with the expert's reports.

'contact zones' or the like." ('960 patent, col. 2:59-63)[5] Accordingly, there exists a genuine issue of material fact with respect to the literal infringement of claims 19 and 20 of the '960 patent.[6] Canon's motion is denied in this regard.

2. Invalidity

The court concluded in its claim construction order that the limitations "a computing device for providing a main image" of claim 1 and "means for computing, the means for computing providing a main image" of claim 26 are indefinite, therefore, these claims are invalid. Dependent claims 7, 12, 28-30 are similarly invalid as they each require the indefinite limitation of the independent claims. Canon's motion for summary judgment of invalidity is granted in this regard.

Canon also asserts that claims 19 and 20[7] are invalid as anticipated by United States Patent No. 5,148,155, titled "Computer with Tablet Input to Standard Programs"

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[5]Additional examples of the patent's use of the words "key" and "button" interchangeably include: "Keyboard overlays according to the invention are especially advantageous for very small screens, because of the relatively large and accessible overlay 'buttons' (keys) that are provided . . . ."; "FIG. 2 illustrates a representation of at least one key – in this example a full QWERTY keyboard with several function/option keys/buttons"; and "[a]ccording to one embodiment, upon entering the cursor mode a number of new keys/buttons (or representations thereof, as above) appear on a side of the screen, for example, cut, paste, copy, delete and/or hold buttons." ('960 patent, 3:48-52, 8:21-24, 8:63-67)

[6]Canon asserts that, because the '960 patent discloses other input zones (i.e., "buttons" and "contact zones," as well as "keys") but claims 1 and 19 recite only "keys," IV is precluded from arguing that these other types of input zones are equivalent to the claimed "keys." (D.I. 182 at 22) IV does not dispute this in its answering brief. As the court has determined that "keys" and "buttons" and, therefore, other input zones are interchangeable, this argument is now moot.

[7]Canon also asserted that claims 1, 7, and 12 were anticipated by Martin. (*See* D.I. 169 at 28) As the court has found these claims indefinite, Canon's arguments are not considered.

("Martin"), issued on September 15, 1992. (D.I. 174, ex. 27) Martin discloses "[a] computer system having a digitizing tablet overlaying the display screen. The tablet serves as a user's primary input device." (*Id.* at abstract) A separate display plane "is effected by use of an ink plane buffer to hold the image to be combined, a mask plane buffer to indicate how the ink plane data is to be combined with the display data from the pre-existing program, and a multiplexer that performs the data combination." (*Id.* at col. 3:44-48) Further,

> [t]he mask plane has one bit per pixel. It is used to determine (on a pixel-by-pixel basis) whether the data from the normal display buffer or data from the ink plane is shown on the display screen. The mask plane could be extended to include more than one bit per pixel; for example, this would permit selection among a set of image combining arrangements, such as AND, OR, XOR, NOR, and NAND, in addition to simply selecting between the VGA and ink data.

(*Id.* at col. 9:5-13)

Both parties' experts point to this section of the Martin specification to dispute whether Martin discloses "individual pixels to be dedicated simultaneously to both the main image and the representation of at least one key." Dr. Feiner opines that "Martin discloses a system in which logical operators are used to implement Boolean operations and combine image data from three different sets of pixels . . . ." (D.I. 176, ex. 68 at ¶ 235) Dr. Schonfeld opines that "[a]lthough Martin discusses the ability to choose pixels from either the ink plane or the display, it does not disclose 'individual pixels . . . [that] can be dedicated simultaneously to both the main image and the representation of at least one key." (D.I. 175, ex. 57 at ¶ 509) Further, Dr. Schonfeld disagrees with Dr. Feiner and opines that "the XOR operation disclosed in Martin . . .

selects a pixel from one image or the other – never both." (*Id.*) This conflicting expert testimony represents a genuine issue of material fact. Canon's motion for summary judgment of invalidity is denied in this regard.

C. The '686 Patent

The '686 patent, titled "Method of Making a Semiconductor Image Sensor," was filed on January 28, 2000 and issued on April 24, 2001. It is a division of application no. 08/970,720, filed on November 14, 1997, now the '081 patent. Image sensors create digital images by converting light to electrical energy. (*See* '686 patent, col. 1:25-28) The portion of the image sensor that performs the conversion from light to electrical energy is called the photodiode or light sensing element. (*See id.* at cols. 2:29-30, 4:62-5:14) To increase the image sensor's efficiency, the fabrication process includes a pinned photodiode formed in an enhancement layer. (*See id.* at cols. 4:62-5:14) IV alleges that Canon's products infringe independent claim 14 and dependent claims 15-16 of the '686 patent. The asserted claims are reproduced below.

> 14. A method of forming an image sensor comprising: using an implant at a first angle to form a conducting region of the image sensor; and forming a pinned layer at least partially within the conducting region.

(*Id.* at col. 6:17-20)

> 15. The method of claim 14 further including using a substrate of a first doping concentration, and forming an enhancement layer on the substrate, the enhancement layer having a doping concentration that is less than the first doping concentration wherein the conducting region is formed in the enhancement layer.

(*Id.* at col. 6:21-26)

16. The method of claim 14 further including forming the pinned layer by implanting at a second angle.

(*Id.* at col. 6:27-28)

1. Infringement

IV alleges that the '686 patent is infringed by Canon's products, including Vixia camcorders and DSLR cameras, that use an image sensor fabricated using Canon's L34 process, K41 process, L60 process, or O10 process. (D.I. 184, ex. 108 ¶ 54) IV alleges that the deep p-type wells ("DPWL") in the L34 process, K41 process, and L60 process, and the p-type buried layer ("PBL") in the O10 process, are the equivalent of the claimed substrate and enhancement layer.

a. IV's motion for partial summary judgment of infringement of claims 14 and 16 of the '686 patent

IV alleges that Canon infringes claims 14 and 16 of the '686 patent. (D.I. 163) In response, Canon provides no opinions as to non-infringement of these claims, instead asserting that, because claims 14 and 16 are invalid in view of the prior art, these claims cannot be infringed.[8] (*See, e.g.*, D.I. 166, ex. E at ¶¶ 68, 103; ex. H at 63:16-64:5; ex. I at 211:13-15) Because Canon has not provided any evidence to dispute infringement, IV's motion for partial summary judgment is granted.

b. Canon's motion for summary judgment of non-infringement of claim 15 of the '686 patent

Claim 15 requires, "using a substrate of a first doping concentration, and forming an enhancement layer on the substrate, the enhancement layer having a doping

[8]In contrast, IV performs a detailed infringement analysis. (D.I. 164 at 6-16)

concentration that is less than the first doping concentration . . . ."[9] IV asserts that Canon's accused products include an enhancement layer having a doping concentration that is less than the first doping concentration under the doctrine of equivalents.[10] (D.I. 192 at 20) Canon moves to exclude the opinion of Dr. Afromowitz on the doctrine of equivalents. (D.I. 182 at 27; D.I. 217)

Based on selected scientific references,[11] Dr. Afromowitz opined that the accused products "comprise an enhancement layer having a doping concentration that is less than the first doping concentration through the deep p-well that is created by process element DPWL in the epitaxial layer by implanting a larger concentration of p-type dopant atoms (Boron) than the concentration of n-type dopant atoms originally grown into the epitaxial layer." (D.I. 165, ex. 1 at ¶¶ 57-58) He concluded that the accused products "comprise a deep p-well on the substrate to perform substantially the same function of creating a lightly doped region that overlies a more heavily doped region, in substantially the same way by differentially doping the semiconductor, to

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[9]Although an "invention may be entitled to some range of equivalents, a court may not, under the guise of applying the doctrine of equivalents, erase a plethora of meaningful structural and functional limitations of the claim on which the public is entitled to rely in avoiding infringement." *Perkin-Elmer Corp. v. Westinghouse Electric Corp.*, 822 F.2d 1528, 1532 (Fed. Cir. 1987).

[10]IV does not argue literal infringement and Canon's motion is granted in this regard.

[11]Using his own selected references, Dr. Fossum disputes the references selected and calculations performed by Dr. Afromowitz, concluding that Dr. Afromowitz's analysis is not reliable and not based on sufficient facts or data. (D.I. 184, ex. 114 at ¶¶ 43-45) The court will not weigh the credibility of the parties' experts, therefore, Canon's motion to exclude the opinion of Dr. Afromowitz is denied in this regard. (D.I. 217)

achieve substantially the same result of enhancing carrier collection." (*Id.*)[12]

Dr. Afromowitz further opined that the n-type substrate "serves no electronic purpose," and "[i]ts only purpose is mechanical" – to provide a base on which an epitaxial layer is formed. (D.I. 184, ex. 108-B at 5, 13, 21, 28-29) Dr. Fossum asserted that "[t]he n-type substrate in the accused products provides many electronic purposes, in addition to providing the mechanical purpose as the base of the device." (*Id.* at ex. 114 at ¶ 58) At deposition, Dr. Afromowitz admitted that he did not make any comparisons between the alleged enhancement layer as compared to the n-sub layer (substrate) in the accused products (*Id.* at ex. 110 at 131:23-132:7) and that, upon reading Dr. Fossum's rebuttal report, believed that it was accurate, and withdrew his opinion regarding the substrate serving no electronic purpose. (*Id.* at 59:19-61:16) Dr. Afromowitz offered no further analysis as to the claim requirement of the enhancement layer having a doping concentration less than the substrate. (*Id.*)

In analyzing the claim, Dr. Fossum explained that, "by ignoring the electrical functions of the substrate, Dr. Afromowitz has ignored the functions, ways, and results that are provided by the structure of the DPWL and PBL regions with the n-type substrate in the [a]ccused [p]roducts, which are separate and distinct from the function, way, and result of the 'enhancement layer' and substrate of Claim 15." (*See id.* at ex. 114 at ¶ 58) As Dr. Afromowitz did not offer further analysis or amend his expert report after changing his opinion regarding the electronic purpose of the substrate, IV has not offered evidence of a genuine issue of material fact as to whether the accused products

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[12]This opinion applies to all the processes. (See D.I. 165, ex. 1 at ¶¶ 57-58 & ex. H)

meet the claim limitation under the doctrine of equivalents. Therefore, the court grants Canon's motion for summary judgment of non-infringement under the doctrine of equivalents.

2. Invalidity

Canon asserts that claims 14 and 16 of the '686 patent are invalid as anticipated by the Japanese unexamined patent application, titled "Method of Producing Solid-State Image Pickup Apparatus," ("Monoi"), published on December 17, 1996. (D.I. 173, ex. 19) Monoi discloses "a method of producing a solid-state image pickup apparatus such as a CCD (Charge Coupled Device) linear image sensor." (*Id.* at 4) As the court has construed "image sensor" in claims 14 and 16 to mean "CMOS image sensor," and Monoi discloses charge-coupled device ("CCD") image sensors, the Monoi reference does not anticipate the asserted claims. Therefore, Canon's motion is denied in this regard.

D. The '081 Patent

The '081 patent, titled "Semiconductor Image Sensor," was filed on November 14, 1997 and issued on February 8, 2000. The '081 patent is the parent of the '686 patent and is directed to a specific configuration of an image sensor that includes a "silicide layer." Specifically, the invention seeks to avoid formation of the silicide layer on the light-sensing photodiode. ('081 patent, cols. 1:50-51, 4:34-35) The '081 patent explains that silicide is used as a low-resistance contact material for the transistor transfer gates. (*Id.* at col. 4:36-38) IV alleges that Canon's products infringe independent claim 3 of the '081 patent. The asserted claim is reproduced below.

An image sensor comprising:
a substrate;
a pinned photodiode on the substrate;
a dielectric layer overlying the pinned photodiode; and
a silicide layer on a portion of the image sensor wherein an area overlying the pinned photodiode is devoid of the silicide layer.

(*Id.* at col. 6:6-15)

1. Infringement

IV asserts that claim 3 of the '081 patent is infringed by Canon's products that include an image sensor fabricated using Canon's L34 process, K41 process, L60 process, or O10 process. (D.I. 184, ex. 108 at ¶ 49) Canon argues that claim 3 of the '081 patent is not infringed because the accused products do not include a "silicide layer."[13] The parties' experts generally agree that titanium deposited on bare silicon which is then heated forms titanium silicide. (*See* D.I. 166, ex. I at 187:20-189:19; ex. H at 21:25-23:4; D.I. 184, ex. 108-A) Specifically, Dr. Afromowitz opined that "[w]hen Ti [titanium] is deposited on a bare Si [silicon] surface, and the wafer heated briefly to 550 degrees Celsius or higher," then a titanium silicide[14] will form. (D.I. 184, ex. 108-A at 5, 10, 15, 21-22)

As to the particular processes, Dr. Afromowitz presented the following evidence.

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[13]Canon moves to exclude the opinion of Dr. Afromowitz on the presence of a "silicide layer" as based on insufficient facts and unreliable principles and methodology. (D.I. 218 at 5) As the court finds the evidence proffered probative of infringement, Canon's motion is denied. *See Mkt. Biosciences Corp. v. Nutrinova, Inc.*, 579 F.3d 1363, 1372 (Fed. Cir. 2009) (Testing is not required to support an infringement opinion; rather, "a patentee may prove infringement by 'any method of analysis that is probative of the fact of infringement.'").

[14]A silicide is a compound containing silicon and a metal. The metal in the accused products is Ti. (D.I. 184, ex. 108-A at 5)

For the 010 process, he points to the Canon process design manual. The manual does not provide a temperature, a time, or use the word anneal for this process. (*See id.* at ex. 82; ex. 108-A at 21-22) However, a reverse engineering report shows four images with the label "Ti Silicide." (*Id.* at ex. 94) For the L34 and L60 processes, he points to Canon's process design manuals, which show annealing at 600 degrees for 30 minutes. (*Id.* at exs. 79, 80, 108-A at 4, 15-16) For the K41 process, Dr. Afromowitz points to the process design manual, which provides annealing at 600 degrees Celsius for 30 seconds. (*Id.* at exs. 81, 108-A at 10) However, a reverse engineering report for the K41 process shows no silicide formation. (*Id.* at ex. 93)

Based on the evidence, the court concludes that there exists a genuine issue of material fact with respect to the presence of silicide for the O10, L34 and L60 processes. However, as to the K41 process, the court concludes that IV has not offered sufficient evidence probative of silicide formation to create a genuine issue of material fact. Therefore, Canon's motion for summary judgment of non-infringement is granted in part and denied in part.

2. Invalidity

Canon argues that claim 3 of the '081 patent is invalid as anticipated by the Japanese unexamined patent application publication, titled "CCD Solid-State Imaging Element," ("Iizuka"), published on May 31, 1994 (D.I. 173, ex. 21), and the published article from the Journal of the Institute of Television Engineers of Japan, titled "A Proposal for a ½ -inch 2 M-pixel Progressive Scan Line-Amplified Multiple

Multielectrode-Potential-Wells Charge-transfer Device, ("Ozaki"), published in February 1996. (*Id.* at ex. 23)

Iizuka discloses "CCD solid-state imaging elements." (*Id.* at ex. 21 at 2) As the court has construed "image sensor" in claim 3 to mean "CMOS image sensor," and Iizuka discloses charge-coupled device ("CCD") image sensors, Iizuka does not anticipate the asserted claim. Therefore, Canon's motion is denied in this regard.

Ozaki discloses a "single-layer CCD/CMOS process and [Vertical] CCD driving circuitry, which generate transfer in readout pulse[s]." (*Id.* at ex. 21 at 1) The parties dispute whether Ozaki discloses a "pinned photodiode." Dr. Fossum opined that Ozaki discloses a pinned photodiode in figure 5, formed by "the p+ surface region . . . above the n-type photodiode . . . , followed by a second n- well, an n-- well, and a p-- well . . . below the photodiode . . . ." (D.I. 176, ex. 67 at ¶ 75) Dr. Afromowitz opined that "Ozaki never describes the device as a pinned photodiode or equivalent. Furthermore, [f]ig. 5 does not disclose a continuous p-region between the p+ surface layer and the p- - well, which well would form the lower p-region of a pinned photodiode." (D.I. 186, ex. 2 at ¶ 215) Canon offers attorney argument to disagree with Dr. Afromowitz's deposition testimony wherein he elaborated on his opinion. (D.I. 175, ex. 58 at 89:22-90:7) Disagreements between experts represent a genuine issue of material fact. Therefore, Canon's motion for summary judgment of invalidity is denied in this regard.[15]

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[15]IV argues that Ozaki is not enabled. (D.I. 185 at 18) An anticipatory reference must be enabling. *See Impax Laboratories, Inc. v. Aventis Pharmaceuticals Inc.*, 468 F.3d 1366, 1381 (Fed. Cir. 2006) ("In order to be anticipating, a prior art reference must be enabling so that the claimed subject matter may be made or used by one skilled in

E. The '587 Patent

The '587 patent, titled "Image Sensor and Method for Fabricating the Same," was filed on December 30, 2002 and issued on December 27, 2005. The '587 patent is directed to reducing "dark current" in the light-sensing region – the photodiode of an image sensor. ('348 patent, col. 3:55-58) Dark current is current that is generated even though there is no light shining on the photodiode. (*Id.* at col. 3:28-30, 3:37-43) The asserted claims of the '587 patent teach a method for solving this problem by moving the edge of the photodiode a predetermined distance away from the transition region and by extending the field stop region outward from under the field oxide layer toward the photodiode area to separate the field oxide layer and photodiode. IV alleges that Canon's products infringe independent claim 1 and dependent claims 2 and 3 of the '587 patent. Claim 1 is reproduced below.

> An image sensor, comprising:
> a semiconductor substrate;
> an active area including a photodiode area formed in a predetermined position of the substrate, a floating diffusion area having a smaller area than the photodiode area and a channel area having a bottle-neck structure connecting to the photodiode area and the floating diffusion area;
> a field area for isolating electrically the active area;
> a field stop layer being formed beneath the field area and being wider than the field area in a direction towards the active area; and
> a gate electrode formed on the substrate by covering the channel area and a portion of the photodiode contacted to the channel area.

(*Id.* at col. 12:5-20)

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the art.") (citations omitted). Therefore should Canon present this as an allegedly anticipatory reference at trial, it must show that it is in fact enabled.

1. Infringement

IV asserts that claims 1-3 of the '587 patent are infringed by Canon's products that include an LC1060 image sensor (fabricated using Canon's L34 process), an LC1130 image sensor (fabricated using Canon's K41 process), or an LC1100 image sensor (fabricated using Canon's L60 process). (D.I. 184, ex. 108 at ¶ 59) Canon argues that claims 1-3 of the '587 patent are not literally infringed because the accused products do not include a "field stop layer," as the structures IV alleges to constitute such layer are each a combination of at least two different regions, **with the second region being formed after the field area** (during the NCS3 step). (D.I. 182 at 43)

For the L34 process, for example, a portion of the field stop is created during process element NCS,[16] in which Boron is implanted to the right and left of the photodiode and floating diffusion regions. (D.I. 166, ex. J at CAN15)[17] The first Boron implantation occurs immediately underneath the areas that become the field areas. (*Id.*) Then, during process element NCS3, Boron is implanted to the right of the field area on the left side of the photodiode active region – merging with the first Boron implantation. (*Id.*)

As explained in the court's claim construction order, the applicant differentiated the claimed field stop layer from two layers found in the prior art, one of which was

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[16]The layer formed during the NCS process is an n-channel stop layer. (D.I. 193, ex. Y at 18:24-19:12; 39:18-21; 48:5-6) Canon's expert, Dr. Theuwissen, confirmed that a channel stop layer and a field stop layer can do exactly the same thing. (D.I. 166, ex. I, Theuwissen Tr. 103:8-18.)

[17]The K41 and L60 processes also use the NCS and NCS3 process elements. (D.I. 184, ex. K at CAN117099-100; ex. L at CAN0117113-114)

formed after the field area. Therefore, IV's argument that the two layers formed by Canon's process elements NCS and NCS3, one of which is formed after the field area, form the "field stop layer" is foreclosed by the prosecution history.[18] There exists no genuine issue of material fact as to whether the accused products infringe the '587 patent. Canon's motion is granted in this regard.[19]

2. Invalidity

Canon asserts that claims 1-3 of the '587 patent are invalid as anticipated by an article from the Journal of the Institute of Image Information and Television Engineers, titled "A CMOS Image Sensor with a Simple FPN-Reduction Technology and a Hole Accumulated Diode," ("Yonemoto"), published in February 2001. (D.I. 174, exs. 28-29) Yonemoto is directed to an image sensor having a pinned photodiode called a "Hole Accumulated Diode" ("HAD") used to reduce dark current caused by crystal defects in the field area ("insulation film"). (D.I. 174, ex. 28, abstract, fig. 2; ex. 29 at 3-4) Claim 1 of the '587 patent requires "a gate electrode formed on the substrate by covering the channel area and a portion of the photodiode contacted to the channel area." ('587

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[18]Contrary to IV's argument that Canon's expert, Dr. Fossum, confirmed that the two implantations of two regions could form the same layer, he instead responded to a hypothetical question as to whether two implantations could be considered a single layer. He responded, ". . . in the case where the two implantations are in identical regions with identical energies . . ., yes, they could form a single layer . . . . (*See* D.I. 173, ex. H at 112:24-115:21)

[19]IV fails to dispute Canon's argument that the "field stop layer" limitation of the asserted claims of the '587 patent is not met under the doctrine of equivalents. (D.I. 182 at 4-5) Canon's motion for summary judgment is granted in this regard. The motion to exclude the opinions of Dr. Afromowitz concerning the alleged equivalence of any structures in the Canon accused products and the claimed "field stop layer" of the '587 patent, therefore, is denied as moot.

patent, col. 12:5-20) The parties dispute whether Yonemoto discloses that the gate electrode covers "a portion of the photodiode contacted to the channel area."

Canon points to figure 2 of Yonemoto to show that it discloses this limitation in exactly the same way as figures 1 and 4E in the '587 patent. Canon's expert, Dr. Theuwissen, opines that "the gate electrode is above the channel area – the area between the floating diffusion area . . . and the photodiode . . . . Yonemoto discloses the gate electrode covers a portion of the photodiode contacted to the channel area in the same manner as disclosed in the '587 patent . . . ." (D.I. 176, ex. 69 at ¶ 69) IV's expert, Dr. Afromowitz, explained that figure 2 shows that the

> left side edge of the N region of [HAD] . . . is coincident vertically with the right side edge of the gate electrode (the center rectangle portion of the structure labeled "Readout Gate"). The region surrounding the gate electrode constitutes the spacer comprising insulating materials and therefore is not part of the gate electrode. . . . the spacer insulating material appears to cover the photodiode identified as HAD, but the gate electrode does not cover the channel area and a portion of the photodiode as required by claim 1 of the '587 patent.

(D.I. 186, ex. 2 at ¶ 72) The court concludes that Canon has not carried its burden of persuasion that Yonemoto does in fact disclose the limitation of the gate electrode covering a portion of the photodiode. Because there exist genuine issues of material fact, Canon's motion is denied in this regard.

F. The '298 Patent

The '298 patent, titled "Image Sensor and Method for Manufacturing the Same," was filed on September 20, 2004 and issued on April 29, 2008. The '298 patent is directed to an image sensor device with increased photosensitivity or light collection.

('298 patent, col. 1:7-11) IV alleges that Canon's products infringe independent claim 1 and dependent claim 2 of the '298 patent. Asserted claim 1 is reproduced below.

> An image sensor, comprising:
> at least one photodiode formed on a semiconductor substrate;
> multi-layer interlayer insulating films formed on the photodiode and stacked in at least two layers of oxide film having different density and the refractive index so that the density and the refractive index of the upper interlayer insulating film becomes lower than that of the lower interlayer insulating film as the multi-layer interlayer insulating films proceed upward;
> a light shield layer and an element-protecting film sequentially stacked on the multi-layer interlayer insulating film;
> color filter arrays and a flattening layer sequentially stacked on the element-protecting film; and
> microlenses arranged on the positions corresponding to the color filters on the flattening layer.

(*Id.* at col. 6:39-55)

1. Infringement

IV asserts that the '298 patent is infringed by Canon's products that include an image sensor fabricated using Canon's L60 process or K41 process. (D.I. 184, ex. 108 at ¶¶ 50, 67) Each of these processes forms at least four layers that are relevant to IV's allegations concerning the claimed multi-layer interlayer insulating films. The parties dispute whether Canon's products satisfy the "multi-layer interlayer insulating films" limitation of claim 1. The court construed this limitation as "two or more oxide films sequentially stacked on a photodiode, with the uppermost layer having the lowest density and refractive index, and the lowest layer having the highest density and refractive index."

Initially, Dr. Afromowitz opined that the accused products

> comprise the TH process that forms two inter-layer insulating films formed immediately on top one of another. Because the upper layer is formed of a normal plasma CVD oxide and the lower layer is formed of an HDP-CVD oxide, the density and the refractive index of the upper interlayer insulating film becomes lower than that of the lower interlayer insulating film as the multi-layer interlayer insulating films proceed upward.

(D.I. 165 at ¶ 71 & ex. J) In response, Canon prepared and tested sample wafers having the same pairing of PE-CVD and HDP-CVD films. The wafers "were prepared utilizing silicon wafers as a substrate with the same fabrication systems, and the same condition standards and processes as those used to form the '298 accused products." (D.I. 166, ex. F at ¶ 87) As a result of this testing, Dr. Theuwissen concluded that "the refractive index of the upper PE-CVD layer is **higher** than the refractive index of the HDP-CVD layer – **opposite** that described by the '298 patent and alleged by Dr. Afromowitz." (*Id.* at ¶ 92) (emphasis in original)[20]

At deposition, having considered Dr. Theuwissen's opinions, Dr. Afromowitz stated that he would choose "the middle two films" or "the upper two films or lower two films" "to satisfy the limitations of this claim." (D.I. 184, ex. 110 at 278:15-22) When questioned further regarding which "two layers of the Canon products [] satisfy the claim requirement," Dr. Afromowitz responded that "the only thing we know is that there are different densities and different indices of refraction," and "I can't tell you because I'm

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[20]Each expert relied on scientific documents to calculate refractive indices and densities of the films to determine whether the accused products met the limitation at issue. Neither expert directly tested the accused products. The parties' competing motions to exclude opinions and testimony (D.I. 217, D.I. 221) are denied. *See Mkt. Biosciences*, 579 F.3d at 1372.

not sure, because the evidence is conflicting. And whichever one is higher or lower, it doesn't matter." (*Id.* at 287:2-13; 280:13-15; 282:11-13)

Based on Dr. Afromowitz's admission that he cannot point to the two layers meeting the claim limitation at issue, and in light of the court's claim construction which requires a specific relationship be present, IV has not presented evidence to create a genuine issue of material fact as to whether Canon's accused products meet this limitation. Canon's motion for summary judgment of non-infringement is granted.

2. Invalidity

Canon argues that claims 1 and 2 of the '298 patent are invalid as anticipated by the Japanese unexamined patent application publication, "Photoelectric Converting Device and Manufacturing Method Thereof," ("Kouchi"), published on April 6, 2001. (D.I. 174, ex. 31) Kouchi discloses a photoelectric converting device having at least two insulating layers arranged in a particular order according to their refractive index. For example, given four layers with refractive indices ("n"), the layers in Kouchi are arranged as "n1 < n2, n2 > n3, and n3 < n4." (*Id.* at ¶ 25) While the parties concentrate their arguments on whether Kouchi discloses an "oxide film," given the court's construction of multi-layer interlayer insulating films as requiring "the uppermost layer [as] having the lowest density and refractive index, and the lowest layer having the highest density and refractive index," the relationship of the layers in Kouchi do not

meet this limitation. Therefore, Canon's motion for summary judgment of invalidity is denied.[21, 22]

G. Motion to Exclude Testimony and Evidence

Rule 702 of the Federal Rules of Civil Procedure allows a qualified witness to testify in the form of an opinion if the witness' "scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue" and if his/her testimony is the product of reliable principles and methods which have been reliably applied to the facts of the case. Canon moves to exclude the testimony of IV's technical experts on secondary considerations regarding invalidity, particularly long-felt need and commercial success. (D.I. 218) Canon argues that IV's experts "have no training, education, experience, or specialized knowledge in the areas of economics, IP licensing, or any similar area that would qualify them to opine regarding the commercial aspects of the commercial success inquiry." (D.I. 236 at 7-8)

Dr. Afromowitz holds a Ph.D. in electrical engineering and has over 25 years of experience in the field of semiconductor device fabrication including teaching at the university level, as well as research work in device fabrication technologies at semiconductor fabrication laboratories. (D.I. 165 at ¶¶ 10-19) Dr. Schonfeld holds a Ph.D. in electrical engineering and computer science and has over 20 years of experience including teaching at the university level, conducting research, co-director

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[21]As dependent claim 2 also requires this limitation, the court's analysis forecloses Canon's anticipation argument.

[22]Canon's arguments with respect to invalidity of the "multilayer interlayer" and "light shield" limitations are further denied as the court has construed these terms in its claim construction order.

and director of research centers, and consulting. (D.I. 187 at ¶¶ 8-16) These qualifications meet the liberal standard for "specialized knowledge" under Federal Rule of Evidence 702. Long-felt need finds its basis in science and each of IV's experts is qualified to address this issue. While Canon disagrees with these opinions, this type of disagreement is more properly the fodder for vigorous cross-examination.

As to the commercial success testimony, neither expert has a specific background in economics or the like. Canon alleges that the factual support and basis for the testimony is insufficient. Neither party has made clear to the court the specific testimony IV intends to present at trial., or the basis for that testimony.[23] Without this information, the court cannot make an informed decision. The court will require a proffer from IV before such testimony will be allowed at trial. Canon's motion to exclude the testimony of IV's experts is denied.[24]

IV moves to exclude the testimony of Canon's experts on obviousness, citing to their deposition testimony, to argue that each "used the asserted claims of the patents-in-suit as guides to find missing elements in the prior art." (D.I. 236 at 5) However, after identifying the prior art, Canon's experts applied an obviousness analysis to reach their opinions regarding obviousness of the patents-in-suit. The court will not preclude the entirety of an expert's testimony based on the selection of prior art

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[23]IV points to a two page summary in Dr. Schonfeld's expert report as providing support for testimony regarding commercial success.

[24]Canon also moved for summary judgment of no evidence of secondary considerations. (D.I. 167) As this is a factual question on which IV's experts have opined, there exists a genuine issue of material fact and Canon's motion is denied in this regard.

references. IV is free to challenge Canon's experts on cross-examination as to why a person of ordinary skill in the art would be motivated to combine the selected references. IV's motion to exclude the testimony of Canon's experts is denied.[25]

V. CONCLUSION

For the foregoing reasons, IV's motion for partial summary judgment of infringement is granted. (D.I. 163) Canon's motion for summary judgment of non-infringement is granted in part and denied in part. (D.I. 168) IV's motion for summary judgment of no obviousness is denied. (D.I. 163) Canon's motion for summary judgment of invalidity is granted in part and denied in part. (D.I. 167) The parties' competing motions to exclude testimony are denied. (D.I. 217; D.I. 219; D.I. 221) An appropriate order shall issue.

[25]IV also moved for summary judgment of no obviousness based on these same arguments. (D.I. 163) As Canon's experts have offered admissible opinions on the obviousness of the patents-in-suit, there exists genuine issues of material fact and IV's motion is denied in this regard.