IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BIO-RAD LABORATORIES INC. and THE UNIVERSITY OF CHICAGO,

Plaintiffs,

v.

10X GENOMICS, INC.,

Defendant.

No. 15-cv-152-RGA

MEMORANDUM OPINION

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July 3, 2019

ANDREWS, U.S. DISTRICT JUDGE:

Presently before the Court is Defendant's motion for judgment as a matter of law under Federal Rule of Civil Procedure 50(b), new trial under Federal Rule of Civil Procedure 59, and remittitur. (D.I. 509). I have reviewed the parties' briefing. (D.I. 510, 530, 535). I have also reviewed Plaintiffs' notice of subsequent development. (D.I. 551). For the following reasons, Defendant's motion is **DENIED**.

I. BACKGROUND

On February 12, 2015, RainDance Technologies, Inc. and the University of Chicago filed suit against 10X Genomics, Inc. alleging infringement of several patents. On May 30, 2017, Bio-Rad Laboratories Inc. substituted for RainDance. (D.I. 180). I held a jury trial from November 5 to 13, 2018.[1] Only three patents remained at issue—U.S. Patent Nos. 8,889,083 ("the '083 patent"), 8,304,193 ("the '193 patent"), and 8,329,407 ("the '407 patent"). (*See* D.I. 499). The jury found all three patents valid and infringed, that the infringement was willful, and that Plaintiffs were entitled to $23,930,718 in damages. (D.I. 476).

10X now moves for judgment as a matter of law that the accused products do not infringe, that infringement was not willful, that the asserted claims are invalid, and that Plaintiffs failed to present a legally sufficient damages case. Where appropriate, 10X requests remittitur of damages. (D.I. 510 at 30). In the alternative, 10X moves for a new trial. (*Id.*).

II. LEGAL STANDARDS

A. Judgment as a Matter of Law

Judgment as a matter of law is appropriate if "the court finds that a reasonable jury would not have a legally sufficient evidentiary basis to find for [a] party" on an issue. Fed. R. Civ. P.

[1] I cite to the trial transcript as "Tr."

50(a)(1). "Entry of judgment as a matter of law is a 'sparingly' invoked remedy, 'granted only if, viewing the evidence in the light most favorable to the nonmovant and giving it the advantage of every fair and reasonable inference, there is insufficient evidence from which a jury reasonably could find liability.'" *Marra v. Phila. Hous. Auth.*, 497 F.3d 286, 300 (3d Cir. 2007) (citation omitted).

"To prevail on a renewed motion for JMOL following a jury trial, a party must show that the jury's findings, presumed or express, are not supported by substantial evidence or, if they were, that the legal conclusion(s) implied [by] the jury's verdict cannot in law be supported by those findings." *Pannu v. Iolab Corp.*, 155 F.3d 1344, 1348 (Fed. Cir. 1998). "'Substantial' evidence is such relevant evidence from the record taken as a whole as might be accepted by a reasonable mind as adequate to support the finding under review." *Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 893 (Fed. Cir. 1984).

In assessing the sufficiency of the evidence, the Court must give the non-moving party, "as [the] verdict winner, the benefit of all logical inferences that could be drawn from the evidence presented, resolve all conflicts in the evidence in his favor and, in general, view the record in the light most favorable to him." *Williamson v. Consol. Rail Corp.*, 926 F.2d 1344, 1348 (3d Cir. 1991). The Court may "not determine the credibility of the witnesses [nor] substitute its choice for that of the jury between conflicting elements in the evidence." *Perkin-Elmer*, 732 F.2d at 893. Rather, the Court must determine whether the evidence supports the jury's verdict. *See Dawn Equip. Co. v. Ky. Farms Inc.*, 140 F.3d 1009, 1014 (Fed. Cir. 1998); *Gomez v. Allegheny Health Servs. Inc.*, 71 F.3d 1079, 1083 (3d Cir. 1995) (describing standard as "whether there is evidence upon which a reasonable jury could properly have found its verdict"); 9B *Charles Alan Wright & Arthur R. Miller, Federal Practice and Procedure* § 2524

(3d ed. 2008) ("The question is not whether there is literally no evidence supporting the party against whom the motion is directed but whether there is evidence upon which the jury might reasonably find a verdict for that party.").

Where the moving party bears the burden of proof, the Third Circuit applies a different standard. This standard "requires the judge to test the body of evidence not for its insufficiency to support a finding, but rather for its overwhelming effect." *Fireman's Fund Ins. Co. v. Videfreeze Corp.*, 540 F.2d 1171, 1177 (3d Cir. 1976) (quoting *Mihalchak v. Am. Dredging Co.*, 266 F.2d 875, 877 (3d Cir. 1959)). The Court "'must be able to say not only that there is sufficient evidence to support the finding, even though other evidence could support as well a contrary finding, but additionally that there is insufficient evidence for permitting any different finding.'" *Id.* at 1171 (quoting *Mihalchak*, 266 F.2d at 877).

B. New Trial

Federal Rule of Civil Procedure 59(a)(1)(A) provides, in pertinent part: "The court may, on motion, grant a new trial on all or some of the issues—and to any party— . . . after a jury trial, for any reason for which a new trial has heretofore been granted in an action at law in federal court . . . ." The decision to grant or deny a new trial is committed to the sound discretion of the district court. *See Allied Chem. Corp. v. Daiflon, Inc.*, 449 U.S. 33, 36 (1980); *Olefins Trading, Inc. v. Han Yang Chem. Corp.*, 9 F.3d 282, 289 (3d Cir. 1993) (reviewing district court's grant or denial of new trial motion under the "abuse of discretion" standard). Although the standard for granting a new trial is less rigorous than the standard for granting judgment as a matter of law—in that the Court need not view the evidence in the light most favorable to the verdict winner—a new trial should only be granted where "a miscarriage of justice would result if the verdict were

to stand," the verdict "cries out to be overturned," or where the verdict "shocks [the] conscience." *Williamson*, 926 F.2d at 1352-53.

III. ASSERTED CLAIMS

A. The '083 Patent

Plaintiffs asserted claims 1 and 9 of the '083 patent. The claims provide:

1. A microfluidic system comprising:

a non-fluorinated microchannel;

a carrier fluid comprising a fluorinated oil and a fluorinated surfactant comprising a hydrophilic head group in the microchannel;

at least one plug[2] comprising an aqueous plug-fluid in the microchannel and substantially encased by the carrier-fluid, wherein the fluorinated surfactant is present at a concentration such that surface tension at the plug-fluid/microchannel wall interface is higher than surface tension at the plug-fluid/carrier fluid interface.

9. The microfluidic system of claim 1, wherein the fluorinated surfactant comprises an oligoethylene glycol.

B. The '193 Patent

Plaintiffs asserted claims 1, 6, and 8 of the '193 patent. The relevant claims provide:

1. A method for conducting an autocatalytic reaction in plugs in a microfluidic system, comprising the steps of:

providing the microfluidic system comprising at least two channels having at least one junction;

flowing an aqueous fluid containing at least one substrate molecule and reagents for conducting an autocatalytic reaction through a first channel of the at least two channels;

flowing an oil through the second channel of the at least two channels;

forming at least one plug of the aqueous fluid containing the at least one substrate molecule and reagents by partitioning the aqueous fluid with the flowing oil at the junction of the at least two channels, the plug being substantially surrounded by an oil flowing through the channel, wherein

[2] The parties also refer to plugs as "droplets."

the at least one plug comprises at least one substrate molecule and reagents for conducting an autocatalytic reaction with the at least one substrate molecule; and

providing conditions suitable for the autocatalytic reaction in the at least one plug such that the at least one substrate molecule is amplified.

6. The method of claim 1, wherein the oil is fluorinated oil.

7. The method of claim 1, wherein the carrier fluid further comprises a surfactant.

8. The method of claim 7, wherein the surfactant is fluorinated surfactant.

C. The '407 Patent

Plaintiffs asserted claims 1, 10, and 11 of the '407 patent. The relevant claims provide:

1. A method for conducting a reaction in plugs in a microfluidic system, comprising the steps of:

providing the microfluidic system comprising at least two channels having at least one junction;

continuously flowing an aqueous fluid containing at least one biological molecule and at least one reagent for conducting the reaction between the biological molecule and the at least one reagent through a first channel of the at least two channels;

continuously flowing a carrier fluid immiscible with the aqueous fluid through the second channel of the at least two channels;

forming at least one plug of the aqueous fluid containing the at least one biological molecule and the at least one reagent by partitioning the aqueous fluid with the flowing immiscible carrier fluid at the junction of the at least two channels, the plug being substantially surrounded by the immiscible carrier fluid flowing through the channel, wherein the at least one plug comprises at least one biological molecule and the at least one reagent for conducting the reaction with the at least one biological molecule; and

providing conditions suitable for the reaction in the at least one plug involving the at least one biological molecule and the at least one reagent to form a reaction product.

8. The method according to claim 1, wherein the immiscible carrier fluid is an oil.

9. The method according to claim 8, wherein the oil comprises a surfactant.

10. The method according to claim 9, wherein the surfactant is a fluorosurfactant.

11. The method according to claim 8, wherein the oil is a fluorinated oil.

IV. NON-INFRINGEMENT

The jury found direct, induced, and contributory infringement of each asserted claim relating to each of 10X's accused products. (D.I. 476). In addition, for liability under 35 U.S.C. § 271(f)(2), the jury found that 10X supplies from the United States a component of the invention claimed in the '083 patent. (*Id.* at 3). Lastly, the jury found that infringement was willful. (*Id.* at 8).

A. '083 Patent

10X's motion addresses two limitations in claim 1 of the '083 patent—(1) the "non-fluorinated microchannel" and (2) the claimed surface tension relationship between the "plug-fluid/microchannel wall interface" and the "plug-fluid/carrier fluid interface." (D.I. 510 at 1-5, 10-11). For the following reasons, 10X's motion is **DENIED** with respect to both limitations.

1. "non-fluorinated microchannel"

Three out of the six accused products are modified to include 0.02% Kynar, a substance containing fluorine. Tr. at 368:15-369:19 (Dr. Sia). The jury found the products with Kynar did not literally satisfy the "non-fluorinated microchannel" limitation, but did meet the limitation under the doctrine of equivalents. (D.I. 476 at 3). 10X argues that the jury verdict is wrong as matter of law, or in the alternative, that it is based on insufficient evidence. (D.I. 510 at 1-4).

"[T]he doctrine of equivalents cannot be employed in a manner that wholly vitiates a claim limitation." *SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc.*, 242 F.3d 1337, 1346 (Fed. Cir. 2001). For example:

> [I]f a patent states that the claimed device must be "non-metallic," the patentee cannot assert the patent against a metallic device on the ground that a metallic device is equivalent to a non-metallic device. The unavailability of the doctrine of equivalents could be explained either as the product of an impermissible vitiation of the "non-metallic" claim limitation, or as the product of a clear and binding statement to the public that metallic structures are excluded from the protection of the patent.

Id. at 1347. "'Vitiation' is not an exception to the doctrine of equivalents." *Deere & Co. v. Bush Hog, LLC*, 703 F.3d 1349, 1356 (Fed. Cir. 2012). "The proper inquiry for the court is to apply the doctrine of equivalents, asking whether an asserted equivalent represents an 'insubstantial difference' from the claimed element, or 'whether the substitute element matches the function, way, and result of the claimed element.'" *Id.* (quoting *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 40 (1997)). The argument against equivalence is especially strong where the prosecution history indicates "particular advantages arising from the absence of" the allegedly equivalent feature. *Moore U.S.A., Inc. v. Standard Register Co.*, 229 F.3d 1091, 1115 n.5 (Fed. Cir. 2000); *see also SciMed*, 242 F.3d at 1347 (finding strong support for not applying the doctrine of equivalents where the asserted patents "specifically recognized and disclaimed" the allegedly equivalent structure, making clear that the patentee regarded it as "significantly inferior" to the structure used in the invention).

Here, it is undisputed that the accused products with Kynar have microchannels with some amount of fluorine. Tr. at 369:14-19 (Dr. Sia). 10X argues that the jury's finding of equivalence thus vitiates the "non-fluorinated microchannel" limitation. (D.I. 510 at 2). 10X further asserts that the patentee disclaimed fluorinated microchannels during prosecution by adding "non-fluorinated" to avoid prior art. (*Id.* at 3).

I considered the prosecution history for "non-fluorinated" during summary judgment. I found the patentee "sought to distinguish the 'microchannel' in its system from the channels described in [the prior art], which may be 'coated with . . . fluorinated oils.'" (D.I. 351 at 9).

Thus, the patentee only disclaimed "'microchannel[s]' 'coated' with fluorine for a purpose—not those containing *de minimis* amounts of fluorine that have no effect on how the microchannel functions in the system." (*Id.*). Similarly, in denying 10X's Rule 50(a) motion, I noted that Plaintiffs could meet the doctrine of equivalents for "non-fluorinated microchannel" with "a product that has the absence of fluorine atoms other than minute quantities that have no function in the accused product." (D.I. 504, Ex. B at 61).

10X argues that my prior ruling is inconsistent with the Federal Circuit's standard that hinges on whether the asserted equivalent and claimed element are "insubstantially different." (D.I. 510 at 3). 10X relies on *Moore*, which addressed a limitation requiring adhesive strips to extend the "majority of the lengths" of a sheet. 229 F.3d at 1105. The accused product had strips extending about 48% of the length. *Id.* at 1106. The Federal Circuit affirmed the district court's summary judgment finding of no infringement by equivalents, because "to allow what is undisputedly a minority (*i.e.*, 47.8%) to be equivalent to a majority would vitiate the [claim] requirement," and "it would defy logic to conclude that a minority—the very antithesis of a majority—could be insubstantially different from a claim limitation requiring a majority, and no reasonable juror could find otherwise." *Id.* 10X argues that, like in *Moore*, no reasonable juror could find a microchannel "containing quintillions of fluorine atoms" to be "insubstantially different" from a "non-fluorinated microchannel." (D.I. 510 at 4).

I agree with 10X that the proper inquiry is whether the asserted equivalent—a microchannel with 0.02% Kynar—is "insubstantially different" from the claimed element—a "non-fluorinated microchannel." *See Bush Hog*, 703 F.3d at 1356. However, unlike in *Moore*, I do not think having 0.02% Kynar is "the very antithesis" of "non-fluorinated." *See* 229 F.3d at 1106. In *Bush Hog*, the Federal Circuit made clear that equivalence may be determined by

asking "whether the substitute element matches the function, way, and result of the claimed element." 703 F.3d at 1356. Although 10X emphasizes that the accused products contain "quintillions" of fluorine atoms, Plaintiffs' expert, Dr. Sia, noted that "[a]toms are really, really small" and "millions of atoms is not a lot." Tr. at 457:1-13. In addition, Dr. Sia testified that the addition of Kynar did not change how the microchannels worked, as evidenced by 10X's documents and testimony from Dr. Lowe, a 10X scientist. Tr. at 370:19-373:8. Therefore, a reasonable juror could find that a 0.02% Kynar microchannel is "insubstantially different" from a "non-fluorinated microchannel," because the Kynar microchannel contains negligible amounts of fluorine and "matches the function, way, and result" of a non-fluorinated microchannel.

In the alternative, 10X argues that there is insufficient evidence to support the jury's verdict, because Dr. Sia merely "reiterated his opinions on literal infringement under the label of the doctrine of equivalents." (D.I. 510 at 4-5).[3] I disagree. By testifying on how the addition of Kynar had no effect on the microchannels in 10X's products, Dr. Sia gave sufficiently particularized testimony to support the jury's verdict. *See* Tr. at 370:19-373:8.

2. Surface Tension Relationship

The '083 patent requires that "the fluorinated surfactant is present at a concentration such that surface tension at the plug-fluid/microchannel wall interface is higher than surface tension at the plug-fluid/carrier fluid interface." 10X argues that no reasonable juror could find 10X's products meet such surface tension relationship. (D.I. 510 at 10-11).

Dr. Sia presented substantial evidence that the accused products meet the surface tension limitation. First, he opined that the surface tension relationship means that "the droplet will then

[3] 10X also argues that Dr. Sia's testimony is insufficient because he is neither a person of ordinary skill in the art nor testified from the perspective of one. (D.I. 510 at 4). This argument is unavailing. *See supra* Section V.A.

not stick to the channel wall, and instead, it's going to be encased in the carrier fluid." Tr. at 381:12-19. It is undisputed that the droplet does not touch the channel wall in 10X products. *Id.* at 382:25-383:7, 383:24-384:9. Second, Dr. Sia presented results from surface tension testing done by Bio-Rad personnel. *Id.* at 385:13-15. He explained that they first measured the surface tension between the plug fluid and microchannel wall by placing the plug fluid on the 10X chips. *Id.* at 385:19-23, 1298:1-2. They then measured the surface tension between the plug fluid and carrier fluid by placing the carrier fluid on top of the plug fluid. *Id.* at 385:24-386:2. The measurements were made using standard lab instruments. *Id.* at 386:2-4. Dr. Sia explained that, because the chips are made of the same material throughout, measurements taken on the surface of the chip are an accurate reflection of what happens inside the microchannel. *Id.* at 1297:23-1298:3.

10X argues that the Bio-Rad tests are insufficient to show the requisite surface tension relationship. (D.I. 510 at 10). 10X's expert, Dr. Huck, testified that due to differences such as surface contaminations, surface roughness, surfactants in the plug fluids, or presence of gel beads, one "really would have to do experiments inside the microchannel." Tr. at 1089:18-21. However, Dr. Huck agreed that "if a sufficient concentration of surfactant is present such that the plug flowed smoothly without adhering to the channel walls[,] then the surface tension at the plug[/]wall interface will be higher than at the plug[/]carrier interface." *Id.* at 1097:2-11.

The jury's verdict is supported by substantial evidence. Given Dr. Sia's testimony, the jury was not required to accept Dr. Huck's opinion that the claimed surface tension could only be measured by testing inside the microchannel. *See id.* at 1089:18-21, 1297:23-1298:3. Further, it is undisputed that droplets in 10X products do not adhere to the channel wall. *Id.* at 382:25-

383:7, 383:24-384:9. Therefore, it would be consistent with Dr. Huck's testimony to find that the accused products meet the claimed surface tension relationship. *See id.* at 1097:2-11.

B. '193 Patent—"autocatalytic reaction"

For the following reasons, 10X's motion is **DENIED** with respect to the '193 patent's "autocatalytic reaction" limitation.

I construed "autocatalytic reaction" to mean "a reaction in which a product of the reaction is also a reagent for the same reaction." (D.I. 469 ¶ 8). Dr. Sia testified that the PHASE and Landlord reactions in 10X products are autocatalytic. Tr. at 417:13-418:15, 422:1-21. Although 10X moves for JMOL with respect to both reactions, its substantive arguments only address the Landlord reaction. (D.I. 510 at 9-10).

Dr. Sia explained that the Landlord reaction starts with a single DNA strand, which combines with enzymes to create new DNA strands. The new DNA strands are both products and reagents of the Landlord reaction—they are a product of the reaction between the first DNA strand and the enzymes, but will also undergo the same reaction to produce more DNA strands. Tr. at 422:12-423:21. In support, Dr. Sia relies on 10X internal documents and Rule 30(b)(6) testimony. *Id.* at 422:1-3 (PTX-1204-011), 423:25-424:7 (deposition video).

10X argues that Dr. Sia failed to present sufficient evidence to support his opinions. (D.I. 510 at 9-10). 10X's expert, Dr. Quackenbush, opined that the Landlord reaction is not autocatalytic because each reaction produces a different fragment of DNA. Tr. at 1129:18-23. The reaction copies sections of a DNA strand, wherein each section is randomly selected by enzymes. The fragments that are copied from the original DNA strand feed back into the reaction by acting as templates from which new fragments are copied. *Id.* at 1130:4-22.

The jury's verdict is supported by substantial evidence. Aside from their ultimate conclusions, I think Dr. Sia and Dr. Quackenbush gave comparable testimony. They agreed that the products of the Landlord reaction, DNA fragments, are used to create more DNA fragments. *See id.* at 422:12-423:21, 1130:4-22. Thus, the DNA fragments are both products and reagents of the reaction. That is sufficient to meet my construction of an autocatalytic reaction. Dr. Quackenbush assumed that the Landlord reaction could not be autocatalytic because each copied DNA fragment is different. I do not think my construction is that limiting—it requires that a product of the reaction be a reagent for the same reaction, but does not specify that each product and reagent be identical. (*See* D.I. 469 ¶ 8).

C. '407 and '193 Patent Preambles

For the following reasons, 10X's motion is **DENIED** with respect to the '407 and '193 patent preambles.

The preambles in claim 1 of the '407 and '193 patents describe a method for conducting a reaction "in plugs in a microfluidic system." The preambles are identical except that the '193 patent specifies "an autocatalytic reaction." '407 patent at 78:54-55; '193 patent at 78:8-9. I will refer to the '407 patent for simplicity, but the same analysis applies to both patents. (D.I. 510 at 5 n.2).

10X argues that under the correct claim construction, the preambles limit the claims to methods of conducting reactions in a microfluidic system. (D.I. 510 at 6). During claim construction, I found each preamble "limiting only to the extent that it provides antecedent basis for the terms 'microfluidic system' and 'reaction.'" (D.I. 116 at 13). Specifically, I noted:

> While portions of a preamble may be limiting where those portions provide an antecedent basis for terms appearing in the body of the claim, it is inappropriate to construe an entire preamble as limiting if the rest of the preamble language is not limiting. Here, the preamble language states an

> intended use for the invention, "followed by the body of the claim, in which the claim limitations describing the invention are recited." Furthermore, the invention as claimed is "structurally complete" without the remaining preamble language. The claim elements are duplicative of the preamble in that it is clear that the reaction in question takes place "in the at least one plug." Nothing in the body of the claims further limits the location of the reaction.

(*Id.* at 12 (quoting *TomTom, Inc. v. Adolph*, 790 F.3d 1315, 1323 (Fed. Cir. 2015)). I later prohibited 10X from arguing at trial that reactions must occur in the microfluidic system as inconsistent with my claim construction order. Tr. at 21:18-22:13, 275:3-6.

If a preamble "recites essential structure or steps, or if it is 'necessary to give life, meaning, and vitality' to the claim," then the preamble can limit the scope of a claim. *Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002). "When limitations in the body of the claim rely upon and derive antecedent basis from the preamble, then the preamble may act as a necessary component of the claimed invention." *Eaton Corp. v. Rockwell Int'l Corp.*, 323 F.3d 1332, 1339 (Fed. Cir. 2003). However, that a phrase in the preamble "provides a necessary structure for [the claim] does not necessarily convert the entire preamble into a limitation, particularly one that only states the intended use of the invention." *TomTom*, 790 F.3d at 1323.

The Federal Circuit's analysis in *TomTom* is informative. In *TomTom*, the asserted claim provided, "A method for generating and updating data for use in a destination tracking system of at least one mobile unit," comprising steps of "generating and storing traveled distance data," "generating and storing section data," and "generating a section data file." 790 F.3d at 1318. The Federal Circuit agreed with the district court that the phrase "destination tracking system of at least one mobile unit" in the preamble was limiting, because it provides an antecedent basis for the later use of "mobile unit" in the body of the claim. *Id.* at 1323. However, the Federal Circuit went on to find the phrase "[a] method for generating and updating data for use in" ("the

generating language") was not limiting and did not provide an antecedent basis for any of the claims. *See id.* at 1323-24. "Rather, it [was] language stating a purpose or intended use and employs the standard pattern of such language: the words 'a method for a purpose or intended use comprising,' followed by the body of the claim, in which the claim limitations describing the invention are recited." *Id.* at 1324. Therefore, the Federal Circuit found the claim "directed to a method for generating and updating travel-related data and [did] not require the data to be used later." *Id.* at 1324. The claim only required "that the data be generated, selected, stored, and continuously updated," all of which were performed within the body of the claim. *Id.* "Though the collected data could at some point be used in the context of a navigation system, this [was] not required of [the claim], and [did] not convert it into a claim limitation." *Id.*

As discussed in my claim construction opinion, I do not think the '407 patent preamble requires the reaction to occur in the microfluidic system. (*See* D.I. 116 at 12-13). That "reaction" and "microfluidic system" provide antecedent basis for the use of those terms in the body of the claim does not necessarily convert the entire preamble into a limitation. *See TomTom*, 790 F.3d at 1323. Specifically, the portion of the preamble that states "*conducting* a reaction in plugs *in a* microfluidic system" is not limiting. Like the generating language in *TomTom*, the conducting language does not provide an antecedent basis for the rest of the claim and follows the standard pattern of "a method for a purpose or intended use comprising," followed by the body of the claim. *See id.* at 1324. The body of the claim requires "providing the microfluidic system comprising at least two channels having at least one junction," forming a plug at the junction, and "providing conditions suitable for the reaction" in the plug. '407 patent at 78:53-79:12. It says nothing about where the reaction would take place. Therefore, like in *TomTom*, though the plug having "conditions suitable for the reaction" could at some point be

used to conduct reactions in the microfluidic system, "this is not required of [claim 1], and does not convert it into a claim limitation." *See* 790 F.3d at 1324.

D. Direct Infringement

For the following reasons, 10X's motion is **DENIED** with respect to direct infringement.

All of the asserted claims are method claims except claim 1 of the '083 patent, which covers a microfluidic system. However, the '083 patent system must include "at least one plug." '083 patent at 73:10-17. It is undisputed that 10X does not sell its products with plugs—the plugs are formed by running the products. Tr. at 721:19-23, 1326:15-21; (*see also* D.I. 510 at 11; D.I. 530 at 8-9). Therefore, to be a direct infringer, 10X had to have used its accused products. 10X argues that there was insufficient evidence to support the jury's verdict that 10X directly infringed through use of the accused products. (D.I. 510 at 11-12).

The jury heard relevant testimony from Dr. Ness, co-founder and former Chief Technology Officer of 10X,[4] and Dr. Huck, 10X's infringement expert. Dr. Ness stated that 10X ran its products "as of 2016" for testing purposes in California. Tr. at 956:1-15. He further stated that they ran the "actual product according to how it's supposed to be used in the product literature." *Id.* at 956:25-957:6. Plaintiffs assert that the 10X products "as of 2016" are the accused products. (D.I. 530 at 9). 10X argues that that cannot be true because the Chromium Single Cell V(D)J product was not launched until 2017. (D.I. 535 at 5 (citing PTX 1255)). However, Dr. Huck also testified that 10X set up its systems in a demonstration lab in California where he used the products. Tr. at 1108:2-1109:5. Plaintiffs argue that this occurred after Dr. Ness left. (D.I. 530 at 9).[5]

[4] Dr. Ness left 10X in September 2016. Tr. at 907:19-908:1.

[5] I believe Plaintiffs' theory is that 10X did not specifically set up the demonstration lab for Dr. Huck as an expert in this case, but maintained it for general use. Therefore, 10X employees would have directly infringed by using the products in the lab.

The testimony from Drs. Ness and Huck is substantial evidence sufficient to support the jury's verdict. "Direct infringement can be proven by circumstantial evidence." *Toshiba Corp. v. Imation Corp.*, 681 F.3d 1358, 1364 (Fed. Cir. 2012). From the fact that 10X ran its products "as of 2016" for testing purposes and maintained a "demonstration lab" in California where Dr. Huck used 10X products, a reasonable juror could infer that 10X used each of its accused products.[6]

E. Indirect Infringement

For the following reasons, 10X's motion is **DENIED** with respect to indirect infringement.

The jury found both induced and contributory infringement of each asserted patent. (D.I. 476). 10X argues that, at most, Plaintiffs' evidence shows that 10X knew of the asserted patents, which is insufficient as a matter of law for either induced or contributory infringement. (D.I. 510 at 12-14).

The Supreme Court clarified the knowledge requirement for indirect infringement in *Commil USA, LLC v. Cisco Systems, Inc.*, 135 S. Ct. 1920 (2015). While direct infringement is a "strict-liability offense," "liability for inducing infringement attaches only if the defendant knew of the patent and that the induced acts constitute patent infringement." *Id.* at 1926 (internal quotation marks omitted). "Like induced infringement, contributory infringement requires knowledge of the patent in suit and knowledge of patent infringement." *Id.* Therefore, knowledge of the patents alone cannot support a finding of indirect infringement. The requisite

[6] Given that I find sufficient evidence to support indirect infringement, *see infra* Section IV.E, even if I were wrong about direct infringement relating to the Chromium Single Cell V(D)J product, I do not believe any of the other issues the jury decided, such as willfulness and damages, would be affected.

knowledge, however, can be met with circumstantial evidence. *See Enplas Display Device Corp. v. Seoul Semiconductor Co., Ltd.*, 909 F.3d 398, 408 (Fed. Cir. 2018).

Plaintiffs argue that substantial evidence supports the jury's finding that 10X knew of both the asserted patents and its infringement. (D.I. 530 at 9-13). 10X was on notice of its alleged infringement for the entire damages period. (D.I. 5); Tr. at 651:12-16 (10X did not begin selling its accused products until after Plaintiffs served their initial complaint). Dr. Hindson, co-founder and Chief Scientific Officer of 10X,[7] was the "point person for IP in the early stages of 10X." *Id.* at 694:14-15, 781:9-10. He admitted that 10X monitored the asserted patents as patent applications were filed and patents issued. *Id.* at 787:14-22. He also stated that he looked at the asserted patents for "intellectual property reasons," "as [10X] was adopting droplets." *Id.* at 786:24-787:3.

Dr. Ness explained that 10X first tried other approaches such as capsules and wells but moved to droplets after the other approaches were unsuccessful. *Id.* at 953:1-954:13. Both Drs. Hindson and Ness had prior experience with droplets. They previously co-founded QuantaLife, which developed a product to perform polymerase chain reaction ("PCR") in droplets. *Id.* at 700:3-23, 907:19. Dr. Hindson was also Chief Scientific Officer at QuantaLife. *Id.* at 700:10-12. He explained that he and Dr. Ness built the QuantaLife product and "were really the only ones who really knew the nuts and bolts from start to finish of that product." *Id.* at 703:4-7. Bio-Rad acquired QuantaLife in 2011 to develop its droplet business. *Id.* at 47:23-48:2, 82:11-19, 120:8-121:5, 701:6-10. Drs. Hindson and Ness stayed at Bio-Rad for about a year before leaving to found 10X. *Id.* at 705:5-6, 707:2-7, 907:17-24.

[7] Dr. Hindson described his role as "the head science guy at the company." Tr. at 694:16-18.

There is no real dispute that 10X knew of the asserted patents. As to knowledge of infringement, neither party presented direct evidence of 10X's state of mind, at least with respect to the '407 and '193 patents.[8] The testimony from Drs. Hindson and Ness, however, provides enough circumstantial evidence to support the jury's verdict. Both were experts in droplets and had succeeded in using droplets at QuantaLife. In fact, they were so successful that Bio-Rad acquired QuantaLife to develop its droplet business. Yet, when they left Bio-Rad to start 10X, they avoided using droplets in their new system. Only after failing with other approaches did they return to droplets. Dr. Hindson admitted that, as the "point person for IP," he looked at the asserted patents as 10X made the move to droplets. A reasonable juror could thus conclude that 10X knew its droplet products were infringing the asserted patents.

The '083 patent is a somewhat different situation because it requires a microfluidic system with a "non-fluorinated microchannel." As discussed, 10X deliberately added 0.02% Kynar, a substance containing fluorine, to its microfluidic chips. *See supra* Section IV.A.1. 10X presented evidence that it did not believe its products infringed after the addition of Kynar. Dr. Stuelpnagel, the Chairman of the Board, said that he came up with and advocated for the addition of Kynar as a means to "intentionally add some fluorine and take [the] issue off the table." *Id.* at 604:11-21. He also noted that 10X "wanted to make sure that whatever [it] did intentionally to the chip would cause no problems with [its] current product." *Id.* at 604:22-24. Likewise, Dr. Saxonov, the CEO, testified that the Kynar was added because "while [10X] felt like [its] position as far as patent infringement was very strong, this was going to make it even stronger."

[8] 10X argues that Dr. Hindson stated that 10X didn't think it infringed. (D.I. 510 at 13). The testimony 10X refers to is said in passing in response to a question about the addition of Kynar to avoid infringement of the '083 patent. He responds, "We didn't think we infringed any way. To make a lot of fluorine into the chip, then it's a fluorinated microchannel." Tr. at 792:8-15. Dr. Hindson appears to be referring to the '083 patent, not making a general statement about infringement of all the asserted patents.

Id. at 602:1-15. Neither Drs. Stuelpnagel nor Saxonov could identify any technical benefits from the addition of Kynar. *Id.* at 605:2-12, 602:16-20.

Plaintiffs argue that the jury could have found "the inclusion of a meaningless chemical to try to create a non-infringement argument was evidence of culpability." (D.I. 530 at 12). I agree, although I think this is a close case.[9] 10X has not shown that no reasonable juror could find, given the small amount of fluorine added and lack of identified benefits, that 10X knew its post-Kynar products infringed the '083 patent.

Therefore, the jury's indirect infringement verdicts are supported by substantial evidence.

F. Section 271(f)(2) Infringement

For the following reasons, 10X's motion is **DENIED** with respect to § 271(f)(2) infringement.

35 U.S.C. § 271(f)(2) provides:

> Whoever without authority supplies or causes to be supplied in or from the United States any component of a patented invention that is especially made or especially adapted for use in the invention and not a staple article or commodity of commerce suitable for substantial noninfringing use, where such component is uncombined in whole or in part, knowing that such component is so made or adapted and intending that such component will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States, shall be liable as an infringer.

The jury's verdict under § 271(f)(2) is based solely on the '083 patent. (D.I. 476 at 3; D.I. 510 at 14; D.I. 530 at 13). 10X argues that there is insufficient evidence that 10X supplied components from the United States or knew that such components would be combined in an infringing manner. (D.I. 510 at 14-16).

[9] Credibility is an issue for the jury. *Perkin-Elmer*, 732 F.2d at 893. It did not have to accept any protestations of innocence by 10X executives.

There was substantial evidence to support finding that 10X supplies components of the accused products from the United States to customers abroad. 10X's damages expert, Dr. Sullivan, acknowledged that "10X manufactures and/or assembles its products in the United States." Tr. at 1242:1-4. Dr. Sullivan relied on testimony from Ms. Osborn, 10X's Vice President of Finance. *Id.* at 1242:5-9, 1243:12-14. The jury heard deposition testimony from Ms. Osborn that "final assembly" of 10X reagents occurs at 10X's California office. *Id.* at 1244:11-16. Likewise, Dr. Hindson testified that the reagents used with the accused products are provided by 10X. *Id.* at 716:4-7. Dr. Hindson also stated that 10X formulates a fluorinated oil with its specialized surfactants and "ship[s] it out to [10X's] customers to use in [10X's system]." *Id.* at 733:1-9, 734:16-735:3. It is undisputed that 10X sells its products to customers worldwide. *Id.* at 1244:19-1245:6, 1322:12-16. Therefore, a reasonable juror could conclude that 10X ships its fluorinated oil, a "component of [the] patented invention that is especially made or especially adapted for use in the invention," from California to customers abroad for use in the accused products.

I addressed 10X's knowledge of infringement with respect to induced and contributory infringement. For the reasons discussed, a reasonable juror could find that 10X knew its customers would use the accused products in an infringing manner. *See supra* Section IV.E.

Therefore, there is substantial evidence to support to the jury's finding that 10X supplies from the United States a component of the '083 patented invention. 10X has thus failed to show that it does not infringe under § 271(f)(2) as a matter of law.

G. Willful Infringement

For the following reasons, 10X's motion is **DENIED** with respect to willful infringement.

Under *Halo Electronics, Inc. v. Pulse Electronics*, "[t]he subjective willfulness of a patent infringer, intentional or knowing, may warrant enhanced damages, without regard to whether his infringement was objectively reckless." 136 S. Ct. 1923, 1933 (2016). Subjective willfulness is met with proof, by a preponderance of the evidence, that "the defendant acted despite a risk of infringement that was either known or so obvious that it should have been known to the accused infringer." *WesternGeco L.L.C. v. ION Geophysical Corp.*, 837 F.3d 1358, 1362, 1364 (Fed. Cir. 2016) (internal citation and quotation marks omitted).

Again, based on testimony from Drs. Hindson and Ness, a reasonable juror could conclude that 10X knew its customers would use the accused products in a manner that infringed the asserted patents. *See supra* Section IV.E. Therefore, a reasonable juror could also conclude that, by selling those products, 10X acted despite a known risk of infringement. Thus, the jury's finding of willful infringement is supported by substantial evidence.

V. INVALIDITY

10X bears the burden of proof by clear and convincing evidence on invalidity. Therefore, to prevail on JMOL, 10X must show "not only that there is sufficient evidence to support the finding, even though other evidence could support as well a contrary finding, but additionally that there is insufficient evidence for permitting any different finding." *Fireman's Fund*, 540 F.2d at 1171.

A. Dr. Sia and the Person of Ordinary Skill in the Art

For the following reasons, 10X's motion with respect to Dr. Sia's testimony is **DENIED**.

10X argues that Dr. Sia, Plaintiffs' invalidity expert, was neither a person of ordinary skill in the art, nor testified from the perspective of a person of ordinary skill in the art. (D.I. 510 at 17-18). 10X did not raise this issue under *Daubert* or at trial. Plaintiffs offered Dr. Sia as an

expert in the subject matter of the patents-in-suit at trial without objection. Tr. at 357:16-19. Therefore, 10X waived any argument relating to Dr. Sia's alleged failings as a person of ordinary skill in the art. *See MobileMedia Ideas, LLC v. Apple Inc.*, 966 F. Supp. 2d 439, 476 (D. Del. 2013), *aff'd in part, rev'd in part*, 780 F.3d 1159 (Fed. Cir. 2015) ("A party's failure to object at trial to the issue it wishes to raise post-trial is fatal to its argument.").

B. Anticipation—'407 Patent, Claim 1

For the following reasons, 10X's motion is **DENIED** with respect to anticipation.

10X argues that no reasonable juror could have rejected 10X's evidence that the Quake reference (DTX 13) anticipates claim 1 of the '407 patent. (D.I. 510 at 18-19). 10X's expert, Dr. Chang, testified that paragraph 170 of Quake discloses the claim element of "continuously flowing an aqueous fluid containing at least one biological molecule and at least one reagent for conducting the reaction between the biological molecule and the at least one reagent through a first channel of the at least two channels." Tr. at 971:6-980:1; (D.I. 510 at 18). However, Dr. Sia testified that paragraph 170 does not disclose a channel with both the biological molecule and reagent as required by the claim. *Id.* at 1269:21-1270:25. He further noted that paragraph 170 "talks about what's going on before the operation of the microfluidic chip." *Id.* at 1271:4-9. A reasonable juror could have relied on Dr. Sia's testimony to find Quake did not disclose the "continuously flowing" claim element. Therefore, 10X has not met its burden of showing that there is insufficient evidence to support the jury's verdict that 10X had not proved by clear and convincing evidence that Quake anticipates claim 1 of the '407 patent.

C. Obviousness

For the following reasons, 10X's motion is **DENIED** with respect to obviousness.

1. '407 Patent, Claims 10 and 11

Claims 10 and 11 of the'407 patent depend from claim 1 and require the use of a "fluorosurfactant" and "fluorinated oil," respectively. '407 patent at 80:9-12. 10X argues that claims 10 and 11 must be invalid as obvious in view of the Quake and Schubert (DTX 16) references. (D.I. 510 at 19-20).

Dr. Chang testified that a person of ordinary skill in the art would have had both motivation to combine and a reasonable expectation of success in using the fluorinated oil and fluorinated surfactant disclosed in Schubert in the microfluidic device disclosed in Quake. Tr. at 980:20-984:6. However, Dr. Sia testified that a person of ordinary skill in the art would not have combined the two references, because "the Schubert reference talks about painting, coatings, polymer technology, metal working in uranium recovered" and did not mention microfluidic devices. *Id.* at 1275:8-16. He also explained that Schubert was a "totally different system," and thus there would be no reasonable expectation of success in using the fluorinated oils for droplets. *Id.* at 1276:1-12. Dr. Sia further noted that Schubert was published before Quake, and thus opined, "[I]f it was so obvious to use the fluorinated compounds disclosed in [Schubert] that was really about paint, and coatings, and so forth in [Quake's] system, [Quake] would have, I'm sure done it." *Id.* at 1275:17-1276:4. Based on Dr. Sia's testimony, a reasonable juror could conclude that 10X did not prove that a person of ordinary skill in the art had motivation to, and a reasonable expectation of success in, combining Quake and Schubert.

2. '193 Patent, Claims 6 and 8

Claims 6 and 8 depend from claim 1 of the '193 patent. Analogous to claims 10 and 11 of the '407 patent, claims 6 and 8 require a "fluorinated oil" and "fluorinated surfactant," respectively. '193 patent at 78:41-45. However, unlike claim 1 of the '407 patent, claim 1 of the '193 patent requires conditions suitable for an "autocatalytic reaction." '193 patent at 78:27-29.

10X argues that claims 6 and 8 of the '193 patent must be invalid as obvious in view of the Quake, Corbett (DTX 18), and Schubert references. (D.I. 510 at 20-21).

Dr. Chang testified that Corbett disclosed conducting PCR, an autocatalytic reaction, in "slugs." Tr. at 996:4-8, 997:3-20. In contrast to droplets, slugs are not encapsulated by oil and thus touch the microchannel wall. *Id.* at 997:11-20. Dr. Chang opined that a person of ordinary skill in the art would have been motivated to conduct the PCR reactions from Corbett in the Quake droplet system to avoid the contamination that occurred from the slugs touching the channel walls. *Id.* at 997:22-998:13.

Dr. Sia gave substantial testimony to the contrary. Dr. Sia opined that the slug and droplet systems are "totally different" and "fundamentally different" from a "flow perspective." *Id.* at 1277:25-1278:2. Further, like Schubert, Corbett predates Quake. Thus, Dr. Sia testified that Quake would have combined the references had there been motivation to do so. *Id.* at 1278:10-14. I do not think Dr. Sia's testimony is rendered insufficient by his later statement on cross-examination that a person of ordinary skill in the art "wouldn't need much motivation" to use PCR. *Id.* at 1318:3-6. Dr. Sia appears to have been commenting on the use of PCR generally, as opposed specifically in the context of combining the Corbett and Quake systems. *See id.* at 1317:17-1318:6. Therefore, based on Dr. Sia's testimony, a reasonable juror could conclude that 10X did not prove that a person of ordinary skill in the art had motivation to combine Corbett and Quake.

Therefore, 10X has failed to show that Dr. Sia's testimony is so insufficient that the jury could have only concluded that 10X proved obviousness.

D. Lack of Enablement—'407 and '193 Patents

For the following reasons, 10X's motion is **DENIED** with respect to lack of enablement.

10X argues that claims 1, 10, and 11 of the '407 patent and claims 6 and 8 of the '193 patent are invalid for lack of enablement. (D.I. 510 at 21-23). 10X asserts that the claims cover methods for conducting reactions once the droplets are removed from the microfluidic chips and transported outside the microfluidic system. (*Id.* at 21). It is undisputed that surfactants are needed to stabilize the droplets once removed from the microfluidic system. (D.I. 510 at 22; D.I. 530 at 22-23); Tr. at 1008:3-23 (Chang), 410:9-411:19 (Sia). 10X argues that the patents thus fail to enable the claims, because the necessary surfactants were not available until 2008, well after the date of invention. (D.I. 510 at 22).

10X raises two distinct issues for enablement—off-chip reactions and reactions outside the microfluidic system. Plaintiffs address each separately. (D.I. 530 at 22; D.I. 535 at 10).

Regarding off-chip reactions, Dr. Chang admitted that the asserted patents teach reactions in droplets wherein the droplets are contained in a capillary that is removed from the microfluidic chip. Tr. at 1054:2-19. Based on that testimony, a reasonable juror could conclude that the asserted patents teach off-chip reactions.

Regarding reactions outside the microfluidic system, Plaintiffs argue that the necessary surfactants were available at the time of the invention. 10X asserts that the surfactants first became available in 2008, citing to the Holtze paper (DTX 93). (D.I. 510 at 22). However, Dr. Ismagilov, a named inventor of the asserted patents, testified that the patents teach "exactly" the same surfactants disclosed in the Holtze paper—"fluoro-surfactants with non-ionic category groups for doing reaction." Tr. at 221:11-222:16. In particular, he stated, "The patents teach that longer [fluorocarbon] tails stabilize droplets." *Id.* at 222:15-16. Dr. Sia agreed, opining that the asserted patents teach "the defining feature of what the Holtze paper says about its own surfactants, having long fluorophillic tails." *Id.* at 1287:22-1288:16. A reasonable juror could

thus conclude that the asserted patents taught the same surfactants taught in the Holtze paper, meaning that the necessary surfactants were available at the time of the invention. Therefore, 10X has failed to show that the '407 and '193 patent claims are not enabled as a matter of law.

E. Indefiniteness—'083 Patent

For the following reasons, 10X's motion is **DENIED** with respect to indefiniteness.

As discussed, the '083 patent claims require the surface tension at the plug-fluid/microchannel wall interface to be higher than that at the plug-fluid/carrier fluid interface. *See supra* Section IV.A.2. 10X argues that claims 1 and 9 of the '083 patent are indefinite because a person of ordinary skill in the art cannot determine whether the claimed surface tension relationship is met in a system where there is no plug-fluid/microchannel wall interface. (D.I. 510 at 23-24).

It is undisputed that the plug does not touch the microchannel wall during flow. Tr. at 381:12-19, 382:25-383:7, 383:13-384:9. Dr. Chang testified that a person of ordinary skill in the art would thus not know where or how to measure the claimed surface tension. *Id.* at 1003:10-19. Dr. Sia, however, offered substantial opposing testimony. Dr. Sia presented the Bio-Rad data measuring the relevant surface tensions on the top and bottom of 10X's microfluidic chips. *Id.* at 384:14-393:13. He explained that surface tension is an intrinsic property—"as long as you have the same two phases" to measure surface tension between, "then that surface tension is going to be the same . . . no matter where it appears." *Id.* at 386:5-19. Dr. Sia also identified portions of the '083 patent specification that state specific surface tension values relevant to the invention. *Id.* at 1295:1-19. A reasonable juror could rely on Dr. Sia's testimony to find that a person of ordinary skill in the art would know how to measure the surface tension at the plug-

fluid/microchannel wall interface. Therefore, 10X has failed to show that the '083 patent claims are indefinite as a matter of law.

VI. DAMAGES

10X argues that the damages award is based on legally insufficient testimony and is not supported by substantial evidence. The jury awarded $23,930,718 in damages, which corresponds to a 15% royalty on 10X's worldwide sales, through the second quarter of 2018. (D.I. 476); Tr. at 611:20-613:2. 10X argues that Plaintiffs' damages expert, Mr. Malackowski, gave insufficient testimony to support the jury's verdict, because (1) he relied on noncomparable prior licenses, (2) he failed to properly apportion damages based on the value of the patented technology, and (3) there was no basis to include 10X's foreign sales in the royalty base. (D.I. 510 at 24-30). For the following reasons, 10X's motion is **DENIED** with respect to damages.

A. Prior Licenses

10X previously moved to exclude Mr. Malackowski's comparable license opinions as inadmissible under *Daubert*. Mr. Malackowski relies on three prior licenses—Caliper/RainDance, Applera/Bio-Rad, and Applied BioSystems/QuantaLife. I denied 10X's motion on the basis that Mr. Malackowski provided "reasonable and specific explanations for selecting the agreements he did." (D.I. 361 at 14; *see also* D.I. 425 at 5 ("I rejected Defendant's arguments in my prior *Daubert* order, which found that Mr. Malackowski met a showing of baseline comparability between the licenses, and that the degree of comparability is a factual issue best addressed through cross examination.")). Now, 10X argues that Plaintiffs failed to present sufficient evidence at trial to establish comparability. (D.I. 510 at 24-26). Although I think 10X is correct with respect to the Applera/Bio-Rad license, that alone does not warrant

granting JMOL. The Caliper/RainDance and Applied BioSystems/QuantaLife licenses provide sufficient support for Mr. Malackowski's reasonable royalty opinions.

1. Caliper/RainDance (PTX 413)

The Caliper/RainDance license covered a large portfolio of patents relating to microfluidics. (D.I. 510 at 25; D.I. 530 at 25); Tr. at 137:15-22, 626:25-627:3. There were separate competitor and noncompetitor royalty rates of 15% and 2%, respectively. Tr. at 140:11-17 (Tumolo).[10] The same rate applied regardless of the number of patents actually used. *Id.* at 140:4-7; 1239:15-1240:1. 10X argues that Plaintiffs failed to present sufficient evidence of technological comparability, or that the 15% competitor rate applies. (D.I. 510 at 25).

First, 10X argues that Plaintiffs did not go beyond "surface similarity" to support technological comparability. (D.I. 510 at 25 (quoting *Finjan, Inc. v. Blue Coat Sys., Inc.*, 879 F.3d 1299 (Fed. Cir. 2018))). In *Finjan*, the court found insufficient evidence to support a damages award based in part on a prior jury verdict. 879 F.3d at 1312. The court found no evidence showing the patents in the prior case were economically or technologically comparable to the asserted patent in *Finjan*. *Id.* Rather, the fact that the infringing products in the prior case "were also in the computer security field" and that the parties were competitors, was mere "surface similarity" and "far too general to be the basis for a reasonable royalty calculation." *Id.*

Regarding technological comparability, Dr. Sia testified that "the Caliper patents dealt with microfluidics and all sorts of ways to control fluids really accurately and so forth," and the asserted patents dealt with the "same subject matter, but with droplets." Tr. at 441:13-442:2. Dr. Sia also described a few Caliper patents, noting that, although they were not doing droplets, they "dealt with manipulating tiny amounts of fluids, mixing, performing nucleic acid reactions, a

[10] Ms. Tumolo, president of life sciences at Bio-Rad, became familiar with the Caliper/RainDance agreement through diligence related to Bio-Rad's acquisition of RainDance. *Id.* at 113:8-9, 138:7-139:1.

whole tool box of reactions and things you can do on a chip," which is "what the [asserted] patents deal with." *Id.* at 442:11-24. Dr. Sia's testimony goes beyond "surface similarity." In *Finjan*, the only technological similarity was the field of "computer security." 879 F.3d at 1312. Here, Dr. Sia testified that both sets of patents related not only to the field of microfluidics, but specific ways to control fluids and conduct reactions in small amounts of fluids. Based on Dr. Sia's testimony, a reasonable juror could conclude that the Caliper patents and the asserted patents are technologically comparable.

Second, 10X argues that the competitor rate cannot apply because RainDance paid Caliper the noncompetitor rate. (D.I. 510 at 25). Although RainDance may have paid the lower rate, it is undisputed that RainDance and Caliper agreed to the competitor rate as the result of an arms-length negotiation. (D.I. 510 at 25; D.I. 530 at 26; D.I. 535 at 11). Further, Ms. Tumolo testified that once RainDance became a competitor, the higher rate would apply. Tr. at 140:11-18. Therefore, Mr. Malackowski had sufficient support to rely on the competitor rate as a prior license relevant to the hypothetical negotiation.

2. Applera/Bio-Rad (PTX 128)

10X asserts that the Applera/Bio-Rad license covered "Nobel Prize-winning technology, licensed for over $2 billion, related to real-time PCR and thermal cycler instruments, including the 'foundational' Higuchi patent." (D.I. 510 at 25). In contrast, 10X argues that its products do not use PCR reactions, it does not make thermal cyclers, and the asserted patents brought in less than $2 million in royalties. (*Id.* at 26).

10X conflates early PCR patents and the Higuchi patent licensed in the Applera/Bio-Rad agreement. Kary Mullis won the Nobel Prize for his PCR inventions made in the 1980s. Tr. at 1161:24-1162:3. There was no evidence that any of the Mullis patents were licensed as part of

the Applera agreement. *Id.* at 1236:17-1237:3. Ms. Tumolo explained that, in contrast, the Higuchi patent "enabled monitoring of a PCR reaction," and was licensed for "a relatively new technology at the time called real[-]time PCR." *Id.* at 154:16-23. She further testified that even with the Higuchi technology, Bio-Rad "had to do a lot of heavy lifting" and "ended up with a lot of patents [itself] around the product that [it] developed using this license." *Id.* at 155:15-24.

On reply, 10X argues that the Higuchi patent must be considered with Applera's entire PCR patent portfolio, because the Applera agreement was part of a global settlement. (D.I. 535 at 12). Mr. Malackowski agreed that the Applera agreement was part of a "three-part resolution" comprising three separate agreements. Tr. at 660:7-24. However, there was no evidence that those other agreements addressed the Higuchi patent or included patents licensed for $2 billion. *See id.* at 196:19-197:3, 1161:1-20. Dr. Sullivan merely made the conclusory statement that the agreements "all are surrounding certain technology that was foundational to the industry." *Id.* at 1161:23-24. Therefore, there was sufficient evidence for the jury to find the Applera/Bio-Rad agreement economically comparable to the hypothetical license.[11]

Plaintiffs presented very little, however, regarding technological comparability. Dr. Sia testified that the Higuchi patent was for "an instrument for doing real-time PCR," and the asserted patents "allow you to do a lot of different types of reactions, and PCR is one of those important reactions." *Id.* at 443:4-13. That is not sufficient to support a finding of technological comparability. The fact that the asserted patents cover droplet technology, which may be used to conduct many types of reactions, does not mean that any patent relating to those reactions is

[11] 10X also raises the new argument on reply that Plaintiffs failed to account for the "offset provision" in the agreement, which resulted in an effective rate of 7-8%, rather than 15%. (D.I. 535 at 12). The issue is waived since it was not raised in the opening brief. In any event, there was conflicting expert testimony at trial. Tr. at 665:13-666:15, 1163:10-22, 1237:22-1238:22. 10X has not shown that the jury had insufficient support to find the 15% rate applied.

technologically comparable. (*See* D.I. 535 at 13). Therefore, Plaintiffs failed to provide substantial evidence that the Applera/Bio-Rad license is technologically comparable such that it can support a reasonable royalty calculation.

3. Applied BioSystems/QuantaLife (PTX 412)

10X argues that the Applied BioSystems license related to the use of the taq polymerase enzyme in PCR and is not technologically comparable to the hypothetical license. 10X relies on the testimony of its expert, Dr. Quackenbush. Dr. Quackenbush opined that, of the patents in the Applied BioSystems agreement, "the only one that's really worth considering is the taq polymerase license." Tr. at 1126:7-19. He went on to find that the asserted patents "just aren't comparable," as they "discuss changes to microfluidic technology, but they haven't transformed the field in a way that taq polymerase has." Tr. at 1126:19-1127:2.

It appears undisputed that the Applied BioSystems license covered patents necessary for PCR. Ms. Tumolo described the patents as "sort of basic rights if you want to do PCR."[12] "They are surrounding polymerases, especially enzymes, things that makes the reaction go. . . . [S]o if you wanted to do PCR and you needed that enzyme, which you do, you needed these patents." *Id.* at 146:4-10. Likewise, Dr. Sia stated that the license was "for some reagents for doing . . . PCR," and specifically "that would help you to do PCR in an improved manner." *Id.* at 443:14-20.

Regarding technological comparability, Dr. Sia stated that the asserted patents "also deal with the subject [of] trying to do PCR and trying to do it better using the droplet technologies." *Id.* at 443:20-22. He also noted that QuantaLife was "licensing the reagents for doing . . . PCR in droplets." *Id.* at 444:4-8. Based on Dr. Sia's testimony, a reasonable juror could conclude that

[12] Ms. Tumolo became familiar with the Applied BioSystems/QuantaLife agreement through diligence related to Bio-Rad's acquisition of QuantaLife. Tr. at 145:19-22.

the Applied BioSystems license, like the hypothetical license, covered technology necessary to conduct reactions in droplets, and thus is technologically comparable.

B. Apportionment

For the following reasons, 10X's motion is **DENIED** with respect to apportionment.

10X argues that Mr. Malackowski's testimony should never have been admitted because he applied an "untested and unreliable theory of 'comparable apportionment.'" (D.I. 510 at 27). 10X raised the same argument under *Daubert*. I held, "The Federal Circuit does not limit apportionment to specific methodologies, because flexibility is required to determine fact-dependent damages. As a methodology, I see no problem with using comparable licenses to establish a reasonable royalty rate, without performing a separate apportionment analysis, where there is a logical basis for doing so." (D.I. 361 at 16 (citations omitted)). I excluded Mr. Malackowski's initial opinion because he failed to explain how the royalty rates in the prior licenses were "apportioned in a comparable fashion to the contribution of the patented technology to the accused products." (D.I. 361 at 17 n.3). I allowed Mr. Malackowski to submit a supplemental report, however, which I found "fill[ed] the gaps in his initial report." (D.I. 425 at 4-5). "Mr. Malackowski compared the unpatented features of the accused product with what he considered to be the unlicensed features of the products in the [prior] licenses." (*Id.* at 5). Specifically, he matched an analogous unlicensed feature to each unpatented feature identified by 10X's damages expert, Dr. Sullivan. (*Id.* at 5 & n.2). Mr. Malackowski's trial testimony was consistent with the methodology in his expert reports. Tr. at 623:21-624:20, 625:24-626:627:3, 630:3-12. Therefore, I find his testimony was properly admitted.

C. Foreign Sales

For the following reasons, 10X's motion is **DENIED** with respect to foreign sales damages.

10X argues that no reasonable juror could have found infringement under § 271(f)(2), the only basis for damages on 10X's foreign sales, or infringement of the '083 patent, the only patent to which § 271(f)(2) applies. (D.I. 510 at 30). I found infringement under § 271(f)(2), including infringement of the '083 patent, supported by substantial evidence. *See supra* Sections IV.A, IV.F. Therefore, 10X's argument is moot.

VII. NEW TRIAL

The decision to grant or deny a new trial is within the discretion of the district court. *Allied Chem.*, 449 U.S. at 36. 10X has not shown that "a miscarriage of justice would result if the verdict were to stand," the verdict "cries out to be overturned," or the verdict "shocks [the] conscience." *Williamson*, 926 F.2d at 1352-53. Therefore, 10X's motion for a new trial is **DENIED**.

VIII. CONCLUSION

A separate order will be entered.