IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

MiiCs & PARTNERS AMERICA, INC., et al., Plaintiffs, v. TOSHIBA CORPORATION, et al., Defendants. SAMSUNG DISPLAY CO., LTD., Intervenor.	Civil Action No. 14-803-RGA
MiiCs & PARTNERS AMERICA, INC., et al., Plaintiffs, v. FUNAI ELECTRIC CO., LTD., et al., Defendants. SAMSUNG DISPLAY CO., LTD., Intervenor.	Civil Action No. 14-804-RGA

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Dennis James Butler, Esq., PANITCH SCHWARZE BELISARIO & NADEL LLP, Wilmington, DE; John David Simmons, Esq., PANITCH SCHWARZE BELISARIO & NADEL LLP, Wilmington, DE; Stephen E. Murray, Esq., PANITCH SCHWARZE BELISARIO & NADEL LLP, Philadelphia, PA; Keith A. Jones, Esq., PANITCH SCHWARZE BELISARIO & NADEL LLP, Philadelphia, PA; Aaron Robert Ettelman, Esq., ICE MILLER LLP, Philadelphia, PA; Frederick Tecce, Esq. (argued), ICE MILLER LLP, Philadelphia, PA; Bryon T. Wasserman, Esq., ICE MILLER LLP, Philadelphia, PA.

Attorneys for Plaintiffs

Robert W. Mallard, Esq., DORSEY & WHITNEY LLP, Wilmington, DE; Clinton L. Conner, Esq. (argued), DORSEY & WHITNEY LLP, .Minneapolis, MN; David Tseng, Esq., DORSEY & WHITNEY LLP, Seattle, WA; Paul T. Meiklejohn (argued), DORSEY & WHITNEY LLP, Seattle, WA.

Attorneys for Defendants Toshiba Corporation and Toshiba America Information Systems, Inc.

Benjamin J. Schladweiler, Esq., ROSS ARONSTAM & MORITZ LLP, Wilmington, DE; Nicholas D. Mozal, Esq., ROSS ARONSTAM & MORITZ LLP, Wilmington, DE; Dennies Varughese, Esq., STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C., Washington, DC; John C. Rozendaal, Esq., STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C., Washington, DC; Michael E. Joffre, Esq., STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C., Washington, DC; Jonathan Turminaro, Esq., STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C., Washington, DC; Daniel J. Bernard, Esq., STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C., Washington, DC; William H. Milliken, Esq., STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C., Washington, DC; Stephanie M. Nguyen, Esq., STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C., Washington, DC; Zhiwei Zou, Esq., STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C., Washington, DC; Jean Paul Y. Nagashima, Esq., NAGASHIMA & HASHIMOTO, Tokyo, Japan; Takaaki Nagashima, Esq., NAGASHIMA & HASHIMOTO, Tokyo, Japan.

Attorneys for Defendants Funai Electric Co., Ltd., Funai Corporation, and P&F USA, Inc.

Adam Wyatt Poff, Esq., YOUNG, CONAWAY, STARGATT & TAYLOR LLP, Wilmington, DE; Pilar G. Kraman, Esq., YOUNG, CONAWAY, STARGATT & TAYLOR LLP, Wilmington, DE; Kevin B. Collins, Esq., COVINGTON & BURLING LLP, Washington, DC; Jared R. Frisch, Esq., COVINGTON & BURLING LLP, Washington, DC; David A. Garr, Esq. (argued), COVINGTON & BURLING LLP, Washington, DC; Christopher Higby, Esq., COVINGTON & BURLING LLP, Washington, DC; Jeffrey H. Lerner, Esq. (argued), COVINGTON & BURLING LLP, Washington, DC; Robert T. Halsam, Esq., COVINGTON & BURLING LLP, Redwood Shores, CA; Chang Sik Kim, Esq., COVINGTON & BURLING LLP, Seoul, South Korea; Scott Schrader, Esq., COVINGTON & BURLING LLP, Seoul, South Korea.

Attorneys for Intervenor.

ANDREWS, U.S. DISTRICT JUDGE:

Presently before the Court are Samsung Display Co., Ltd.'s Motions for Partial Summary Judgment of Non Infringement and Invalidity (D.I. 404) and related briefing (D.I. 407, 458, 509).[1] The Court held oral argument on October 18, 2017. (D.I. 573) ("Tr."). For the reasons that follow, the Court will grant in part Samsung's motion as to no literal infringement and no infringement by the doctrine of equivalents of dependent claim 4 of U.S. Pat. No. 5,966,589.

I. BACKGROUND

Plaintiffs filed these actions against Defendants Toshiba and Funai on June 24, 2014, alleging infringement of nine patents, including the '190 patent. (D.I. 1). With the Court's permission, Plaintiffs filed First Amended Complaints on March 31, 2015, in which they asserted additional patents. (D.I. 35). On August 11, 2015, this Court stayed these cases pending inter partes review before the PTAB. (D.I. 82). After Plaintiffs agreed to withdraw certain patents on which the PTAB instituted IPRs, the Court lifted the stays on March 23 and 31, 2016, respectively. (D.I. 112; C.A. No. 14-804-RGA, D.I. 117). On June 15, 2016, the Court granted Samsung Display Company's motion to intervene.[2] (D.I. 139). The remaining patents-in-suit generally relate to various liquid crystal display ("LCD") apparatuses and thin film transistors ("TFTs") used therein.

Dependent claim 4 of the '589 patent depends from claim 1 and is the only asserted claim of the '589 patent. (D.I. 407 at 15). Independent claim 1 reads as follows:

> 1. A method of fabricating a thin film transistor array comprising a transparent insulating substrate, a plurality of thin film transistors formed on said substrate in a matrix, a gate bus line connected to gate electrodes of said thin film transistors, a drain bus line connected to drain electrodes of said thin film transistors, and a pixel electrode driven by said thin film transistors, said method comprising the steps of:

[1] All docket references refer to 1:14-cv-803-RGA unless otherwise noted.

[2] Samsung Display Company and Toshiba will be referred to hereinafter collectively as "Defendants."

(a) forming said gate electrodes and said gate bus line on said transparent insulating substrate;

(b) forming a gate insulating film over said substrate;

(c) forming an operative semiconductor on said gate insulating film;

(d) forming source electrodes, said drain electrodes, and said drain bus line of said thin film transistors on said gate insulating film and said operative semiconductor;

(e) forming a protection film over said substrate;

(f) removing a portion of both said gate insulating film and said protection film, located above a terminal of said gate bus line, and removing a portion of said protection film located above a terminal of said drain bus line; and

(g) forming said pixel electrode on said substrate.

('589 patent, claim 1). Dependent claim 4 reads as follows:

4. The method as set forth in claim 1, wherein said operative semiconductor is formed where said gate bus line overlaps said drain bus line.

('589 patent, claim 4).

II. LEGAL STANDARD

"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 has the initial burden of proving the absence of a genuinely disputed material fact relative to the claims in question. *Celotex Corp. v. Catrett*, 477 U.S. 317, 330 (1986). Material facts are those "that could affect the outcome" of the proceeding, and "a dispute about a material fact is 'genuine' if the evidence is sufficient to permit a reasonable jury to return a verdict for the nonmoving party." *Lamont v. New Jersey*, 637 F.3d 177, 181 (3d Cir. 2011) (quoting *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248 (1986)). The burden on the

moving party may be discharged by pointing out to the district court that there is an absence of evidence supporting the non-moving party's case. *Celotex*, 477 U.S. at 323.

The burden then shifts to the non-movant to demonstrate the existence of a genuine issue for trial. *Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574, 586-87 (1986); *Williams v. Borough of West Chester, Pa.*, 891 F.2d 458, 460-61 (3d Cir. 1989). A non-moving party asserting that a fact is genuinely disputed must support such an assertion by: "(A) citing to particular parts of materials in the record, including depositions, documents, electronically stored information, affidavits or declarations, stipulations . . . , admissions, interrogatory answers, or other materials; or (B) showing that the materials cited [by the opposing party] do not establish the absence . . . of a genuine dispute . . . ." Fed. R. Civ. P. 56(c)(1).

When determining whether a genuine issue of material fact exists, the court must view the evidence in the light most favorable to the non-moving party and draw all reasonable inferences in that party's favor. *Scott v. Harris*, 550 U.S. 372, 380 (2007); *Wishkin v. Potter*, 476 F.3d 180, 184 (3d Cir. 2007). A dispute is "genuine" only if the evidence is such that a reasonable jury could return a verdict for the non-moving party. *Anderson*, 477 U.S. at 247-49. If the non-moving party fails to make a sufficient showing on an essential element of its case with respect to which it has the burden of proof, the moving party is entitled to judgment as a matter of law. *See Celotex*, 477 U.S. at 322.

III. DISCUSSION

The parties previously agreed to construe "where" in the '589 patent as "at the place at which." (D.I. 146 at 9). Thus, the sole limitation added by claim 4 is a locational limitation requiring that the operative semiconductor be located at the overlap between the gate bus line and the drain bus line. I previously construed "operative semiconductor" to mean "a portion of

the semiconductor layer(s) within a TFT that overlies the gate electrode and contacts and connects the drain and source electrodes." (D.I. 167 at 6). During claim construction, I determined that the function of the operative semiconductor was "serving as a transistor, turning the connection between the source electrode and drain electrode on and off based on the input from the gate electrode," and explicitly distinguished the operative semiconductor from "silicon formations that act simply as insulators." (*Id.* at 7).

A. Literal Infringement

Defendants argue that under the Court's construction, which requires that the operative semiconductor be "within the TFT," there can be no literal infringement because none of the accused products contain a TFT at the overlap of the gate bus line and drain bus line. (D.I. 407 at 16). Plaintiffs do not dispute that none of the accused products contain a TFT at the overlap between the gate bus line and the drain bus line. (*See, e.g.*, D.I. 409-1 at SA1749 (Watts Dep. at 185:20-25 (Plaintiffs' expert's admission that "in none of the infringing devices is the TFT located at the crossover" between the gate and drain bus lines))). Plaintiffs contend, however, that "[c]laim 4, however, does not require that the TFT be at the overlap." (D.I. 458 at 21). More specifically, Plaintiffs argue that Defendants conflate the claim terms "TFT" and "operative semiconductor," and that the claims require only the operative semiconductor, not the TFT, to be at the overlap between the gate bus line and drain bus line. (*Id.* at 19-20). Plaintiffs further argue that reading "the claim to require that the entire TFT is moved to the location of the overlap renders the claim nonsensical, because there no longer would be an overlap of the bus lines—there would be a TFT at that location." (*Id.* at 20).

Plaintiffs' arguments are without merit. The Court's construction of "operative semiconductor" specifically limits the operative semiconductor to "a portion of the

semiconductor layer(s) within the TFT." (D.I. 167 at 6). Thus, to literally infringe claim 4, the TFT, which contains the operative semiconductor, would have to be located at the overlap of the gate bus line and drain bus line. Plaintiffs' admission that none of the accused products contain a TFT at the overlap between the gate bus line and drain bus line thus amounts to an admission of no literal infringement. Contrary to Plaintiffs' assertions, locating a TFT at the overlap between the gate bus line and drain bus line is not impossible, because the prior art den Boer reference discloses a TFT at that location. (Tr. at 124:16-125:2; *see also* U.S. Pat. No. 5,414,283 at Fig. 7). Therefore, I will grant summary judgment for Defendants as to no literal infringement of claim 4 of the '589 patent.

B. Infringement under the Doctrine of Equivalents

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, 39-40 (1997). The doctrine of equivalents is "applied to individual elements of the claim, not to the invention as a whole." *Id.* at 29. Under the doctrine of equivalents, "the essential inquiry [is whether] the accused product or process contain[s] elements identical or equivalent to each claimed element of the patented invention[.] Different linguistic frameworks may be more suitable to different cases, depending on their particular facts." *Id.* at 40. The patent owner has the burden of proving infringement by a preponderance of the evidence. *See SmithKline Diagnostics, Inc. v. Helena Labs. Corp.*, 859 F.2d 878, 889 (Fed. Cir. 1988).

Plaintiffs argue that the accused products infringe under the doctrine of equivalents because "the accused products have the same, contiguous semiconductor layer(s) within the TFT

and where the gate and drain bus lines overlap." (D.I. 458 at 20). Although Plaintiffs admit that the "contiguous semiconductor layer formation [in the accused products] functions as a selective switch within the TFT and also as an insulator at the overlap of the bus lines" (*id.*), Plaintiffs nonetheless argue that the semiconductor layer at the overlap is operative because the whole semiconductor layer becomes conductive even without electricity flow. (Tr. at 134:14-18). Essentially, Plaintiffs argue that because (1) the portion of the semiconductor layer within the TFT is operative, (2) the portion of the semiconductor layer located at the overlap is contiguous with the operative semiconductor layer portion within the TFT, and (3) the entire semiconductor layer is conductive, all contiguous portions of the semiconductor layer are therefore operative as required by claim 4 of the '589 patent. (*Id.* at 138:4-138:8). Relying on their expert's conclusory statement, Plaintiffs argue that the accused products with contiguous semiconductor (but no TFT) at the overlap satisfy the function-way-result requirements (D.I. 458 at 22-23 (citing D.I. 409-1 at SA1640-42 ¶¶ 36-39)), because "the portion of the contiguous semiconductor layers where the bus lines overlap does not alter the performance of the portion within the TFT." (D.I. 409-1 at SA1640-42 ¶ 37). At the summary judgment stage, I assume the quoted statement is true, but it is irrelevant to the function-way-result analysis because it does not focus on the equivalence of the limitation at issue—the location of the operative semiconductor. *See Warner-Jenkinson Co.*, 520 U.S. at 29.

Defendants counter that Plaintiffs' interpretation does not properly assert infringement under the doctrine of equivalents because Plaintiffs ignore the Court's claim construction opinion and because Plaintiffs' asserted equivalent "is not insubstantially different from the claim limitation." (D.I. 407 at 22; D.I. 509 at 13). More specifically, Defendants contend that having a portion of semiconductor layer that functions as an insulator at the overlap contravenes the

Court's construction of "operative semiconductor," which defines the function of the operative semiconductor as "turning the connection between the source and drain electrode on and off based on input from the gate electrode." (D.I. 167 at 7; D.I. 509 at 13). To argue that Plaintiffs' asserted equivalent is insufficient, Defendants cite their expert's supporting declaration, which explains why the result of claim 4's limitation is to "increase the effective pixel area." (D.I. 407 at 22 (citing D.I. 408-1 at SA0442 ¶ 246)). Defendants then maintain that the contiguous portion of the semiconductor layer that Plaintiffs assert is operative in fact performs a different function as a "silicon formation[] that act[s] simply as [an] insulator[]." (D.I. 509 at 13; Tr. at 120:16-20). In other words, the result of Plaintiffs' asserted equivalent is that the so-called "operative semiconductor" acts as an insulator, which does not achieve the result of the limitation of claim 4 of increasing the effective pixel area. (D.I. 407 at 22). As further support, Defendants offer Plaintiffs' expert's admission that the '589 patent describes that the "semiconductor material that [he] identified at the overlap at the gate and drain bus lines in the accused products functions as an insulating material," and statement that he "would agree with" the '589 patent's description of the material as an insulator. (*Id.* at 17 (citing D.I. 409-1 at SA1751-52 (Watts Dep. at 193:22-194:6))). Defendants also assert that Plaintiffs' expert's conclusory function-way-result analysis is insufficient to raise a material issue of fact regarding whether locating a TFT at the overlap between the gate bus line and the drain bus line is equivalent to locating a TFT elsewhere. (Tr. at 142:23-143:2).

I agree with Defendants. The only limitation added by claim 4 is locational. It locates the operative semiconductor to the overlap between the gate bus line and the drain bus line. The Court's claim construction limited "operative semiconductor" to "a portion of the semiconductor layer(s) within a TFT." (D.I. 167 at 6). Therefore, claim 4 also necessarily locates the TFT (or

at least the portion of the TFT that has the operative semiconductor) to the intersection between the gate bus line and the drain bus line. The function of the operative semiconductor is to act as a switch, not to act as an insulator. Therefore, any configuration that does not move the TFT to the intersection of the gate bus line and the drain bus line cannot serve an equivalent function, because it would not act as a switch, and therefore cannot meet the function part of the function-way-result test under the doctrine of equivalents. *See Warner-Jenkinson Co.*, 520 U.S. at 40. ("An analysis of the role played by each element in the context of the specific patent claim will thus inform the inquiry as to whether a substitute element matches the function, way, and result of the claimed element[.]").

Although Plaintiffs' expert appears to assert that the contiguous portion of the semiconductor outside the TFT functions as a switch, he does not assert that there is ever any electricity or current that flows through the contiguous portion of the semiconductor as would be required for the contiguous portion of the semiconductor to be operative. (D.I. 409-1 at SA1641 ¶ 37 ("The [contiguous] portion of the semiconductor layer(s) [not within the TFT but] overlying the gate electrode and contacting and connecting the drain and source electrodes still (a) functions as a selectively conductive layer connecting the drain and source electrodes, (b) the way it does so is by having its conductivity altered by a gate voltage, and (c) as a result when the gate voltage makes it conductive, charge can flow from the drain electrode to the source electrode. The portion of the contiguous semiconductor layer(s) where the bus lines overlap does not alter the performance of the portion within the TFT.")). Plaintiffs do not dispute that the gate electrode and source electrode are located within the TFT and that the TFT is where the charge flows between the gate and source electrodes. (*See, e.g.*, *id.* at SA1641 ¶ 36 ("Within the TFT, the semiconductor layer(s) of the operative semiconductor overlie the gate electrode and

contact and connect the drain and source electrodes.")). To be operative, a semiconductor portion must "turn[] the connection between the source electrode and drain electrode on and off based on input from the gate electrode." (D.I. 167 at 7). This requires current to flow through all portions of the semiconductor that are operative. Plaintiffs' expert admitted, "The materials at the crossover [of the accused device] do not serve the function of conducting electricity," because that would "render the device nonfunctioning." (D.I. 463-1 at 196 (Watts Dep. at 195:11-15)). This undermines Plaintiffs' argument for their asserted equivalent, which was based on the fact that the semiconductor layer outside the TFT was conductive. The admission reduces Plaintiffs' argument to an assertion that the portion of the semiconductor layer outside the TFT is operative merely because it is capable of carrying a current. But the operation of the TFT requires generating a current in the operative portion of the semiconductor, which Plaintiffs' expert has testified would render the device inoperable. Plaintiffs cannot assert as an equivalent a structure that their expert has stated would not be functional.

Even if a configuration locating the TFT away from the overlap between the gate bus line and the drain bus line could be an equivalent, Plaintiffs' arguments are unavailing, because Plaintiffs have failed to raise a genuine issue of material fact that the portion of the semiconductor layer located outside the TFT is operative. Plaintiffs' expert does not assert that the portion of the semiconductor layer outside the TFT but located at the overlap between the gate bus line and the drain bus line turns the connection between the source electrode and the drain electrode on and off based on input from the gate electrode. (*See id.* at 193-96 (Watts Dep. at 193:14-195:15 (describing various other functions of such material))). Plaintiffs' argument improperly equates the "operative" function with a "conductive" function. As the Court recognized during claim construction, however, the semiconductor layer is not operative merely

because it is capable of conduction—the claim term "operative" is inconsistent with acting "simply as [an] insulator[]." (D.I. 176 at 7). Plaintiffs' asserted equivalent is thus improper because it is "a structural feature that is the opposite of, or inconsistent with, the recited limitation." *Augme Techs., Inc. v. Yahoo! Inc.*, 755 F.3d 1326, 1335 (Fed. Cir. 2014) ("No reasonable jury could find equivalence here because doing so would require a determination that embedded code is substantially the same as linked code—the very thing that the construction of 'embedded' excludes."). Plaintiffs have therefore failed to present evidence that their proffered equivalent serves the same function as the limitation in claim 4.

Plaintiffs have also failed to demonstrate that their proffered equivalent achieves the same result as the limitation in claim 4. While Defendants' expert's supporting declaration explains that the result of the limitation in claim 4 is to "increase the effective pixel area," Plaintiffs have not offered an alternative result specifically achieved by the limitation in claim 4 or argued that their asserted equivalent results in increasing the effective pixel area. (D.I. 408-1 at SA0442 ¶ 246; *see also* Tr. at 143:6-25). Plaintiffs do not dispute Defendants' expert's analysis. They simply say that it is irrelevant because the '589 patent does not describe the result. (D.I. 409-1 at SA1642 ¶ 39). Plaintiffs offer only their expert's conclusory statement that their proposed equivalent meets the function-way-result test. (D.I. 458 at 22-23 (citing D.I. 409-1 at SA1640-42 ¶¶ 36-39)). This is insufficient to raise a genuine issue of material fact. *Novartis Corp. v. Ben Venue Labs., Inc.*, 271 F.3d 1043, 1051 (Fed. Cir. 2001) ("[A] party does not meet this evidentiary threshold merely by submitting the affidavit of an expert who opines that the accused device meets the claim limitations."); *see also Penn. Dental Ass'n v. Medical Service Ass'n*, 745 F.2d 248, 262 (3d Cir. 1984) ("[T]he factual predicate of an expert's opinion must find some support in the record.").

Plaintiffs therefore have not met their burden to present sufficient evidence to raise a genuine issue of material fact regarding literal infringement or infringement under the doctrine of equivalents.

IV. CONCLUSION

For the reasons set forth above, Samsung Display Co. Ltd.'s Motion for Partial Summary Judgment of Noninfringement and Invalidity (D.I. 404) is granted-in-part as to no literal infringement and no infringement by the doctrine of equivalents of asserted claim 4 of the '589 patent.

An appropriate order will be entered.