No. 2020-1413

IN THE UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

MLC INTELLECTUAL PROPERTY, LLC,

Plaintiff-Appellant

v.

MICRON TECHNOLOGY, INC.,

Defendant-Appellee

Appeal from the United States District Court for the Northern District of California in Case No. 3:14-cv-03657-SI, Judge Susan Illston

CORRECTED OPENING BRIEF OF PLAINTIFF-APPELLANT

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March 25, 2020

CERTIFICATE OF INTEREST

Counsel for Plaintiff-Appellant MLC Intellectual Property, LLC, certifies the following:

1. The full name of every party or amicus represented by the undersigned is:

   MLC Intellectual Property, LLC.

2. The names of the real parties in interest represented by the undersigned is:

   MLC Intellectual Property, LLC.

   Robert Hinckley and Jerry Banks are members of MLC Intellectual Property, LLC.

3. All parent corporations and any publicly held companies that own 10 percent or more of the stock of the party or amicus curiae represented by the undersigned is:

   N/A

4. The name of the law firm and the partners or associates that appeared for the party or amicus now represented by me in the trial court or agency or are expected to appear in this court (including those who have not or will not enter an appearance in this case) are:

   Polsinelli LLP
   Fabio E. Marino, Russell S. Jones, Jr., Barrington E. Dyer.,
   Teri Hong-Phuc Nguyen, Rebecca B. Horton, Joshua L. Rayes

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   Frietas & Weinberg LLP (formerly, Frietas Angell & Weinberg)
   Robert E. Freitas, Daniel J. Weinberg, Jason S. Angell (no longer with the firm)

5. The title and number of any case known to counsel to be pending in this or any other court or agency that will directly affect or be directly affected by this court's decision in the pending appeal.

MLC Intellectual Property, LLC v. Micron Tech., Inc., No. 3:14-cv-03657 (CAND); *MLC Intellectual Property, LLC v. Micron Tech., Inc.*, No. 3:19-cv-03345 (CAND); Ex parte reexamination Application No. 90/014,245 (U.S.P.T.O.)

Dated: March 25, 2020

By: /s/ *Fabio E. Marino*
Fabio E. Marino

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STATEMENT OF RELATED CASES

There have been no other appeals from this civil action in any appellate court. Counsel for MLC Intellectual Property, LLC is aware of the following cases that may directly affect or be directly affected by this Court's decision:

- MLC Intellectual Property, LLC v. Micron Technology, Inc., USDC-CAND CASE No. 3:19-cv-03345.
- Ex Parte Reexamination Application No. 90/014,245 (U.S.P.T.O.).

JURISDICTIONAL STATEMENT

The United States District Court for the Northern District of California had subject-matter jurisdiction over this patent-infringement action, filed by Plaintiff-Appellant MLC Intellectual Property, LLC ("MLC") against Defendant-Appellee Micron Technology, Inc. ("Micron"), under 28 U.S.C. § 1331. Appx47-141. On October 17, 2019, the district court certified three orders—*in limine* order (Appx1-24, Dkt. 639); *Daubert* order (Appx25-31, Dkt. 668), and motion to strike Milani (Appx32, Dkt. 672) (collectively, the "Damages Orders")—for interlocutory review under 28 U.S.C. § 1292(b). On October 29, 2019, MLC filed its Petition for Permission to Appeal with this Court. Pet. for Permission to Appeal, No. 20-105 (Fed. Cir. filed Oct. 29, 2019). On January 30, 2020, this Court granted MLC's Petition, and has jurisdiction under 28 U.S.C. § 1292(b).

INTRODUCTION

In 2007, MLC's predecessor, BTG International, Inc. ("BTG"), entered into parallel patent-license negotiations with Micron and three of Micron's direct competitors in the then-nascent multi-level-cell Flash memory industry. Appx864-872, Appx873-874. As a result of those negotiations, Hynix and Toshiba agreed to patent licenses. Appx905-907. Samsung also agreed to a license, albeit after litigation. *Id*. Micron, however, refused to license, precipitating this patent-infringement suit.

MLC survived all invalidity and non-infringement challenges raised below. But, on the eve of trial, the district court, ruling on Micron's multiple evidentiary and *Daubert* challenges, excluded evidence regarding the Hynix and Toshiba licensing negotiations and MLC's damages-expert opinions based on that evidence, leaving MLC without a damages case to present at trial. Appx1-24; Appx25-31; Appx32.

MLC sought interlocutory review because the damages-expert's opinions complied with this Court's established precedent and the district court erred in excluding them. Pet. for Permission to Appeal, No. 20-105 (Fed. Cir. filed Oct. 29, 2019); Appx33-46. Specifically, MLC's expert, Michael Milani ("Milani"), conducted a *Georgia-Pacific* analysis to reconstruct the hypothetical negotiation between BTG and Micron based on contemporaneous licensing negotiations

between BTG and other parties, including Hynix and Toshiba. Appx899-926 (*Georgia-Pacific* analysis). Milani began with the Hynix license, because that license was signed at roughly the same time that the hypothetical negotiation would have taken place, involved a firm (Hynix) that is a direct competitor to Micron, included rights to the patent-in-suit, U.S. Patent No. 5,764,571 (the "'571 patent"), and applied to products that are virtually identical to the Micron products at issue. Appx905-906. That license obligated Hynix to pay a lump-sum fee, however, and so Milani was not able to simply read the contract and determine the royalty rate the parties used. *Id.* But the contract had a "most-favoured customer" ("MFC") clause under which BTG was obligated to give Hynix an even lower rate if BTG ever licensed another firm at a rate below 0.25%. Appx1702. Milani thus focused on 0.25% as a reasonable estimate of what BTG would have offered Micron in a hypothetical negotiation. Appx905-906; Appx921-923; Appx1144-1145; Appx1147-1150. After all, BTG had a very strong economic incentive to not offer a rate below that level, because a lower rate would trigger Hynix's MFC clause. Appx906; Appx1653-1654.

Milani did not stop there, however. Milani next looked at the evidence to see if there were other documents that might corroborate or undermine his proposed royalty rate. Appx921-923; Appx1144; Appx1147; Appx1149-1151. He found many supportive documents, including letters from BTG explicitly referring

to 0.25% in the context of negotiations with other would-be licensees, and also a letter from BTG that specifically offered to license Micron at that same rate. *Id.*

Milani then made several appropriate adjustments to this rate, all based on the evidence of record. Appx913; Appx915; Appx923-925; Appx1152-1157. For example, he adjusted for the fact that the Hynix license involved more than just the '571 patent, and he adjusted for the fact that the Hynix license applied to international sales, rather than only domestic. *Id.* He also adjusted for evidence suggesting that Hynix benefited from a discounted rate because it was the first licensee, and for the patent law rule that hypothetical negotiations assume that the underlying patent is both valid and infringed. Appx921-923; Appx1114-1115; Appx1149-1150. These various adjustments were all documented and explained in Milani's Report.

As for the royalty base, Milani again followed this Court's guidance. He identified within the accused products the "smallest salable unit" and then further engaged in apportionment so as to focus on only the infringing components of that smallest salable unit. Appx894-899; Appx1122-1123; Appx1125-1127. Thus, for example, he apportioned Micron's revenue on any product that was made up of more than one component, only counting revenue that was relevant to the single infringing component. *Id.* (And note that Milani in fact was not obligated to apportion at all, because apportionment was already "accounted for" in the

comparable-license negotiations. Appx1134-1135. Yet, just to be safe, Milani performed a full apportionment analysis in accordance with this Court's apportionment jurisprudence from *Cornell* to *VirnetX*, to *Finjan*). Appx894-899; Appx1122-1123; Appx1127.

Despite this appropriate and careful work, the district court excluded Milani's Report for four separate reasons. First, the court ruled that "the extrinsic evidence that Milani relies upon [to determine the royalty rate] . . . is inadmissible parol evidence." Appx24. Here, the court specifically rejected Milani's decision to consider information about how BTG approached licensing negotiations with various companies, invoking a contract law doctrine that forbids a court from using extrinsic information to interpret a signed contract that is unambiguous on its face. *Id.* Second, the court ruled that the evidence, even including the disputed extrinsic evidence, "does not support a 0.25% royalty rate for the terms of the Hynix and Toshiba licenses." Appx24; Appx25-31. This was a substantive criticism in which the court disagreed not with Milani's method, but instead with Milani's ultimate opinions as to various contract provisions and documents. Third, the court ruled that the disputed extrinsic evidence was "never disclosed by MLC" and hence should be excluded. Appx24. The court's objection here was not that the documents were not produced during fact discovery (they were), nor that Milani failed to cite and discuss the evidence in his report (he did), but instead that MLC

did not specifically call out this information in its responses to certain interrogatories or during the 30(b)(6) deposition of MLC's corporate representative. Appx12-16; Appx18-24. Lastly, with respect to Milani's calculation of the proper royalty base, the court ruled that Milani failed to properly apportion Micron's revenue. Appx29-31.

All of these four rulings are reversible error. The court was wrong to invoke the parol-evidence rule because evidence of this sort is clearly appropriate in the context of a *Georgia-Pacific* analysis. The court was wrong to exclude Milani's 0.25% rate not only because substantial evidence supports it, but also because the parties' disagreements about the rate were factual disagreements that should have been left to the jury. The court was wrong to characterize MLC's evidentiary disclosures as insufficient, among other reasons because MLC complied with both the letter and the spirit of Rule 26, namely by producing all of the relevant documents during fact discovery and then disclosing MLC's damages theory in full and on time at the first moment it was appropriate to do so: when Milani authorized MLC to serve his report. Lastly, the court was wrong to exclude Milani's calculation of the royalty base because Milani followed this Court's guidance and in fact apportioned correctly, down to a single component of the smallest salable unit.

STATEMENT OF THE ISSUES

1. Did the district court err in excluding evidence of comparable-license negotiations under the parol-evidence rule in a *Georgia-Pacific* analysis and the resulting royalty opinions?

2. Did the district court err in adopting an evidentiary standard contrary to the Federal Rules to require disclosure of expert and privileged information during fact discovery?

3. Did the district court err in resolving factual disputes as a matter of law under *Daubert* rather than leaving them for the jury?

4. Did the district court err in requiring further apportionment of the royalty base within a single-component device based on the functionality of the component?

STATEMENT OF THE CASE

I. THE PARTIES AND PATENT-IN-SUIT

MLC is a Delaware limited liability company co-founded by Robert Hinckley and Jerry Banks. Appx874. Mr. Banks is the inventor of a portfolio of patents including the patent-in-suit, U.S. Patent No. 5,764,571 (the "'571 patent"), which relates to multi-level Flash memory devices. Appx873-874; Appx142-166 (the '571 patent). In 1997, BTG acquired the '571 patent and other related patents. Appx873-874. In 2006 and 2007, BTG negotiated lump-sum licenses with large

manufacturers of Flash memory devices, including Hynix, Toshiba, Samsung, and Micron. Appx884-886; Appx873-874; Appx900-909. In 2012, MLC re-acquired all rights to the patent portfolio including the '571 patent. Appx873-874. MLC renewed license negotiations with Micron in 2012-14, but Micron again refused to license, forcing MLC to bring suit. Appx884-886; Appx2641. MLC alleges that Micron's Flash Memory devices infringe the structural claims of the patent-in-suit because they include the claimed structures. *See, e.g.,* Appx2183-1290.

II. MLC'S DAMAGES MODEL

MLC is seeking a reasonable royalty based on a *Georgia-Pacific* analysis that relies on evidence of comparable licenses and the licensing negotiations that led to them, as well as evidence of other contemporaneous license negotiations. Appx1-24; Appx1771-1780; Appx2868-2884. All evidence of prior licensing negotiations and all licenses were produced in fact discovery. Appx794; Appx2804; Appx2808-2809; Appx2810. MLC identified such evidence as relevant to the *Georgia-Pacific* analysis in its discovery responses. *See, e.g.,* Appx9-13.

On February 8, 2019, following the close of fact discovery on December 14, 2018, MLC served Milani's Report[1] which described, in detail, the *Georgia-*

[1] Milani submitted an Amended Expert Report on March 15, 2019 after the district court granted MLC's motion to add accused products. The substance of Milani's royalty rate and base opinions was unchanged.

Pacific analysis Milani undertook to reconstruct the hypothetical negotiation and his ultimate opinions regarding the result of that negotiation.

A. Milani's royalty rate opinion

Damages experts for both parties concluded that the Hynix and Toshiba licenses were most comparable to the license that would have resulted from the BTG-Micron hypothetical negotiation. Appx905-907; Appx1566-1568; Appx1572-1574; Appx1650. To reconstruct the hypothetical negotiation, Milani considered evidence of the licensing documents and actual negotiations that BTG exchanged with Hynix, Toshiba, Micron, and other Micron competitors. Appx905-907; Appx921-923. Milani specifically considered an MFC clause in the Hynix license that guaranteed Hynix a substantial reduction in payments if the patent portfolio were subsequently licensed at a "royalty rate … less than 0.25%." *Id.* (citing Appx1698-1709; Appx1701). Because of the MFC clause, Milani chose 0.25% as a reasonable BTG starting demand in reconstructing the hypothetical negotiation—a rate BTG did, in fact, offer Micron during their failed licensing negotiations. Appx905-907; Appx921-923; Appx1144-45; Appx1147-48; Appx1149-50; Appx1151; Appx1390-1393.

B. Milani adjusted the royalty rate to account for differences between the prior licenses and the hypothetical license

Milani recognized that there were differences between the hypothetical license and BTG's prior licenses and license offers, including that the prior

licenses and offers granted a worldwide license to a portfolio of patents, while the hypothetical negotiation would only be for domestic infringement of the '571 patent. Appx913-920; Appx923-925. Milani accounted for these differences by making two adjustments to the 0.25% royalty rate. First, he apportioned to account for U.S. rights versus foreign rights. Appx913. Second, he apportioned to account for the value of the '571 patent relative to the other portfolio assets. Appx923-926; Appx1152; Appx1153; Appx1155; Appx1155-1157.

Milani determined it was reasonable to adjust the 0.25% rate to 0.75% to account for the difference between U.S. and foreign rights based on the particular facts of this case. Appx913; Appx1152; Appx1153; Appx1155. For instance, the evidence reflected that BTG's licensing practice was to negotiate a "heavily discounted [0.25%] rate" that would apply to a conservative forecast of worldwide sales, not just U.S. sales. Appx913; Appx921-923; Appx1151; Appx1390-1393; *see also,* Appx1387-1389; Appx1682-1685; Appx1394-1399; Appx1400-1402; Appx1403-1414; Appx1415-1417; Appx1418-1430. Milani also considered sworn deposition testimony produced in this case from Simon Fisher, BTG's lead negotiator of the Hynix/Toshiba licenses, who also negotiated with other potential licensees, including Micron. Appx913; Appx921-923; Appx1153-1155; Appx1846. Based on this information, Milani understood that if only U.S. (as opposed to worldwide) sales or shipments were used as the base, as is admittedly

the case in the hypothetical Micron negotiation, BTG would have considered 0.75% to be the appropriate rate. *Id.* Fisher had explained this was because only a third of the licensee's total shipments were to the U.S., and the portfolio was predominantly composed of U.S. rights. Appx1846.

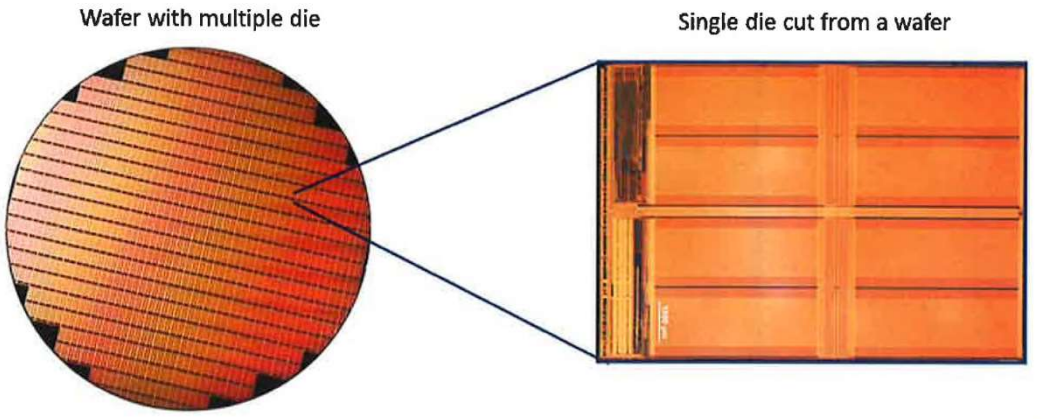
Further, at the time of the hypothetical negotiation, the MLC portfolio consisted of twenty-eight U.S. Patents, two U.S. Patent Applications, ten Foreign Patents, and one Foreign Patent Application. Appx923-924. In other words, approximately 73.6% of the portfolio was U.S. patent assets. To account for the relative value of the '571 patent compared to other portfolio assets, Milani thus further adjusted the hypothetical rate down from 0.75% to 0.375%. Appx923-926; Appx1155-1157. This 50% reduction was based on extensive record evidence including, for example, the opinion of MLC's technical expert, Dr. Lee, regarding the technological significance and contribution of the '571 patent to multi-level cell NAND flash technology, generally, as well as relative to other patents in the portfolio. Appx923-926; Appx1155-1157; Appx2193-2204. According to Dr. Lee, MLC's technical expert, the "teachings of the '571 Patent are core to the operation of multi-level cell NAND Flash" and "the *vast majority* of the technical value of the MLCIP portfolio is attributable to the '571 Patent." Appx2193-2204 (emphasis added). Milani also relied on inventor Jerry Banks's testimony that the '571 patent "was a core technology" and "foundational" compared to his other

patents in the portfolio. Appx923-926; Appx2583.

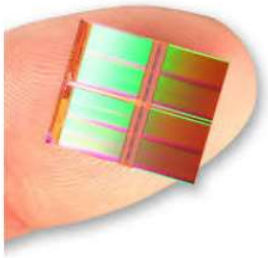
Interestingly, Micron's damages expert (Meyer) likewise attributed 50% of the portfolio's value to the '571 patent, relying on similar historical facts. Appx1613-1614.

C. Milani's royalty-base opinion

Micron's multi-level cell flash memory devices, at issue in this case, are sold as either wafers or packaged products. Appx2180-2181; Appx3112; Appx3116-3117. A "wafer" has multiple "bare dies" on it and can be used to make multiple flash packages. Appx2180-2181.



Physically, a bare die is extremely small, as shown in the illustration from Micron's technical report:



Appx2396. Bare dies can be assembled together and connected to external leads and encapsulated in plastic packages and, when packaged, these bare dies are referred to as "chips," "chip packages" or "multi-chip packages." Appx2180-2181. A single NAND Flash package can include anywhere from one to eight bare dies. Appx2180-2181; Appx3116-3117.

Based on the evidence in the record, as well as his own independent research, Milani understood that Micron sold bare dies alone and also products, including controllers, solid-state drives (SSD), and USB drives, that incorporate additional components. Appx894-899; Appx1122-1123; Appx1125-1127. Micron admitted in its interrogatory responses that the bare die was the appropriate SSPPU to be used for damages calculations. Appx1242. Milani thus separated the infringing products into two groups: the bare dies in the SSPPU Group, and all other products in the Non-SSPPU Group. Appx894-899; Appx1122-1123; Appx1125-1127. Next, Milani calculated the average selling price ("ASP") per die for the SSPPU Group, which was $2.92. Appx894-899. He then calculated the

ASP per die for the Non-SSPPU Group to be $3.94. Appx894-899. Thus, by apportioning the revenue associated with the Non-SSPPU Group down to the ASP of the bare die alone, Milani *excluded the value attributable to the non-patent practicing components* in the multi-component products. *Id.* The resulting royalty base thus included *only* revenue derived from the price of the isolated bare die, a single-component product with no non-infringing components, i.e. the base with "the close[st] relation to the claimed invention." *Cornell Univ. v. Hewlett-Packard Co.*, 609 F.Supp.2d 279, 288 (N.D.N.Y. 2009) (C.J. Rader, by designation).

As discussed in greater detail below, the district court excluded Milani's opinions and related evidence underlying those opinions, in three separate orders certified for appeal to this Court. Appx1-24; Appx25-31; Appx32.

SUMMARY OF THE ARGUMENT

The district court improperly excluded Milani's opinions based on the parol-evidence rule because Milani did not rely on extrinsic evidence to interpret the terms of the Hynix license agreement, but rather used the express language of the MFC clause, in combination with other evidence of BTG's negotiation conduct, to arrive at his opinions as to the royalty rate resulting from the hypothetical BTG-Micron negotiation.

The district court also improperly excluded Milani's opinions by usurping the jury's role as ultimate arbiter of factual disputes, by resolving disputes as to the

competing evidence presented by the parties in Micron's favor as part of its *Daubert* analysis.

The district court also excluded MLC's evidence supporting Milani's opinion by imposing disclosure requirements during fact discovery that are unsupported by the Federal Rules of Civil Procedure and that would have required MLC to identify in interrogatory responses and witness testimony which facts and documents Milani would later rely upon and were indeed fully disclosed during expert discovery.

Finally, the district court erred by excluding Milani's royalty base opinions applying an apportionment standard that violates this Court's sound precedent.

For all these reasons, the district court Damages Orders should be reversed.

ARGUMENT

I. STANDARDS OF REVIEW

In an interlocutory appeal under 28 U.S.C. §1292(b), this Court reviews the district court's certified orders. *See J.S. ex rel. N.S. v. Attica Central Schs.*, 386 F.3d 107, 115 (2d Cir. 2004). The Court's "jurisdiction is not confined to the precise question[s] certified by the district court," but may "consider any aspect of the order[s] from which the appeal is taken." *Id.* (citations omitted).

This Court reviews *Daubert* decisions regarding damages methodology for an abuse of discretion, *ActiveVideo Networks, Inc. v. Verizon Commc'ns, Inc.*, 694

F.3d 1312, 1332 (Fed. Cir. 2012), but the district court's legal conclusions are reviewed *de novo*. *Cancer Research Tech., Ltd. v. Barr Labs, Inc*, 625 F.3d 724, 728-29 (Fed. Cir. 2010).

Decisions regarding the admissibility of evidence and sanctions under Federal Rule of Civil Procedure 37 are reviewed under regional circuit law. *Arctic Cat Inc. v. Bombardier Recreational Prods., Inc.*, 876 F.3d 1350, 1369 (Fed. Cir. 2017); *Pickholtz v. Rainbow Techs., Inc.*, 284 F.3d 1365, 1371 (Fed. Cir. 2002). The Ninth Circuit reviews such evidentiary rulings for abuse of discretion, but rulings that rest on a "construction or interpretation" of the federal rules, including whether "particular evidence falls within the scope of a given rule" are reviewed *de novo. Estate of Barabin v. AstenJohnson, Inc.*, 740 F.3d 457, 462 (9th Cir. 2014).

II. THE DISTRICT COURT ERRED IN EXCLUDING MILANI'S ROYALTY-RATE OPINIONS

In his Report, Milani opined that the Hynix license "reflects" a 0.25% royalty rate. Appx905-906. As he explained, he derived this number in part by analyzing the license's MFC clause, under which BTG promised to substantially reduce the rate Hynix was paying if BTG offered any other companies a license rate below 0.25%. Appx905-906; Appx921-923; Appx1144-45; Appx1147-48; Appx1149-50; Appx1151. Milani then confirmed his analysis by considering other documents, including documents that BTG generated as it negotiated with Hynix, Toshiba, Micron, and other companies. *Id.*

The district court excluded this opinion on three independent grounds. First, the court ruled that "the extrinsic evidence that Milani relies upon…is inadmissible parol evidence." Appx20; Appx24. Here, the court specifically rejected Milani's decision to consider information about how BTG approached licensing negotiations with various companies, invoking a contract law doctrine that forbids use of extrinsic information to interpret a contract that was in fact executed and is unambiguous on its face. Second, the district court ruled that the evidence, even including the disputed extrinsic evidence, "does not support a 0.25% royalty rate for the terms of the Hynix and Toshiba licenses." Appx24. This was a substantive criticism, reflecting the court's disagreement not with Milani's method but instead with Milani's ultimate opinions based on various contract provisions and documents. Third, the court ruled that the disputed extrinsic evidence was "never disclosed by MLC" and thus should be excluded. Appx24. The court's objection here was not that the documents were not produced during fact discovery (they were), nor that Milani failed to cite and discuss the evidence in his report (he did), but instead that MLC did not specifically call out this information in its responses to certain interrogatories (MLC did identify license negotiation documents in its responses to the challenged interrogatories as well as other, still damages-related interrogatories) or during the 30(b)(6) deposition of MLC's corporate representative. Appx18-24. These three decisions each constitute reversible error.

A. The district court erred in invoking the parol-evidence rule.

The district court's invocation of the parol-evidence rule is unprecedented. No court appears to have ever prohibited an expert's use of contemporaneous negotiation evidence as part of a *Georgia-Pacific* analysis simply because the negotiation at issue resulted in a clear, final agreement. This is unsurprising. The parol-evidence rule is designed to protect the signatories of a contract from using extrinsic evidence to interpret what is otherwise a clear and final agreement between them. *Barron Bancshares, Inc. v. U.S.*, 366 F.3d 1360, 1378-79 (Fed. Cir. 2004). But that policy concern simply does not arise in the context of a *Georgia-Pacific* analysis, where this sort of extrinsic evidence might instead shed important light on one or both parties' actions in negotiating the hypothetical license.

Just as important, even if the parol-evidence rule did apply in the context of a *Georgia-Pacific* analysis, it would apply only if an expert were using evidence to interpret a contract. Here, Milani did no such thing. As discussed above, Milani instead used the disputed evidence to show what BTG said about the contract to other companies during follow-on negotiations. Appx921-923; Appx1122; Appx1144-1145; Appx1147-1148; Appx1149-1150; Appx1151. Milani's theory was that BTG would have said similar things during any hypothetical negotiation with Micron, too. *Id.*; Appx1148-1150. And BTG's actual communications with Micron indeed confirm Milani's opinions. Appx1390-1393.

1. Negotiation evidence is commonly considered in *Georgia-Pacific* analyses.

The parol-evidence rule is a rule of contract interpretation that "renders inadmissible" extrinsic evidence, including evidence of the parties' course of dealing, when "introduced to modify, supplement, or alter the terms of an integrated agreement," where the relevant terms "are clear and unambiguous." *Barron*, 366 F.3d at1378-79. The rule protects the finality of signed contracts, stopping signatories from creating ambiguities by citing information from outside the four corners of the contract. *See, e.g.*, *Transcore, LP v. Elec. Transaction Consultants Corp.*, No. 3:05-cv-2316, 2008 WL 2152027, at *5 (N.D. Tex. May 22, 2008); *Morris Kirschman & Co., L.L.C. v. Hartford Fire Ins. Co.*, No. 2:03-cv-1743, 2004 WL 1934848, at *1 n.1 (D. La. Aug. 30, 2004); Appx20; Appx828; Appx847-848 (disputing application of parol-evidence rule).

That concern obviously does not arise in the context of a *Georgia-Pacific* analysis. Quite the opposite, an expert estimating a reasonable royalty by reconstructing the hypothetical negotiation is affirmatively obligated to consider all available evidence from comparable licenses and contemporaneous licensing negotiations. *See, e.g.*, *Commonwealth Sci. & Indus. Research Org. v. Cisco Sys., Inc.*, 809 F.3d 1295, 1303-05 (Fed. Cir. 2015) (*CSIRO*); *Riles v. Shell Exploration*, 298 F.3d 1302, 1313 (Fed. Cir. 2002); *Stickle v. Heublein, Inc.*, 716 F.2d 1550, 1561 (Fed. Cir. 1983) (court erred in assessing likely outcome of hypothetical

negotiations by failing to account for prior "actual negotiations").

This Court has repeatedly approved consideration of negotiation evidence in the context of *Georgia-Pacific* analyses, never even addressing the parol-evidence rule as a possible constraint. *See, e.g.*, *id.*; *Elbit Sys. Land & C4I v. Hughes Network Sys., LLC*, 927 F.3d 1292, 1299 (Fed. Cir. 2019); *VirnetX, Inc. v. Cisco Sys., Inc.*, 767 F.3d 1308, 1330 (Fed. Cir. 2014); *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1326 (Fed. Cir. 2014); *Studiengesellschaft Kohle, m.b.H. v. Dart Indus. Inc.*, 862 F.2d 1564, 1568 (Fed. Cir.1988) ("[T]he patentee's usual licensing approach should be considered in assessing a reasonable royalty").

2. Milani did not violate the parol-evidence rule regardless because he did not use extrinsic evidence to interpret the underlying contract.

Even if the parol-evidence rule were to apply in the context of a *Georgia-Pacific* analysis, here the rule would not be triggered. The parol-evidence rule prohibits the use of extrinsic evidence to interpret a contract; but, rather than being used to interpret the Hynix license, the evidence in dispute here was simply used to show how BTG characterized the Hynix license when negotiating with other licensees. That is, the parol-evidence rule is a rule about contract interpretation, but Milani is emphatically not interpreting the BTG-Hynix license agreement.

In reconstructing the hypothetical negotiation, Milani drew on a variety of relevant documents—as discussed above. For instance, he looked at several prior licenses that covered the '571 patent, and he looked at documents detailing BTG's contemporaneous licensing and negotiation practices. Appx899-904; Appx905-907; Appx921-923. Milani ultimately concluded that the Hynix and Toshiba licenses were the "most relevant real-world license agreements to consider in a hypothetical negotiation" because (a) they were executed around the time of the hypothetical negotiation; (b) they involved the same patent holder (BTG) and two NAND Flash manufacturers, both competitors of Micron; (c) they included rights to the '571 patent; and (d) they covered substantially similar commodity products. *Id.*; Appx1134-1135. Micron's damages expert offered a similar opinion in his Expert Report. *See, e.g.,* Appx1566-1568; Appx1572-1574.

The Hynix and Toshiba licenses, however, obligated those firms to make lump-sum payments to BTG but did not explain how those lump-sum amounts were calculated. Appx1698-1709 (Hynix PLA); Appx1710-1724 (Toshiba PLA). Milani thus focused on one clause from the Hynix license: the MFC clause under which BTG promised to lower Hynix's rate if BTG offered a rate below 0.25% to any other licensee. Appx1701-1702 (Section 4.3, "Future Licenses"); *see also,* Appx905-906; Appx921-923; Appx1122; Appx1144-1145; Appx1147-1148; Appx1149-1150; Appx1-24. This clause is unambiguous and requires no

interpretation: there is no dispute that the number "0.25%" is the trigger that would force BTG to lower Hynix's rate. Appx1701-1702; *see also*, Appx1653-1654. Milani thus referred to that number when developing his opinion as to the rate BTG would have offered Micron in the hypothetical negotiation, not because Hynix had agreed to pay a lump-sum license fee calculated using a 0.25% royalty rate, but because BTG had agreed with Hynix not to offer other licensees, including Micron, a lower royalty rate. Milani then looked at other evidence to see if BTG in fact behaved in ways consistent with the MFC from the Hynix license agreement.

Milani found a great deal of confirming evidence. For example, he found a letter from BTG to Samsung in which BTG represented to Samsung that the 0.25% rate was the rate that Hynix paid, was an appropriate rate, and should be the rate that Samsung pays as well. Appx905-906 (citing e.g., Appx1686-1691; Appx921-922, n.377, 378. Milani used the Samsung letter not as evidence of the truth about what Hynix paid, but instead as evidence that, consistent with his expectation, BTG did start contemporaneous negotiations with Samsung asking for 0.25% royalty rate. *Id.*; *see also*, Appx1146-1148. Similarly, Milani found a letter from BTG to Micron where again BTG asked for a royalty of 0.25%. *Id.*; *see also* Appx1390-1393. Once more, Milani did not rely on this evidence to interpret the Hynix agreement, but rather to inform his understanding of how BTG would have

negotiated the hypothetical license with Micron. *Id.* Milani similarly found and relied on other documents in which BTG explicitly talked about, justified, and focused on 0.25% as the target royalty rate. *Id.*[2]

Milani's testimony was not about the proper interpretation of the Hynix license document; rather, his point was that BTG would start negotiations with Micron at 0.25% because (a) BTG would not want to trigger the MFC clause in the Hynix contract and (b) that is what BTG in fact did when it engaged in contemporaneous negotiations with Micron, Samsung, and others. For this reason, the district court was wrong to invoke the parol-evidence rule. That ruling should be reversed.

B. The district court erred in using *Daubert* to evaluate the merits, rather than the methodology, of Milani's opinions.

Under Federal Rules of Evidence 702 and 703, *Daubert* and its progeny, a district court "must be cautious not to overstep its gatekeeping role and weigh facts, evaluate the correctness of conclusions, impose its own preferred methodology, or judge credibility, including the credibility of one expert over another [because] these tasks are solely reserved for the fact finder." *Apple,* 757 F.3d at 1317; *accord Daubert v. Merrell Dow Pharm, Inc.*, 509 U.S. 579, 595

[2] In its Order, the district court referred to these other documents as "extrinsic evidence," which are the documents Milani specifically discussed in his Report. Appx18-24.

(1993); *Primiano v. Cook*, 598 F.3d 558, 564-65 (9th Cir. 2010). Thus, when the "evidence relied upon [is] sufficiently related to the case at hand, disputes about the degree of relevance or accuracy (above this minimum threshold) may go to the testimony's weight, but not its admissibility." *i4i Ltd. P'Ship v. Microsoft Corp.*, 598 F.3d 831, 854 (Fed. Cir. 2010).

Respecting this limited role "is particularly essential in the context of patent damages." *Apple*, 757 F.3d at 1315. This Court "has recognized that questions regarding which facts are most relevant or reliable to calculating a reasonable royalty are 'for the jury.'" *Id.* This Court has also recognized that there "may be more than one reliable method for estimating a reasonable royalty," and "that one of these methods may be said to more accurately value this aspect of a reasonable royalty calculation does not, necessarily, make the other approach inadmissible." *Id.* And this Court has even explicitly warned that a district court errs "by questioning the factual underpinnings and correctness of the damages expert's testimony, rather than the reliability of his principles and method and the sufficiency of the data upon which he relied." *Id.* at 1320.

Despite all this, the district court below excluded Milani's royalty-rate opinion on the ground that the evidence "does not support" his conclusion. Appx24; Appx25-31. This ruling impermissibly usurps the jury's role in evaluating the factual underpinnings and accuracy of Milani's opinion.

1. Milani's opinion was grounded in reliable evidence.

As discussed above, Milani's royalty rate calculation was based in part on a specific clause in the Hynix license, the MFC clause. And under that clause, BTG was obligated to reduce Hynix's licensing rate if BTG in the future licensed any other company at a rate below 0.25%. Milani thus unremarkably took the position that "the 0.25% royalty rate called for in the MFC reflected "a ***relevant consideration*** for evaluating a reasonable royalty" in this case, because any lower royalty rate offered to Micron would trigger the Hynix MFC clause. Appx905-906; Appx1144-1150. Importantly, Milani did not testify that the Hynix license document itself stated that Hynix paid a 0.25% royalty rate. He instead appropriately testified that the MFC clause of the contract "reflects" such a rate and then explained his rationale.[3]

It is hard to understand why this opinion was excluded. Indeed, it is beyond dispute that, at the very least, the MFC clause provided a strong monetary incentive for BTG to demand a rate of 0.25% or more from Micron during the hypothetical negotiation. Milani nevertheless brought his expertise to bear: he studied BTG's negotiating history and concluded that it was in fact appropriate to

[3] *See, e.g.,* Appx1145 (Q: "So is it your opinion that 0.25 percent is the effective royalty rate of the Hynix agreement?" A: "It is my opinion that 0.25 percent is the proper rate to consider in connection with relying on the Hynix agreement for the purposes of determining a reasonable royalty in this case.").

consider the 0.25% rate as a particularly reasonable starting point for the hypothetical negotiation.

For example, as identified above, Milani identified in his Report documents from the record related to BTG's licensing negotiations with other Micron competitors during the same time period, wherein BTG offered a lump-sum license covering the '571 patent ***based on*** the application of a 0.25% rate to a conservative estimate of worldwide sales. Appx905-906.[4] Those documents also show BTG discussing the Hynix license with other potential licensees and asserting that the Hynix license was based on a 0.25% royalty rate.

In those communications, including BTG's correspondence with Micron during the hypothetical-negotiation period, BTG represented that a 0.25% offer was "heavily discounted" and "commensurate" with the deals it had reached with Hynix and Toshiba. *See, e.g.* Appx1390-1393. And those communications supported Milani's understanding that BTG had represented that the effective rate applicable to the Hynix and Toshiba licenses was 0.25% and that BTG consistently demanded the same rate from other licensees. *Id.* Indeed, as the district court acknowledged BTG's licensing history "shows that BTG used 0.25% as a tool to

[4] *See, e.g.,* Appx1387-1389; Appx1390-1393; Appx1682-1685; Appx1394-1399; Appx1400-1402; Appx1403-1414; Appx1415-1417; Appx1418-1430. Additionally, Milani considered numerous other BTG negotiation evidence, which he identified in his "Materials Considered List." Appx943-950.

calculate lump sum payments". Appx18.

All this is clearly reasonable. In fact, and again consistent with Milani's view, it is undisputed that BTG *actually offered* to Micron a lump-sum license covering the '571 patent based on a 0.25% royalty rate. Appx1390-1393.

Other details of Milani's royalty-rate opinion were likewise grounded in ample factual support. For example, Milani opined that the 0.25% rate was "applied to Hynix worldwide sales," and he based that conclusion on extrinsic evidence produced by BTG during fact discovery, all of which Milani identified in his Report. Appx905-906; Appx1144-1151; Appx1154.

In short, Milani correctly (and reasonably) relied on facts and data of a type relied upon by experts in the patent licensing field to determine a reasonable royalty rate for the hypothetical negotiation. Appx1144-1145; *see also Daubert*, 509 U.S. at 595-96 (under Rule 703, expert opinions based on otherwise inadmissible hearsay "are to be admitted" when "the facts or data are of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject.") The district court abused its discretion when it concluded that Milani's royalty-rate opinion was unsupported by the evidence.

2. The district court improperly usurped the jury's role in evaluating Milani's evidence and opinions.

The district court obviously disagreed with Milani's opinions regarding the Hynix license and other supporting evidence. But under this Court's precedents,

the district court should have allowed the jury to decide whether Milani's analysis was appropriate, rather than excluding his royalty-rate opinion preemptively. Put differently, the district court overstepped its role when, instead of evaluating Milani's methodology, the court itself evaluated the underlying facts and passed judgment on Milani's ultimate opinions.

For example, the district court specifically criticized Milani's reliance on one document cited in his report: a letter from BTG to a potential licensee (Samsung) dated September 6, 2007. Appx18 (citing Appx1326-1331). That date falls just a few months after the Hynix license was executed (on or about April 11, 2007) and is well within the hypothetical-negotiation timeframe. In that letter, BTG offered a lump-sum license to Samsung "based on a 0.25% rate applied to sales forecasts" and "enclosed a market share forecast that included data for Hynix and Toshiba showing forecasted (or actual) sales from 2006-2011, and a 0.25% royalty rate applied to those forecasts to derive lump sum payments." Appx1326-1331; *see also* Appx6. Micron said that "this letter shows what was subjectively in BTG's mind and after the time of the Hynix agreement." Appx745. The district court agreed with Micron that "this letter is not a contemporaneous communication between BTG and Hynix showing how those parties negotiated the BTG/Hynix license, but rather an after-the-fact licensing proposal made by BTG to Samsung." Appx6. In support of its view, Micron cited two pieces of evidence, namely two

letters dated March 2007 between BTG and Hynix, and Micron argued that those letters "show[] that the parties negotiated over lump sum payments." Appx6 (citing Appx1761-1762; Appx1763-1764). In other words, MLC and Micron submitted competing evidence; and, rather than allowing the jury to evaluate the facts, the court itself resolved the factual dispute. That was clear error.[5]

To take another example, Milani opined in his report that the Hynix products covered by its license and the Micron products at issue in this case are "commodity products" in the sense that buyers view them as indistinguishable. Micron did not meaningfully dispute Milani's conclusion about the commodity nature of these products. Micron's damages expert, for example, did not offer a contrary opinion about the commodity nature of the market in his Rebuttal Report. *See, e.g.,* Appx1547-1548. On the contrary, Micron's expert compared Hynix and Toshiba units to Micron units, characterizing it as an "apples to apples" comparison. Appx1566-1568; Appx1572-1574; Appx1498; Appx1507-1511; Appx1482-1483. Similarly, Micron's technical expert confirmed that a "[s]olid state memory is

[5] The district court also stated that MLC does not cite to any specific evidence to show that the "record is 'replete' with references to the 0.25% royalty rate." Appx19. Not so. MLC's Opposition explicitly cited its *Daubert* Motion to Exclude Micron's Damages Expert, in which MLC identified evidence from the record supporting Milani's opinion that 0.25% was a "relevant consideration" in his analysis. *See* Appx836; n.1; Appx837-838 (incorporating MLC's briefing *Daubert* re: Meyer); *see also,* Appx1524-1526 (citing e.g., Appx1387-1389; Appx1390-1393; Appx1682-1685; Appx1394-1399; Appx1400-1402; Appx1403-1414; Appx1415-1417; Appx1418-1430); Appx1471-1477.

generally considered a fungible product by the industry." Appx2397.

Despite all this, the district court not only weighed in on the question of whether the products are commodities (again, a question reserved for the jury) but also concluded that Milani's view was so flawed as to warrant exclusion. The problem? The district court thought that Milani based his opinion on a single article, even though Milani in fact had based his opinion on much more. Appx27 ("Merely asserting that the flash memory market is a 'commodity' market with a citation to a 2006 article about market conditions does not establish that the licensed Hynix products are similar to Micron's accused products for purposes of a damages analysis.").

For example, Milani had considered multiple market news sources and statements by industry analysts where the NAND flash market was described as a "commodity market with competitors mainly competing on price." Appx916; n.345; Appx918; Appx923. Milani had further explained that "a commodity market is a market in which products have very little, if any, differentiation." Appx1131-1132. And, as an expert in the field, Milani surely knew that, as even the Merriam Webster's Dictionary acknowledges, "memory chips" (including flash memory) are examples of a commodity.[6]

[6] "commodity," *Merriam-Webster Online Dictionary* https://www.merriam-webster.com/dictionary/commodity (last visited Mar. 10, 2020).

Yet another example of an instance where the district court abused its discretion and improperly evaluated the accuracy of Milani's royalty-rate opinion, rather than his methodology, was the district court's conclusion that Milani failed to appropriately account for what the court described as the "truncated period of the license agreements." Appx21. Micron had argued to the court that, in the letter to Samsung, BTG applied the 0.25% rate to "a revenue base of forecasted sales from 2006-2011, thus ignoring years of Hynix's and Toshiba's sales that were covered by the term of the license." Appx19. Micron thought this important because, in its view, "if an effective royalty rate was calculated for the Hynix and Toshiba licenses, that rate would need to also take account of the years of forecasted (or actual) sales from 2012-2017, and thus the actual effective royalty rate would be much less than 0.25%." Appx19. Micron thus argued that Milani's royalty-rate opinion was unreliable because Milani allegedly did not account for the truncated period over which BTG applied the 0.25% rate. *Id*.

This is the kind of dispute that should be presented to a jury, with Micron raising its concerns both through its own expert and through cross-examination of Milani. But the district court summarily agreed with Micron and excluded Milani's opinion on this basis. Appx19-24. This deprived MLC of the chance to explain its side of the dispute to a jury. As MLC would have argued, and as Milani in fact explained in his Report and at his deposition, the evidence indicates that

BTG was offering licenses based on a conservative estimate of worldwide sales through 2011 because of uncertainties surrounding each licensee's future extent of use. Appx905-906; Appx909; Appx914-912; Appx1148-1151. BTG's September 2007 letter to Samsung, for example, evidences BTG's practice to use forecasted numbers through 2011 to estimate "the future use that was anticipated at the time the agreement was negotiated." Appx1394-1399.

In other words, at the time of these negotiations, neither BTG nor each licensee could predict the actual extent of use through the entire term of the license, so the parties focused instead on market forecasts available at the time (*i.e.*, through 2011). Appx905-906; Appx909; Appx914-912; Appx1145-1147. Further, BTG negotiated under the uncertainty of validity and infringement—which are presumed in a hypothetical, but not in an actual negotiation Appx905; Appx907; Appx926; Appx1148-1149; Appx1151; *see also*, *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1325 (Fed. Cir. 2009) ("The hypothetical negotiation also assumes that the asserted patent claims are valid and infringed."). Milani thus opined that BTG was willing to distribute the risk by accepting a lump-sum payment based on a 0.25% rate applied to a conservative estimate of worldwide sales using available forecasts that covered only a truncated time period, through 2011. Appx905-906; Appx909; Appx914-912; Appx1148-1151. Milani concluded, however, that BTG would not have offered the same discount to

Micron in the hypothetical negotiation because, *inter alia*, Micron was a subsequent licensee and both infringement and validity are presumed. Appx905-907; Appx921-923; Appx1148-1150.

Again, a jury might agree or disagree with Milani. But that determination belongs to the jury and should not have been made by the district court as part of its *Daubert* analysis. *See, e.g., VirnetX*, 767 F.3d at 1328 ("questions regarding which facts are most relevant for calculating a reasonable royalty are properly left to the jury"); *Micro Chemical, Inc. v. Lextron, Inc.,* 317 F.3d 1387, 1392 (Fed. Cir. 2003) ("When, as here, the parties' experts rely on conflicting sets of facts, it is not the role of the trial court to evaluate the correctness of facts underlying one expert's testimony.").

C. The district court erred when it excluded certain evidence on the ground that MLC did not sufficiently disclose it.

In granting Micron's *Daubert* motion and its motion to strike Milani's royalty rate opinion, the district court incorrectly found that "MLC did not disclose that it intended to rely on [particular] evidence in support of its reasonable royalty claim" because it did not specifically identify the exact documents Milani would ultimately find relevant and did not explain how Milani would consider certain documents in reaching his ultimate expert opinion. Appx18-24. The court's order

is contrary to the Federal Rules of Civil Procedure and prejudiced MLC.[7]

1. The district court's Damages Orders required a fact witness to divulge privileged information.

One of the bases for the district court's discovery-related exclusions is that MLC's Rule 30(b)(6) witness provided supposedly insufficient responses to Micron's "repeated" questions about what evidence MLC would use at trial, what information can be "inferred" from the Hynix or Toshiba license, and whether the Hynix license stated that 0.25% was the effective royalty rate. Appx15. The effect of that order is to have required MLC's corporate representative—a fact witness—to divulge privileged information as well as to speculate concerning both trial counsel's strategy and expert opinion. The Rules do not require such disclosures. *See* Fed. R. Civ. P. 26 and 33; *see generally,* Rule 26 Advisory Committee's notes; *see also, Republic of Ecuador v. Mackay*, 742 F.3d 860, 870 (9th Cir. 2014).

MLC's corporate representative, Robert Hinckley ("Hinckley"), was deposed on December 11, 2018. Appx4. He was designated to provide the non-privileged factual basis related to MLC's damages claim, and the facts and circumstances regarding BTG's prior licenses for which he and MLC had

[7] MLC addressed, herein, Milani's analysis of both the comparable Hynix and Toshiba licenses in conjunction with other extrinsic evidence, that lead him to determine that the 0.25% rate was a reasonable consideration in his *Georgia-Pacific* analysis, namely, as the starting bargaining place for BTG's hypothetical negotiation with Micron.

knowledge. Appx14-16; Appx22-24. Hinckley so testified, explaining that BTG – *not MLC* – had negotiated the Hynix and Toshiba licenses, and thus MLC was not privy to those negotiations nor to how the royalty payments were calculated. *Id.*; Appx1262-1263; Appx1266-1267; Appx1289; Appx1291-1292; Appx1293. Thus, when Micron's counsel asked Hinckley about the Hynix license or whether a particular royalty rate could be "inferred" from it, MLC objected that the answers were privileged, and Hinckley reiterated that neither he nor MLC were privy to those specific negotiations:

> Q: So MLC has no knowledge with respect to a royalty rate that could be inferred from this particular agreement?
>
> Hinckley: That's correct. MLC has no knowledge about where these numbers came from.
>
> Q: Has MLC attempted to investigate that?
>
> Counsel: Objection to the extent that it calls for privileged communications. If you have an independent knowledge, you can testify to that.
>
> Hinckley: No, I don't have any independent knowledge. I – I – BTG did not include us in the negotiations, and – and so what communications were between Hynix and BTG over these numbers, MLC has no knowledge.

Appx15. Micron did not ask Hinckley about the Hynix license's MFC clause. Appx1246-1302. And Hinckley's response that MLC "has no understanding" as to the Hynix license royalty rate or whether a royalty rate is listed in that license is consistent with Milani's opinion. Appx15. As discussed above, Milani did not

opine as to the effective royalty rate of the Hynix license itself, nor did he rely on Hinckley's or MLC's knowledge when he determined the hypothetical royalty rate that he would apply to Micron (not Hynix). His opinion instead is based on documents and other physical evidence, including the Hynix license's MFC clause. Hinckley's response was therefore perfectly appropriate. Neither he nor MLC had the relevant understanding; that understanding came only from Milani, and his evaluation of the record as a damages expert.

Micron's questions to Hinckley were objectionable as they called for the disclosure of privileged communications and work-product, including preliminary expert analysis and opinions. Appx14-16. The Federal Rules do not "require a party or an attorney to disclose privileged communications or work product." Fed. R. Civ. P. 26 advisory committee's notes (1983 amendment). MLC objected on those grounds, and Micron did not seek an order overruling those objections. Appx47-141; Appx794.

The district court also took issue with Hinckley's responses to Micron's other objectionable questions attempting to elicit MLC's privileged trial strategy and preliminary expert analysis and opinion:

> Q: Are there any facts with respect to [the Hynix License] that MLC will seek to rely upon with respect to its burden of proof at trial?

> Q: MLC is not disclosing any facts with respect to this agreement that it will seek to rely upon at trial, correct?
>
> Q: Mr. Hinckley, outside of what's written here within [the Hynix License], are there any other facts that MLC will seek to introduce at trial with respect to [the Hynix License]?"
>
> Q: Will MLC at least disclose those facts before the close of fact discovery?

Appx15-16. As discussed above, MLC objected that these questions called for expert testimony and also instructed the witness not to divulge privileged information. *See* Appx14-16. MLC then allowed the witness to testify to the extent he had knowledge independent of privileged communications. Appx15-16; Appx1262-1263; Appx1266-1267; Appx1289; Appx1291-1292; Appx1293. Subject to those instructions, Hinckley responded that he was not aware of what specific facts or evidence MLC would ultimately use *at trial*. *Id.* Micron's questions as to what evidence MLC would introduce at trial asked a fact witness to divulge the mental impressions and strategy of MLC's trial counsel, and to speculate as to what MLC's expert would ultimately say. Thus, the Order finding MLC's objections and Hinckley's responses to constitute an insufficient "factual" disclosure was an abuse of discretion based on an incorrect interpretation of the requirements of Rule 26.

2. The district court's Damages Orders erroneously required disclosure of expert opinion during fact discovery.

The district court also ruled that MLC's responses to Micron's

interrogatories did not disclose the "factual underpinnings" of Milani's royalty-rate opinion. Appx22. There are two fundamental problems with this ruling: (1) it conflates fact and expert discovery; and (2) it would also have required MLC to disclose privileged and protected mental impressions, conclusions, and opinions of how its counsel intended to present its case at trial, disclosures that are not only not required, but expressly protected under the Federal Rules. *See* Fed. R. Civ. P. 26(b)(3); *Republic of Ecuador*, 742 F.3d at 866.

Micron served a number of damages-related interrogatories. Appx1-24; Appx2608-2615; Appx2616-2629; Appx2630-2637; Appx2638-2645; Appx2868-2884. Under Rule 33(a)(2), "[a]n interrogatory may relate to any matter that may be inquired into under Rule 26(b)," which permits discovery regarding "nonprivileged matters." MLC responded to all of those damages-related interrogatories, which, when taken together, identify and describe MLC's damages theory and the facts supporting MLC's damages claim. *Id.*[8] The district court highlighted MLC's responses to Micron's Interrogatory Nos. 6 and 22. Appx23-

[8] On this record, the parties only submitted some, not all, of Micron's damages-related interrogatories and MLC's responses thereto on to the docket below. The district court noted that MLC did not identify the Toshiba license, or some of the "extrinsic evidence" Milani relied on his in Report. Appx22-23. The district court was incorrect, however, because MLC did identify the Hynix and Toshiba licenses (albeit it using different Bates-numbers than the one Milani referenced in his Report) and did identify several of the documents Milani relied on, for instance, in response to Interrogatory Nos. 6, 7, 18, and 22. Appx2806-2808.

24. MLC's responses identified (a) its damages theory (*e.g.*, a reasonable royalty), (b) that reasonable royalty damages (*e.g.*, the rate and base) would be based on expert analysis of *Georgia-Pacific* factors, (c) that it will be based on consideration of relevant licenses to the '571 patent (*e.g.*, Hynix and Toshiba licenses), and (d) that MLC would consider prior licensing negotiations regarding the patented technology. Appx1-24; Appx2608-2615; Appx2616-2629; Appx2630-2637; Appx2638-2645; Appx2868-2884; Appx780-800. MLC also notified Micron in its initial disclosures that prior licenses and documents related to licensing were relevant to MLC's claims. Appx1765-1770; Appx1303-1312; Appx1771-1780.

Further, even though Micron failed to timely produce evidence of its infringing sales—a subject on which MLC was repeatedly forced to seek judicial relief[9]—MLC nevertheless explained that its damages claim would also consider the Net Sales revenues Micron publicly reported in SEC 10-K Annual Statements for each fiscal year in the damages period, as well as the applicable percentage rates attributable to the accused products. Appx9-13; Appx23-24. As discussed above, MLC also identified numerous documents by Bates-Number as ***examples*** of the types of documents that may be relevant to MLC's damages claim. *See, e.g.,* Appx9-13. MLC also objected to Micron's interrogatory because it sought

[9] *See* Appx223-249; Appx322-337; Appx379-399; Appx354-359 (Order); Appx541-545 (Order).

information that was privileged and the proper subject of expert analysis. Appx9-13. Micron did not move under Rule 37 to compel supplemental interrogatory answers during fact discovery. Appx47-141 (Docket); Fed. R. Civ. P. 33 advisory committee's note (1970 amendment) ("If objections are made, the burden is on the interrogating party to move under Rule 37(a) for a court order compelling answers"). Further, any alleged deficiency was cured when MLC timely served its expert report, otherwise supplementing "in writing," under Rule 26(e), its prior disclosures and responses.

Rule 26(a)(2) governs the disclosure of expert witness opinions through the issuance of a report that contains "a complete statement of all opinions," "the basis and reasons for them" and "the facts or data considered by the witness in forming them." Fed. R. Civ. P. 26(a)(2)(B). The district court's ruling that MLC was not compliant is simply incorrect. For instance, Milani's Report explained how he: (1) analyzed the prior licenses; (2) analyzed and concluded the Hynix and Toshiba licenses were most comparable; (3) analyzed the Hynix license's MFC provision, including the 0.25% rate contained therein; (4) considered the prior licenses in conjunction with other evidence contemporaneous to the hypothetical negotiation related to BTG's prior licenses, license offers, and negotiations; (5) determined the 0.25% rate in the MFC provision was a "relevant consideration" as to what BTG's starting bargaining position would be; (6) identified differences between the prior

licenses/negotiations and the hypothetical license; (7) adjusted the starting 0.25% rate to account for those differences based on prior statements from BTG personnel (*e.g.*, Simon Fisher), market-based evidence, and other expert/fact witness testimony; (8) determined the appropriate and reasonable royalty rate, after making the appropriate apportionment adjustments, to be 0.375%; (9) apportioned the royalty base to the single-component SSPPU; and (10) calculated the lump-sum amount by multiplying the 0.375% rate by the apportioned revenue royalty base. *See* pp. 9-14, 20-27, *supra*; Appx894-926. Thus, the "factual basis" that Milani considered in his analysis and in forming his opinions was produced during fact discovery, identified in his Report, and further discussed at his deposition.

Rule 26 requires nothing more. Yet, the district court ruled that MLC should have given Micron advance notice in its discovery responses as to exactly ***which*** documents Milani would be using, ***how*** Milani would interpret those documents, including what parts of a document he would find most relevant (*e.g.*, the MFC clause of the Hynix License), and ***how*** Milani would use them to derive his reasonable royalty opinion. Appx13-14; Appx23-24. There is simply no support for that ruling in the language of Rule 26 or its legislative history. Indeed, there is no reason to believe that MLC was even in possession of any of the information the district court faulted MLC for not disclosing during fact discovery. After all, under the court's scheduling order, expert discovery followed the conclusion of

fact discovery. Appx208-209. Thus there was no basis for the district court's assumption that MLC and Milani formulated the opinions contained in Milani's Report any time before fact discovery closed, and hence no basis for its assumption that MLC could have disclosed that information at some earlier time.

Further, according to the Advisory Committee Notes, Rule 26 expressly protects against the disclosure of "preliminary expert opinions" as part of fact discovery.[10] For instance, Notes of the Advisory Committee for the 2010 Amendments to Rule 26 states:

> The addition of Rule 26(b)(4)(C) is designed to protect counsel's work product and ensure that lawyers may interact with retained experts without fear of exposing those communications to searching discovery. The protection is limited to communications between an expert witness required to provide a report under Rule 26(a)(2)(B) and the attorney for the party on whose behalf the witness will be testifying, ***including any "preliminary" expert opinions***.

This is consistent with Rule 26(b)(4) which protects ***draft*** reports and disclosures or attorney-expert communications from discovery. The 2010 Advisory Committee further explained that while discovery is permitted to "identify facts or data" that an "expert considered in forming the opinions to be

[10] Advisory Committee's Notes are given weight in interpreting federal procedural and evidentiary rules. *See, e.g., United States v. Vonn,* 535 U.S. 55, 64 n.6 (2002) (the Advisory Committee's Notes "provide a reliable source of insight into the meaning of a Rule"); *Republic of Ecuador*, 742 F.3d at 865 (the Advisory Committee's notes for Rule 26 "are a particularly reliable indicator of legislative intent").

expressed," "***communications about the potential relevance of the facts or data are protected***." *Id.* Indeed, Rule 26(a)(2)(B)(ii) was amended to "refocus" the disclosure on "facts or data," thereby "limit[ing] disclosure to material of a factual nature by excluding theories or mental impressions of counsel." *Id.*; *see also, Republic of Ecuador*, 742 F.3d at 870 (discussing Rule 26's protection of expert and opinion work-product).

In other words, the Federal Rules expressly protect from discovery "preliminary expert opinions," the "theories or mental impressions of counsel," and even theories and impressions about the "potential relevance of the facts or data." The district court's order is thus plainly at odds with the language and intent of the Federal Rules, as it would have forced MLC to disclose protected information, theories, mental impressions, and preliminary opinions.

Finally, overruling MLC's objection that any perceived noncompliance was harmless,[11] the district court found prejudice against Micron and issued Rule 37 sanctions that amounted to a dismissal of MLC's damages claim. Appx17-24;

[11] The district court stated that Micron was prejudiced because it was "prevented from conducting fact discovery," such as depositions of BTG, Hynix and Toshiba witnesses focusing on the alleged 0.25% royalty rate, as well as a deposition of Mr. Fisher." Appx23-24. This is not accurate. MLC explained that Micron was aware of these third-parties and did conduct discovery regarding BTG's licensing history. Appx2823; Appx2806; Appx2808. Indeed, Micron conducted and obtained discovery of BTG's prior licenses and negotiations from BTG and Toshiba, but elected not to take depositions and not to seek discovery from Hynix.

Appx32. Under Ninth Circuit law, where Rule 37 sanctions amounts to dismissal of a claim, the district court was required to consider whether the claimed noncompliance involved willfulness, fault, or bad faith. *R&R Sails v. Insurance Co. of Pa.*, 673 F.3d 1240, 1247 (9th Cir. 2012). The district court conducted no such inquiry and made no such findings. Appx24; Appx32. On this basis alone, the district court's sanctions order should be vacated.

Thus, as detailed above, all the documents Milani considered (and thus the factual underpinnings for his opinions) were produced during fact discovery, were cited in MLC's responses to Micron, cited in MLC's response to Micron's damages interrogatories, and MLC identified the damages theory it would likely pursue, *i.e.* the use of comparable license (including the Toshiba and Hynix licenses). Tellingly, Micron also identified these same documents in its written discovery responses to MLC's interrogatories. Appx1237-1245. It defies logic to believe Micron was unaware of the importance of these documents, in light of MLC's discovery responses. As a result, the district court's Damages Orders must be reversed.

III. THE DISTRICT COURT ERRED IN REQUIRING APPORTIONMENT WITHIN A SINGLE INFRINGING COMPONENT OF A STRUCTURAL CLAIM BASED ON THE DEVICE'S FUNCTIONALITY

In addition to excluding Milani's opinion as to the royalty rate, the district court also excluded Milani's opinion as to the royalty base. The court's rationale

for this exclusion was its assertion that Milani failed to reliably apportion the revenue base. Appx25-31. That is reversible error for one simple reason: Milani properly apportioned the revenue base.

In this case, both parties agreed that the smallest-salable-patent-practicing unit ("SSPPU") was the bare die. Appx25. Thus, Milani apportioned Micron's revenue down to that single, patent-practicing component (the bare die), in that way excluding the value attributable all other components. Yet, the district court ruled that Milani had to apportion *beyond* that single, infringing component to account for different functions performed by it. Because this ruling is contrary to this Court's precedent, it must be reversed.

A. Federal Circuit precedent does not require apportionment beyond a single, infringing component

Former Chief Circuit Judge Rader first articulated the principle of using the smallest saleable patent-practicing, or SSPPU, for determining the royalty base in *Cornell*, 609 F. Supp. 2d at 288; *see VirnetX*, 767 F.3d at 1327 (attributing SSPPU as arising in the *Cornell* case). The claimed invention in *Cornell* was a method for instruction issuance, which was a "small part of the IRB (instruction reorder buffer), which is a part of a [computer] processor, which is part of a CPU module, which is part of a 'brick,' which is itself only part of the larger server." *Id.* at 283. And while the computer processor was "only a component of a larger computing system," in the "anatomy of a Hewlett-Packard server, the [computer] processor is

the smallest salable patent-practicing unit" incorporating the claimed invention. *Id.*

The plaintiff, however, sought damages based on the value of the ***entire CPU brick*** as the royalty base, "not the invention or the IRB or even the processor," asserting this was appropriate because "Hewlett-Packard's primary business did not include a la carte processor sales. *Id.* The plaintiff then calculated a $23 billion base using "revenues Hewlett-Packard would have obtained if it had sold each of the infringing processors in conjunction with a CPU brick," rather than "adding up invoice amounts" from "actual CPU brick sales to Hewlett-Packard customers." *Id.* at 285. Judge Rader rejected plaintiff's royalty base and queried why plaintiff had not chosen a base more clearly relevant to the patented invention's value: "the revenue Hewlett-Packard would have earned had it sold each infringing processor as just that, a processor, without any additional non-infringing components." *Id.* According to Judge Rader, "the logical and readily available alternative was the smallest salable infringing unit with close relation to the claimed invention—namely the processor itself," of which "the infringing IRB is an important component." *Id.* at 285, 288. Judge Rader, in articulating an appropriate royalty-base approach, found the computer processor to be an appropriate base, even though the infringing IRB was just a component within the processor, albeit an important one. *Id.*

Since *Cornell*, this Court has repeatedly recognized the SSPPU approach as an accepted apportionment methodology.[12] *See, e.g., CSIRO*, 809 F.3d at 1301("where a damages model apportions from a royalty base, the model should use the smallest salable patent-practicing unit as the base"); *VirnetX, Inc.*, 767 F.3d at 1327 ("The "smallest saleable unit approach was intended to produce a royalty base much more closely tied to the claimed invention than the entire market value of the accused products.") The SSPPU approach is rooted in the principle that "where a multi-component product is at issue and the patented feature is not the item which imbues the combination of the other features with value, care must be taken to avoid misleading the jury by placing undue emphasis on the value of the entire product." *Ericsson*, 773 F.3d at 1226. It is also rooted in the fact that apportionment of the royalty base can be an "exceedingly difficult and error-prone task," as this Court reflected in *LaserDynamics*:

[12] Given that "different cases present different facts," this Court has called for flexibility in identifying an appropriate methodology for apportionment. *CSIRO*, 809 F.3d at 1301-02. Indeed, apportionment can be done in various ways, including "by careful selection of the royalty base…, by adjustment of the royalty rate…, or by a combination thereof." *Ericsson, Inc. v. D-Link Sys., Inc*., 773 F.3d 1201, 1226 (Fed. Cir. 2014). Applying the *Georgia-Pacific* factors to identify an appropriate royalty is also a well-accepted methodology for apportionment. *Astrazeneca AB v. Apotex Corp*., 782 F.3d 1324, 1338 (Fed. Cir. 2015) ("Thus, the standard *Georgia-Pacific* reasonable royalty analysis takes account of the importance of the inventive contribution in determining the royalty rate that would have emerged from the hypothetical negotiation.") Reliance on comparable real-world licenses is also a well-accepted apportionment methodology, as discussed *infra*. *CSIRO,* 809 F.3d at 1301-02.

> We begin by noting that some products are made of many different components, one or more of which components may be covered by an asserted patent, while other components are not. This is especially true for electronic devices, which may include dozens of distinct components, many of which may be separately patented, the patents often being owned by different entities. To assess how much value each patented and non-patented component individually contributes to the overall end product — e.g., a personal computer — can be an exceedingly difficult and error-prone task.

LaserDynamics, Inc. v. Quanta Computer, Inc., 694 F.3d 51, 67 (Fed. Cir. 2012).

This Court clarified the SSPPU approach in *VirnetX*, holding that "[w]here the *smallest salable unit is, in fact, a multi-component* product containing *several non-infringing features* with *no relation to the patented feature*, the patentee must do more to estimate what portion of the value of that product is attributable to the patented technology." 767 F.3d at 1327 (emphasis added). The royalty base claimed in *VirnetX* was the entire cost of an iPod Touch and iPhone, which plaintiff argued were the smallest salable units Apple sold that contained the infringing technology. *Id.* But this Court explained that because the iPod and iPhone were, in fact, multi-component products composed of "significant unpatented [hardware and software] features" not covered by the patent, using their entire cost as the royalty base was problematic. Rather, "VirnetX should have identified a patent-practicing feature with a sufficiently close relation to the claimed functionality." *Id.* at 1329.

More recently in *Finjan, Inc. v. Blue Coat Sys.*, this Court reiterated that a patentee must apportion beyond the alleged SSPPU (or "smallest, identifiable technical component") where the SSPPU was "*itself* a *multi-component* software engine" that "perform[ed] both infringing and non-infringing functions." 879 F.3d 1299, 1310 (Fed. Cir. 2018) (emphasis added). In *Finjan,* the plaintiff had accused a malware identification function, a component of the DRTR engine, which itself was part of the infringing product, WebPulse, a cloud-base software engine. *Finjan*, 879 F.3d at 1311. At trial, the plaintiff used as its royalty base the DRTR even though DRTR also performed valuable functions "unrelated to DRTR's malware identification function". *Id.* at 1310.

This Court rejected the *Finjan* plaintiff's argument that because DRTR was "the smallest, identifiable technical component tied to the footprint of the invention," apportionment to DRTR was adequate. *Id.* Rather, because "DRTR [was] itself a *multi-component software engine that include[d] non-infringing features*," further apportionment was needed. *Id.* at 1311 (emphasis added). Several cases since *Cornell* have similarly required further apportionment when the identified SSPPU is a multi-component product. *See, e.g., Lucent.*, 580 F.3d at 1337 (disapproved use of entire Outlook program as royalty base because "the patented feature [a date picker feature] was 'but a tiny feature of one part of a much larger software program"); *LaserDynamics*, 694 F.3d at 69 (disapproved use

of entire laptop computer as royalty base because the "patented method" was a "useful commodity-type feature that consumers expect will be present in all laptop computers").

Thus, according to this Court's precedent, the patentee must apportion by identifying the proper SSPPU. But if the SSPPU is still a multi-component product containing both infringing and non-infringing components, the patentee must further apportion down to a single, patent-practicing component of the SSPPU. That is, "[w]here the smallest salable unit is, in fact, a multi-component product containing several non-infringing features with no relation to the patented feature, the patentee must do more to estimate what portion of the value of that product is attributable to the patented technology." *VirnetX, Inc.*, 767 F.3d at 1327. What this Court has never held, however, is that when the SSPPU is a single, infringing component, the patentee must further apportion the royalty base (as opposed to the royalty rate) simply because the infringing component is capable of additional, non-patented functionalities. Yet that is exactly what the district court required in this case. Because such a standard is contrary to this Court's precedent, it must be reversed.

B. The district court departed from Federal Circuit precedent.

At Micron's behest, the district court erroneously imposed a further apportionment step among multiple functionalities performed by the same single

infringing component, the bare die. Appx25-31. None of this Court's prior decisions required as much and this Court should not do so now: when the royalty base has already been apportioned down to a single, infringing structural component, not a multi-component product containing both infringing and non-infringing parts, no further apportionment of the royalty base is appropriate.

Any additional apportionment between infringing and non-infringing functionalities of the single infringing structural component is more properly accomplished by selecting an appropriate royalty rate that reflects the value of the infringing functionality in relationship to any additional non-patented functionalities the infringing component may be capable of performing. That is particularly true here, where the infringing functionality (the ability to reliably store information in the multi-level memory cell) is the primary functionality of the single infringing component (the bare die), and any additional functionalities (such as error correction) are merely ancillary to that primary, infringing functionality. Appx2264 (testifying that other "Features" are "related to single feature of MLC technology"); Appx2265-2266 (testifying that the purpose of the '571 patent is programming and verification of a multi-level memory for stable operation).

Indeed, in *Exmark*, this Court rejected the defendant's request to apportion the royalty base of a single infringing component product based on functionality, a request analogous to the one the district court granted in this case. *Exmark Mfg.*

Co. v. Briggs & Stratton Power Prods. Grp., LLC, 879 F.3d 1332, 1348-49 (Fed. Cir. 2018). In *Exmark*, defendant Briggs argued that because the patent was directed to a lawn mower having improved control baffles, *Exmark's* expert should have "apportioned or separated the value of the baffle from the other features of the mower through the royalty *base* rather than the royalty rate." *Id.* at 1348. This Court disagreed, explaining that "[u]sing the accused lawn mower sales as the royalty base is particularly appropriate in this case because the asserted claim is, in fact, directed to the lawn mower as a whole." *Id.* Claim 1, for example, recites a "multiblade lawn mower" and thus "covers the infringing product as a whole, not a single component of a multi-component product. There is no unpatented or non-infringing feature of the product." *Id.* Thus, this Court explained, using the entire lawn mower apparatus as the royalty base was not only appropriate, but also "consistent with the realities of a hypothetical negotiation and accurately reflects the real-world bargaining that occurs, particularly in licensing." *Id.* at 1349.

The same is true here. The asserted apparatus claims recite a "multi-level memory device" (claim 1) or a "multi-level memory apparatus" (claim 9) or an "apparatus for programming a multi-level memory device" (claim 30). Appx142-166; Appx2183-1290. None of the additional features Micron pointed out below (*e.g.* error correction) are performed by a separate, non-infringing component of the accused products, but rather by the single, infringing component (the bare die)

identified by Milani.

Applying all that here, MLC demonstrated that the bare die of the accused semiconductor chip is a single-component product containing the infringing structures. Indeed, Micron "agree[d] that the SSPPU is a…bare die." Appx25. MLC then further established that the bare die is a single-component product. Appx897-899; Appx2489 (McAlexander testifying, "[NAND] Flash would be *a component* within the solid state drive, yes") (emphasis added); Appx3115 (Micron witness testifying, "A wafer is a single crystal silicon disc 13—that the NAND flash memory is built upon."). At that point, there was no need to apportion further. Yet, the district court required further apportionment beyond the single-component SSPPU based on Micron's unsubstantiated and unverified contention that the bare die contains "non-patented functionalities." Appx25-31.

This Court's precedent, including *Finjan*—the decision on which the district court expressly relied—requires additional apportionment beyond the SSPPU *only* when the alleged "SSPPU" *is* a multi-component product containing both infringing and non-infringing components. *VirnetX*, 767 F.3d at 1327; *Finjan*, 879 F.3d at 1299. For instance, while the royalty base used in both *VirnetX* and *Finjan* may have been the "smallest" unit the defendant sold that included the patented invention, there was no dispute that even those units (*i.e.*, the claimed SSPPUs) were still multi-component products (not single-component products) and thus

could have been further apportioned to isolate the patented component from other, non-patented components. That is simply not the case here.

In fact, the two decisions cited by the district court below in support of its decision required additional apportionment ***because*** the claimed SSPPU in those cases were multi-component products where the infringing component could be separated from the non-infringing components. *See* Appx25-31 (Orders citing *Dynetix Design Sols., Inc. v. Synopsys, Inc.*, No. C11-05973-PSG, 2013 WL 4538210, at *3 (N.D. Cal. Aug. 22, 2013); *Golden Bridge Tech. v. Apple*, No. 512-cv-04882-PSG, 2014 WL 2194501, *5 (N.D. Cal. May 18, 2014)).

In *Golden Bridge*, for example, the district court found that the iPhone and iPad, the alleged SSPPUs, were not only multi-component products, but that plaintiff had admitted that the "entire infringing functionality [a software protocol] lies in the baseband processor, not the accused product as a whole." *Golden Bridge*, 2014 WL 2194501, at *5. And in *Dynetix*, the district court stated that "the alleged smallest salable unit is not, in fact, any smaller or any different than the entire multi-component product, but rather *is* the multi-component VCS product." *Dynetix*, 2013 WL 4538210, at *3 (emphasis in original). In short, this Court's precedent holds that apportionment is required only where the accused product is the smallest salable unit that is ***still*** a multi-component product. There is no requirement to further apportion once the smallest salable unit has already been

apportioned down to a single, infringing component.

C. The district court's order would impose an unworkable apportionment standard.

Apportionment of the royalty base is not an absolute requirement that should be imposed in all situations—and especially not here, where apportioning beyond the single-component bare die is not feasible. This Court has acknowledged that further apportionment is not possible in some cases. In *Ericsson*, for instance, this Court explained that "an economist could [apportion] in various ways—by careful selection of the royalty base to reflect the value added by the patented feature, *where that differentiation is possible*." *Ericsson*, 773 F.3d at 1226. In *VirnetX*, this Court explained that the rule that the "patentee's obligation to apportion damages only to the patented features does not end with the identification of the smallest salable unit" applies *only* when "that unit still contains significant unpatented features" *and* the patentee "*could have* apportioned a smaller per unit figure." *VirnetX, Inc.*, 767 F.3d at 1329 (emphasis added).

Further, this Court has recognized that flexibility in identifying an appropriate methodology for apportionment is necessary not only "because different cases present different facts," but because of the inherent difficulty and imprecise nature of the analysis. *See CSIRO*, 809 F.3d at 1301-02; *see also VirnetX*, 767 F.3d at 1328 ("we are cognizant of the difficulty that patentees may face in assigning value to a feature that may not have ever been individually sold.

However, we note that we have never required absolute precision in this task; on the contrary, it is well-understood that this process may involve some degree of approximation and uncertainty."); *Unisplay, S.A. v. Am. Elec. Sign Co.*, 69 F.3d 512, 517 (Fed. Cir. 1995) (a reasonable royalty analysis "necessarily involves an element of approximation and uncertainty").

Here, MLC complied with this Court's precedents by apportioning the revenues associated with all multi-component products down to a single component for which no further separation or differentiation was possible. Appx894-899. The district court's requirement for further apportionment of the single-component bare die not only created a new standard, but one that is rigid and unworkable. Indeed, Micron's own damages expert used the "die" without further apportionment as the royalty base. *See, e.g.,* Appx1569-1572; Appx1646-1647 (explaining that "die" is the appropriate Micron "unit"); Appx1674; Appx1482-1483. Thus, the common understanding among the parties and experts in the field in this case is that apportioning to the single infringing component SSPPU (the bare die) is both the prevailing standard and an acceptable and reliable royalty base calculation methodology.[13]

[13] MLC moved to exclude Micron's damages expert, Paul Meyer's opinions and testimony under *Daubert*. *See* Appx47-141 (Docket No. 453-4, Appx1463-1493 (*Daubert* Motion)). The district court never issued a decision on any of MLC's motions regarding Meyer's damages methodology. Appx33-46.

D. The district court's finding that the single infringing component also contained unpatented features is of no legal consequence when applying the correct legal standard.

The district court credited Micron's argument that the single-component bare die itself contains non-patented functionalities and rejected MLC's argument that the bare die had no non-infringing uses. Appx25-31. But the fact that the single infringing component also has non-infringing uses is of no consequence, because any further apportionment based on functionality of the single infringing component is more properly accomplished via the royalty rate.

Applying the correct legal standard, further apportionment would have been required only if the alleged non-infringing features were part of other components, separable from the single infringing component. But Micron made no such showing. At best, Micron asserted that the single infringing component had additional, non-patented features. Appx691-697; Appx738-743. MLC countered by providing evidence that such alleged non-patented features are part of a single infringing component, the bare die, which as a result has no non-infringing uses. Appx30; Appx721; Appx894-899.

For example, because the patented feature is the reliable storage of information in the multi-level cell, the error correction "feature" Micron points to simply cannot be used without the patented feature. Indeed, error correction is a technique for ensuring the accuracy of the information stored in the cell, and

simply cannot be used in the accused products unless information has been stored in the cell using the patented feature.

There is no dispute that MLC apportioned all accused *multi*-component products down to the single-component bare die. Appx25-31; Appx894-899; Appx1122-1123; Appx1125-1127. Micron argued that "non-infringing features, such as micro-fabrication and lithography techniques, error correction, and copy-back technology" were also contained in the bare die. Appx27; Appx30-31; Appx693; Appx741. Micron pointed to an unverified interrogatory response that it served on the last day of discovery listing a number of allegedly "non-patented technologies" contained in the accused products. Appx27; Appx30-31; Appx1237-1245. Micron also referenced its technical expert's rebuttal report on non-infringement, which generally referred to the "Accused Products" (not specifically the single-component bare die) as having these other technologies. Appx693; Appx741. And, in Reply, Micron cited to an excerpt of Dr. Lee's deposition testimony suggesting that because Dr. Lee agreed those "features" were not taught by the '571 patent, they must not be patented. Appx741; Appx1332-1339. The district court concluded that because MLC did not "dispute Micron's evidence" that the bare die (the SSPPU) contained "non-infringing features, such as micro-fabrication and lithography techniques, error correction, and copy-back technology," further apportionment of the royalty base was required. Appx30

(citing Appx1332-1339). But because no such apportionment based on functionality of the single infringing component is or should be required, the district court's conclusion was in error and should be reversed.

Indeed, MLC proffered record evidence that the alleged non-infringing "features" were part of the single infringing component. Appx2180-2181; Appx894-899. For instance, Micron asked Dr. Lee questions about whether the '571 patent teaches "how to build an MLC chip" and about "how to fabricate, design, and manufacture multi-level memory." Appx1332-1339. Dr. Lee responded that the '571 patent does not teach lithography or micro-fabrication techniques because "it's not about the fabrication." *Id*. In other words, Dr. Lee's testimony was that "micro-fabrication" and "lithography" are *fabrication* techniques on how to make the bare die; but that hardly shows that they are "non-patented technologies" "contained" in the bare die. Micron's argument is tantamount to saying that the way the meat is cooked is a "non-patented feature" of a steak. But none of the asserted claims of the '571 patent are product-by-process claims, thus how the bare die was manufactured is simply not an element or "feature" of the infringing product.

Micron also asked Dr. Lee whether the '571 patent "teach[es] how to apply error correction software to ensure stability of multi-level memory cells" or "teach[es] copy-back technology." Appx1332-1339. Dr. Lee correctly responded

those methods are "not the goal of the patent." *Id.* Rather, Dr. Lee testified that while the '571 patent "doesn't teach fabrication steps…it teaches the very important things of the apparatus, how the chips are – are lay out and form, and the method of programming and verification programming." *Id.* The claims at issue are apparatus claims where infringement is met when the structural elements are present regardless of the manufacturing techniques used to make the bare die or whether it is capable of "other functions." *See Baldwin Graphic Sys., Inc. v. Siebert, Inc.*, 512 F.3d 1338, 1344 (Fed.Cir.2008) ("Courts must generally take care to avoid reading process limitations into an apparatus claim…because the process by which a product is made is irrelevant to the question of whether that product infringes a pure apparatus claim. . . .").

Micron's assertion that error correction and copy-back technologies are "contained" in the bare die is similarly of no consequence. As the district court acknowledged, MLC explained that the bare die "is not a multi-component product, like a cellphone or computer. Rather, it is a single component with ***no non-infringing uses***." Appx28; Appx721; Appx25-31. In fact, this was why Milani apportioned the royalty base between the Non-SSPPU group and the single-component SSPPU group—devices that have no other non-infringing uses or functions. Appx894-899; Appx1122-1123; Appx1125-1127. *Lucent, VirnetX*, and *Finjan* explained that further apportionment beyond a single-component SSPPU

was not required, in particular where these alleged attributes were ***related*** to the infringing structure of the bare die. *Lucent,* 580 F.3d at 1320 (other software features were separate and distinct from patented feature); *Finjan*, 879 F.3d at 1310 (non-infringing functions were "unrelated" to patented function); *VirtnetX*, 767 F.3d at 1329.

Finally, the district court ruled that although MLC asserts that the single-component bare die has "no non-infringing uses," MLC did not dispute Micron's contention that the bare die has "non-infringing features." Appx30. As explained above, the district court's attempt to distinguish between "uses" and "features" is of no consequence when the correct legal standard is applied. The district court order should be reversed.

IV. CONCLUSION

Milani's opinions here were based on sound methodology as well as relevant and timely disclosed facts and documents directly tied to the circumstances of this case, which damages experts typically rely on. Milani's damages opinions are rooted in approved methodologies, and thus, not the "'junk science' Rule 702 was meant to exclude." *Estate of Barabin,* 740 F.3d at 463. The interests of justice leave the critiques lodged by Micron and the district court "in the hands of the jury and rely[] on the safeguards of the adversary system—vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof—

to attack shaky but admissible evidence." *Wendell v. GlaxoSmithKline LLC*, 858 F.3d 1227, 1237 (9th Cir. 2017). The district court not only applied incorrect legal standards, but compounded its error by usurping the jury's role to "weigh contradictory evidence, to judge the credibility of the witnesses, and to resolve factual disputes" in place of its own. *Elbit*, 927 F.3d at 1301; *Finjan, Inc. v. Secure Computing Corp.*, 626 F.3d 1197, 1212 (Fed. Cir. 2010). The district court's Damages Orders should be reversed.

Dated: March, 25, 2020

Respectfully Submitted,

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Fabio E. Marino

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CORRECTED ADDENDUM

APPENDIX PAGES	DOCUMENT
Appx1-24	Order Granting-in-Part Denying-in-Part as Moot Micron's Damages Motion in Limine No. 1
Appx25-31	Order Granting Micron's Daubert Motion to Exclude Expert Testimony of Mr. Milani
Appx32-32	Order Granting Micron's Motion to Strike Portions of Milani Report
Appx33-46	Order Granting Certifying Damages Orders for Interlocutory Appeal
Appx142-166	United States Patent No. 5,764,571

ORDER GRANTING-IN-PART DENYING-IN-PART AS MOOT MICRON'S DAMAGES MOTION IN LIMINE NO. 1

DATED JULY 2, 2019

(DKT 639)

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

MLC INTELLECTUAL PROPERTY, LLC,

Plaintiff,

v.

MICRON TECHNOLOGY, INC.,

Defendant.

Case No. 14-cv-03657-SI

ORDER GRANTING IN PART AND DENYING IN PART AS MOOT MICRON'S DAMAGES MOTION IN LIMINE #1

Re: Dkt. No. 444

On June 6, 2019, the Court held a hearing on numerous pretrial motions. For the reasons set forth below, Micron's damages motion in limine #1 is GRANTED in part and DENIED in part as moot.[1]

INTRODUCTION

Pursuant to Federal Rules of Evidence 401, 402 and 403, Micron seeks to "preclude MLC from relying on any testimony, evidence, argument, or insinuation regarding irrelevant royalty rates for the '571 patent that exceeds the disclosure within the four corners of the license agreements themselves." Motion at 1 (Dkt. No. 444). Specifically, Micron moves to exclude evidence and

[1] Portions of the briefing on this motion, as well as entire exhibits, were filed under seal. In order to resolve the present motion, the Court must discuss the under seal material in detail, and the Court finds it appropriate that this order be filed entirely in the public docket. Further, after engaging in an in-depth review of these materials, the Court concludes that none of the under seal material – such as the licenses, discovery responses, and deposition testimony – is truly confidential. In any event, the parties have put these matters directly at issue in this litigation and the Court cannot rule on the current motion without discussing this material.

argument regarding: (1) the alleged royalty rate that Mr. Milani (MLC's damages expert) derives from the Hynix and Toshiba agreements, (2) the royalty rate Mr. Milani derives from the testimony of a BTG witness (Simon Fisher) in litigation between MLC and BTG, and (3) the royalty rates and slide presentations that Mr. Epstein[2] offered during the failed licensing negotiations with Micron in 2013-2014. *Id.* Micron also seeks to preclude MLC from eliciting testimony from Mr. Liesegang (Micron's rebuttal licensing expert) regarding royalty rates tied to IBM's licensing policy in the 1980s and 1990s.

In a separate order, the Court has granted Micron's *Daubert* motion to exclude Epstein's expert testimony, concluding *inter alia* that testimony regarding Epstein's licensing negotiations with Micron is irrelevant. Accordingly, for the reasons set forth in that order, the Court GRANTS this motion to the extent it is directed at Epstein's testimony. Further, because Liesegang is Micron's rebuttal witness to Epstein, the Court DENIES AS MOOT the portion of the motion regarding Liesegang's testimony about IBM's royalty rates, as Micron has represented that Liesegang will not testify if Epstein is excluded.

Thus, what remains of the present motion focuses on the question of whether there is a factual basis for Milani to testify that the BTG/Hynix and BTG/Toshiba lump sum licenses contain or "reflect" specific royalty rates, as well as whether Milani may rely on Fisher's deposition testimony for alleged royalty rates.[3] As set forth below, the Court concludes that the Hynix and Toshiba licenses do not contain specific royalty rates nor do they state how the lump sums were calculated, and therefore Milani may not mischaracterize those agreements by testifying that they do, in fact, "reflect" specific royalty rates. The Court also concludes that Milani's opinion that the

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[2] In 2012-2014, Epstein was MLC's outside licensing counsel/agent and pursuant to a contingent fee agreement he represented MLC in the unsuccessful licensing negotiations with Micron. In January 2019, MLC retained Epstein as a "licensing expert" in this case. *See generally* Order Granting Micron's *Daubert* Motion to Exclude Expert Testimony of Ronald Epstein. Dkt. No. 636.

[3] Micron has also filed a *Daubert* motion to exclude Milani's expert testimony, as well as a motion to strike his testimony based on MLC's alleged failures to disclose its damages case during fact discovery in violation of Federal Rules of Civil Procedure 26 and 37. The Court will issue separate orders on those motions. However, to the extent those motions raise overlapping challenges to Milani's opinion regarding the 0.25% royalty rate, the Court also addresses those questions in this order.

Hynix and Toshiba agreements reflect a 0.25% royalty rate is not grounded in any facts or a reliable methodology because even if admissible, the extrinsic evidence upon which Milani relies suggests that BTG may have calculated the lump sum payments by applying 0.25% to Gartner forecasts of future revenue for Hynix and Toshiba from 2006-2011. However, both license agreements covered a significantly longer time period through the expiration of the last patent in December 2017 (and the '571 patent's expiration in June 2015), and thus to the extent 0.25% was used to calculate lump sum payments, that number was not applied to forecasted sales over the entire terms of the license agreements and therefore cannot reflect a royalty rate for those licenses. Thus, Milani's opinion that the Hynix and Toshiba agreements "reflect" a 0.25% royalty rate is supported neither by the actual license agreements nor by the extrinsic evidence. Finally, as a separate basis of exclusion, the Court finds that Milani may not rely on the Fisher deposition testimony and the other extrinsic evidence that he relies upon for his opinion that the licenses reflect royalty rates because MLC failed to disclose that evidence as a basis for a royalty rate calculation in discovery.

BACKGROUND

I. The Hynix and Toshiba Licenses

On April 11, 2007, BTG (which then owned the rights to the MLC patent portfolio) entered into licenses with Hynix and Toshiba. Both licenses were to MLC's entire portfolio of 30 U.S. patents (including the '571 patent), and 11 foreign patents.[4]

The Hynix license agreement defines "Licensed Products" as "any and all Hynix products, including MLC Memory Devices, the making, using, selling or offering for sale, exporting, importing or otherwise disposing of which would otherwise infringe one or more claims of the Licensed Patents." Hynix License § 1.5 (Dkt. No. 444-2). The license granted Hynix and its subsidiaries a "non-exclusive, worldwide, indivisible non-transferable and personal license" to 41

[4] Hynix is a South Korean company and Toshiba is a Japanese company. Dkt. Nos. 442-5, 444-7. Exhibit A to both agreements lists the following foreign patents: 1 German patent; 2 "Europe" patents; 1 United Kingdom patent; 1 Italian patent; 2 Japanese patents; 2 South Korean patents; and 1 Dutch patent. *Id.*

patents "through the expiration date of the last of the Licensed Patents to expire." *Id.* §§ 3.1, 6.1.[5] Under "Compensation," the agreement states that "In consideration of the release and License, Hynix shall pay to BTG $21,000,000 (twenty-one million dollars) as follows: (a) $11,000,000 (eleven million dollars) no later than 30 April 2007 (b) $5,000,000 (five million dollars) no later than 31 March 2008 [and] (c) $5,000,000 (five million dollars) no later than 31 December 2009." *Id.* § 4.1.

Section 4.3 of the agreement, titled "Future Licenses," is the basis of Milani's opinion that the agreement contains a 0.25% royalty rate. That section provides:

> Future Licenses. BTG hereby agrees that Hynix will be granted most-favoured customer status. In the event that BTG grants a license under the Licensed Patents after the Effective Date, other than a license granted in settlement of litigation, in which the royalty rate is less than 0.25%, then as its sole remedy, Hynix's future payments, if any, shall be reduced so that Hynix, in total pays not more than 90% of the royalty rate paid by the new licensee. In no event shall Hynix receive any refund of any amount paid, or which became due, prior to the execution of the new license agreement. In the case of a paid up license, the royalty rate shall be calculated using formula X/Y x 100 where X is the gross undiscounted value of sales of MLC Memory Devices made and forecast to be made by the new licensee through 31 December 2011 (future sales shall be BTG's reasonable and good faith estimate based upon a reputable industry analyst data). BTG shall notify Hynix within thirty (30) days after BTG enters into an agreement granting a license under the Licensed Patents to a new licensee. Within six (6) months of BTG notifying Hynix it has entered into a new license under the Licensed Patents, Hynix may have an independent internationally recognized accounting firm conduct an audit of BTG's records, without disclosing such records to Hynix, and subject to such accounting firm entering into a reasonable non-disclosure agreement, to confirm Hynix is paying, in total as specified in Section 4.1, not more than 90% of the rate paid by the new licensee taking into account the factors described above.

Id. § 4.3.

The Hynix agreement also contains Section 7.7 titled "Entire Understanding." That provision reads:

> This Agreement embodies the entire understanding between the parties relating to the subject matter hereof, whether written or oral, and there are no prior representations, warranties or agreements between the parties that are not contained in this Agreement.

Id. § 7.7.

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[5] The licensed patents expired at different times, with the '571 patent expiring in June 2015 and the last patent expiring in December 2017. Milani Tr. at 151:1-19 (Dkt. No. 442-11). Milani opines that the '571 patent comprised "at least 50%" of the value of the licenses to Hynix and Toshiba. Milani Report at 67 (Dkt. No. 442-3).

The Toshiba license agreement is similar to the Hynix agreement in several respects. The "Licensed Products" are defined as "all Toshiba or its Subsidiaries' products, including MLC Memory Devices," and the term of the license was through the expiration of the last of the licensed patents. Toshiba License §§ 3.1, 6.1. The license also provided Toshiba with the option of extending the license to a Toshiba-SanDisk joint venture. *Id.* §§ 3.2, 3.6. The compensation provided under the license is as follows:

> 4.1. Compensation. In consideration of the release and license granted by BTG in this Agreement, Toshiba shall pay to BTG the following sums:
>
> (a) $6,000,000 (six million dollars) no later than 30 days after the Effective Date;
>
> (b) $11,000,000 (eleven million dollars) on or before March 31, 2008;
>
> (c) if Toshiba has exercised the Option in accordance with Section 3.6, a further $10,000,000 (ten million dollars) on or before March 31, 2009;
>
> (d) $6,000,000 (six million dollars) on or before March 31, 2009;
>
> (e) if Toshiba has exercised the Option in accordance with Section 3.6, a further $10,000,000 (ten million dollars) on or before March 31, 2009; and
>
> (f) if BTG has, on or before December 31, 2008, either: (i) entered into a license under the Licensed Patents with two of the companies whose annual worldwide revenue of NAND Flash Memory Devices in 2007 as reported by Gartner Dataquest (or if such information is not available from Gartner, then as reported by another reputable market research firm agreed by the parties such as iSupply or Forrester) is ranked as top three other than Toshiba; or (ii) initiated any litigation against any one of such company in any jurisdiction for infringement of one or more claims of any of the Licensed Patents, a further $2,000,000 (two million dollars) no later than April 30, 2009, provided that BTG shall notify Toshiba in writing indicating the above with relevant evidences . . . .

Id. § 4.1. The Toshiba license does not contain a "most favored customer" provision. The Toshiba license contains Section 7.7 "Entire Understanding" that is identical to the "Entire Understanding" provision in the Hynix license. Milani states that Toshiba paid a total of $25 million under the license ($23 million followed by a $2 million payment). Milani Report at 48.

II. Milani's Royalty Rate Opinion re: the Hynix and Toshiba Licenses

In his report, Milani states that he considers the Hynix and Toshiba licenses to be the most relevant licenses for determining a reasonable royalty in a hypothetical negotiation. Milani Report

at 47-48, 50. Regarding the Hynix license, Milani states that it "contains a most favored customer provision which provides a quantitative metric allowing for the application of the terms of the Hynix Agreement to the Hypothetical License, while also adjusting for Micron's extent of use. To that point, I consider the 0.25% royalty rate called for in the most favored customer provision to reflect a relevant consideration for evaluating a reasonable royalty and understand that rate was applied to Hynix's worldwide sales." *Id.* at 47 (citing BTG_06398-06402).[6] With regard to the Toshiba license, Milani states, "given the most favored customer provision in the Hynix Agreement, and the fact that both agreements were executed on the same day, it's reasonable to presume BTG considered the royalty rate in the Toshiba Agreement to reflect a running royalty that is at least equal to the rate reflected by the Hynix Agreement." *Id.* at 48 (citing BTG_06398-06402).

Milani uses the 0.25% royalty rate derived from the Hynix license as the starting point for his calculation of the appropriate royalty rate in this case. Milani states,

> Relative to the Hynix Agreement, the scope of the hypothetical license would be narrower, because the Hynix Agreement had a worldwide scope. Mr. Simon Fisher, the BTG employee responsible for licensing the '571 Patent, provided deposition testimony regarding the relationship between the worldwide scope of the license grant and the 0.25% royalty rate reflected within the Hynix agreement. [citing Fisher's deposition testimony at 237-238, produced in this case as BTG_02097-BTG_02142][7] On that point, Mr. Fisher testified that BTG's historical licenses were based on worldwide shipments, but the MLCIP Patent Portfolio was predominantly made up of U.S. rights. Recognizing this, Mr. Fisher explained that rather than adjusting the royalty base to reflect only U.S. sales, BTG discounted the royalty rate in the Agreements to account for the larger royalty base. Mr. Fisher further explained that, in connection with negotiating the Agreements, BTG considered the proper rate

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[6] The document cited by Milani is a September 6, 2007 letter from Christine Soden of BTG to Jay Shim of Samsung. Dkt. No. 442-44. The letter states that it is "Subject to FRE 408" and that it is confidential subject to a non-disclosure agreement between Samsung and BTG. In the letter, which appears to be a licensing proposal, Soden states that "[o]ur calculation still supports a fully paid up figure for Samsung of $69 million which was based on a 0.25% rate applied to sales forecasts," and she states that enclosed with the letter are "the sales forecast data that we used in March 2007 to calculate fully paid up licenses at an effective royalty rate of 0.25%." *Id.* at BTG_06398. The enclosed market share forecast data includes data for Hynix and Toshiba showing forecasted (or actual) sales from 2006 – 2011, and a 0.25% royalty rate applied to those forecasts to derive lump sum payments. *Id.* at BTG_06400-BTG_06401.

As Micron notes, this letter is not a contemporaneous communication between BTG and Hynix showing how those parties negotiated the BTG/Hynix license, but rather an after-the-fact licensing proposal made by BTG to Samsung. In connection with other motion briefing, Micron has submitted contemporaneous communications (dated March 2007) between BTG and Hynix showing that the parties negotiated over lump sum payments. *See* Dkt. Nos. 481-8, 481-9.

[7] Fisher's deposition testimony is discussed *infra.*

> to apply to U.S. sales would be 0.75%, but since BTG presumed that amount reflected only a third of a licensee's total shipments, the rate in the agreement was discounted to 0.25%. Therefore, I consider the Hynix Agreement suggests a royalty rate of 0.75% is the proper rate to consider in connection with determining a reasonable royalty in a hypothetical negotiation.

Milani Report at 54 (internal footnotes omitted).

Milani further explains his royalty rate calculation:

> In summary, as discussed throughout the *Georgia-Pacific* factors (and the remainder of this report), I consider the 0.25% rate discussed in the Hynix Agreement to be a relevant metric for evaluating a reasonable royalty in a hypothetical negotiation. I also consider that the 0.25% royalty rate should be adjusted to 0.75%, to reflect the fact that it was applied to a base of worldwide sales. Further, I consider that at least 50% (and potentially much more) of the 0.75% royalty rate is attributable to the technology of the '571 Patent. Based on that apportionment, I consider the resultant 0.375% royalty rate to reflect the minimum rate that does not account for differences between real-world and hypothetical licenses, such as the assumption of validity and infringement, as discussed in Mr. Epstein's expert report.
>
> Finally, I recognize that the historical licensing practices of both BTG and Micron have been based on lump-sum payments. I also recognize the lump-sum payments included in the BTG license agreements reflect the application of the 0.25% royalty rate reflected in the agreements to a royalty base comprised of estimated worldwide sales. [citing BTG_06398-06402]. Therefore, applying the 0.375% royalty rate to the royalty bases discussed above in Section 10 results in the following lump sum payments, but recognizes that the appropriate lump sum payment in this case may be much higher after the rate has been properly adjusted, as discussed above.

Milani Report at 67.[8] The lump sum damages payments that Milani arrives at are between $63,142,053 and $70,207,876. *Id.*

III. Fisher's Deposition Testimony

Excerpts from the Fisher deposition testimony are at Dkt. No. 442-15. Fisher was a BTG employee who was involved in negotiating the Hynix and Toshiba licenses and the other efforts to

[8] In his report, Milani also states that the 0.25% royalty rate that he derives from the Hynix agreement is consistent with BTG's licensing history, citing documents related to BTG's negotiations with Samsung, ST Micro, Micron, and Acacia. Milani Report at 63-64. All of these negotiations were unsuccessful, and BTG ultimately sued Samsung in the ITC and then entered into a settlement after, *inter alia*, the ITC staff preliminarily concluded that the '571 patent was invalid. BTG did not enter into licenses with ST Micro, Acacia, or Micron. The specific documents cited by Milani as additional support for the 0.25% royalty rate are: BTG_05660-670; MLC00056549-551; MLC00060545; MLC00054615-616; MICRONM034216-218; MLC00002575-576; ACACIA00000228-229; and MLC00056617-628. Milani Report at 63-64. Based on Milani's description of these documents, they appear to be BTG internal memos discussing licensing negotiations, BTG's licensing offers, and an unsigned draft agreement between BTG and Acacia.

license the BTG/MLC patent portfolio. Fisher was deposed in connection with a breach of contract lawsuit brought by MLC against BTG. In the deposition excerpts provided to the Court,[9] Fisher was asked about BTG's negotiations with Toshiba. Fisher Tr. at 236:1-239:25. Fisher testified, "And if we can get a deal done quickly with Toshiba as the initial licensee, we would do it at this [unspecified] number and then presented that number." *Id*. at 236:3-6. The questioning continued:

> Q: Was that number supposed to be an up-front number that was going to be paid –
>
> A: Yeah, it was a fully paid-up lump sum number.
>
> Q: All right. And would that fully paid-up lump sum number be considered a royalty rate?
>
> A: Well, it's – it was a payment in lieu of past shipments and a paid-up amount in lieu of future royalties. So I don't know how – I don't know how the finance people would view it, whether they'd view it as a compensation payment or as a royalty payment.
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> Q: What calculations did you, BTG, use to get to $60 million?
>
> A: We did a number of calculations. There were sort of different approaches for what we, you know – I think I termed out early bird licensing model that – the value that we had put forward, and we calculated on a variety of royalty rates initially taking the Gartner Dataquest numbers, taking the U.S. – as I recall, the U.S. proportion of those, taking a potential royalty award that might come from a court at some future date, MPV'ing that with a fairly harsh discount because of the risk of litigation.
>
> Another model was to take the Gartner Dataquest numbers worldwide and use a .25 percent royalty rate.
>
> And there was another model which had a staggered or tiered set of royalties.
>
> So actually, you know, there was a whole range of numbers that [sic] could come up with. And I think in the Toshiba case it was as low as $16 million, and I don't remember what the upper bound was, but through the process of discussion, I think we all settled on the opening number of 60 something million dollars being the appropriate one.
>
> Q: Why did you, BTG, use the .25 percent royalty rate when you were talking about using the Dataquest material?
>
> A: Well, based on the – based on the worldwide shipments, leveraging worldwide licenses off of a predominantly U.S. patent position, that was a reasonably – well, seemed to be deemed appropriate by everyone at the time number to use for a first

[9] The parties have not provided the Court with the entire deposition, nor have the parties provided any evidence regarding the details of the *MLC v. BTG* litigation or the circumstances surrounding that case, except to state that it was a breach of contract case and that it ultimately settled.

> licensee scheme. Given that a third of the worldwide shipments, as a rule of thumb, end up in the U.S., it's equivalent to a .75 percent based on the U.S. shipments which represents a sort of discount off of a sort of one percent U.S. royalty rate which one might reasonably anticipate as a reasonable outcome from a U.S. court case.

Id. at 236:7-238:4.

IV. Discovery

The parties dispute the adequacy of MLC's initial (and amended) disclosures regarding damages, as well as MLC's responses to specific interrogatories seeking information related to MLC's damages. The extensive briefing on that matter is found at Dkt. Nos. 452, 499, 544, and 594-595. The Court recounts the discovery only as it specifically relates to MLC's damages based upon a reasonable royalty rate.

A. Interrogatory No. 6

Micron's Interrogatory No. 6 asked MLC to "Describe in detail the factual and legal basis and supporting evidence for the relief Plaintiff seeks . . . including but not limited to Your contention that You are entitled to damages (e.g. a reasonable royalty) . . . ." Dkt. No. 278-13. MLC's original response stated,

> **RESPONSE TO INTERROGATORY NO. 6:**
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> MLC incorporates the above-stated General Objections as if fully set forth herein. MLC also objects to this interrogatory as being premature and properly the subject of expert discovery and reports. MLC further objects to this interrogatory to the extent it seeks information that is protected from disclosure by the attorney-client privilege and attorney-work product doctrine.
>
> Subject to and without waiving the foregoing General and Specific Objections, MLC responds as follows: MLC is the holder of all rights and interest in the '571 Patent. As demonstrated in MLC's Preliminary Infringement Contentions, Micron's NAND flash memory devices infringe multiple claims of the '571 Patent. Under 35 U.S.C. § 284, MLC is entitled to damages "adequate to compensate for the infringement, but in no event less than a reasonable royalty." MLC does not presently know the volume or duration of sales of Micron's infringing devices, and the measure of damages adequate to compensate for the infringement will be determined no later than trial.

MLC's supplemental response stated:

SUPPLEMENTAL RESPONSE TO INTERROGATORY NO. 6:

MLC incorporates its prior response to this Interrogatory as if fully set forth herein.

Subject to and without waiving the foregoing general and specific objections set forth in its prior response, incorporated herein by reference, MLC provides the following supplemental response to this Interrogatory:

MLC objects to this request on the grounds that Micron has not complied with the Court's Order compelling discovery of financial information for Micron's accused multi-level cell and triple-level cell NAND Flash (Dkt. 193), which is now the subject of a motion for sanctions (Dkt. 214-4). For this reason, MLC still does not presently know the volume or duration of sales of Micron's infringing devices. Interrogatory No. 6 is objectionable on the grounds that it is compound and an improper attempt to enlarge the numerical limits under Federal Rule of Civil Procedure Rule 33(a)(1).

Notwithstanding, MLC responds that it is the holder of all rights and interest in the '571 Patent. As demonstrated in MLC's Infringement Contentions, Micron's multi-level cell and triple-level cell NAND flash devices infringe multiple claims of the '571 Patent. MLC's Infringement Contentions also provides a non-exhaustive list of devices accused of infringement.

Under 35 U.S.C. § 271, Micron "without authority makes, uses, offers to sell, or sells multi-level cell (including triple-level cell) NAND flash devices, within the United States, or imports into the United States, multi-level call NAND flash devices during the term of the patent therefor" that infringes multiple claims of the '571 Patent. Due to Micron's infringement, under 35 U.S.C. § 284, MLC is entitled to damages "adequate to compensate for the infringement, but in no event less than a reasonable royalty." And MLC is entitled to no less than a reasonable royalty measured and calculated in a manner consistent with federal case law.

MLC further responds that the calculation of damages will also be informed by, at least, the following documents identified pursuant to Rule 33(d): EPICENTER029194, EPICENTER029212, EPICENTER029216, EPICENTER029243, EPICENTER029247, EPICENTER029260, EPICENTER029334, EPICENTER029345, EPICENTER029347, MUIR000020, MUIR000027, MUIR000031, MUIR000033,MUIR000072, MUIR000085, MUIR000109, MUIR000149, MUIR000163, MUIR000174, MUIR000194, MUIR000208, MUIR000219, MUIR000256, MUIR000848, MUIR000862, MUIR000873, MUIR000893, MUIR000907, MUIR000918, MUIR001052, MUIR001056, MUIR001095, MUIR001101, MUIR001115, MUIR001126, MUIR001144, MUIR001155, MUIR001213, MUIR001233, MUIR001284, ACACIA00000005, ACACIA00000026, ACACIA00000037, ACACIA00000051, ACACIA00000057, BTG_02342, BTG_02345, BTG_02351, BTG_02793, BTG_02863, BTG_02866, BTG_02977, BTG_03037, BTG_05418, BTG_05438, BTG_05501, BTG_05569, BTG_05617, BTG_05618, BTG_05619, BTG_05654, BTG_05655, BTG_05657, BTG_05674, BTG_05686, BTG_05706, BTG_05813, BTG_05834, BTG_05835, BTG_05842, BTG_06058, BTG_06296, BTG_06433, BTG_06440, BTG_07877, BTG_07921, BTG_07995, BTG_07996, BTG_08102, MLC00002536, MLC00002575, MLC00002581, MLC00002583, MLC00007108, MLC00007112, MLC00033662, MLC00033675, MLC00052637, MLC00052641, MLC00052661, MLC00052674, MLC00053395, MLC00053396.

In addition to the foregoing documents, the proper calculation of damages will also depend on information from Micron's SEC 10-K statements, industry reports (such as MICRONM046812 and MICRON047492), as well as financial information solely within the possession, custody and control of Micron. On September 25, 2018, Micron produced financial data (MICRONM047490) for certain accused products and improperly excluded financial data for other products on the grounds that the excluded information is not relevant. MLC has since moved for sanctions regarding Micron's immediate supplementation. See Dkt. 215. Absent the requested information, MLC is without sufficient information regarding, at a minimum, the volume of sales of Micron's multi-level cell and triple-level cell NAND flash products during the relevant time period. And consequently, MLC is unable to respond to this contention interrogatory in full.

Micron's deficient document production notwithstanding, MLC further objects to this interrogatory on the grounds that it not only calls for a legal conclusions but also on the grounds that it is premature as it seeks information that requires expert discovery and analysis. Pursuant to Federal Rule of Civil Procedure 33(a)(2), such discovery "need not be answered until designated discovery is complete," that is, until expert discovery which does not commence until January 25, 2019. *See* Dkt. 184.

MLC reserves the right to further supplement the response to this Interrogatory in the course of fact and expert discovery.

MLC's second supplemental response, dated November 30, 2018, stated:

SECOND SUPPLEMENTAL RESPONSE TO INTERROGATORY NO. 6:

MLC incorporates its prior response to this Interrogatory as if fully set forth herein. Subject to and without waiving the foregoing general and specific objections set forth in its prior response, incorporated herein by reference, MLC provides the following supplemental response to this Interrogatory:

As permitted under 35 U.S.C. § 284, MLC is entitled to damages "adequate to compensate for the infringement, but in no event less than a reasonable royalty." MLC seeks a reasonable royalty with respect to infringement of the '571 Patent. The amount of a reasonable royalty will be based on expert analysis and testimony, and applicable law, including but not limited to the factors identified in *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116 (S.D.N.Y. 1970), and in the many district court and Federal Circuit cases that have adopted and opined on that methodology. The royalty rate will be based on at least the *Georgia-Pacific* factors, and will include but not limited to consideration of relevant license agreements for the patented technology, including those identified in MLC's prior response, as well as any prior negotiations between the parties regarding the patented technology. The royalty base will at least be based on financial sales information solely within the possession, custody and control of Micron including revenues from all infringing sales during the damages period—information Micron has yet to produce in response to the Court's November 26, 2018 Order (Dkt. 240).

The calculation of damages will also be informed by industry analysis and reports (such as MICRONM046812 and MICRON047492), as well as statements made by Micron in, for example, its SEC 10-K statements. For example, in its SEC 10-K Annual Statements, for Fiscal Years 2012 through 2015, Micron reported approximately $1.26 billion (FY12), $1.51 billion (FY13), $2.55 billion (FY14), and $2.56 (FY15) in Net Sales to the U.S. ("based on customer ship-to location"). Micron also reported that 44%, 40%, 27% and 33%, respectively, of Net Sales were from

> NAND Flash Sales. Upon information and belief, MLC contends that it is entitled to a reasonable royalty to compensate it for said infringing sales.
>
> Further, "'[t]he law requires patentees to apportion the royalty down to a reasonable estimate of the value of its claimed technology,' unless it can 'establish that its patented technology drove demand for the entire product.'" *Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.*, 904 F.3d 965, 978 (Fed. Cir. 2008) (citing *VirnetX, Inc. v. Cisco Sys., Inc.*, 767 F.3d 1308, 1329 (Fed. Cir. 2014). "The entire market value rule allows a patentee to assess damages based on the entire market value of the accused product only where the patented feature creates the 'basis for customer demand' or 'substantially create[s] the value of the component parts.'" *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1318 (Fed. Cir. 2011); *see also, TWM Mfg. Co. v. Dura Corp.*, 789 F.2d 895, 901 (Fed. Cir.1986) ("The entire market value rule allows for the recovery of damages based on the value of an entire apparatus containing several features, when the feature patented constitutes the basis for customer demand."). Moreover, "[i]n some circumstances, for example, where the other features are simply generic and/or conventional and hence of little distinguishing character . . . it may be appropriate to use the entire value of the product because the patented feature accounts for almost all of the value of the product as a whole." *Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.*, 904 F.3d at 978 (citing *AstraZeneca AB v. Apotex Corp.*, 782 F.3d 1324, 1338-40 (Fed. Cir. 2015). The patented technology incorporated into the accused multilevel cell and triple-level cell NAND Flash products made and/or sold by Micron substantially creates the value of the accused products and constitutes the basis for customer demand.
>
> Because this Interrogatory requests information requiring legal conclusions and expert analysis and testimony, which has yet to commence, and given that fact discovery has yet to conclude, MLC reserves the right to supplement and/or amend its responses to this Interrogatory in light of additional factual developments and expert discovery.

MLC's Second Supplemental Responses to Interrogatory No. 6 at 1-6 (Dkt. No. 278-13).

MLC's collective responses to Interrogatory No. 6 did not identify the Hynix license (MLC00007148-MLC00007158) or the Toshiba license (MLC00007159-MLC00007172) and did not disclose a reasonable royalty theory aside from generally stating "[t]he royalty rate will be based on at least the *Georgia-Pacific* factors, and will include but not limited to consideration of relevant license agreements for the patented technology, including those identified in MLC's prior response, as well as any prior negotiations between the parties regarding the patented technology." In addition, MLC's responses to Interrogatory No. 6 did not identify any of the extrinsic evidence cited in the Milani report in support of his opinion that 0.25% is the royalty rate "reflected" in the Hynix and Toshiba licenses.[10]

[10] That extrinsic evidence is: (1) Christine Soden's September 2007 letter to Jay Shim of Samsung (BTG_06398-BTG_06402); (2) Simon Fisher's deposition testimony (BTG_02097-BTG_02142); (3) a November 2007 internal BTG "Briefing Paper" summarizing BTG's

B. Interrogatory No. 22

Micron's Interrogatory No. 22 asked MLC to "[i]dentify all facts, evidence, and testimony regarding any applicable royalty rates that You intend to rely upon at trial and describe in complete detail why those royalty rates are applicable." Dkt. No. 465-2 at 11. MLC's December 12, 2018 response asserted various objections such as "the word product doctrine, joint-defense privilege, common-interest privilege, and any other applicable privilege or immunity"; objected to the interrogatory as premature "on the grounds that it seeks information that is properly the subject of expert discovery and testimony"; and then stated that MLC was entitled to a reasonable royalty:

> based on at least the *Georgia-Pacific* factors, and will include but not limited to consideration of license agreements for the patented technology, including but not limited to EPICENTER029247-29259; EPICENTER029326-EPICENTER029333; EPICENTER029334-EPICENTER029344; EPICENTER029345-EPICENTER029346; BTG00037609-BTG00037610; MLC00007148-MLC00007158; BTG_09023-BTG_09036, as well as any prior negotiations between the parties regarding the patented technology.

Dkt. No. 465-2 at 12.

MLC did identify the Hynix license (MLC00007148-MLC00007158), but did not identify the Toshiba license (MLC00007159-MLC00007172). MLC's response to Interrogatory No. 22 did not disclose a specific royalty rate, and did not disclose that it believed the Hynix or Toshiba licenses supported a 0.25% (or 0.75%) royalty rate. In addition, MLC's interrogatory response did not identify any of the extrinsic evidence upon which Milani would rely to support his opinion that the Hynix and Toshiba licenses "reflect" a 0.25% royalty rate. *See* footnote 10 *supra*.[11]

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negotiations with Samsung (BTG_05660-670); (4) correspondence between BTG and Samsung regarding negotiations (MLC00056549-551, MLC00060545); (5) BTG's licensing offer to ST Micro (MLC00054615-616); and (5) documents related to BTG's licensing negotiations with Acacia (ACACIA00000228-229 and MLC00056617-628). *See* Milani Report at 63-64, notes 377-386.

[11] In addition, Micron's Interrogatory No. 18 requested information regarding, *inter alia*, "the factual and legal basis and supporting evidence for your contention that MLC is entitled to damages for Micron's alleged infringement of the Asserted Patent occurring before the filing of the Present Litigation." Dkt. No. 442-45 MLC's response to Interrogatory No. 18 did not identify the Hynix or Toshiba licenses, and did not contain any response regarding a royalty rate. *Id.*

Micron's Interrogatory No. 21 requested MLC to identify "all agreements that You contend constitute a comparable licensing agreement that You intend to rely upon at trial and describe in complete detail the facts, evidence and testimony surrounding the formation of those license agreements and why those license agreements are comparable." In response to Interrogatory No. 21, MLC identified the Hynix license in a list of documents, and did not provide any description of why the Hynix license was comparable, nor did MLC ever state that it intended to rely on the Hynix

C. Mr. Hinckley's deposition

On December 11, 2018, Micron took the Rule 30(b)(6) deposition of Robert Hinckley. Dkt. No. 442-41 (Hinckley Tr.). Mr. Hinckley is the Chairman of MLC as well as its counsel. Hinckley Tr. at 16:22-17:11. MLC consists of Hinckley and Jerry Banks, the inventor of the '571 patent (and the other patents in the MLC portfolio). *Id.* Hinckley was produced as the Rule 30(b)(6) witness regarding, *inter alia*, the following topics:

> 82. All information, facts, and documents relating to MLC's claim of damages for the Asserted Patent, including any reasonable royalty, the royalty base and rate, and any alleged lost profits damages.
>
> 53. All agreements entered into by MLC or any prior owner of the Asserted Patent related to the Asserted Patent, Related Patents, or related technology field, including offers to license, settlement agreements, assignments, covenants, and technology agreements, and any related negotiations, communications, and drafts.
>
> 58. Financial information relating to MLC's and BTG's licensing of the Asserted Patent, including, without limitation, products licensed, sales volume, dates of sales, revenue, and if known, gross margin, net profit, or loss.
>
> 64. All facts and circumstances regarding any and all licenses granted for the Asserted Patent, including but not limited to the name and location of any licensee, the terms of each license, the circumstances under which each license was granted, communications with each of the past or present licensees including negotiations, the amount of royalties or other type of compensation paid to MLC, all products licensed to practice any of the Asserted Patent, the sales volume, dates of sales, revenue, as well as gross margin, net profit, or loss related thereto if known or calculated, and Documents related to the foregoing.

Micron's First Notice of Deposition to MLC (Dkt. No. 360-14).[12]

Hinckley was asked about the Hynix agreement at his deposition:

> Q: Is there a royalty amount associated with this agreement?
>
> A: I believe there is.
>
> Q: What is that amount?

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license as evidence of a .025% royalty rate. *See* Dkt. No. 465-2. MLC did not list the Toshiba license in its response to Interrogatory No. 21.

[12] Micron's motion to strike the Milani Report quotes these deposition topics, with a citation to Micron's First Notice of Deposition. *See* Micron's Motion to Strike at 12, citing Dkt. No. 360-14 (Dkt. No. 452). However, Dkt. No. 360-14 is only an excerpt of the deposition notice and does not contain topics # 53 and # 58.

A: Well, I can read you what it says, because my knowledge is based on what's in the agreement, not my recollection. It says, "4.1 Compensation. In consideration of the release and License, Hynix shall pay to BTG $21 million as follows: $11 million no later than 30 April 2007; $5 million no later than 31 March 2008;" and "$5 million no later than 31 December 2009."

Q: Now, there's not a royalty rate that's listed in this particular license agreement, correct?

A: Correct.

Q: Does MLC have an understanding as to what the royalty rate for this particular agreement is?

A: No, MLC has no understanding.

. . .

Q: I'm just asking you personally, as someone who has knowledge within the – the licensing industry, is one way to calculate a royalty rate for an agreement to take the sales revenue that's covered by the agreement and divide that into the total amount that was paid for that particular agreement?

A: I'm sorry. I don't – I don't understand the question, because when parties get into licensing discussions, they usually talk numbers. It varies all over the map how they get to those numbers. And in this particular case, I have no idea how these numbers came about.

Q: So MLC has no knowledge with respect to a royalty rate that could be inferred from this particular agreement?

A: That's correct. MLC has no knowledge about where these numbers came from.

Q: Has MLC attempted to investigate that?

Mr. Marino: Objection to the extent that it calls for privileged communications. If you have an independent knowledge, you can testify to that.

A: No, I don't have any independent knowledge. I – I – BTG did not include us in the negotiations, and – and so what communications were between Hynix and BTG over these numbers, MLC has no knowledge.

Hinckley Tr. at 61:9-63:23. Hinckley also testified that he did not know what Hynix products were covered by the agreement. *Id*. at 64:14-65:6.

Hinckley was repeatedly asked whether MLC would be relying on the Hynix agreement at trial:

Q: Now, there's a lot of things you've testified that you don't know with respect to this agreement. Are there any facts with respect to Exhibit 5 [Hynix License] that MLC will seek to rely upon with respect to its burden of proof at trial?

> Mr. Marino: And objection. It's vague. I don't understand what – "facts with respect to" an agreement that aren't the agreement itself. But if you understand the question, please answer.
>
> A: Same. I do not know what facts, if any, BTG will rely at trial – I mean, MLC will rely on at trial that pertains to Exhibit 5.
>
> Q: And so MLC is not disclosing any facts with respect to this agreement that it will seek to rely upon at trial, correct?
>
> A: Well, again, my answer is, I do not know one way or the other the extent to which MLC will be relying on – on any facts pertaining to Exhibit 5 in the trial.
>
> Q: Who at MLC would know those facts?
>
> A: Well, it would be me and Jerry. And so if I'm speaking on behalf of MLC, I'm saying MLC as an entity doesn't know one way or the other what facts, if any, it will rely on relating to Exhibit 5 at trial.
>
> Q: Will MLC at least disclose those facts before the close of fact discovery?
>
> A: I defer to my counsel.
>
> Mr. Marino: I think that's a completely unfair question to ask of a fact witness. Also, again, I still don't understand what facts related to a document mean. So I think the question is vague.
>
> Mr. Schartzer: Mr. Marino, we know that Mr. Hinckley is here designated as a corporate witness, not just a fact witness.
>
> Mr. Marino: Corporate witness by definition is a fact witness. What do you think he is, an expert witness? That statement is nonsensical.
>
> Mr. Schartzer: Mr. Hinckley, outside of what's written here within Exhibit 5, are there any other facts that MLC will seek to introduce at trial with respect to Exhibit 5?
>
> A: Well, same answer. I do not know the extent – if MLC will seek to introduce any facts relating to this exhibit at trial or relating to the agreement between Hynix and BTG.

Id. at 65:7-67:7. Hinckley provided similar answers when questioned about the BTG/Toshiba license agreement. *See id*. at 67:11-69:4; 78:6-7; 77:13-79:14. As noted *supra*, MLC did not in fact disclose prior to the close of fact discovery that it intended to rely on "facts relating to Exhibit 5 [the Hynix license agreement]" – such as any of the extrinsic evidence cited in Milani's report.

LEGAL STANDARDS

Federal Rule of Evidence 402 provides that "[i]rrelevant evidence is not admissible." Rule 403 provides that even relevant evidence may be excluded "if its probative value is substantially

outweighed by a danger" of unfair prejudice, confusion etc.

Federal Rule of Evidence 702 provides that expert testimony is admissible if "scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue." Fed. R. Evid. 702. Expert testimony under Rule 702 must be both relevant and reliable. *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 589 (1993). When considering evidence proffered under Rule 702, the trial court must act as a "gatekeeper" by making a preliminary determination that the expert's proposed testimony is reliable. *Elsayed Mukhtar v. Cal. State Univ.*, 299 F.3d 1053, 1063 (9th Cir. 2002), *amended by* 319 F.3d 1073 (9th Cir. 2003). As a guide for assessing the scientific validity of expert testimony, the Supreme Court provided a nonexhaustive list of factors that courts may consider: (1) whether the theory or technique is generally accepted within the relevant scientific community; (2) whether the theory or technique has been subjected to peer review and publication; (3) the known or potential rate of error; and (4) whether the theory or technique can be tested. *Daubert*, 509 U.S. at 593-94; *see also Kumho Tire Co., Ltd. v. Carmichael*, 526 U.S. 137 (1999).

Federal Rule of Civil Procedure 37(c)(1) provides that a party's failure to disclose or supplement information will result in that party being precluded from using that information on a motion, at a hearing, or at trial, unless that failure was substantially justified or harmless. This sanction applies to failures to supplement discovery responses in accordance with Federal Rule of Civil Procedure 26(e). *See id.*; *see also Hoffman v. Constr. Prot. Servs., Inc.*, 541 F.3d 1175, 1179 (9th Cir. 2008) (affirming district court's order excluding undisclosed damages evidence); *Yeti by Molly, Ltd. v. Deckers Outdoor Corp.*, 259 F.3d 1101, 1106 (9th Cir. 2001) ("[A]lthough we review every discovery sanction for an abuse of discretion, we give particularly wide latitude to the district court's discretion to issue sanctions under Rule 37(c)(1). . . . This particular subsection, implemented in the 1993 amendments to the Rules, is a recognized broadening of the sanctioning power. . . . The Advisory Committee Notes describe it as a 'self-executing,' 'automatic' sanction to 'provide[ ] a strong inducement for disclosure of material. . . .' Fed. R .Civ. P. 37 advisory committee's note (1993).")

DISCUSSION

Micron contends that "[t]he Milani Report relies on a flawed, self-serving characterization of the Hynix and Toshiba Agreements to arrive at a royalty rate not found anywhere in the agreements." Motion at 3 (Dkt. No. 444). Micron argues that the 0.25% figure that Milani claims represents the royalty rate applied in the Hynix Agreement is mentioned only in the context of the "most favored customer" provision as a rate that, if given to a different, future, hypothetical licensee, would trigger an additional discount to Hynix. Micron argues that Milani's assertion that the Toshiba license effectively includes a 0.25% royalty rate is also entirely speculative, citing Milani's statement in his report that "it's reasonable to presume BTG considered the royalty rate in the Toshiba Agreement that is at least equal to the rate reflected in the Hynix Agreement." Milani Report at 48. Micron argues that the Hynix and Toshiba licenses speak for themselves, and that both agreements on their face provide for lump sum payments and neither agreement contains a royalty rate applicable to the licenses.

Micron also argues that because MLC failed to disclose during fact discovery (such as through the Hinckley deposition or its responses to Interrogatory Nos. 6 and 22) that it believed that 0.25% was the applicable royalty rate based upon the Hynix and Toshiba licenses, as well as MLC's failure to disclose the extrinsic evidence that Milani relies upon for his royalty rate opinion (such as Soden's 2007 letter to Samsung and Fisher's deposition testimony), Micron was prevented from conducting relevant discovery, such as depositions of BTG, Hynix and Toshiba witnesses focusing on the alleged 0.25% royalty rate, as well as a deposition of Mr. Fisher.

Micron also argues that the 0.25% rate is not a real rate because, to the extent the extrinsic evidence cited by MLC is considered, that evidence shows that BTG used 0.25% as a tool to calculate lump sum payments based on forecasted sales from 2006 to 2011, while the actual license agreements covered the period of April 2007 through the expiration dates of the 41 patents (including *inter alia* June 2015 for the '571 patent and December 2017 for the last expiring patent). Thus, Micron argues that Milani's opinion that the Hynix and Toshiba licenses reflect a 0.25% royalty rate has no basis in fact because (1) the contracts themselves provide for lump sum payments and do not specify a royalty rate and (2) the extrinsic evidence shows that, at most, BTG used 0.25%

as a method for calculating lump sum payments based upon a revenue base of forecasted sales from 2006-2011, thus ignoring years of Hynix's and Toshiba's sales that were covered by the term of the license. Micron argues that if an effective royalty rate was calculated for the Hynix and Toshiba licenses, that rate would need to also take account of the years of forecasted (or actual) sales from 2012-2017, and thus the actual effective royalty rate would be much less than 0.25%.

MLC devotes a significant portion of its opposition to arguing that the Hynix and Toshiba licenses are comparable and that the use of comparable licenses is a well-established methodology to determine a reasonable royalty. However, the specific issue presented by Micron's motion is whether Milani may testify that the Hynix and Toshiba license agreements "reflect" a 0.25% royalty rate, not whether those license agreements are comparable. As to that question, MLC argues that "the 0.25% royalty rate figure is expressly referenced in the 'most favored customer' provision of the license" which "provides Hynix with a guarantee that no subsequent licensee would receive a license 'in which the royalty rate is less than 0.25%.'" Opp'n at 3 (Dkt. No. 492). MLC also argues, "[i]ndeed, the record of the case is replete with references to 0.25% being used as the effective worldwide royalty rate – including several license agreements involving the patent-in-suit and contemporaneous business communications and testimony relating to the nature of the agreements and the manner by which they were negotiated – which have all been disclosed to Micron." *Id.* MLC's opposition to Damages MIL#1 does not cite any specific evidence in support of the assertion that the record is "replete" with references to the 0.25% royalty rate, nor does it identify how and when it "disclosed" all of this evidence to Micron.[13]

The Court concludes that Milani's proposed testimony that the Hynix and Toshiba licenses "reflect" a 0.25% royalty rate is speculative and not based on the facts of the actual licenses, and therefore GRANTS the motion as framed. Specifically, Milani may not testify that the Hynix and Toshiba agreements contain or "reflect" specific royalty rates because the documents speak for themselves and neither provides for an applicable royalty rate. Both license agreements are lump

[13] MLC's opposition to Micron's Motion to Strike the Milani Report asserts that MLC disclosed certain evidence in its response to Interrogatory No. 6 and 22. The Court discusses those responses *infra*.

sum agreements, and there is no explanation in the agreements regarding how the lump sum amounts were calculated. Milani's derivation of a 0.25% royalty rate based on the "most favored customer" provision in the Hynix license is contrary to the plain language of that provision, which provides that if BTG entered into a "future license" "in which the royalty rate is less than 0.25% . . . Hynix's future payments (if any) shall be reduced so that Hynix, in total, pays not more than 90% of the royalty rate paid by the new licensee." Hynix License § 4.3. The "most favored customer" provision does not state that the 0.25% royalty rate was applied to that license, nor does that provision (or any other provision in the agreement) state anything about how the lump sum payments were calculated.

Milani's testimony about the Hynix and Toshiba licenses containing a 0.25% royalty rate is not "based on sufficient facts or data" and is not "the product of reliable principles and methods." Rule 702. Even if the extrinsic evidence was admissible[14] to interpret the Hynix and Toshiba license agreements, the extrinsic evidence does not show that those licenses have an effective 0.25% royalty rate. Instead, that evidence suggests that BTG may have calculated lump sum amounts by applying 0.25% to forecasts of revenue from 2006-2011.[15] Of course, if 0.25% had been applied to forecasts of revenue for the term of the license (2007-2017), the lump sum amounts would have been greater; conversely, if the same lump sum figures were paid and measured across a revenue base of forecasted revenue from 2007-2017, the effective royalty rate would be less than 0.25%. Thus, Milani's opinion that the Hynix and Toshiba licenses "reflect" a 0.25% royalty range is not based

[14] As discussed *infra*, the Court finds that MLC did not disclose that it intended to rely on this extrinsic evidence in support of its reasonable royalty claim, and thus it is inadmissible on that ground. Further, even if that evidence was properly disclosed, the extrinsic evidence would not be admissible as parol evidence to interpret the license agreements because those agreements are clear and unambiguous. *See generally Barron Bancshares, Inc. v. United States*, 366 F.3d 1360, 1375-76 (9th Cir. 2004) (discussing parol evidence rule); *Transcore, LP v. Electronic Transaction Consultants Corp.*, No. 3:05-cv-2316, 2008 WL 2152027, at *5, *aff'd*, 563 F.3d 1271 (Fed. Cir. 2009) ("Although TransCore would like the court to consider its extraneous proof of the parties' discussions that were contemporaneous to the final preparation of the Settlement Agreement, the court cannot do so, because it finds that they intended the Settlement Agreement to be a final expression of their agreement.").

[15] As noted *supra*, the Hynix license covered "all Hynix products," and was not limited specifically to Hynix's MLC Memory Devices. The revenue base for all Hynix products for the term of the license was presumably larger than the revenue base for the subset of Hynix MLC Memory Devices.

in fact, but instead upon an misinterpretation of an inapposite "most favored customer" provision in the Hynix license and irrelevant extrinsic evidence suggesting that BTG used the 0.25% figure as a method for calculating lump sums in negotiations using forecasted sales data for a truncated period of the license agreements.

The Court is mindful of the principle that "[a] judge must be cautious not to overstep its gatekeeping role and weigh facts, evaluate the correctness of conclusions, impose its own methodologies, or judge credibility, including the credibility of one expert over another." *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1315 (Fed. Cir. 2014), *overruled on other grounds*, *Williamson v. Citrix Online, LLC*, 792 F.3d 1339 (Fed. Cir. 2015). The Court also recognizes that resolving disputes of fact is the province of the jury. *See Micro Chemical, Inc. v. Lextron, Inc.*, 317 F.3d 1387, 1392 (Fed. Cir. 2003) ("In this case, the trial court properly did not rule inadmissible Fiorito's damages testimony simply because it was based on Micro Chemical's version of the contested facts."). Here, however, there is not a factual dispute about whether the Hynix and Toshiba licenses contain a royalty rate: they do not. Instead, Milani (and MLC) divine a royalty rate for these agreements by stitching together selected pieces of extrinsic evidence of BTG's description of how it formulated lump sum licensing proposals.[16] MLC cannot create a dispute of fact by having Milani mischaracterize evidence, and the Court cannot permit Milani to testify about a "fact" – the royalty rate reflected in the Hynix and Toshiba licenses – when there is no evidence to support that fact. *Cf. Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1317 (Fed. Cir. 2011) ("[T]here must be a basis in fact to associate the royalty rates used in prior licenses to the particular hypothetical negotiation at issue in the case."); *see also Golden Bridge Tech. v. Apple, Inc.*, Case No. 5:12-cv-04882-PSG, 2014 WL 2194501, at *6 (N.D. Cal. May 18, 2014) (granting *Daubert* motion to exclude expert testimony about royalty rates derived from fully-paid lump sum licenses where, *inter alia*, the expert did not "account for the portion of the lump sum payments that would cover future sales").

[16] In the limited excerpts of the Fisher deposition provided to the Court, Fisher testified that there several "different approaches" leading to a "whole range of numbers" that BTG used when determining amounts for BTG's licensing negotiations. Fisher Tr. at 236:18-237:15.

The Court also concludes that MLC never disclosed the factual underpinnings of its claim that the Hynix and Toshiba licenses "reflect" a 0.25% royalty rate, and that pursuant to Rule 37(c)(1), this failure is a separate and independent basis for excluding evidence and argument that those licenses contain such a rate. It bears repeating that because the Hynix and Toshiba licenses are lump sum agreements that do not contain specific royalty rates, absent a disclosure by MLC, Micron would have no way of knowing that Milani would opine that these agreements reflect a 0.25% royalty rate that should be applied to this case (and that the rate should be tripled to 0.75% based on Fisher's deposition testimony and ultimately halved to 0.375% to account for the value of the '571 patent). It is undisputed that prior to the submission of Milani's initial expert report in February 2019,[17] MLC had never disclosed what it believed was an appropriate royalty rate to calculate damages, had never disclosed that it believed the Hynix and Toshiba licenses "reflect" a 0.25% royalty rate, and had never disclosed any of the extrinsic evidence that Milani relies on for his royalty rate opinion (the 2007 BTG letter from Soden to Shim of Samsung; the Fisher deposition testimony; and the BTG memos regarding licensing negotiations and offers to Samsung, ST Micro and Acacia).[18] Further, at Hinckley's Rule 30(b)(6) deposition, he testified, *inter alia*, that the Hynix agreement did not have a royalty rate, that "MLC has no understanding" of the royalty rate for the Hynix agreement, and that "MLC has no knowledge about where these [lump sum] numbers came from." Hinckley Tr. at 61:21-62:2, 63:9-13. Although Mr. Marino repeatedly objected to questions asking Hinckley about whether MLC would rely on any "facts with respect to" the Hynix agreement at trial (such as objecting "It's vague. I don't understand what – 'facts with respect to' an agreement that aren't the agreement itself,"), in fact Milani and MLC are attempting to rely on "facts with respect to" the Hynix agreement that are not the agreement itself, namely extrinsic evidence such as Soden's 2007 letter to Samsung, Fisher's deposition testimony, and other BTG memos and license

[17] Milani first issued an expert report on February 8, 2019, and then issued an amended report on March 15, 2019 "to reflect the Court's order regarding the infringement contentions and schedule." Milani Report at 4.

[18] MLC had generally identified "any prior negotiations between the parties." However, that disclosure still does not state that MLC believed that 0.25% was a reasonable royalty rate that should be used as an input (before tripling and then halving, as Milani does) to determine damages.

offers. Thus, the record reflects that Micron repeatedly asked MLC – through interrogatories and the Hinckley deposition – for the factual basis of its reasonable royalty claim and about its reliance on the Hynix license in particular – and MLC consistently failed to disclose its contention that the Hynix license "reflected" a 0.25% royalty rate that should be applied to this case.

MLC argues that its responses to Interrogatories Nos. 6 and 22 were sufficient, and that in any event Micron has not been prejudiced. The Court disagrees. In both interrogatories, Micron asked MLC to "describe the factual and legal basis and supporting evidence" in support of MLC's claim for a reasonable royalty (Interrogatory No. 6) and to "identify all facts, evidence and testimony regarding any applicable royalty rates that You intend to rely upon at trial and describe in complete detail why those royalty rates are applicable." Interrogatory No. 22. MLC's responses to both interrogatories asserted numerous boilerplate objections and set forth a generic statement of the law regarding entitlement to damages with citations to *Georgia-Pacific* without ever stating that MLC believed that 0.25% was an appropriate royalty rate or MLC's contention that the Hynix and Toshiba licenses reflected such a rate. MLC's responses also contained a list of documents, which curiously did not include either license in response to Interrogatory No. 6 and only identified the Hynix license in response to Interrogatory No. 22. Crucially, none of the listed documents included any of the extrinsic evidence upon which Milani relies to conclude that the Hynix and Toshiba licenses "reflect" a 0.25% royalty rate and that the 0.25% rate should be tripled to account for the fact that the Hynix and Toshiba licenses were worldwide and damages in this case are based on U.S. revenue.[19] Because MLC never disclosed this information, Micron was prevented from conducting fact discovery regarding these issues.

To the extent MLC seeks to blame Micron for its inadequate damages disclosures, the Court is unpersuaded. To be sure, there were problems with Micron's production of sales data. However, none of that discovery was relevant to the issue of what MLC contended was the appropriate royalty rate in this case. Indeed, the vast majority of the evidence that Milani and MLC rely upon for the

[19] As Micron notes in its *Daubert* motion challenging Milani's testimony, notwithstanding Milani's explanation for tripling the alleged 0.25% royalty rate, Milani's damages numbers include Micron's (and its subsidiaries') foreign sales.

0.25% (and 0.75%) royalty rate opinion was produced by MLC. There is simply no explanation to excuse MLC's failure to disclose the factual basis for its claim about a reasonable royalty. MLC suggests that it was not required to do so because the reasonable royalty is the subject of expert testimony. However, while MLC was not required to disclose its expert opinions during fact discovery, MLC was still required to disclose the factual basis for its reasonable royalty claim. *See Siemens Med. Sols. USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc.*, 637 F.3d 1269, 1287 (Fed. Cir. 2011) (affirming district court's evidentiary ruling excluding portions of expert testimony not disclosed during discovery, including expert's testimony about testing that was not disclosed during fact discovery); *Corning Optical Commc'ns Wireless Ltd. v. Solid, Inc.*, 306 F.R.D. 276, 279 (N.D. Cal. 2015) (finding interrogatory response summarized as "wait until we serve our expert report" to be "plainly insufficient" and granting motion to compel further responses to damages interrogatories, including disclosure of facts upon which plaintiff sought a reasonable royalty)

Accordingly, the Court concludes that Milani may not testify that the Hynix and Toshiba license agreements "reflect" a 0.25% royalty rate because such testimony is contrary to the plain language of the documents. Further, the extrinsic evidence that Milani relies upon (1) is inadmissible parol evidence; (2) even if considered, does not support a 0.25% royalty rate for the terms of the Hynix and Toshiba licenses; and (3) was never disclosed by MLC and thus MLC may not rely on this evidence to assert that the Hynix and Toshiba licenses "reflect" a 0.25% royalty rate.

CONCLUSION

For the foregoing reasons, the Court GRANTS Micron's Damages MIL#1 as to Milani's and Epstein's testimony and DENIES as moot the portion of the motion directed at Liesegang's proposed rebuttal testimony.

IT IS SO ORDERED.

Dated: July 2, 2019

SUSAN ILLSTON
United States District Judge

ORDER GRANTING MICRON'S DAUBERT MOTION TO EXCLUDE EXPERT TESTIMONY OF M. MILANI

DATED JULY 12, 2019

(DKT 668)

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

MLC INTELLECTUAL PROPERTY, LLC,

Plaintiff,

v.

MICRON TECHNOLOGY, INC.,

Defendant.

Case No. 14-cv-03657-SI

ORDER GRANTING MICRON'S DAUBERT MOTION TO EXCLUDE EXPERT TESTIMONY OF MICHAEL MILANI

Re: Dkt. No. 446

On June 6, 2019, the Court held a hearing on numerous pretrial motions. For the reasons set forth below, the Court GRANTS Micron's *Daubert* motion to exclude the expert testimony of Michael Milani.

Micron raises numerous challenges to Milani's expert damages opinion. The Court has already resolved some of these matters in other orders. *See* Order Re: Micron's Damages Motions in Limine #2, #3, and #5 (holding MLC may not seek damages based on Micron's foreign sales or based on any sales by Micron's subsidiaries and IMFT) (Dkt. No. 596); Order Granting in Part and Denying in Part Micron's Damages Motion in Limine #1 (Dkt. No. 639) (holding Milani may not testify that the BTG/Hynix and BTG/Toshiba lump sum agreements "reflect" a 0.25% royalty rate and Milani may not rely on, *inter alia*, Fisher deposition testimony for alleged 0.25% or 0.75% royalty rates). This order resolves the remaining issues regarding Milani's testimony.

Milani offers two damages opinions: (1) the comparative license opinion and (2) the smallest saleable patent practicing unit "SSPPU" approach.[1] For the comparative license opinion, Milani

[1] The parties agree that the SSPPU is a wafer, or bare die.

applies a royalty rate of 0.375%[2] to a royalty base that includes all of Micron's revenue for the accused products. Milani Report at 34-35, 67 (Dkt. No. 585). For the SSPPU approach, Milani applies the same 0.375% royalty rate to a royalty base that includes all of the revenue for what Milani refers to as the "SSPPU Products" – the bare die or wafer – and a majority of the revenue for what he refers to as the "non-SSPPU Products" which are products that incorporate the bare die and have other components, such as controllers. *Id.* at 37-39. The revenue base for Milani's SSPPU approach includes 87.4% of the total accused product revenue. *Id*. at 39 & Exhibit 3.2. There are over 2,600 non-SSPPU products, including products such as solid state disk drives. *Id.* at Exhibit 3.2.1 (list of non-SSPPU products).

Micron contends that both approaches are flawed and unreliable because Milani did not apportion the revenue base to include only the revenue attributable to the patented technology. Micron argues that Milani has not shown that the patented feature is the sole driver of demand for the accused products, which is necessary to justify using the entire market value of the accused products for the revenue base. *See Power Integrations, Inc. v. Fairchild Sesmiconductor Int'l, Inc.*, 904 F.3d 965, 979 (Fed. Cir. 2018) ("[T]he entire market value rule is appropriate only when the patented feature is the sole driver of customer demand or substantially creates the value of the component parts. . . . When the product contains other valuable features, the patentee must prove that those other features do not cause consumers to purchase the product."); *see also Finjan, Inc. v. Blue Coat Sys., Inc.*, 879 F.3d 1299, 1311 (Fed. Cir. 2018) ("[I]f the smallest saleable unit – or smallest identifiable technical component – contains non-infringing features, additional apportionment is still required."). Micron argues that Milani has used the entire market value for

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[2] Milani arrived at the 0.375% royalty rate by starting with a 0.25% rate that he derived from the Hynix agreement, tripling that rate to 0.75% based on Simon Fisher's deposition testimony, and then halving it to 0.375% based on the conclusion that the '571 patent represented at least half of the value of the 41 patent portfolio licensed in the Hynix agreement. As noted *supra*, the Court has held that (1) the lump sum Hynix agreement does not contain a 0.25% royalty rate and thus that Milani may not testify that the agreement contains such a rate, and (2) Milani may not rely upon the Fisher deposition testimony for alleged royalty rates. Because the Court has excluded Milani's testimony regarding two of the inputs for his ultimate 0.375% royalty rate opinion, it does not appear that there is any reliable admissible basis for his royalty rate opinion, which he applies to both damages models. In any event, this order addresses the related but distinct challenges to the royalty bases.

the comparative license opinion because he includes all revenue for the accused products in the revenue base. Regarding the SSPPU approach, Micron argues that a bare die contains numerous non-infringing features, such as micro-fabrication and lithography techniques, error correction, and copy-back technology, and thus that Milani was required to apportion beyond the SSPPU. In addition, Micron argues that Milani engaged in a superficial apportionment for the non-SSPPU products (such as solid state disk drives) because he testified that did not evaluate or assign value to the non-infringing features of those products. *See* Milani Tr. at 201-206 (stating he did not put a value on various non-infringing features of a Micron solid state disk drive) (Dkt. No. 442-13); *see also* Milani Report at 35-39 (stating that he did not have an understanding of what many of the non-SSPPU products were and that he classified many as "unidentifiable").[3]

MLC asserts that Milani was not required to apportion the revenue base in his comparable license approach because the royalty rate from the Hynix license "already accounts for apportionment." Opp'n at 10 (Dkt. No. 497-4); *see also* Milani Report at 34 n.195 ("In other words, the royalty rate associated with the comparable license agreements already apportions for other components and technologies included in the infringing product."). MLC also asserts that Milani relied on evidence showing that the multi-level cell flash market is a "commodity" market, and thus that the Hynix products and Micron products were sufficiently similar. *Id*. at 8 (citing Milani Report at 8).[4] With regard to Milani's SSPPU approach, MLC asserts that Milani "ensured that the royalty rate, which was derived from the Hynix Agreement, was not applied to products that were broader than any Hynix products that were subject to a royalty under the Hynix Agreement (e.g., solid-state drives). In doing so, Mr. Milani, in consultation with Dr. Lee, determined that the SSPPU was a

[3] Milani also testified, *inter alia*, that he did not know who Micron's customers were, he did not conduct any consumer surveys to gauge demand for the accused products, and he did not consult with any market analysts or Micron engineers. Milani Tr. at 33-34, 97-99.

[4] In his report Milani states, "Given the significant supply of NAND flash by 2006, the market was described as a commodity market, with competitors mainly competing on price." Milani Report at 8. In support of that statement, Milani cites an article titled "NAND sails into 'commodity storm,'" published online at www.eetimes.com/document.asp?doc_id=1164075#. The article does not discuss or analyze any company's particular products, and states, *inter alia*, that "The NAND flash market, which has been in the 'oversupply' mode since the beginning of this year [2006], is fast becoming a mere commodity."

bare die. He then limited revenues in his alternative royalty base calculation to those associated with the SSPPU. The SSPPU is not a multi-component product, like a cellphone or computer. Rather, it is a single component with no non-infringing uses." *Id*. at 9. MLC argues that no further apportionment is necessary because "Milani is using the Comparable Licensing Approach methodology" and "Micron competes in a market where products are not sufficiently differentiated." *Id*.

Thus, MLC defends Milani's revenue base for both damages models by arguing that the royalty rate from the Hynix license already addresses apportionment. However, in order to start with the Hynix lump-sum agreement and reach Milani's comparative license opinion applying a 0.375% royalty rate to a royalty base comprised of the revenue of all the accused products, one is required to make numerous unsupported inferential leaps. As set forth in detail in the Court's Order Granting in Part and Denying in Part Micron's Damages Motion in Limine #1, the Hynix agreement is a lump-sum agreement that does not explain how the parties calculated each lump sum. There is no royalty rate in the Hynix agreement. Further, the Hynix agreement covered worldwide rights to 41 patents for "all Hynix products."[5] Although Milani states that the flash memory market is a "commodity market," he did not (nor did anyone) compare Micron's accused products to the licensed Hynix products. There is no evidence in the record regarding the nature or volume of the licensed Hynix products. Merely asserting that the flash memory market is a "commodity" market with a citation to a 2006 article about market conditions does not establish that the licensed Hynix products are similar to Micron's accused products for purposes of a damages analysis. *Cf. Lucent Tech. v. Gateway, Inc.*, 580 F.3d 1301, 1330-32 (Fed. Cir. 2009) (explaining why different licenses did not support damages award because jury was not provided with sufficient information about those licenses, including "the jury again did not hear any explanation of the types of products covered by the agreement or the various royalty rates set forth in the agreement"). Milani also relies on Lee's technical opinion that the '571 patent is "essential" to flash memory and that the '571

[5] In addition, the Hynix license provided Hynix with a release for sales prior to the April 11, 2007 effective date, and the term extended through the expiration of all of the licensed patents. *See generally* Hynix Agreement (Dkt. No. 442-5).

patent is the most important of MLC's patents. However, even if Lee is correct about the importance of the '571 patent, there still is no basis for Milani to opine that the Hynix lump-sum agreement reflects a royalty rate that can be applied to all of the revenue for Micron's accused products without the need for any apportionment of the revenue base.

Simply put, there is no evidence regarding the Hynix agreement that supports Milani's opinion that a specific royalty rate derived from the Hynix agreement already accounts for apportionment of non-patented features in Micron's accused products and thus can be applied to all the revenue for Micron's accused products. *Cf. Lucent,* at 1330 ("[C]ertain fundamental differences exist between lump-sum agreements and running-royalty agreements. This is not to say that a running-royalty license agreement cannot be relevant to a lump-sum damages award, and vice versa. For a jury to use a running-royalty agreement as a basis to award lump-sum damages, however, some basis for comparison must exist in the evidence presented to the jury."); *see also Wordtech Systs., Inc. v. Integrated Networks Solutions, Inc.*, 609 F.3d 1308, 1320 (Fed. Cir. 2010) ("[T]he two lump-sum licenses provide no basis for comparison with INSC's infringing sales. Neither license describes how the parties calculated each lump sum, the licensees' intended products, or how many products each licensee intended to produce. . . . Thus, without additional data, the licenses offered the jury 'little more than a recitation of royalty numbers.'").

The cases in which the Federal Circuit has held that damages can be based upon the terms of a comparable license which already values the patented technology involve facts very different than those presented here. For example, in *Elbit Systems Land & C4I Ltd. v. Hughes Network Systs., LLC*, __ F.3d __, 2019 WL 2587754, at *5-6 (Fed. Cir. June 25, 2019), the plaintiff's damages expert relied on a settlement license between the defendant and another satellite internet company involving one-way satellite communication technology. The Federal Circuit affirmed the damages award because the expert "appropriately accounted for differences between the circumstances of that settlement and the present circumstances" and the expert "relied on the per-unit figure in the Gilat Agreement for one-way technology, together with Hughes-based evidence that two-way technology was worth at least an additional 20%, to arrive at his proposed per-unit figure – which the jury adopted." *Id.* at *6. The Federal Circuit found that the damages evidence did not violate

principles of apportionment because the expert testified that apportionment was "essentially embedded in the comparable value" from the Gilat Agreement: "Mr. Martinez's testimony allowed the jury to find that the components at issue, for purposes of apportionment to the value of a larger product or service, were comparable to the components at issue in the Gilat-Hughes agreement. . . Gilat and Hughes would have had to consider the benefit from the patented technology over other technology and account for that in the Gilat Agreement." *Id.* at *7; *see also Commonwealth Scientific & Industrial Research Organisation v. Cisco Systems, Inc.* ("*CSIRO*"), 809 F.3d 1295, 1303 (Fed. Cir. 2015) ("Because the parties' discussions centered on a license rate for the '069 patent, this starting point for the district court's analysis already built in apportionment. Put differently, the parties negotiated over the value of the asserted patent, 'and no more.'"). Here, in contrast, Milani does not present any analysis that would support the conclusion that a 0.375% royalty rate derived from the Hynix license can be applied to the entire market value of Micron's accused products because the royalty rate somehow already accounts for apportionment.

The Court also finds that Milani's SSPPU approach does not satisfy apportionment requirements. As an initial matter, the Court notes that MLC defends the SSPPU approach on the ground that the royalty rate accounts for apportionment. Further, although MLC asserts that the bare die does not have any "non-infringing *uses*," MLC does not dispute Micron's evidence that the bare die has non-infringing *features*, such as error-correction software and implementation of copy-back technology. MLC's technical expert Dr. Lee testified at his deposition that the '571 patent does not cover these technologies. Lee Tr. at 228-231 (Dkt. No. 542-2). Milani was required to apportion for these non-patented technologies for both the SSPPU group and the non-SSPPU group. His failure to do so renders his damages analysis unreliable and excludable. *See Finjan*, 879 F.3d at 1311; *Dynetix Design Sols., Inc. v. Synopsys, Inc.*, No. C 11-05973 PSG, 2013 WL 4538210, at *3 (N.D. Cal. Aug. 22, 2013) (excluding expert who "relied on the blanket assumption that, once he selected the smallest salable unit . . . he could end the analysis").

In light of the Court's conclusion that Milani's reasonable royalty analysis is fundamentally flawed both as to the royalty rate and the royalty base, the Court need not address Micron's other challenges to Milani's opinions. For the foregoing reasons, the Court GRANTS Micron's *Daubert*

motion to exclude Milani's testimony.

IT IS SO ORDERED.

Dated: July 12, 2019

SUSAN ILLSTON
United States District Judge

United States District Court
Northern District of California

ORDER GRANTING MICRON'S MOTION TO STRIKE PORTIONS OF MILANI REPORT

DATED JULY 12, 2019

(DKT 672)

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

MLC INTELLECTUAL PROPERTY, LLC,

Plaintiff,

v.

MICRON TECHNOLOGY, INC.,

Defendant.

Case No. 14-cv-03657-SI

ORDER RE: MICRON'S MOTION TO STRIKE MILANI REPORT AND DENYING AS MOOT MLC'S DAMAGES-RELATED MOTION IN LIMINE RE: LIESEGANG

Re: Dkt. Nos. 450, 452

In various orders the Court has granted Micron's *Daubert* motions to exclude MLC's experts Ronald Epstein and Michael Milani. Micron has represented that if Epstein's testimony is excluded, it does not intend to call its rebuttal expert, Robert Liesegang. Accordingly, MLC's motion regarding that expert is DENIED as moot. In addition, for the reasons set forth in the Court's Order Granting in Part and Denying in Part Micron's Damages Motion in Limine No. 1, the Court GRANTS in part Micron's motion to strike the Milani Report. The remainder of Micron's motion to strike is DENIED as moot in light of the *Daubert* order.

IT IS SO ORDERED.

Dated: July 12, 2019

SUSAN ILLSTON
United States District Judge

United States District Court
Northern District of California

ORDER GRANTING CERTIFYING DAMAGES ORDERS FOR INTERLOCUTORY APPEAL

DATED OCTOBER 17, 2019

(DKT 711)

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

MLC INTELLECTUAL PROPERTY, LLC,

Plaintiff,

v.

MICRON TECHNOLOGY, INC.,

Defendant.

Case No. 14-cv-03657-SI

ORDER CERTIFYING DAMAGES ORDERS FOR INTERLOCUTORY APPEAL; DENYING MICRON'S MOTION FOR SUMMARY JUDGMENT BASED ON MLC'S FAILURE TO PROVE REMEDY; STRIKING AS IMPROPER MLC'S OPPOSITION BRIEF AND ADMINISTRATIVE MOTIONS AND DECLARATIONS FILED IN SUPPORT (DKT. NOS. 692-696); DENYING ALL OTHER PENDING MOTIONS AS MOOT

Re: Dkt. Nos. 456, 519, 690, 694, 695, 696

This order resolves all pending motions in this case. For the reasons set forth below, the Court concludes that the proper and most efficient disposition of this case is to adopt the parties' initial joint proposal to certify three damages orders for interlocutory appeal. The Court also concludes that summary judgment of no remedy is not appropriate, and accordingly DENIES defendant's motion for summary judgment of no remedy. The Court also finds that plaintiff's "opposition" to defendant's motion for summary judgment is a disguised and improper motion for reconsideration that, *inter alia*, seeks to expand the record through new evidence and arguments, and accordingly the Court STRIKES plaintiff's opposition papers (Dkt. Nos. 692-696). The Court DENIES all other pending motions as moot.

BACKGROUND

On August 12, 2014, MLC Intellectual Property, Inc. ("MLC") filed this lawsuit against

Micron Technology, Inc. ("Micron"), alleging infringement of U.S. Patent No. 5,764,571 (the '571 Patent). The '571 Patent expired on June 9, 2015. The docket reflects that this case has been extensively litigated, including two rounds of claim construction, numerous discovery disputes, multiple rounds of summary judgment motions, and many other pretrial motions. The Court also stayed this case twice due to an *inter partes* review and an *ex parte* reexamination.[1]

In a pretrial order filed July 23, 2018, the Court set various fact and expert discovery deadlines as well as a schedule for *Daubert* motions, motions in limine, and a final pretrial hearing date of July 23, 2019 and a trial date of August 5, 2019. Dkt. No. 183.[2]

In April and May of 2019, the parties filed *Daubert* motions, "technical" motions in limine, and damages-related motions in limine. Three of these motions are relevant to this order: Micron's *Daubert* Motion to Exclude Expert Testimony and Opinions of Michael Milani (Dkt. No. 443-4); Micron's Damages Motion in Limine #1 (Dkt. No. 444); and Micron's Motion to Strike Portions of the Milani Expert Report (Dkt. No. 443-7). The docket reflects that the briefing on those motions was voluminous, including numerous exhibits filed by both parties. *See* Dkt. Nos. 442-444, 446, 452, 465, 492, 497-500, 502-503, 513, 524, 540, 542, & 544. The Court held a lengthy hearing on these and other motions on June 6, 2019. Dkt. No. 591 (minute entry); Dkt. No. 612 (Tr. of June 6, 2019 hearing).

In an order filed July 2, 2019, the Court granted in part Micron's damages motion in limine #1. Dkt. No. 639. The Court held that MLC's damages expert, Michael Milani, could not opine that certain licenses (the Hynix and Toshiba licenses) "reflected" a particular royalty rate when those lump sum licenses did not contain a particular royalty rate or any discussion of how the lump sums were derived, and where MLC had failed to disclose in discovery all of the evidence that Milani

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[1] On March 12, 2019, Micron sought a third stay of this case due to the institution of a second *ex parte* reexamination. Dkt. No. 359. In an order filed April 1, 2019, the Court denied Micron's request for a stay, finding that a third stay would not promote judicial economy and would be prejudicial to MLC. To the Court's knowledge, this second *ex parte* reexamination is currently pending.

[2] Some of these dates were later adjusted slightly to accommodate the parties' and the Court's calendar. The final pretrial conference was rescheduled to July 16, and trial was rescheduled to August 12, 2019.

relied on in support of his opinion that the licenses contained such a royalty rate. *Id.* On July 12, 2019, the Court granted Micron's *Daubert* motion to exclude the expert testimony of Mr. Milani. Dkt. No. 668. The Court held that Milani's reasonable royalty opinion was unreliable because, in addition to the issues regarding the royalty rate as set forth in the July 2, 2019 order, Milani failed to apportion the royalty base to reflect only the revenue attributable to the patented technology. *Id.* On July 12, 2019, the Court issued an order granting in part Micron's motion to strike portions of the Milani Expert Report for the same reasons set forth in the July 2, 2019 order, namely MLC's failure to disclose damages evidence during discovery. Dkt. No. 672.[3] This order refers to the July 2 and July 12 orders as the "Damages Orders."

On July 16, 2019, the Court held the final pretrial conference in this case. *See generally* Dkt. No. 686 (July 16, 2019 Tr.). During the conference, counsel informed the Court that they wished to discuss the impact of the Court's Damages Orders on the upcoming trial and whether a trial was necessary. MLC's counsel stated, *inter alia*, that "it definitely does sound like you've excluded both of our damages experts. So it would certainly be difficult to put in a damages case that would satisfy the Court's requirements on damages." *Id.* at 13:1-4. MLC's counsel requested leave to present another damages report "or at least a disclosure of a damages theory," which the Court denied. *Id.* at 21:5-6. The parties discussed the fact that because the patent is expired, MLC is not seeking injunctive relief, and thus a trial would focus solely on liability. *Id.* at 17:23-18:4. MLC's counsel also stated, "I think we're all in agreement that if we don't have to do a trial because the Court has decided that the damages issue has basically been disposed of, that would be desirable." *Id.* at 16:8-10.

Counsel discussed several proposals for the remainder of the case, including interlocutory appeal of the Damages Orders, bifurcation of liability and damages phases for trial (with the entry of judgment as a matter of law on damages if MLC prevailed at the liability phase), and summary

[3] In addition, on June 28, 2019, the Court granted Micron's *Daubert* motion to exclude the expert testimony of Ronald Epstein, MLC's former licensing counsel and proposed expert on licensing and damages. Dkt. No. 636. Although Mr. Epstein was, at least in part, MLC's expert witness on damages, MLC did not request that the Court certify the June 28, 2019 order for interlocutory appeal.

judgment based on MLC's inability to prove damages. *Id.* at 11:11-19:1; 19:19-20:11; 23:6-30:14. The Court stated its belief that the exclusion of a plaintiff's damages expert did not necessarily preclude a damages verdict where a plaintiff had other evidence in support of damages. *Id.* at 23:18-24:2. At the conclusion of the hearing, the Court informed the parties that the Court was prepared to go ahead with the trial, but the Court was also "mindful of how expensive trials are. They are time consuming for courts. They are wildly expensive for clients. And to do one for no purpose at all seems to me not a good use of anybody's funds." *Id.* at 30:16-23. The Court instructed the parties file a letter by July 18, 2019, setting forth the parties' proposals regarding how to proceed with the remainder of the case. *Id.* at 35:2-11.

On July 18, 2019, the parties filed a joint letter setting forth two alternate proposals for the remainder of the case. Dkt. No. 687. The letter stated, "in light of the Court's recent Orders, as well as the Court's denial of MLC's oral request at the pre-trial conference for the opportunity to submit a supplemental damages report consistent with the Court's opinions (Dkt. 686, July 16, 2019 Tr. at 21:3-8)," the parties proposed that the Court stay the trial and certify for interlocutory appeal the Order Granting Micron's *Daubert* Motion to Exclude Expert Testimony of Michael Milani (Dkt. No. 668); the Order Granting in Part and Denying in Part as Moot Micron's Damages Motion in Limine No. 1 (Dkt. No. 639); and the Order Regarding Micron's Motion to Strike the Milani Report (Dkt. No. 672). Alternatively, if the Court was not inclined to certify orders for interlocutory appeal, Micron requested leave of Court to file a "short motion for summary judgment regarding the lack of a sufficient evidentiary basis for a remedy in this case," which, if granted, would "conclusively resolve all claims to prepare the case for appeal to the Federal Circuit, where MLC could test its challenges to the Court's [D]amages [O]rders." *Id.* at 2.

The same day, the Court issued an Order re: Damage Proceedings. Dkt. No. 689. The Court stated that it preferred to consider Micron's summary judgment proposal first, and the Court set a briefing schedule for that motion and stayed the August 12 trial. *Id.* In a separate order filed July 18, 2019, the Court ruled on the additional motions in limine and motions to strike that were argued at the pretrial conference. Dkt. No. 688.

On July 24, 2019, Micron filed a "Motion for Summary Judgment for MLC's Failure to Prove Remedy." Dkt. No. 690. On August 2 and 3, 2019, MLC filed: (1) an "opposition," (2) two

administrative motions to file exhibits under seal,[4] (3) the declaration of MLC's counsel, Mr. Marino, with 29 exhibits attached; and (4) a nine-page declaration dated August 2, 2019, from MLC's technical expert, Dr. Jack Lee. Dkt. Nos. 692-695. Micron filed its reply brief on August 6, 2019. Dkt. No. 698. Micron also filed an opposition to MLC's administrative motions to seal. Dkt. No. 697.[5]

DISCUSSION

I. Micron's Motion for Summary Judgment and Certification under 28 U.S.C. § 1292(b)

Defendant Micron has moved for summary judgment on the ground that MLC cannot prove damages and thus that its liability claims, which only seek damages, are moot. Micron asserts that as a result of this Court's *Daubert* orders excluding MLC's damages experts, Michael Milani and Ronald Epstein, as well as other pretrial orders excluding certain evidence and trial witnesses, MLC does not have any admissible evidence to show an entitlement to a reasonable royalty. Micron argues that MLC based its damages case entirely on expert testimony that the Court has excluded, and Micron notes that as recently as the filing of the parties' joint pretrial conference statement, MLC identified its experts, Messrs. Milani and Epstein, as the only witnesses who would provide damages testimony. Micron argues that because the burden of proving damages lies with the patentee, a court may enter summary judgment when a patentee puts forth no evidence to prove damages.

In support of this assertion, Micron cites pre-2014 unpublished district court cases and

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[4] In an order filed June 3, 2019, the Court informed the parties that no further administrative motions to seal would be accepted in this case. *See* Dkt. No. 586. Despite that order, MLC seeks to file under seal five exhibits in support of its opposition. MLC filed two administrative motions to seal those exhibits because the first motion, in addition to violating the Court's order, was filed incorrectly in that it did not comply with the Local Rules governing under seal filings.

[5] On August 26, 2019, MLC filed a "Suggestion Regarding the Court's Recusal." Dkt. No. 702. The Court initially referred the matter to the Clerk for random reassignment to another district court judge. Dkt. No. 706. Based on the fact that MLC had filed a "Suggestion" and not an actual motion for disqualification, Judge Alsup referred the matter back to the undersigned. In an order filed October 17, 2019, this Court denied MLC's "Suggestion."

several Federal Circuit opinions, the most recent of which is *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286 (Fed. Cir. 2014). In *Apple*, the district court[6] excluded the majority of Apple's damages expert testimony. *Id*. at 1237. Motorola moved for summary judgment that, even assuming the patent was infringed, Apple was not entitled to any damages, including a nominal reasonable royalty. *Id*. The district court "concluded that Apple was not entitled to any measure of damages because Apple had failed to show that its measure of damages was correct," and the court granted summary judgment in favor of Motorola. *Id*. The Federal Circuit reversed, holding that at summary judgment "a judge may award a zero royalty for infringement if there is no genuine issue of material fact that zero is the only reasonable royalty." *Id*. at 1328. The Federal Circuit noted that "[i]f a patentee's evidence fails to support its specific royalty estimate, the fact finder is still required to determine what royalty is supported by the record." *Id*.; *see also id*. at 1329-30 (discussing Motorola's failure to meet burden to show that "the record is uncontroverted that zero is the only royalty").

MLC's "opposition" does not respond to any of the arguments presented by Micron in its motion for summary judgment. MLC does not address *Apple v. Motorola* or any of the other authority upon which Micron relies in support of its contention that the Court may enter summary judgment of no remedy. In addition, MLC does not argue that there is any remaining admissible evidence that it can present at trial to prove damages. MLC does not argue, for example, that there are percipient witnesses who can provide testimony and evidence in support of a reasonable royalty, nor does MLC assert that it can rely on Micron's rebuttal damages expert.[7] Instead, MLC's opposition argues that Mr. Milani's damages analysis is sound and that the Court erred in finding that MLC did not disclose some (but not all) of the damages evidence in discovery. Thus, although MLC's filing is titled "Opposition," in actuality the filing is a disguised motion for reconsideration of the Court's *Daubert* order excluding Mr. Milani as well as the other Damages Orders.[8]

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[6] Circuit Judge Posner sat by designation on the district court and authored the district court opinion.

[7] Micron has represented that because MLC's damages experts have been excluded, it would not call its damages expert (Paul Meyer) at trial, and Micron notes that MLC did not list Mr. Meyer on its trial witness list.

[8] The Court addresses the impropriety of MLC's summary judgment opposition filings *infra*.

Notwithstanding MLC's complete failure to address Micron's arguments, the Court concludes that the more prudent course is to certify the Damages Orders for interlocutory appeal and to deny summary judgment. The district court cases upon which Micron relies predate *Apple v. Motorola*, and there is no Federal Circuit authority directly addressing a situation like the instant case in which the court has excluded all of the plaintiff's expert evidence. Although *Apple v. Motorola* is not directly on point, the Federal Circuit emphasized that a district court can only grant summary judgment of no damages if "the record is uncontroverted that zero is the only reasonable royalty." *Id*. at 1329. Assuming infringement, the Court cannot conclude that it is undisputed that zero is the only reasonable royalty. Accordingly, the Court DENIES Micron's motion for summary judgment of no remedy.

However, the Court does find that the criteria for certification of interlocutory appeal have been met.[9] 28 U.S.C. § 1292(b) permits a district court to certify an order for interlocutory appellate review where the order involves (1) "a controlling question of law;" (2) "as to which there is substantial ground for difference of opinion;" and (3) where "an immediate appeal from the order may materially advance the ultimate termination of the litigation." 28 U.S.C. § 1292(b). Certification under § 1292(b) requires the district court to expressly find in writing that all three § 1292(b) requirements are met. *See In re Cement Antitrust Litig.*, 673 F.2d 1020, 1026 (9th Cir. 1981). Section 1292(b) is "to be used only in exceptional situations in which allowing an interlocutory appeal would avoid protracted and expensive litigation." *Id.* at 1026.

The Court finds that these criteria are met. In the Damages Orders, the Court excluded Mr. Milani's damages opinion under *Daubert* because the Court concluded that his comparative license analysis did not comport with Federal Circuit jurisprudence. These deficiencies included, *inter alia*, Mr. Milani's failure to apportion the revenue base to include only the revenue attributable to the patented technology and Mr. Milani's calculation of a royalty rate that was not supported by the evidence. In addition, the Court held that MLC had failed to disclose the factual underpinnings of

[9] Although the parties had proposed full briefing on the certification issue, the Court finds that this is unnecessary. The parties jointly agree that certification is appropriate, and they agree about which orders should be certified. Under these circumstances, full briefing on the matter is not in the interest of judicial economy.

its reasonable royalty claim in discovery, and excluded much of Mr. Milani's opinion on that ground. MLC asserts that it was not required to disclose those facts because the determination of a reasonable royalty is the province of expert opinion. All of these questions are controlling questions of law as to which there is substantial ground for difference of opinion. Further, interlocutory review of the Damages Orders will materially advance the ultimate termination of this litigation. Absent interlocutory review, the parties and the Court will be required to proceed with an expensive trial focused solely on liability, as MLC concedes that it has no damages case to present at trial. Interlocutory review of the Damages Orders will result in either the ultimate conclusion of this case (if the Federal Circuit affirms) or a single trial on liability and damages (in the event of reversal); either way, interlocutory review is in the interest of judicial economy and will save the parties a considerable amount of time and expense.

Accordingly, pursuant to 28 U.S.C. § 1292(b) the Court certifies the Damages Orders for interlocutory appeal.

II. MLC's Opposition Filings are Improper

The Court now turns to the substance of MLC's opposition filings (Dkt. Nos. 692-696) and explains why the Court STRIKES these filings from the record. As noted *supra*, MLC's opposition does not address the questions presented by Micron's motion, specifically whether the Court could enter summary judgment of no remedy and whether MLC had any admissible evidence in support of damages. Instead, MLC's opposition argues (1) that Mr. Milani's opinions are not inadmissible under *Daubert*; and (2) that MLC did, in fact, disclose some of the evidence that the Court found MLC had failed to disclose in discovery. In making these arguments, MLC relies on, *inter alia*, (1) a new declaration from its technical expert, Dr. Lee, which sets forth new opinions about Micron's technology as it relates to apportionment and the revenue base; (2) some exhibits that MLC did not previously submit in connection with the motion practice resulting in the Damages Orders; and (3) a declaration from MLC's counsel, Mr. Marino, in which he makes assertions for the first time about MLC's discovery disclosures. Further, as noted *supra*, MLC seeks to file some exhibits under seal, notwithstanding the Court's prior order informing the parties that no further administrative motions

to seal would be accepted.

MLC's opposition filings are improper for numerous reasons. MLC's opposition filings are in essence a disguised motion for reconsideration of the Damages Orders. MLC did not comply with Civil Local Rule 7-9, which governs motions for reconsideration. That rule provides, in relevant part,

> **7-9. Motion for Reconsideration**
>
> **(a) Leave of Court Requirement**. Before the entry of a judgment adjudicating all of the claims and the rights and liabilities of all the parties in a case, any party may make a motion before a Judge requesting that the Judge grant the party leave to file a motion for reconsideration of any interlocutory order on any ground set forth in Civil L.R. 7-9 (b). No party may notice a motion for reconsideration without first obtaining leave of Court to file the motion.
>
> **(b) Form and Content of Motion for Leave**. A motion for leave to file a motion for reconsideration must be made in accordance with the requirements of Civil L.R. 7-9. The moving party must specifically show reasonable diligence in bringing the motion, and one of the following:
>
> **(1)** That at the time of the motion for leave, a material difference in fact or law exists from that which was presented to the Court before entry of the interlocutory order for which reconsideration is sought. The party also must show that in the exercise of reasonable diligence the party applying for reconsideration did not know such fact or law at the time of the interlocutory order; or
>
> **(2)** The emergence of new material facts or a change of law occurring after the time of such order; or
>
> **(3)** A manifest failure by the Court to consider material facts or dispositive legal arguments which were presented to the Court before such interlocutory order.
>
> **(c) Prohibition Against Repetition of Argument**. No motion for leave to file a motion for reconsideration may repeat any oral or written argument made by the applying party in support of or in opposition to the interlocutory order which the party now seeks to have reconsidered. Any party who violates this restriction shall be subject to appropriate sanctions.

N.D. Cal. Civ. Local Rule 7-9.

MLC's filings do not comply with any provision of this rule. First, MLC did not actually file a motion requesting leave to file a motion for reconsideration; instead, MLC simply filed an "opposition" that effectively seeks reconsideration of the Court's orders.

Second, MLC did not show "reasonable diligence" in seeking reconsideration. The Court filed the orders at issue on June 28, July 2 and July 12, 2019. The Court held a pretrial conference on July 16, during which there was an extended discussion about the consequence of the Court's

orders and how this case should be resolved. During the hearing MLC's lawyers never stated that they wished to seek reconsideration of the Court's Damages Orders. Indeed, in the letter the parties filed on July 18, 2019, the parties jointly proposed that MLC could file a motion for interlocutory certification of the Damages Orders, and alternatively Micron proposed that it could file a "short motion for summary judgment regarding the lack of a sufficient evidentiary basis for a remedy in this case." Dkt. No. 687. At no time prior to the filing of the "opposition" did MLC indicate that it would be seeking reconsideration, and a disguised motion for reconsideration filed *after* the final pretrial conference is not "reasonably diligent."

Third, even if construed as a motion for leave to file a motion for reconsideration, MLC has not demonstrated that reconsideration is warranted. MLC's opposition does not demonstrate any of the grounds for reconsideration: (1) "[t]hat at the time of the motion for leave, a material difference in fact or law exists from that which was presented to the Court before entry of the interlocutory order for which reconsideration is sought. The party also must show that in the exercise of reasonable diligence the party applying for reconsideration did not know such fact or law at the time of the interlocutory order"; or (2) "[t]he emergence of new material facts or a change of law occurring after the time of such order"; or (3) "[a]" manifest failure by the Court to consider material facts or dispositive legal arguments which were presented to the Court before such interlocutory order." N.D. Cal. Civ. Local Rule 7-9(b)(1)-(3). Instead, MLC's opposition to a large extent (with certain exceptions, noted *infra*) violates the prohibition on "repetition of argument" by raising many of the same arguments that MLC presented in opposition to Micron's pretrial motions.

Fourth, MLC raises several new arguments and/or provides evidence that is either entirely new (such as Dr. Lee's August 2, 2019 declaration) or evidence that was not previously submitted in connection with the litigation on the *Daubert* motions and motions in limine (such as Exhibit 2 to the Marino Declaration, Dkt. No. 693-2).[10] It appears to the Court that this is an effort by MLC to improperly expand the record for appeal. MLC has submitted a new nine-page declaration from

[10] Based upon the Court's review of the docket, it does not appear that MLC ever submitted Exhibit 2 (April 10, 2007 emails between Simon Fisher and Hynix employees) in connection with the prior briefing. There may be other exhibits attached to Mr. Marino's declaration that MLC did not previously submit.

its technical expert, Jack Lee, in which Dr. Lee addresses, *inter alia*, whether Micron's bare die incorporates various non-patented features. Dkt. No. 693-30 (August 2, 2019 Lee Declaration). MLC relies on this new declaration to argue that Mr. Milani properly apportioned the revenue base because the bare die either does not incorporate various non-patented technologies or because the technologies do not exist independently of the patented invention. MLC never raised any of these arguments in opposition to Micron's *Daubert* motion, despite the fact that Micron's *Daubert* motion directly criticized Mr. Milani's analysis on the ground that he did not apportion non-patented features like error correction and copy-back technology. *See* Dkt. No. 443-4 at 8-10 (Micron's *Daubert* Motion); Dkt. No. 540-4 at 5-7 & n.1 (Micron's *Daubert* Reply). Micron correctly objects that this new declaration constitutes improper sur-rebuttal and requests that it be stricken.

As another example, MLC argues that the Court erred in finding that MLC had not disclosed certain extrinsic evidence in support of its damages theories because MLC had, in fact, disclosed that evidence to Micron during discovery. In the Court's Order Granting in Part and Denying in Part as Moot Micron's Damages Motion in Limine #1, the Court found that MLC had failed to disclose six categories of extrinsic evidence that Mr. Milani cited in his report to support his opinion that the Toshiba and Hynix licenses "reflected" a 0.25% royalty rate. *See* Dkt. No. 639 at 12 n.10 & 22-24.[11] MLC now argues (through Mr. Marino's declaration), that it did in fact disclose three of those categories of evidence: (1) documents regarding negotiations between BTG and Samsung, which MLC asserts it disclosed in response to Interrogatory No. 7; (2) documents regarding BTG's licensing negotiations with Acacia, which MLC asserts it also disclosed in response to Interrogatory No. 7; and (3) Simon Fisher's deposition testimony, which MLC asserts it disclosed in response to Interrogatory No. 18; *See* Marino Decl. ¶¶ 30-31 (Dkt. No. 693).[12]

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[11] That extrinsic evidence is: (1) Christine Soden's September 2007 letter to Jay Shim of Samsung (BTG_06398-BTG_06402); (2) Simon Fisher's deposition testimony (BTG_02097-BTG_02142); (3) a November 2007 internal BTG "Briefing Paper" summarizing BTG's negotiations with Samsung (BTG_05660-670); (4) correspondence between BTG and Samsung regarding negotiations (MLC00056549-551, MLC00060545); (5) BTG's licensing offer to ST Micro (MLC00054615-616); and (6) documents related to BTG's licensing negotiations with Acacia (ACACIA00000228-229 and MLC00056617-628).

[12] As to the other three categories of extrinsic evidence that the Court found MLC had not disclosed in discovery (Christine Soden's September 2008 letter to Jay Shim, the November 2007 internal BTG "Briefing Paper," and BTG's licensing offer to ST Micro), MLC concedes it never disclosed these documents in response to Micron's damages interrogatories.

There are several problems with these assertions, and they are emblematic of the way that MLC has litigated much of this case. As an initial matter, MLC did not make these arguments in its opposition to Micron's motion to strike. *See generally* Dkt. No. 498-4 (MLC's Opp'n to Micron's Motion to Strike Portions of Milani Report). MLC did not previously assert that it disclosed these documents, and indeed, nowhere in the voluminous briefing on the motion to strike is Interrogatory No. 7 ever mentioned by either party.[13] At the risk of repetition, MLC cannot now raise new arguments that it failed to present in opposition to Micron's motion to strike.

Further, although MLC now asserts that it disclosed the BTG-Samsung negotiation documents and the BTG-Acacia documents in response to Interrogatory No. 7, MLC does not provide any evidence in support of this assertion. Although MLC filed numerous exhibits in support of its "opposition," MLC did not file a copy of its responses to Interrogatory No. 7. Mr. Marino's current declaration states that MLC's Second Supplemental Response to Interrogatory No. 7 is found at Dkt. No. 514-2. *See* Marino Decl. ¶ 31 (Dkt. No. 693). However, Docket No. 514-2, which is Exhibit 9 to Micron's Consolidated Exhibits that it submitted in support of its various *Daubert* and other damages motions, does not contain MLC's responses to Interrogatory No. 7. Instead, Docket No. 514-2 contains excerpts of MLC's Second Supplemental Responses to Interrogatory Nos. 1, 8, 9 and 10. *See* Dkt. No. 514-2. It is not the Court's task to "examine the entire file for evidence . . . where the evidence is not set forth in the . . . papers with adequate references so that it could be conveniently found." *Carmen v. San Francisco Unified Sch. Dist.*, 237 F.3d 1026, 1031 (9th Cir. 2001); *see also* Civil Local Rule 7-5(a).[14]

MLC also states that the Court erred when it stated that MLC had failed to identify the Toshiba license in response to Micron's Interrogatory Nos. 21 and 22 because MLC did disclose the Toshiba license, albeit under different Bates numbers. The Court's error in this regard is of no consequence because the Court's rulings regarding Mr. Milani's opinions did not turn in any way on whether MLC had disclosed the Toshiba license.

[13] The briefing on Micron's motion to strike Mr. Milani's report based on MLC's failure to disclose focused on MLC's initial and amended disclosures, MLC's Rule 30(b)(6) witness, and Interrogatory Nos. 6, 18, 21 and 22.

[14] That rule provides, "Affidavit or Declaration Required. Factual contentions made in support of or in opposition to any motion must be supported by an affidavit or declaration and by appropriate references to the record. Extracts from depositions, interrogatory answers, requests for admission and other evidentiary matters must be appropriately authenticated by an affidavit or

MLC's assertion that it disclosed the Fisher deposition testimony is misleading. MLC now states that it disclosed Mr. Fisher's deposition testimony (identified by MLC as BTG_2097 and BTG_2062) in response to Interrogatory No. 18. *See* Marino Decl. ¶ 30 (Dkt. No. 693). MLC's Second Supplemental Response to Interrogatory No. 18 (Dkt. No. 278-13) discloses Mr. Fisher's deposition testimony (BTG_2097 at BTG_2137) in support of MLC's claim that "MLC is entitled to damages for Micron's infringement of the Asserted Patent occurring before the filing of the Present Litigation because Micron had actual notice of infringement prior to the lawsuit." Dkt. No. 178-13 at 9.[15] It is disingenuous for MLC to assert that it disclosed Mr. Fisher's deposition testimony as a factual underpinning for Mr. Milani's royalty rate opinion when MLC actually disclosed a portion of Mr. Fisher's deposition testimony in support of its claim for pre-suit damages.[16] These are just a few examples of the new, and incorrect, arguments that MLC has presented in its opposition.

For all of these reasons, the Court finds that MLC's summary judgment "opposition" papers are improper and hereby STRIKES these filings from the record. For purposes of any appeal in this case, MLC is bound by the record that it created.

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declaration."

[15] Interrogatory No. 18 asked,

> Describe in complete detail the factual and legal basis for your contention that MLC is entitled to damages for Micron's alleged infringement of the Asserted Patent occurring before the filing of the Present Litigation, including the identification of all evidence and testimony regarding apportionment, the applicability of the entire market value rule, and any contention that Micron was notified of the alleged infringement in a manner that entitles MLC to these damages under 35 U.S.C. §§ 284, 286, and 287.

Dkt. No. 442-45.

[16] As discussed at length in the Court's orders, Mr. Milani relied on a different (undisclosed) portion of Mr. Fisher's deposition testimony from an unrelated state court action in which Mr. Fisher discussed using a 0.25% royalty rate as a "rule of thumb" when negotiating world-wide licenses and a 0.75% royalty rate for U.S. shipments in support of his royalty rate opinion. *See generally* Dkt. No. 639.

In the final pretrial order, the Court held that MLC could not introduce Mr. Fisher's deposition testimony at trial and the Court struck Mr. Fisher from MLC's trial witness list because MLC did not properly disclose him Fisher as a witness and has not shown that its failure to do so was "substantially justified or is harmless." Fed. R. Civ. P. 37(c)(1). *See generally* Dkt. No. 688.

CONCLUSION

For the reasons set forth above, the Court DENIES Micron's motion for summary judgment of no remedy (Dkt. No. 690) and CERTIFIES the Damages Orders (Dkt. Nos. 639, 668 & 672) for interlocutory appeal pursuant to 28 U.S.C. § 1292(b). The Court STRIKES MLC's improper summary judgment filings. Dkt. Nos. 692-696. The Court DENIES all other pending motions as MOOT. Dkt. Nos. 456 & 519.

IT IS SO ORDERED.

Dated: October 17, 2019

SUSAN ILLSTON
United States District Judge

United States District Court
Northern District of California

UNITED STATES PATENT NO. 5,764,571 (DKT 001-1)

EXHIBIT A

US005764571A

United States Patent [19]

Banks

[11] Patent Number: 5,764,571

[45] Date of Patent: Jun. 9, 1998

[54] **ELECTRICALLY ALTERABLE NON-VOLATILE MEMORY WITH N-BITS PER CELL**

[75] Inventor: **Gerald J. Banks**, Fremont, Calif.

[73] Assignee: **BTG USA Inc.**, Gulph Mills, Pa.

[21] Appl. No.: **410,200**

[22] Filed: **Feb. 27, 1995**

Related U.S. Application Data

[62] Division of Ser. No. 71,816, Jun. 4, 1993, Pat. No. 5,394,362, which is a continuation of Ser. No. 652,878, Feb. 8, 1991, Pat. No. 5,218,569.

[51] **Int. Cl.**[6] **G11C 13/00**

[52] **U.S. Cl.** **365/189.01**; 365/189.07; 365/168; 365/201

[58] **Field of Search** 365/189.01, 189.07, 365/168, 201

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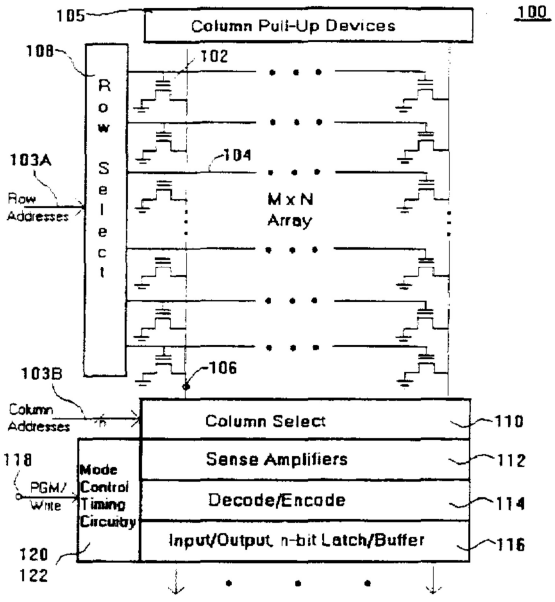
Primary Examiner—Terrell W. Fears
Attorney, Agent, or Firm—Shapiro and Shapiro

[57] **ABSTRACT**

An electrically alterable, non-volatile multi-bit memory cell has K^n predetermined memory states (K^n>2), where K is a base of a predetermined number system and n is a number of bits stored per cell. Programming of the cell is verified by selecting a reference signal corresponding to the information to be stored and comparing a signal of the cell with the selected reference signal.

47 Claims, 14 Drawing Sheets



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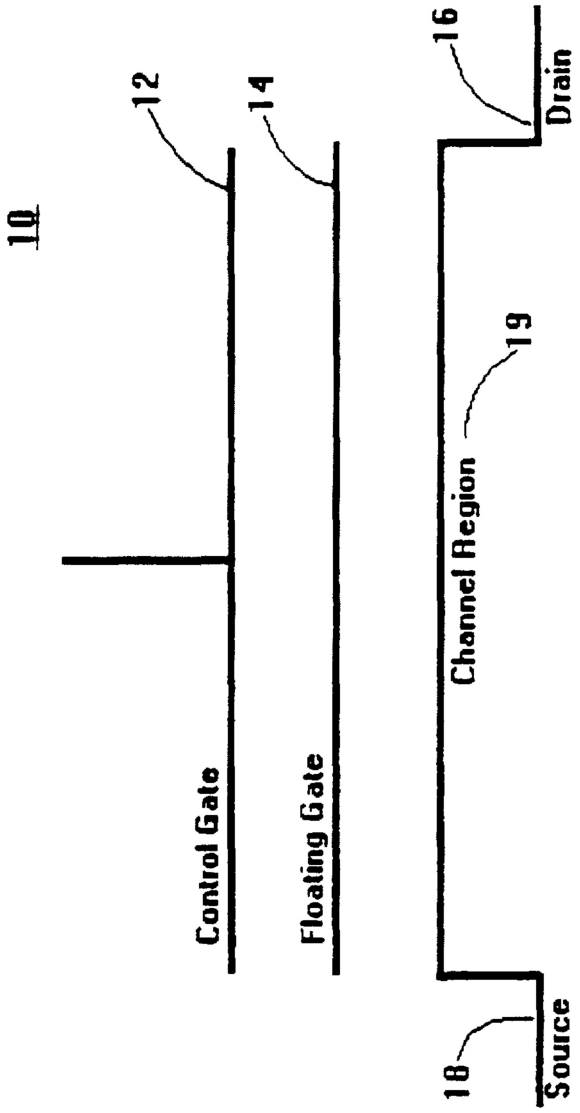
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Drain
Control Gate
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Channel Region
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Source

Figure 1

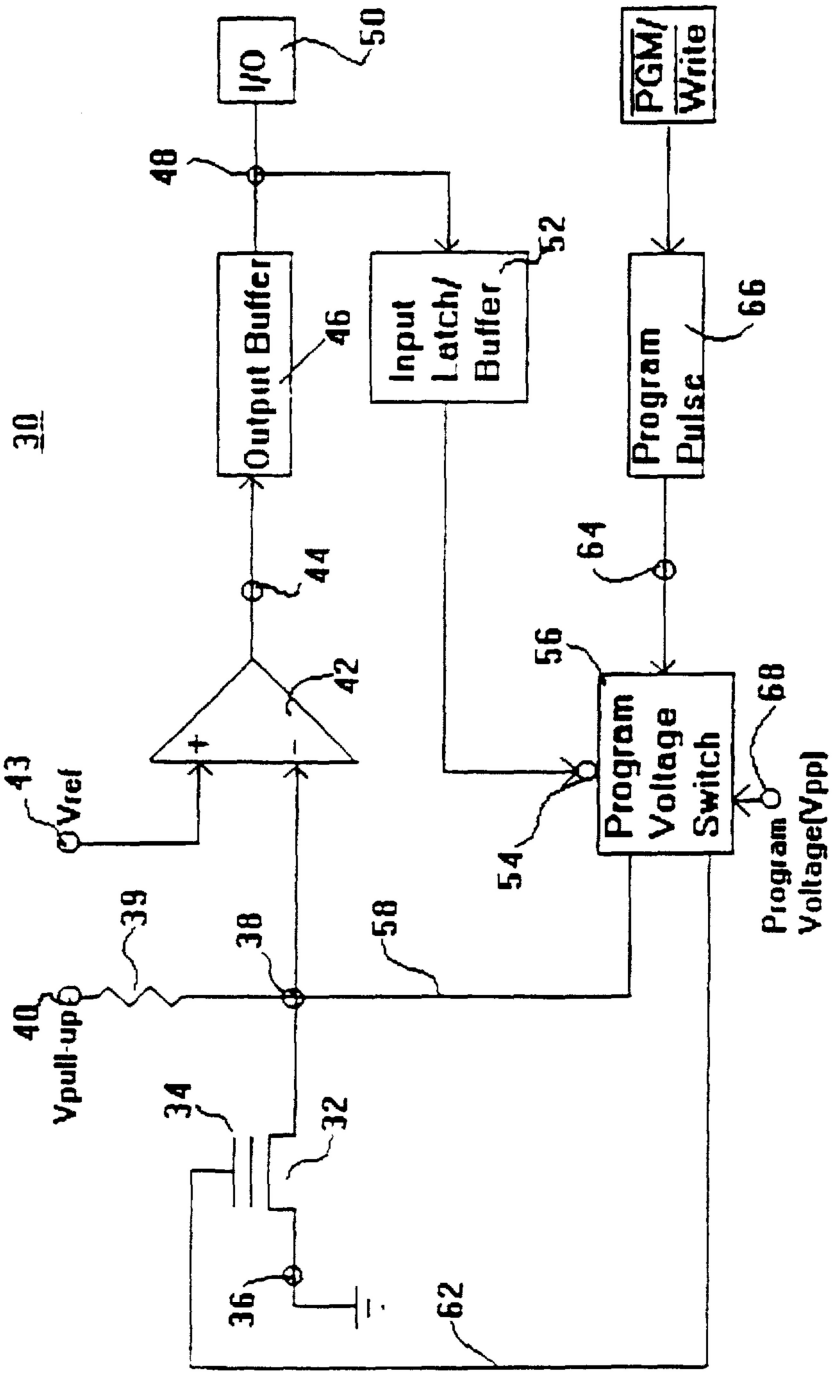

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Figure 2

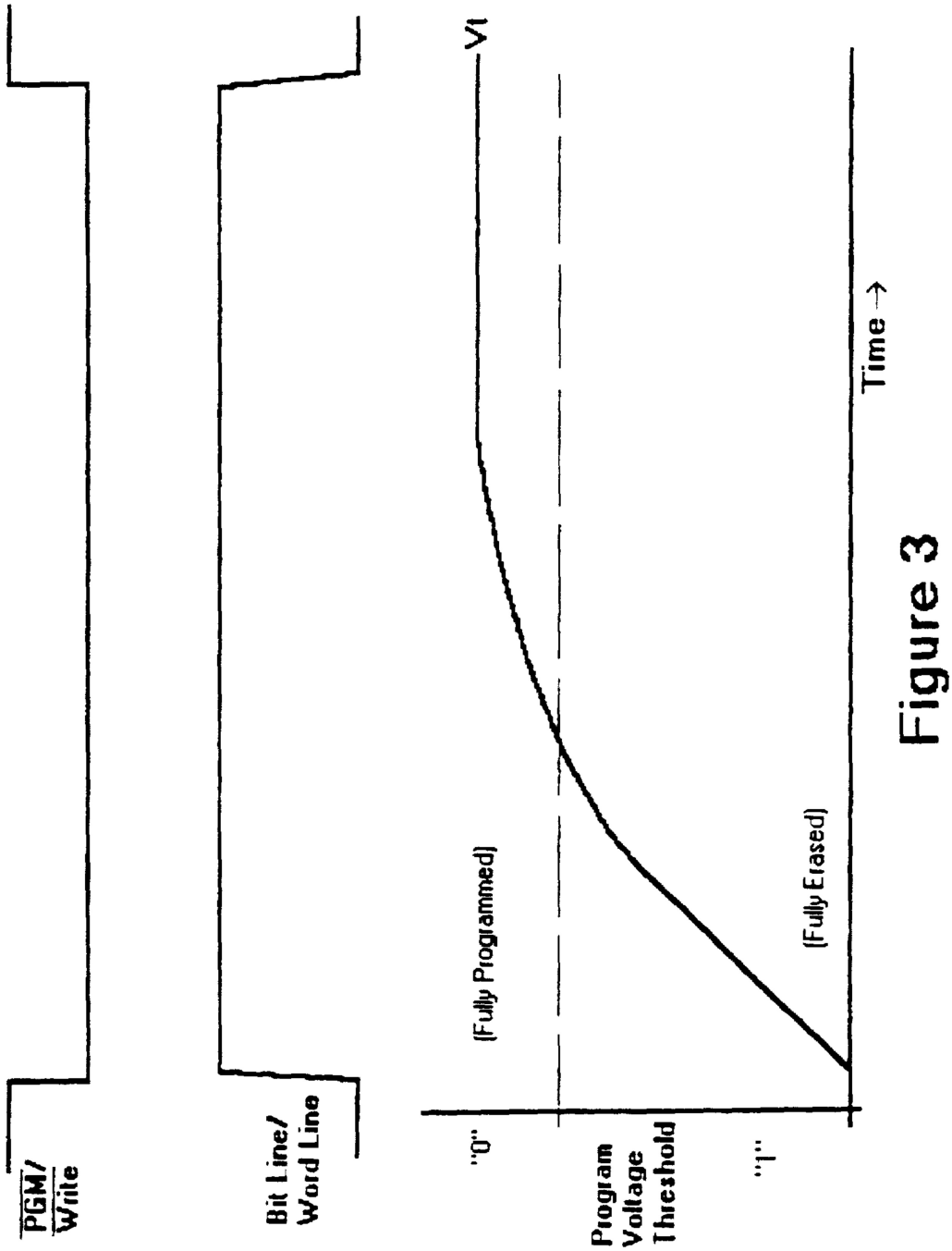
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Figure 3

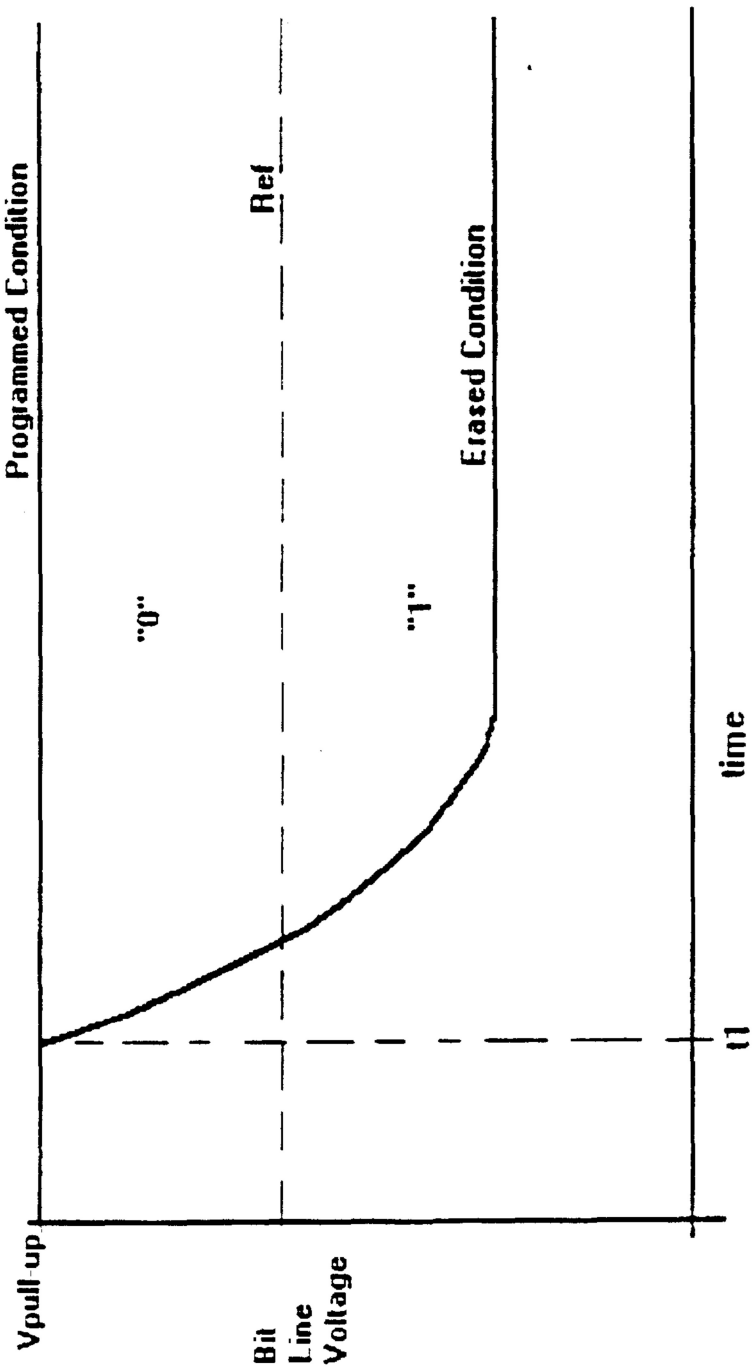

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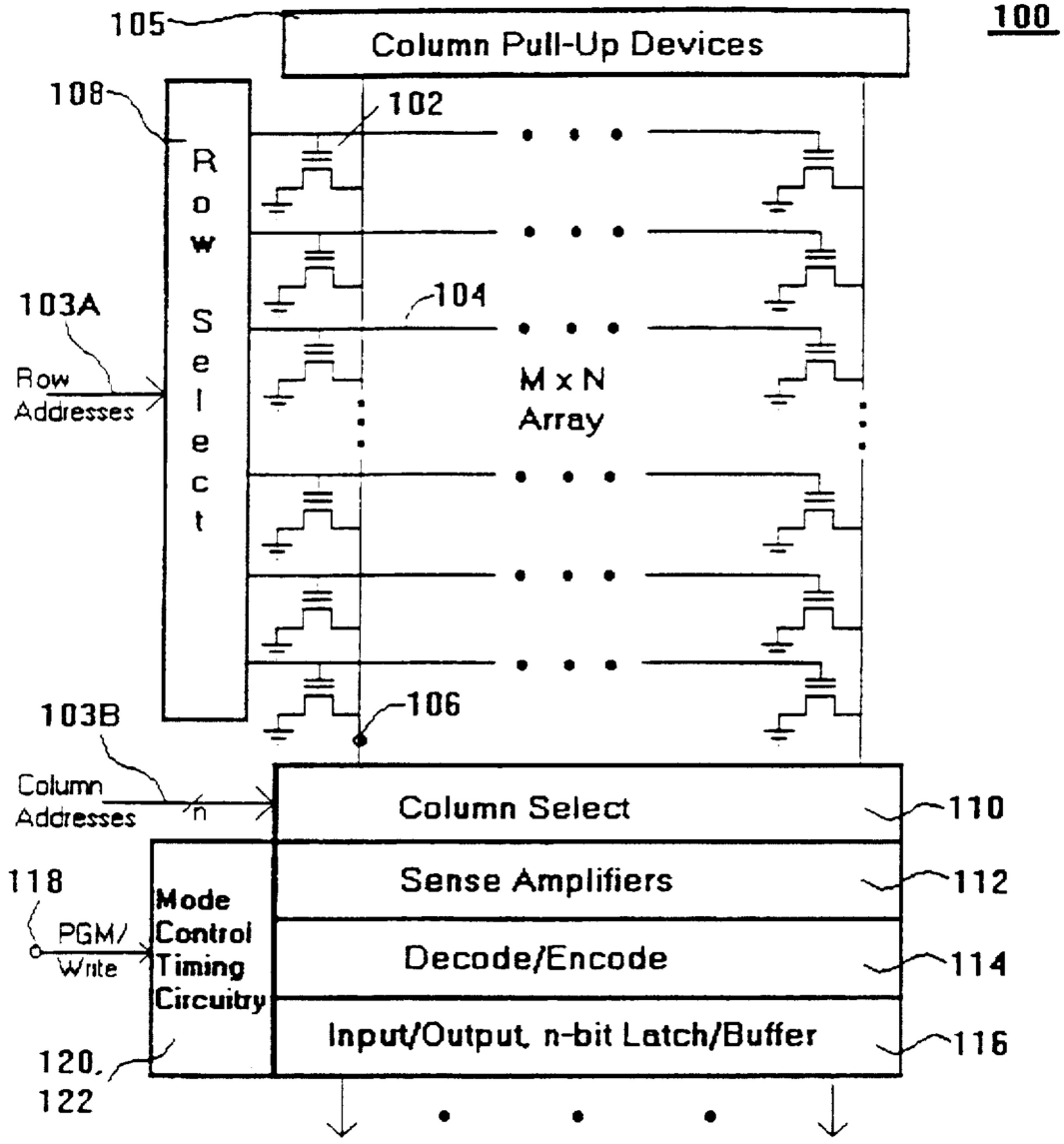
Figure 4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Column Pull-Up Devices
108
Row Select
102
104
103A
Row Addresses
M x N Array
103B
106
Column Addresses
n
Column Select
110
Sense Amplifiers
112
Decode/Encode
114
Input/Output, n-bit Latch/Buffer
116
118
PGM/ Write
Mode Control Timing Circuitry
120, 122

Figure 5

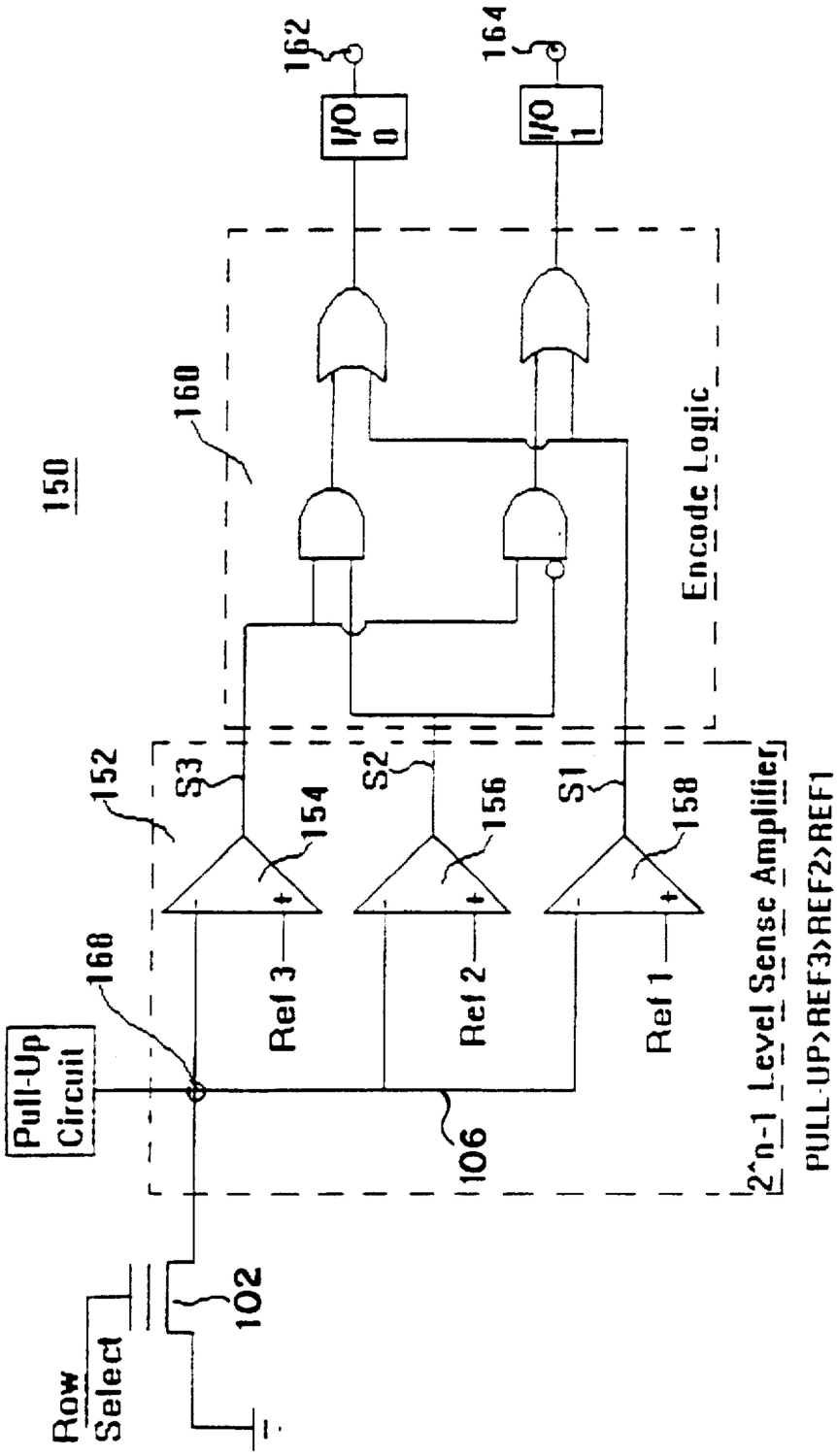

Figure 6

Appx150

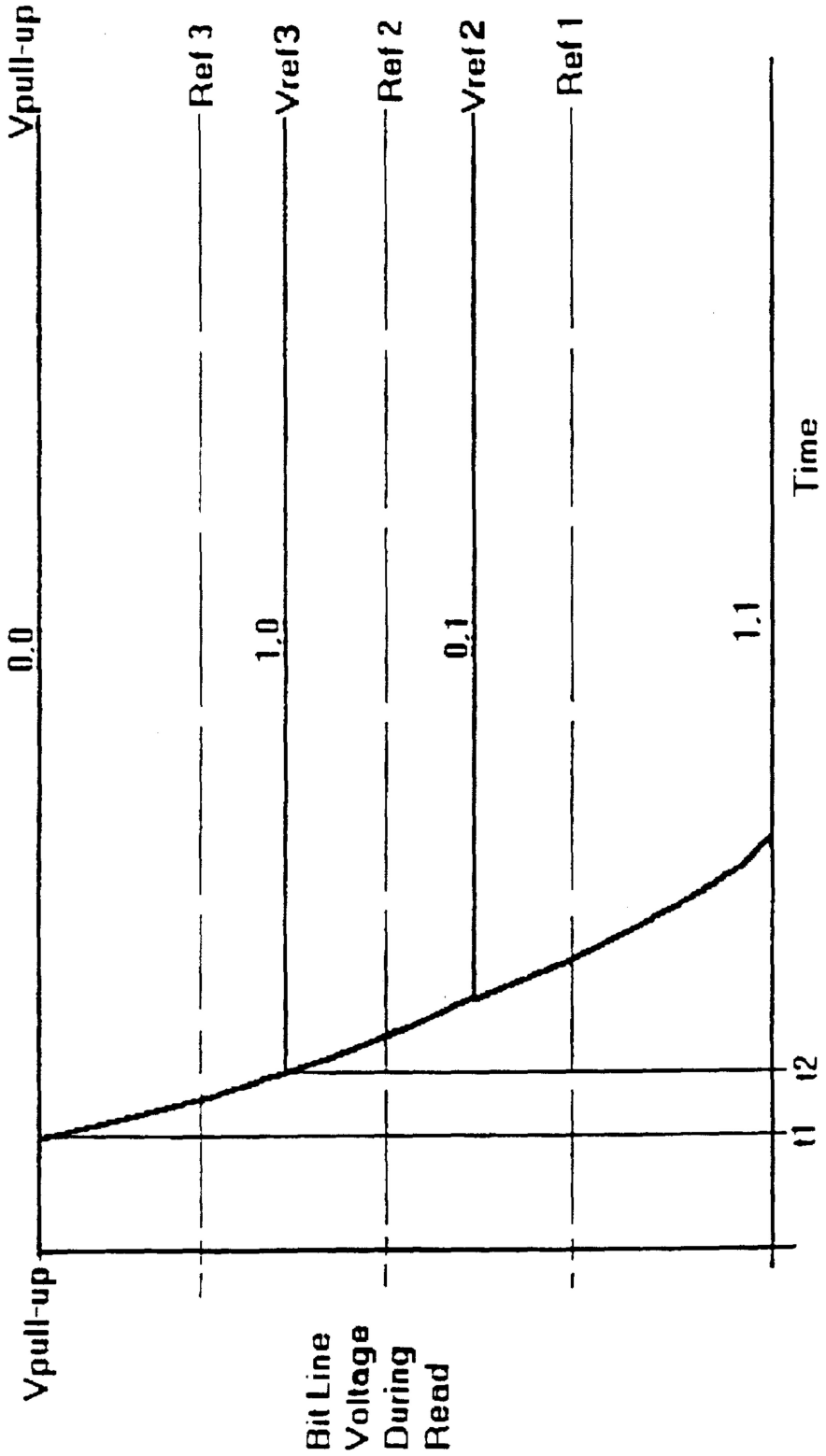
Vpull-up
Ref 3
Vref3
Ref 2
Vref2
Ref 1
Time
0,0
1,0
0,1
1,1
t2
t1
Vpull-up
Bit Line Voltage During Read

Figure 7

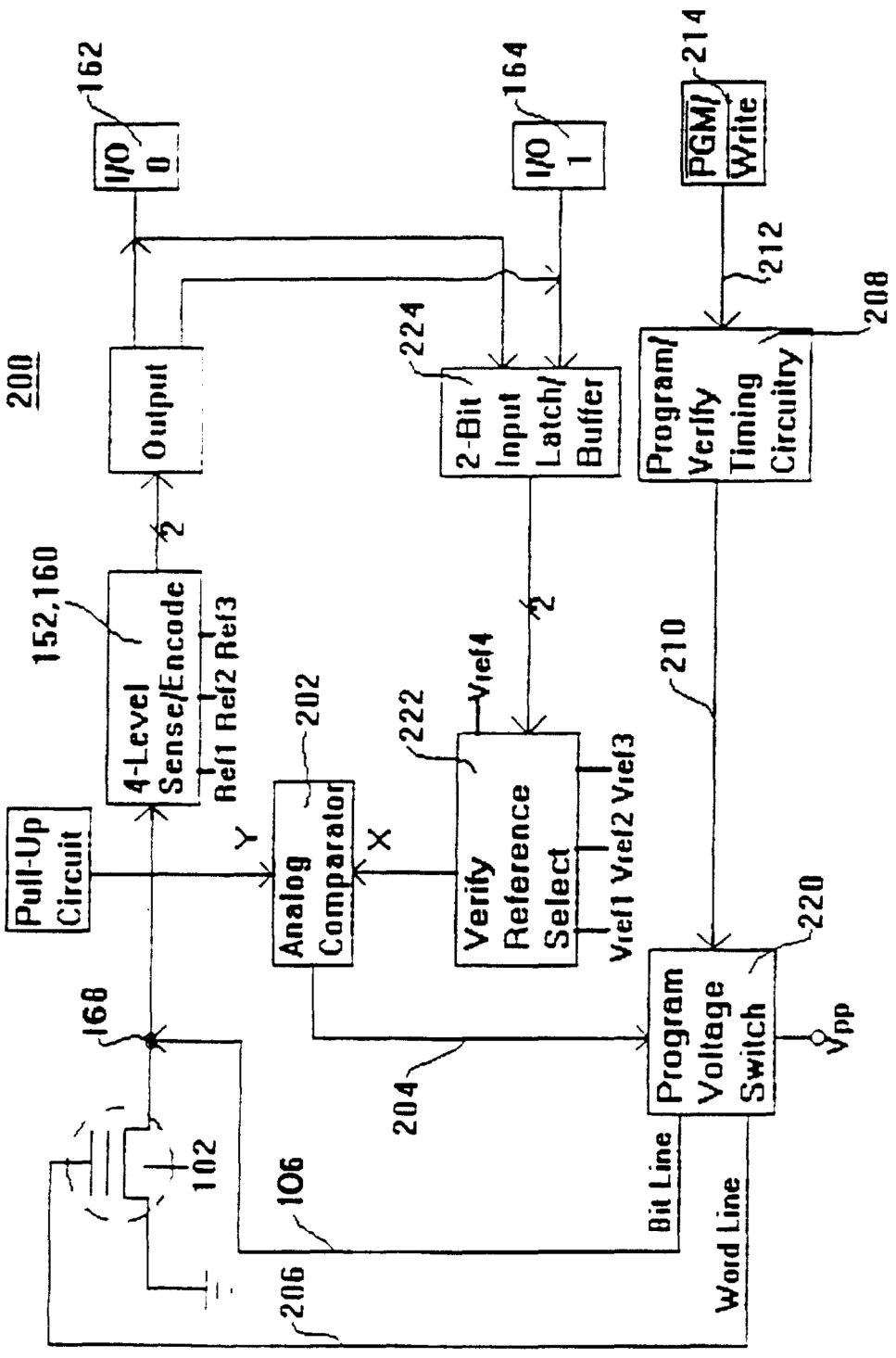

Figure 8

Appx152

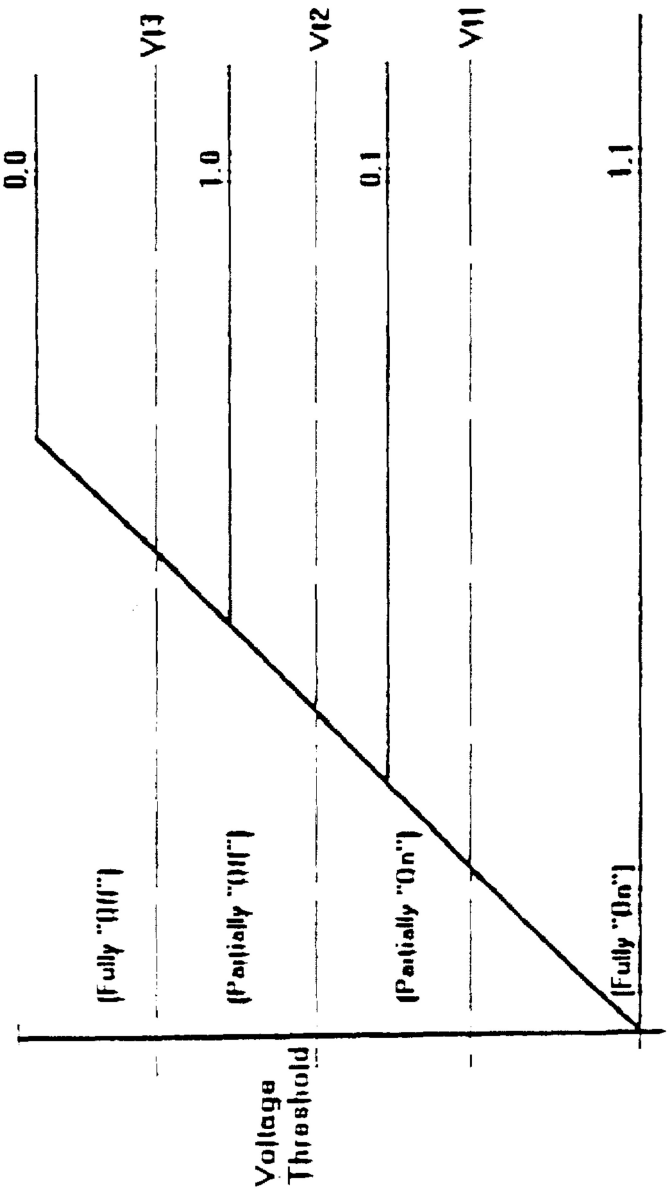
V13
V12
V11
0.0
1.0
0.1
1.1
(Fully "Off")
(Partially "Off")
(Partially "On")
(Fully "On")
Voltage Threshold

Figure 9

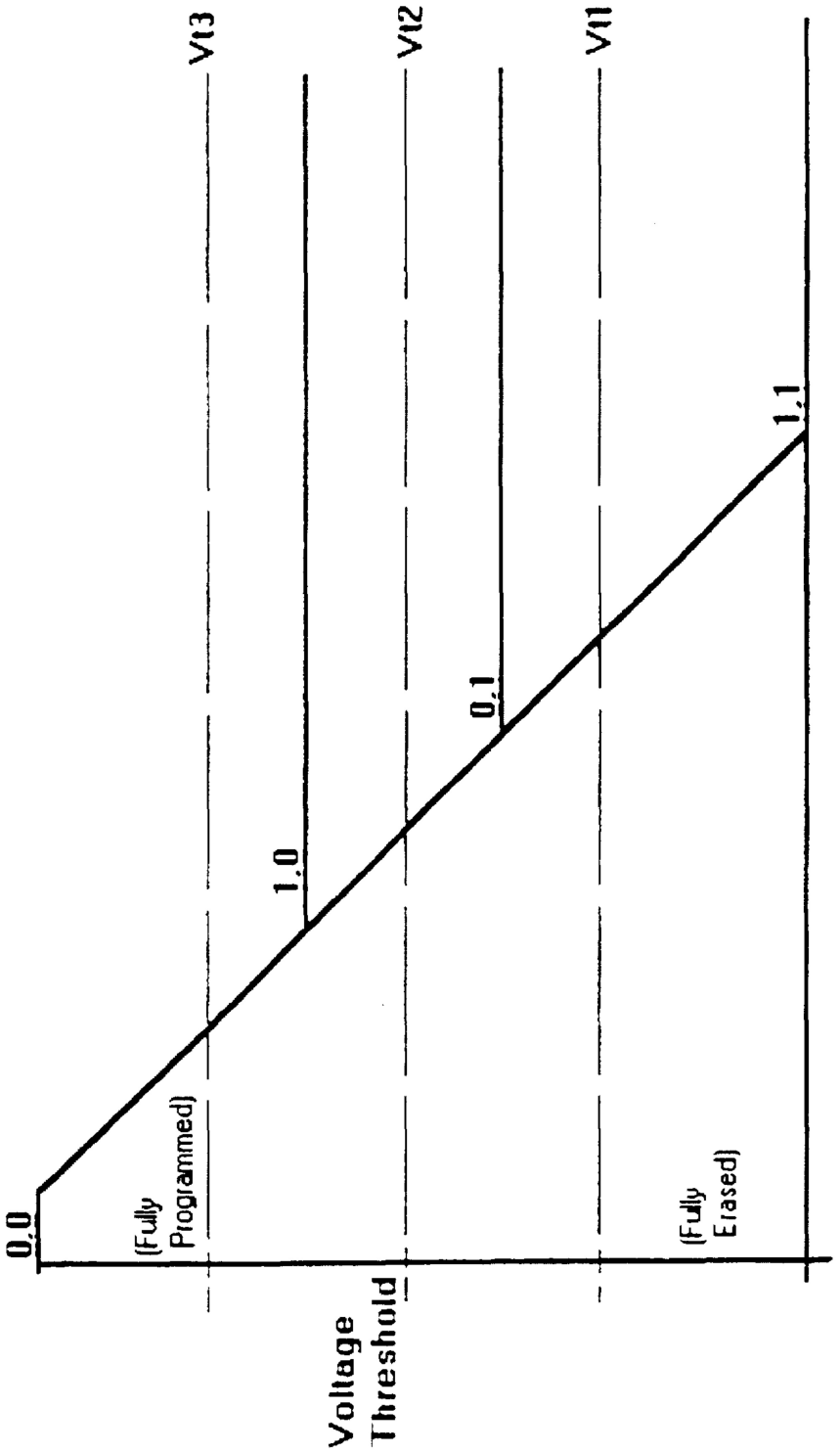
Vt3
Vt2
Vt1
1,1
0,1
1,0
0,0
(Fully Programmed)
(Fully Erased)
Voltage Threshold

Figure 10

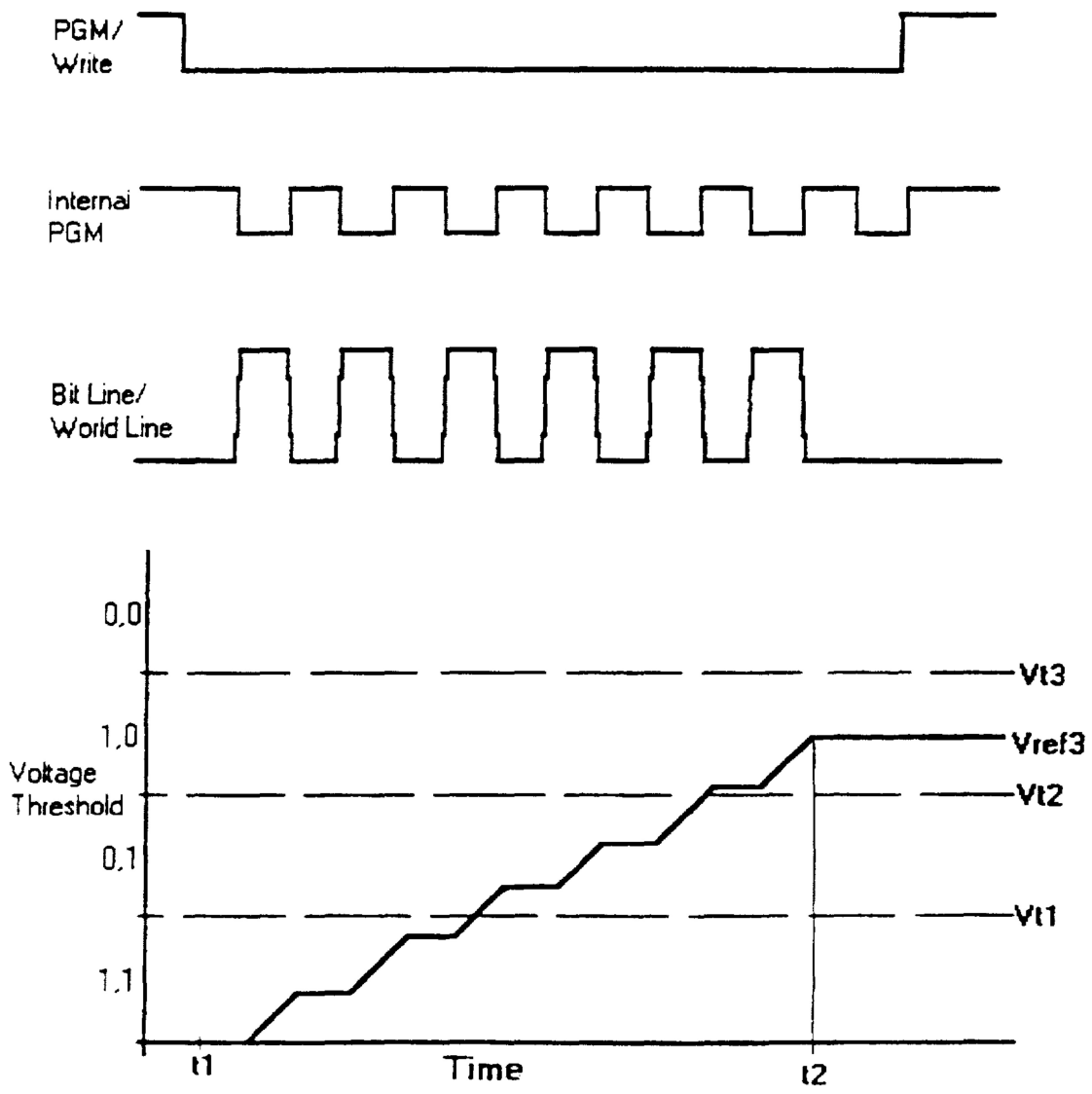
PGM/
Write
Internal
PGM
Bit Line/
World Line
0.0
1.0
Voltage
Threshold
0.1
1.1
Vt3
Vref3
Vt2
Vt1
t1
Time
t2

Figure 11

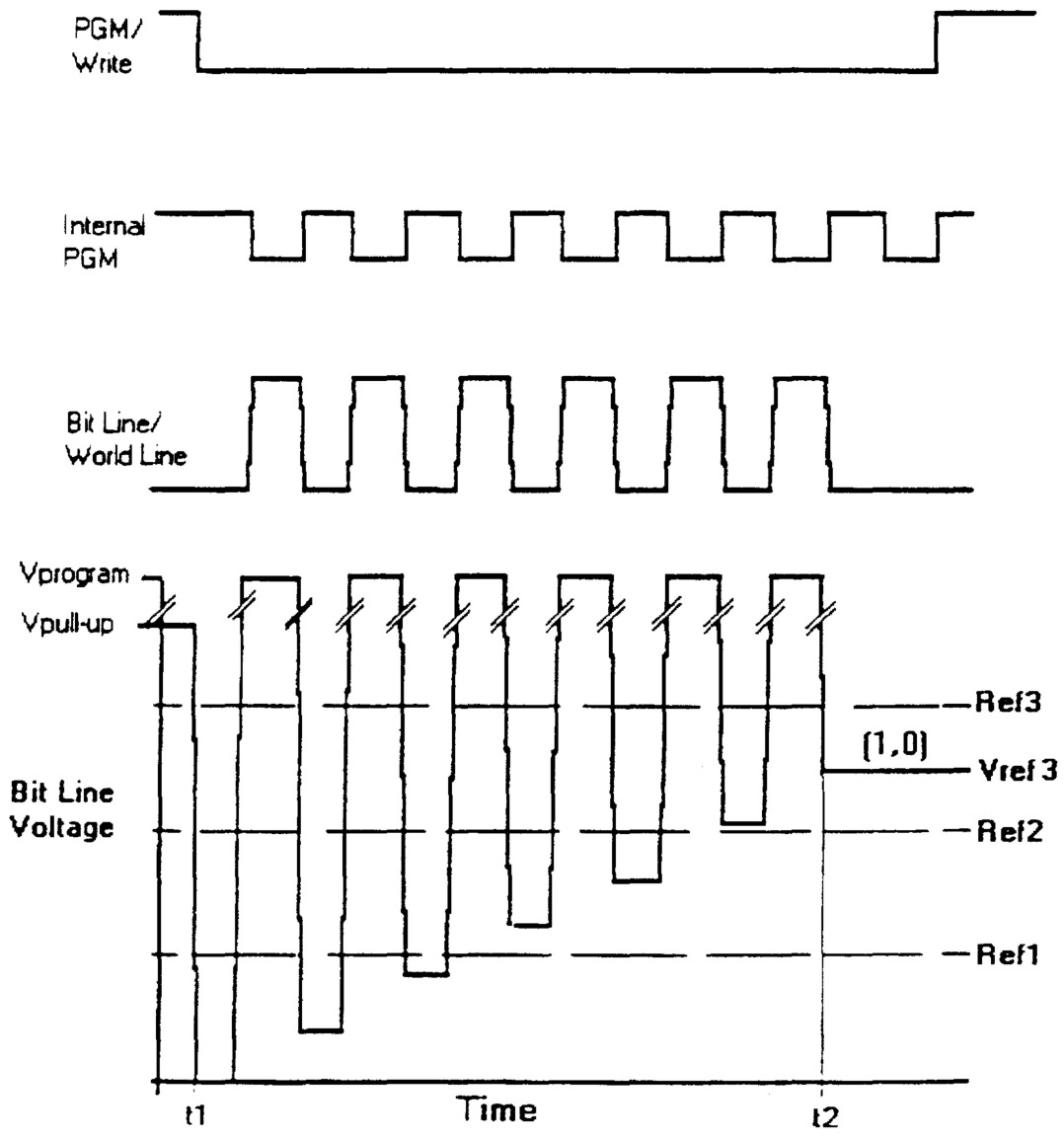
PGM/
Write
Internal
PGM
Bit Line/
World Line
Vprogram
Vpull-up
Bit Line
Voltage
Ref3
(1,0)
Vref 3
Ref2
Ref1
t1
Time
t2

Figure 12

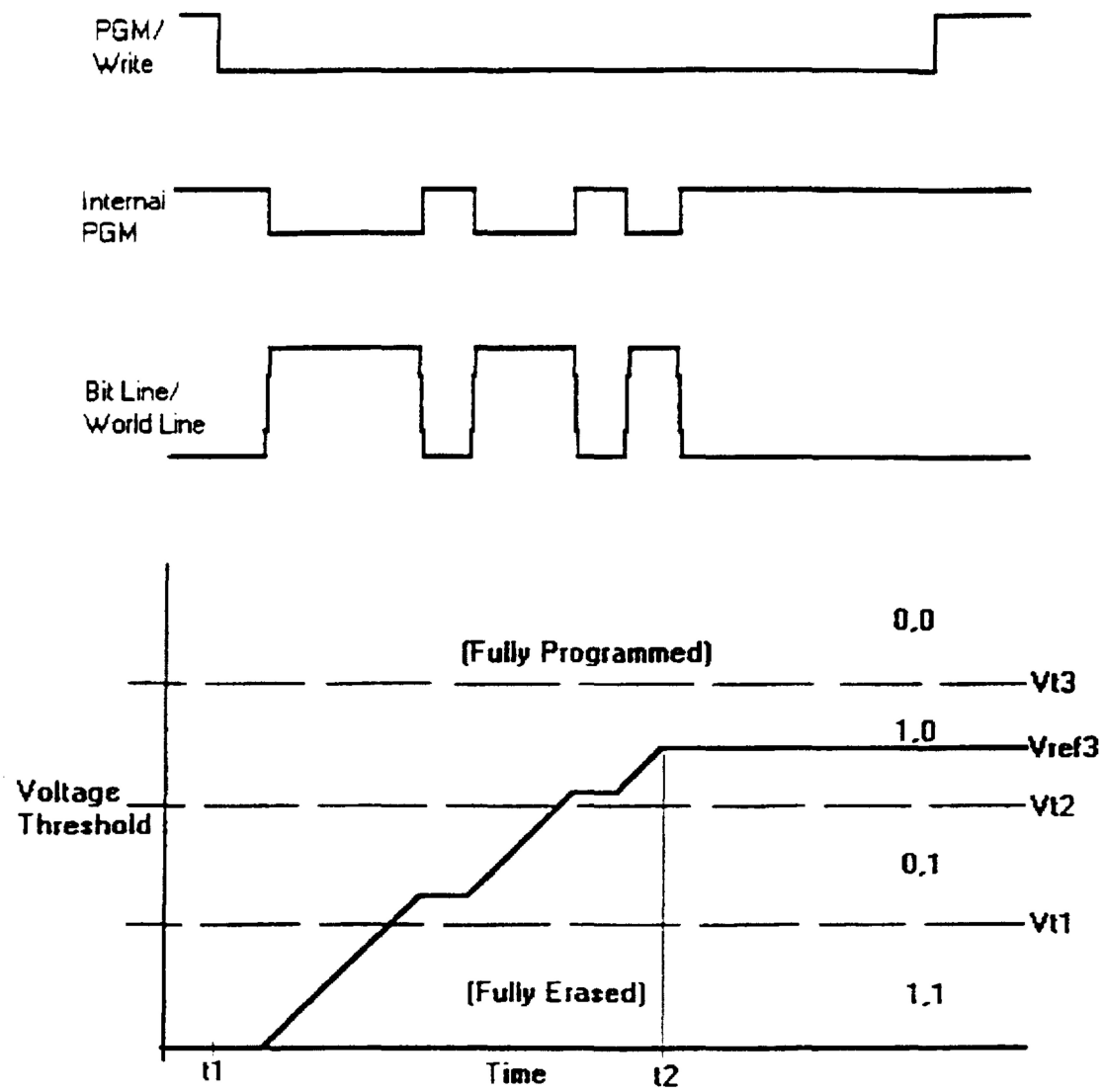
PGM/
Write
Internal
PGM
Bit Line/
World Line
0,0
(Fully Programmed)
Vt3
1,0
Vref3
Voltage
Threshold
Vt2
0,1
Vt1
(Fully Erased)
1,1
t1
Time
t2

Figure 13

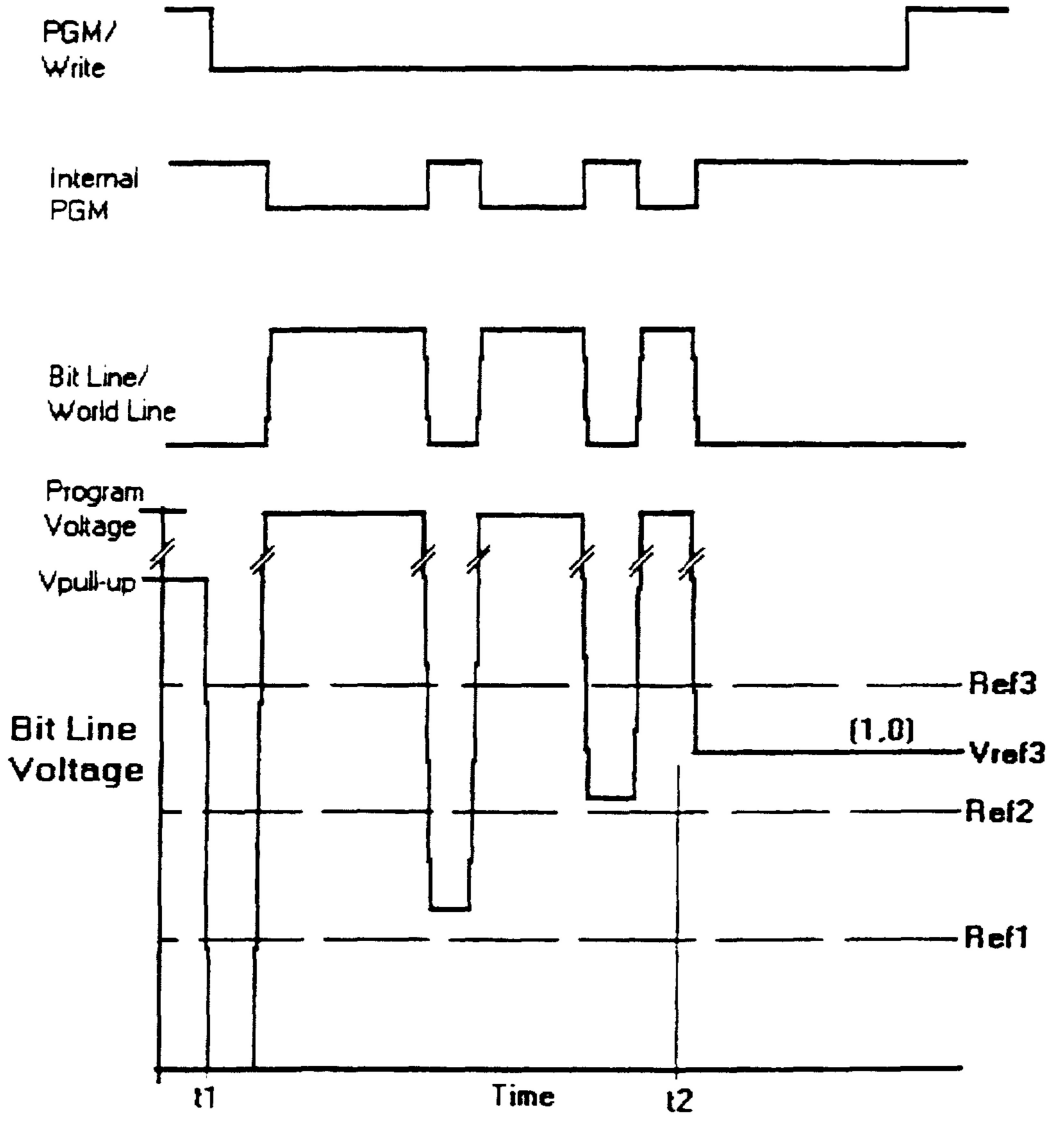
PGM/
Write
Internal
PGM
Bit Line/
World Line
Program
Voltage
Vpull-up
Bit Line
Voltage
Ref3
(1,0)
Vref3
Ref2
Ref1
t1
Time
t2

Figure 14

ELECTRICALLY ALTERABLE NON-VOLATILE MEMORY WITH N-BITS PER CELL

Cross Reference to Related Applications

This application is a continuation-in-part of U.S. patent application Ser. No. 08/071,816, filed Jun. 4, 1993 entitled "Electrically Alterable Non-Volatile Memory with N-Bits Per Memory Cell," now U.S. Pat. No. 5,394,362, which is a continuation of U.S. patent application Ser. No. 07/652,878, filed Feb. 8, 1991 (now U.S. Pat. No. 5,218,569) entitled "Electrically Alterable Non-Volatile Memory with N-Bits Per Cell."

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to non-volatile memory (NVM) devices; and, more particularly, is concerned with an apparatus and method for programming and/or verifying programming of a multi-level NVM device with stable reference voltages.

2. Description of the Background Art

In conventional single-bit per cell memory devices, the memory cell assumes one of two information storage states, either an "on" state or an "off" state. This combination of either "on" or "off" defines one bit of information. As a result, a memory device which can store n-bits of data requires n separate memory cells.

Increasing the number of bits which can be stored in a single-bit per cell memory device relies upon increasing the number of memory cells on a one-for-one basis with the number of bits of data to be stored. Methods for increasing the number of memory bits in a single memory device have relied upon the following advanced manufacturing techniques: manufacture larger die which contain more memory cells; or use improved lithography techniques to build smaller memory cells and allow more memory cells to be placed in a given area on a single chip.

An alternative approach to the single-bit per cell approach involves storing multiple-bits of data in a single memory cell. Previous approaches to implementing multiple-bit per cell non-volatile memory devices have only involved mask programmable read only memories (ROMs). In one of these approaches, the channel width and/or length of the memory cell is varied such that 2^n different conductivity values are obtained which correspond to 2^n different states corresponding to n-bits of data which can be stored on a single memory cell. In another approach, the ion implant for the threshold voltage is varied such that the memory cell will have 2^n different voltage thresholds (Vt) corresponding to 2^n different conductance levels corresponding to 2^n different states corresponding to n-bits of data which can be stored on a single memory cell. Examples of memory devices of these types are described in U.S. Pat. No. 4,192,014 by Craycraft, U.S. Pat. No. 4,586,163 by Koike, U.S. Pat. No. 4,287,570 by Stark, U.S. Pat. No. 4,327,424 by Wu, and U.S. Pat. No. 4,847,808 by Kobatake.

Single-bit per cell read-only-memory devices are only required to sense, or read, two different levels or states per cell, consequently they have need for only one voltage reference. Sensing schemes for multi-level memory devices are more complex and require 2^n-1 voltage references. Examples of such multiple state sensing schemes for ROMs are described in U.S. Pat. No. 4,449,203 by Adlhoch, U.S. Pat. No. 4,495,602 by Shepard, U.S. Pat. No. 4,503,578 by Iwahashi, and U.S. Pat. No. 4,653,023 by Suzuki.

These approaches to a multi-bit ROM commonly have one of 2^n different conductivity levels of each memory cell being determined during the manufacturing process by means of a customized mask that is valid for only one data pattern. Thus, for storing n different data information patterns, a minimum of n different masks need to be produced and incorporated into a manufacturing process. Each time a data information pattern needs to be changed a new mask must be created and a new batch of semiconductor wafers processed. This dramatically increases the time between a data pattern change and the availability of a memory product programmed with that new data pattern.

Prior art electrically alterable multiple-bit per cell memory approaches store multiple levels of charge on a capacitive storage element, such as is found in a conventional dynamic random access memory (DRAM) or a charge coupled device (CCD). Such approaches are described in U.S. Pat. No. 4,139,910 by Anantha, U.S. Pat. No. 4,306,300 by Terman, U.S. Pat. No. 4,661,929 by Aoki, U.S. Pat. No. 4,709,350 by Nakagome, and U.S. Pat. No. 4,771,404 by Mano. All of these approaches use volatile storage, that is, the charge levels are not permanently stored. They provide 2^n different volatile charge levels on a capacitor to define 2^n different states corresponding to n-bits of data per memory cell. All of these approaches have the common characteristic that whatever information is stored on such a memory cell is volatile because such a cell loses its data whenever power is removed. Furthermore, these types of memory cells must be periodically refreshed as they have a tendency to lose charge over time even when power is maintained.

It would be advantageous to develop a multi-bit semiconductor memory cell that has the non-volatile characteristic of a mask programmable read-only-memory (ROM) and the electrically alterable characteristic of a multi-bit per cell DRAM. These characteristics combined in a single cell would provide a multi-bit per cell electrically alterable non-volatile memory (EANVM) capable of storing K^n bits of data, where "K" is the base of the numbering system being used and "n" is the number of bits to be stored in each memory cell. Additionally, it would be advantageous if the EANVM described above was fully compatible with conventional industry standard device programmers/erasers and programming/erasing algorithms such that a user can program/erase the multi-bit per cell memory in a manner identical to that used for current single-bit per cell memory devices.

SUMMARY OF THE INVENTION

The present invention provides a multi-level electrically alterable non-volatile memory (EANVM) device, wherein some or all of the storage locations have more than two distinct states.

In a specific embodiment, the present invention provides a multi-level memory device. The present multi-level memory device includes a multi-level cell means for storing input information for an indefinite period of time as a discrete state of the multi-level cell means. The multi-level cell means stores information in K^n memory states, where K is a base of a predetermined number system, n is a number of bits stored per cell, and $K^n>2$. The present multi-level memory device also includes a memory cell programming means for programming the multi-level cell means to a state corresponding to the input information. A comparator means for comparing the memory state of the multi-level cell means with the input information is also included. The input information corresponds to one of a plurality of reference

voltages. The present comparator means further generates a control signal indicative of the memory state as compared to the input information.

An alternative specific embodiment also provides a multi-level memory device. The present multi-level memory device includes a multi-level cell means for storing input information for an indefinite period of time as a discrete state of the multi-level cell means. The multi-level cell means stores information in K^n memory states, where K is a base of a predetermined number system, n is a number of bits stored per cell, and $K^n>2$. A memory cell programming means for programming the multi-level cell means to a state corresponding to the input information is also included. The present multi-level memory device further includes a comparator means for comparing the memory state of the multi-level cell means with the input information. The input information corresponds to one of a plurality of reference voltages. The present comparator means further generates a control signal indicative of the memory state as compared to the input information. A reference voltage means for defining the plurality of reference voltages is also included. The present reference voltage means is operably coupled to the comparator means.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and form a part of this specification, illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention:

FIG. **1** is a generic schematic representation of a non-volatile floating gate memory cell.

FIG. **2** is a block diagram of a prior art single-bit memory system.

FIG. **3** is a timing diagram of the voltage threshold of a prior art single-bit per cell EANVM system being programmed from an erased "1" state to a programmed "0".

FIG. **4** is a timing diagram of the bit line voltage of a prior single-bit per cell EANVM during a read operation. It illustrates waveform levels for both the programmed and erased conditions.

FIG. **5** is a block diagram of an M×N memory array implementing a multi-bit per cell EANVM system.

FIG. **6** is a block diagram for reading a multi-bit per cell EANVM system.

FIG. **7** shows the bit line voltage during a read cycle as a function of time for a 2-bit per cell EANVM which has been programmed to one of four possible states, (0, 0), (1, 0), (0,1) and the fully erased condition (1,1). Four separate voltage levels are represented on this figure, each representing one of the four possible states. Only one of these would be present for any given read operation.

FIG. **8** is a block diagram of a multi-bit per cell system combining program/verify and read circuitry.

FIG. **9** is a timing diagram for the voltage threshold for a 2-bit per cell EANVM being programmed from a fully erased (1,1) state to one of the other three possible states.

FIG. **10** is a timing diagram which illustrates the voltage threshold of a 2-bit per cell EANVM being erased from a fully programmed (0,0) state to one of the other three possible states.

FIG. **11** is a timing diagram illustrating the voltage threshold of a 2-bit per cell EANVM during a program/verify cycle using fixed width program pulses.

FIG. **12** is a timing diagram illustrating the bit line voltage of a 2-bit per cell EANVM during a program/verify process which uses fixed width program pulses.

FIG. **13** is a timing diagram illustrating the voltage threshold of a 2-bit per cell EANVM during a program/verify cycle using variable width program pulses.

FIG. **14** is a timing diagram illustrating the bit line voltage of a 2-bit per cell EANVM during a program/verify process which uses variable width program pulses.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Reference will now be made in detail to the specific embodiments of the invention, examples of which are illustrated in the accompanying drawings. While the invention will be described in conjunction with the specific embodiments, it will be understood that they are not intended to limit the invention to those embodiments. On the contrary, the invention is intended to cover various alternatives, modifications and equivalents, which may be included within the spirit and scope of the invention as defined by the appended claims.

In general, the invention described here allows n-bits of information to be stored on and read from an Electrically Alterable Non-Volatile Memory (EANVM). This is accomplished by electrically varying the conductivity of the channel of a floating gate FET to be within any one of K^n conductivity ranges where "K" represents the base of the numbering system being employed (in a binary system, "K" equals 2). The conductivity range is then sensed and encoded. This forms the basis of an n-bit EANVM memory cell. The floating gate FET conductivity is electrically modified by using external programming hardware and algorithms which supply signals and voltages to the EANVM memory device.

These external signals and voltages are then modified internal to the device to provide an internally controlled program/verify cycle which incrementally stores electrons on the floating gate until the desired conductivity range is achieved. For the purpose of illustration, the n-bit per cell descriptions will assume a binary system which stores 2-bits per memory cell.

I. PRIOR ART SINGLE-BIT EANVM DEVICES

FIG. **1** is a generic schematic representation of a non-volatile floating gate memory cell **10**. It is not intended that this schematic drawing is in any way indicative of the device structure. It is used to illustrate the fact that this invention refers to an FET memory cell which uses an electrically isolated, or floating, gate **14** to store charged particles for the purpose of altering the voltage threshold and hence channel conductivity of the FET memory cell **10**.

The FET memory cell **10** includes a control gate **12** which is used either to select the memory cell for reading or is used to cause electrons to be injected onto the floating gate **14** during the programming process. Floating gate **14** is an electrically isolated structure which can indefinitely store electrons. The presence or absence of electrons on floating gate **14** alters the voltage threshold of the memory cell **10** and as a result alters the conductivity of its channel region. A drain region **16** of the FET is coupled to a source region **18** by a channel region **19**. When the floating gate **14** is fully erased and the control gate **12** has been selected, the channel region **19** is in the fully "on", or high conductivity, state. When the floating gate **14** is fully programmed the channel region **19** is in the fully "off", or low conductivity state.

FIG. **2** is a block diagram of a prior art conventional single-bit EANVM memory system **30**. The memory system

30 stores a single bit of information in an EANVM cell 32. The cell 32, as described in FIG. 1, is selected for reading or writing when a row, or word, select signal is applied to a control gate terminal 34. A source terminal 36 for the FET of the cell 32 is connected to a reference ground potential. A drain terminal 38 is connected through a pull-up device 39 to a voltage Vpull-up at a terminal 40. Terminal 38 serves as the output terminal of the cell 32. When the cell 32 stores a "1" bit, the channel of the FET is in a low conductivity, or high impedance, state so that the voltage at terminal 38 is pulled-up to the voltage level Vpull-up on terminal 40. When the cell 32 stores a "1" bit, the channel of the FET is in a high conductivity, or low impedance, state so that the voltage at terminal 38 is pulled-down by the ground potential at terminal 36.

For reading the value of the single-bit stored in the cell 32, a sense amplifier 42 compares the voltage at terminal 38 with a reference voltage Vref at terminal 43. If a "0" is stored on the EANVM cell 32, the cell will be in a low conductivity state and as a result the voltage at terminal 38 is above the reference voltage at terminal 43. For a "0" stored in the cell 32, the output terminal 44 of the sense amplifier 42 will be a low voltage which will be transmitted through an output buffer 46 to a terminal 48 and then coupled to the I/O terminal 50 as a logical "0". If a "1" is stored on the EANVM cell 32, the cell is in a high conductivity state and as a result the voltage at terminal 38 is below the reference voltage at terminal 43. The output of the sense amplifier 42 will be a high voltage which will be transmitted to the I/O terminal 50 as a logical "1".

For writing the value of an information bit stored in the cell 32, it is assumed that the cell 32 is in the erased, or fully "on", state which corresponds to a logical "1". The I/O terminal 50 is connected to the input terminal of an input latch/buffer 52. The output of the input latch/buffer 52 is connected to an enable/disable terminal 54 of a program voltage switch 56. The program voltage switch 56 provides a bit-line program voltage on a signal line 58 connected to terminal 38. Another output from the program voltage switch 56 is the word line program voltage on a signal line 62, which is connected to the control gate 34 of the EANVM cell 32. When a logical "0" is present at terminal 54 of the program voltage switch 56 from the output of Input Latch/Buffer 52 and when the program voltage switch 56 is activated by a program pulse on a signal line 62 from a program pulse 66, activated by a PGM/Write signal, the program voltage switch 56 provides the Program Voltage Vpp from a terminal 68 to the control gate 34 of the EANVM cell 32. The program voltage switch 56 also biases the drain of the EANVM cell 32 to a voltage, typically between 8 to 9 volts, and the gate of the EANVM cell 32 to the program voltage Vpp, typically 12 volts. Under these conditions, electrons are injected onto the floating gate by a phenomenon known as hot electron injection. This programming procedure raises the voltage threshold of the EANVM cell which increases its source-drain impedance. This continues until the FET memory cell 32 is effectively turned off, which corresponds to a "0" state. When a "1" is present on terminal 54 from the output of the Input Latch/Buffer 52 and when the PGM/Write is enabled, the signal line 58 is driven low and programming is inhibited and the "1", or erased, state is maintained.

FIG. 3 is a timing diagram of a prior-art single-bit EANVM cell 32, as described in connection with FIG. 2. The timing diagram shows the change in voltage threshold of the EANVM cell 32, as controlled by the word line and bit line programming voltages, which are illustratively shown as a single signal and which are both controlled by the PGM/Write signal. The memory cell is being programmed from the fully erased "1" state to the fully programmed "0" state. For the duration of the PGM/Write pulse, the bit and word line program voltages, which need not be the same, are respectively applied to the source connected to the bit line 38 and to the control gate 34 of the memory cell 32. As electrons are injected onto the floating gate, the voltage threshold of the memory cell begins to increase. Once the voltage threshold has been increased beyond a specific threshold value as indicated by the dashed horizontal line, the memory cell 32 is programmed to a "0" state.

Note that Fowler-Nordheim tunnelling can also be used instead of hot electron injection to place electrons on the floating gate. The multi-bit EANVM device described here functions with either memory cell programming technique. The prior art programming algorithms and circuits for either type of programming are designed to program a single-bit cell with as much margin as possible in as short a time as possible. For a single-bit memory cell, margin is defined as the additional voltage threshold needed to insure that the programmed cell will retain its stored value over time.

FIG. 4 is a timing diagram showing the bit line voltage at terminal 38 as a function of time during a memory read operation. In this example, prior to time t1 the bit line is charged to the Vpull-up condition. Note that it is also possible that the bit line may start at any other voltage level prior to time t1. At time t1, the EANVM cell 32 is selected and, if the cell 32 is in the erased or tilt state, the cell 32 provides a low impedance path to ground. As a result, the bit line is pulled down to near the ground potential provided at terminal 36 in FIG. 2. If the EANVM cell 32 were in the "0" or fully programmed state, the bit line voltage would remain at the Vpull-up voltage after time t1. The voltage on the bit-line terminal 38 and the reference voltage Vref at terminal 43 are compared by the comparator 42, whose buffered output drives I/O terminal 50. When Vref is greater than the bit line voltage, the output on I/O terminal 50 is a logical "1". When Vref is lower than the bit line voltage, the output on I/O terminal 50 is a logical "0".

II. MEMORY ARRAY FOR A MULTI-BIT EANVM SYSTEM

FIG. 5 is a block diagram of a multi-bit per cell EANVM system 100 which includes an M×N array of memory cells. The cells are typically shown as a floating gate FET, or EANVM, 102, as described in connection with FIG. 1. The array uses similar addressing techniques, external control signals, and I/O circuits as are used with currently available single bit per cell EANVM devices such as EPROM, EEPROM, FLASH, etc. devices. Row Address signals are provided at input terminals 103A and Column Address signals are provided at input terminals 103B.

Each of the EANVM cells in a row of cells has its source connected to a ground reference potential and its drain connected to a column bit line, typically shown as 106. Each of the columns is connected to a pull-up device, as indicated by the block 105. All of the control gates of a row are connected to a row select, or word, line, typically shown as 104. Rows are selected with a row select circuit 108 and columns are selected with a column select circuit 110. Sense amplifiers 112 are provided for each of the selected columns. Decode/encode circuits 114 and n-bit input/output latches/buffers 116 are also provided. A PGM/Write signal is provided at an input terminal 118 for activating a mode control circuit 120 and a timing circuit 122.

A significant feature of this n-bit per cell system **100** as compared to a single-bit per cell implementation is that the memory density is increased by a factor of n, where n is the number of bits which can be stored on an individual multi-bit memory cell.

III. BASIC READ MODE OF AN N-BIT MEMORY CELL

FIG. **6** shows a binary system **150** for reading the state of an n-bit floating gate memory cell **102**, as described in connection with FIG. **1**, according to the invention, where n is the number of bits stored in the memory cell. For this example, n is set to 2 and one of four states of the memory cell must be detected. The four possible states being, (0,0), (0,1), (1,0), or (1,1). Detecting which state is programmed requires a 3-level sense amplifier **152**. This amplifier includes three sense amplifiers **154**, **156**, **158** each of which have their negative input terminals connected to the output terminal **168** of the memory cell **102**. Sense amplifier **154** has a reference voltage Ref **3** connected to its positive input terminal. Sense amplifier **156** has a reference voltage Ref **2** connected to its positive input terminal. Sense amplifier **158** has a reference voltage Ref **1** connected to its positive input terminal. The voltage references are set such as follows: Vpull-up>Ref **3**>Ref **2**>Ref **1**. The respective output signals **S3**, **S2**, **S1** of the three sense amplifiers drive an encode logic circuit **160**, which encodes the sensed signals **S3**, **S2**, **S1** into an appropriate 2-bit data format. Bit **0** is provided at an I/O terminal **162** and Bit **1** is provided at an I/O terminal **164**. A truth table for the encode logic circuit **160** is as follows:

S3	S2	S1	I/O 1	I/O 0	State
L	L	L	0	0	(0,0)
H	L	L	1	0	(1,0)
H	H	L	0	1	(0,1)
H	H	H	1	1	(1,1)

During a read operation of an n-bit memory cell, the levels of the respective output signals **S3**, **S2**, **S1** of the sense amplifiers **154**, **156**, **158** are determined by the conductivity value to which the memory cell had been set during a programming operation. A fully erased EANVM cell **102** will be in its lowest threshold voltage state, or the highest conductivity state. Consequently, all of the reference voltages will be higher than the bit line voltage at terminal **168**, resulting in a (1,1) state. A fully programmed EANVM cell **102** will be in its highest threshold voltage state, or its lowest conductivity state. Consequently, all reference voltages will be lower than the bit line voltage at terminal **168**, resulting in a (0,0) state. The intermediate threshold states are encoded as is illustrated in the truth table for the logic circuit **160**. FIG. **7** shows the bit line voltage as a function of time at terminal **168**, during a read cycle, for a binary 2-bit per memory cell. For purposes of illustration, each of the four possible waveforms corresponding to the four possible programmed states of the memory cell are shown. During a read cycle only the waveform corresponding to the programmed state of the EANVM cell would occur. For example, assume the EANVM memory cell **102** has been programmed to a (1,0) state. Prior to time **t1**, because the EANVM cell **102** has not yet been selected or activated, the bit line **106** is pulled-up to Vpull-up. At time **t1**, the EANVM cell is selected using conventional memory address decoding techniques. Because the EANVM cell has been programmed to a specific conductivity level by the charge on the floating gate, the bit line is pulled down to a specific voltage level corresponding to the amount of current that the cell can sink at this specific conductivity level. When this point is reached at time **t2** the bit line voltage stabilizes at a voltage level Vref**3** between reference voltages Ref **3** and Ref **2** which correspond to a (1,0) state. When the EANVM cell **102** is de-selected, the bit line voltage will return to its pulled-up condition. Similarly, the bit-line voltage stabilizes at Vref**2** for the 0,1 state for, or at zero volts for the 1,1 state. FIG. **8** is a block diagram of an n-bit memory cell system **200**. For purposes of illustration a binary 2-bit per cell system is shown. However, the concepts of the invention extend to systems where n is greater than 2. It is also intended that the invention include any system where the EANVM memory cell has more than two states. For example, in a non-binary system, the memory states can be three or some other multiple of a non-binary system. Some of the components of this system **200** are shown and described with the same reference numerals for the components of FIG. **6** for the read mode of operation. It is intended that these same reference numerals identify the same components. The system **200** includes a memory cell **102**, as described in FIG. **1**, with a bit line output terminal **168**. For the read mode of operation, a 3-level sense amplifier **152** with read reference voltages Ref **1**, Ref **2**, and Ref **3** and an encoder **160** is provided. Read data is provided at a Bit I/O terminal **162** and at a Bit **1** I/O terminal **164**. For the write mode of operation, a verify reference voltage select circuit **222** provides an analog voltage reference level signal X to one input terminal of an analog comparator **202**. The verify reference voltages are chosen so that as soon as the bit line voltage on bit line **106** is greater than the verify reference voltage the threshold of the EANVM cell **102** is set to the proper threshold corresponding to the memory state to which it is to be programmed. To this end the verify reference voltages Vref**1**, Vref**2**, Vref**3**, and Vref**4** are set such that Vref**4** is above Ref **3**, Vref**3** is between Ref **3** and Ref **2**, Vref**2** is between Ref **1** and Ref **2**, and Vref**1** is below Ref **1**. During a normal read operation, the bit line voltage will settle midway between the read reference voltages to insure that the memory contents will be read accurately. The verify reference voltage select circuit **222** is controlled by the 2-output bits from a 2-bit input latch/buffer circuit **224**, which receives binary input bits from the I/O terminals **162** and **164**. The Y signal input terminal of the analog comparator **202** is connected to the bit line output terminal **168** of the multi-level memory cell **102**. The output signal from the analog comparator is provided on a signal line **204** as an enable/disable signal for the program voltage switch **220**. An output signal line **206** from the program voltage switch **220** provides the word line program voltage to the control gate of the EANVM cell **102**. Another output signal line **106** constitutes the bit line and provides the bit-line programming voltage to the bit-line terminal **168** of EANVM cell **102**. After a program/verify timing circuit **208** is enabled by a PGM/Write signal provided on signal line **212** from a PGM/Write terminal **214**, the timing circuit **208** provides a series of program/verify timing pulses to the program voltage switch **220** on a signal line **210**. The pulse widths are set to control the programming process so that the voltage threshold of the EANVM cell **102** is incrementally altered by controlling the injection of charge onto the floating gate of the EANVM cell. Each programming cycle increases the voltage threshold and, as a result, decreases the conductance of the memory cell **102**. After each internal program cycle is complete, as indicated by signal line **210** going "high", the program voltages are removed via the Program Voltage Switch **220** and a verify cycle begins. The voltage threshold of memory cell **102** is then determined by

using the comparator **202** to compare the bit line voltage at terminal **168** with the selected verify reference voltage from the verify reference voltage select circuit **222**. When the bit line voltage exceeds that supplied by the verify reference voltage select circuit **222**, the output signal **204** from the comparator **202** will then disable the program voltage switch **220** ending the programming cycle. For this embodiment of the invention, during a write operation, comparison of the current memory cell analog contents with the analog information to be programmed on the memory cell **102** is performed by the analog comparator **202**. The verify reference voltage select circuit **222** analog output voltage X is determined by decoding the output of the n-bit input latch/buffer **224** (n=2 in the illustrative form). The Y input signal to the analog comparator **202** is taken directly from the bit line terminal **168**. Note that the 3-level sense/encode circuits **152**, **160**, and reference voltage select circuit **222** may be completely independent, as indicated in the drawing. Alternatively, they may be coupled together to alternately time share common circuit components. This is possible because the 3-level sense/encode circuits **152** and **160** are used in the read mode of operation while the verify reference voltage select circuit **222** is used only in the write/verify mode of operation.

IV. BASIC WRITE MODE FOR A MULTI-BIT PER CELL EANVM SYSTEM

In the write mode, a binary n-bit per cell EANVM system must be capable of electrically programming a memory cell to 2^n uniquely different threshold levels. In the two-bit per cell implementation, because it is assumed that the cell starts from the erased (1,1) state, it is only necessary to program three different thresholds (Vt1, Vt2, and Vt3) which define the (0,1), (1,0), and (0,0) states. Vt1 is the threshold required such that in the read mode, the bit line voltage will fall between Ref 1 and Ref 2. Vt2 is the threshold required such that in the read mode, the bit line voltage will fall between Ref 2 and Ref 3. Vt3 is the threshold required such that in the read mode, the bit line voltage will be greater than Ref 3.

FIG. **9** illustrates the change in voltage threshold for a 4-level, or 2-bit EANVM cell as the floating gate is being charged from an erased (1,1) threshold state to any one of the three other possible states. In prior art single-bit memory cells where there are only two states, the design objective is to provide enough charge to the floating gate to insure that the cell's voltage threshold is programmed as high as possible, as shown in FIG. **3**. Because there is no upper threshold limit in a single-bit per cell system, overprogramming the cell will not cause incorrect data to be stored on the memory cell.

As will be appreciated from FIG. **9**, in an n-bit per cell system the memory cell must be charged to a point so that the voltage threshold is within a specific voltage threshold range. In this example, where the cell is being programmed to a (1,0) state, the proper threshold range is defined as being above a threshold level Vt2 and as being below a threshold level Vt3.

To accomplish this n-level programming it is necessary to add to or modify the prior art EANVM circuitry. FIG. **8** shows the additional or modified circuits, including a reference voltage select, an n-bit latch/buffer, a program/verify timing circuit, and a comparator. The comparator can be either digital or analog.

FIG. **10** illustrates the voltage threshold of an EANVM cell as the floating gate is being erased from a (0,0) state. Standard EANVM programming operating procedure calls for a memory cell to be erased prior to being programmed. This erasure can be performed at the byte, block, or chip level and can be performed by electrical, UV, or other means. In this type of system the cell would be completely erased to a (1,1) state prior to initiating a programming cycle. If a system has the capability to erase an individual memory cell, then it is not necessary to erase all of the cells of a group prior to initiating a programming operation. It is then possible to incrementally erase an individual memory cell, as necessary, to program the cell to the appropriate voltage threshold as is indicated by the waveforms labelled (1,0) and (0,1).

FIG. **11** is a timing diagram which illustrates how a 2-bit EANVM cell of FIG. **8** is programmed from an erased (1,1) state to a (1,0) state using the timing circuitry **208** to generate fixed length timing pulses. A low logic level state of the PGM/Write signal on signal line **212** enables the timing circuit **208**. When enabled at time t1, the timing circuit **208** provides an internal fixed-width low level internal PGM timing pulse on signal line **210** to the program voltage switch **220**. For the duration of the low state of the internal PGM timing pulse, the bit line and word line program voltage outputs on lines **106** and **206** will be raised to their respective programming voltage levels as shown in FIG. **11**. During this programming process, charge is added to the floating gate of the memory cell **102**. When the internal PGM timing pulse from timing circuitry **208** switches to a high level, the programming voltages are removed and a verify cycle begins. For this example, verify reference voltage Vref3 is compared with the bit line voltage. This internally controlled program/verify cycle repeats itself until the bit line voltage on terminal **168** exceeds Vref3. At this time, t2, the EANVM cell **102** is verified to have been programmed to a (1,0) state and programming is halted by the comparator **202** providing a disable signal on signal line **204** to the program voltage switch **220**.

FIG. **12** illustrates the bit line voltage of a 2-bit per cell EANVM as it is being programmed from a fully erased, or fully "on", state (1,1) to a partially "off" state (1, 0) using fixed length program pulses. When the externally applied PGM/Write pulse is applied at time t1, the program/verify timing circuit **208** first initiates a verify cycle to determine the current status of the memory cell **102**. This is indicated by the bit line voltage being pulled to a ground condition from, in this example, Vpull-up. More generally, prior to time t1, the bit line voltage could be pre-set to any voltage level. Once the cell has been determined to be at a condition below the verify reference voltage, Vref3 in this example, corresponding to the data to be programmed, the first program cycle is initiated. This is represented by the bit line voltage being pulled up to Vprogram. After the first fixed length programming pulse ends, a verify cycle begins. This is represented by the bit line voltage being pulled down to a point midway between ground potential and Ref1. During each successive verify cycle the bit line voltage is observed to incrementally increase. This program/verify cycle continues until the bit-line voltage exceeds the selected verify reference voltage, in this case Vref3, which indicates a memory state of (1,0), at time t2.

FIG. **13** illustrates how a 2-bit EANVM cell is programmed from an erased (1,1) state to a (1,0) state using variable length programming pulses. The internal PGM pulses for this implementation start with a low state longer than for fixed-width implementation of FIGS. **11** and **12**. The low-state pulse widths grow progressively shorter as the memory cell approaches the appropriate voltage threshold.

This approach requires more precise control than the fixed length approach. However, programming times can be greatly reduced on average.

FIG. **14** illustrates the bit line voltage of a 2-bit per cell EANVM as it is being programmed from a fully erased, or fully "on", state (1,1) to a partially "off" state (1,0) using variable length program pulses. When the externally applied PGM/Write pulse goes to an active low level at time t**1**, the program/verify timing circuit **208** first initiates a verify cycle to determine the current status of the memory cell **102**. This is indicated by the bit line voltage being pulled to a ground condition from, in this example, Vpull-up. Although, prior to time t**1**, the bit line voltage could be preset to any voltage level. Once the cell has been determined to be at a condition below the verify reference voltage corresponding to the data to be programmed, Vref**3** in this example, the first program cycle is initiated. This is represented by the bit line voltage being pulled up to Vprogram. After the first variable length programming pulse is over, another verify cycle begins. This is represented by the bit line voltage being pulled down to a point midway between Ref**1** and Ref**2**. During each successive verify cycle the bit line voltage is observed to incrementally increase. This program/verify cycle continues until the bit-line voltage surpasses the selected verify reference voltage, in this case Vref**3** which indicates a memory state of (1,0), at time t**2**.

Accordingly, the programming process for an n-bit per cell EANVM uses program/verify cycles, to incrementally program a cell. The durations of these cycles are determined by the timing circuit **208**. A key element of the system is to provide a programming scheme which provides for accurate programming of the memory cell **102**. This is accomplished by matching the pulse widths of the timing pulses of the timing circuitry **208** to the program time of the EANVM cell being used. As indicated in FIGS. **11** and **13**, a desired voltage threshold actually falls within a range of threshold voltages. If the program pulses are too long, then too much charge may be added to the floating gate of the memory cell **102**. This may result in an overshoot of the target voltage threshold, resulting in incorrect data being stored in the memory cell.

The programming pulse width is set such that if the voltage threshold of the cell **102** after the (n−1) programming pulse is at a point just below the target voltage threshold, then the (n)th, or final, program pulse will not cause an overshoot resulting in an overprogrammed condition for a memory cell.

FIG. **8** may also use a digital comparator rather than the analog comparator **202** shown in FIG. **8**. The digital comparator would use the encoded data from the encode circuitry **160** which represents the current contents of the EANVM cell **102**, as the input to the comparator represent the. The verify reference voltage select **222** would provide the voltage to be encoded with the input coming from the output of the n-bit input latch/buffer **224**, representing the data to be programmed. Otherwise, the function of the comparator within the system remains the same.

The foregoing descriptions of specific embodiments of the present invention have been presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the invention to the precise forms disclosed, and obviously many modifications and variations are possible in light of the above teaching. The embodiments were chosen and described in order to best explain the principles of the invention and its practical application, to thereby enable others skilled in the art to best utilize the invention and various embodiments with various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the claims appended hereto and their equivalents.

What is claimed is:

1. A multi-level memory device comprising:

an electrically alterable non-volatile multi-level memory cell for storing input information in a corresponding one of K^n predetermined memory states of said multi-level memory cell, where K is a base of a predetermined number system, n is a number of bits stored per cell, and $K^n>2$;

memory cell programming means for programming said multi-level memory cell in accordance with said input information;

reference voltage selecting means for selecting one of a plurality of reference voltages in accordance with said input information, each of said reference voltages corresponding to a different one of said predetermined memory states; and

comparator means for comparing a voltage of said multi-level memory cell with the selected reference voltage, said comparator means further generating a control signal indicating whether the state of said multi-level memory cell is the state corresponding to said input information.

2. A device according to claim **1**, wherein each memory state is bounded by one or more voltage values, and each reference voltage differs from the voltage value or values bounding the corresponding memory state.

3. Multi-level memory apparatus, comprising

an electrically alterable non-volatile memory cell having more than two predetermined memory states;

a selecting device which selects one of a plurality of reference signals in accordance with information indicating a memory state to which said memory cell is to be programmed, each reference signal corresponding to a different memory state of said memory cell; and

a comparator which compares a signal corresponding to the state of said memory cell with the selected reference signal to verify whether said memory cell is programmed to the state indicated by said information.

4. Apparatus according to claim **3**, wherein said comparator compares a bit line signal of said memory cell with the selected reference signal.

5. Apparatus according to claim **3**, wherein said comparator compares a bit line voltage of said memory cell with a voltage of the selected reference signal.

6. Multi-level memory apparatus, comprising:

an electrically alterable non-volatile memory cell having more than two predetermined memory states;

a selecting device which selects one of a plurality of reference signals in accordance with information indicating a memory state to which said memory cell is to be programmed, each reference signal corresponding to a different memory state of said memory cell; and

a verifying device which detects a parameter indicating the state of said memory cell and verifies whether said memory cell is programmed to the state indicated by said information based on the detected parameter and the selected reference signal.

7. Apparatus according to claim **6**, wherein said verifying device detects said parameter at a bit line terminal of said memory cell.

8. Apparatus according to claim **6**, wherein said parameter is a bit line voltage of said memory cell.

9. Multi-level memory apparatus, comprising:
an electrically alterable non-volatile memory cell having more than two predetermined memory states;
a selecting device which selects one of a plurality of predetermined reference signals in accordance with information indicating a memory state to which said memory cell is to be programmed, each reference signal corresponding to a different memory state of said memory cell;
a programming signal source which applies a programming signal to said memory cell; and
a comparator which compares a signal corresponding to the state of said memory cell with the selected reference signal to verify whether said memory cell is programmed to the state indicated by said information.

10. Apparatus according to claim 9, wherein said comparator compares a bit line signal of said memory cell with the selected reference signal.

11. Apparatus according to claim 9, wherein said comparator compares a bit line voltage of said memory cell with a voltage of the selected reference signal.

12. Multi-level memory apparatus, comprising:
an electrically alterable non-volatile memory cell having more than two predetermined memory states;
a selecting device which selects one of a plurality of reference signals in accordance with information indicating a memory state to which said memory cell is to be programmed, each reference signal corresponding to a different memory state of said memory cell;
a programming signal source which applies a programming signal to said memory cell; and
a verifying device which detects a parameter indicating the state of said memory cell and which verifies whether said memory cell is programmed to the state indicated by said information based on the detected parameter and the selected reference signal.

13. Apparatus according to claim 12, wherein said verifying device detects said parameter at a bit line terminal of said memory cell.

14. Apparatus according to claim 12, wherein said parameter is a bit line voltage of said memory cell.

15. Multi-level memory apparatus, comprising:
an electrically alterable non-volatile memory cell having more than two predetermined memory states;
a selecting device which selects one of a plurality of reference signals in accordance with information indicating a memory state to which said memory cell is to be programmed, each reference signal corresponding to a different memory state of said memory cell;
a programming signal source which applies a programming signal to said memory cell; and
a control device which controls the application of said programming signal to said memory cell based on the selected reference signal.

16. Apparatus according to claim 15, wherein said control device detects a parameter indicating the state of said memory cell, verifies whether said memory cell is programmed to the state indicated by said information based on the detected parameter and the selected reference signal, and controls the application of said programming signal to said memory cell based on a result of the verification.

17. Apparatus according to claim 15, wherein said control device compares a signal corresponding to the state of said memory cell with the selected reference signal and controls the application of said programming signal to said memory cell based on a result of the comparison.

18. Apparatus for verifying programming of an electrically alterable non-volatile memory cell having more than two predetermined memory states, comprising:
a selecting device which selects one of a plurality of reference signals in accordance with information indicating a memory state to which said memory cell is to be programmed, each reference signal corresponding to a different memory state of said memory cell; and
a comparator to compare a signal corresponding to the state of said memory cell with the selected reference signal to verify whether said memory cell is programmed to the state indicated by said information.

19. Apparatus according to claim 18, wherein the signal corresponding to the state of said memory cell is a bit line signal of said memory cell.

20. Apparatus according to claim 18, wherein the signal corresponding to the state of said memory cell is a bit line voltage of said memory cell.

21. Apparatus for verifying programming of an electrically alterable non-volatile memory cell having more than two predetermined memory states, comprising:
a selecting device which selects one of a plurality of reference signals in accordance with information indicating a memory state to which said memory cell is to be programmed, each reference signal corresponding to a different memory state of said memory cell; and
a verifying device to detect a parameter indicating the state of said memory cell and to verify whether said memory cell is programmed to the state indicated by said information based on the detected parameter and the selected reference signal.

22. Apparatus according to claim 21, wherein said parameter is a bit line signal parameter of said memory cell.

23. Apparatus according to claim 21, wherein said parameter is a bit line voltage of said memory cell.

24. Apparatus for programming an electrically alterable non-volatile memory cell having more than two predetermined memory states, comprising:
a selecting device which selects one of a plurality of predetermined reference signals in accordance with information indicating a memory state to which said memory cell is to be programmed, each reference signal corresponding to a different memory state of said memory cell;
a programming signal source to apply a programming signal to said memory cell; and
a comparator to compare a signal corresponding to the state of said memory cell with the selected reference signal to verify whether said memory cell is programmed to the state indicated by said information.

25. Apparatus according to claim 24, wherein the signal corresponding to the state of said memory cell is a bit line signal of said memory cell.

26. Apparatus according to claim 24, wherein the signal corresponding to the state of said memory cell is a bit line voltage of said memory cell.

27. Apparatus for programming an electrically alterable non-volatile memory cell having more than two predetermined memory states, comprising:
a selecting device which selects one of a plurality of reference signals in accordance with information indicating a memory state to which said memory cell is to be programmed, each reference signal corresponding to a different memory state of said memory cell;
a programming signal source to apply a programming signal to said memory cell; and

a verifying device to detect a parameter indicating the state of said memory cell and to verify whether said memory cell is programmed to the state indicated by said information based on the detected parameter and the selected reference signal.

28. Apparatus according to claim **27**, wherein said parameter is a bit line signal parameter of said memory cell.

29. Apparatus according to claim **27**, wherein said parameter is a bit line voltage of said memory cell.

30. Apparatus for programming an electrically alterable non-volatile memory cell having more than two predetermined memory states, comprising:

a selecting device which selects one of a plurality of reference signals in accordance with information indicating a memory state to which said memory cell is to be programmed, each reference signal corresponding to a different memory state of said memory cell;

a programming signal source to apply a programming signal to said memory cell; and

a control device to control the application of said programming signal to said memory cell based on the selected reference signal.

31. Apparatus according to claim **30**, wherein said control device is constructed to detect a parameter indicating the sate of said memory cell, to verify whether said memory cell is programmed to the state indicated by said information based on the detected parameter and the selected reference signal, and to control the application of said programming signal to said memory cell based on a result of the verification.

32. Apparatus according to claim **30**, wherein said control device is constructed to compare a signal corresponding to the state of said memory cell with the selected reference signal, and to control the application of said programming signal to said memory cell based on a result of the comparison.

33. A method of verifying programming of an electrically alterable non-volatile memory cell having more than two predetermined memory states, said method comprising:

selecting one of a plurality of reference signals in accordance with information indicating a memory state to which said memory cell is to be programmed, each reference signal corresponding to a different memory state of said memory cell; and

comparing a signal corresponding to the state of said memory cell with the selected reference signal to verify whether said memory cell is programmed to the state indicated by said information.

34. A method according to claim **33**, wherein said comparing includes comparing a bit line signal of said memory cell with the selected reference signal.

35. A method according to claim **33**, wherein said comparing includes comparing a bit line voltage of said memory cell with a voltage of the selected reference signal.

36. A method of verifying programming of an electrically alterable non-volatile memory cell having more than two predetermined memory states, said method comprising:

selecting one of a plurality of reference signals in accordance with information indicating a memory state to which said memory cell is to be programmed, each reference signal corresponding to a different memory state of said memory cell;

detecting a parameter indicating the state of said memory cell; and

verifying whether said memory cell is programmed to the state indicated by said information based on the detected parameter and the selected reference signal.

37. A method according to claim **36**, wherein said parameter is detected at a bit line terminal of said memory cell.

38. A method according to claim **36**, wherein said parameter is a bit line voltage of said memory cell.

39. A method of programming an electrically alterable non-volatile memory cell having more than two predetermined memory states, said method comprising:

selecting one of a plurality of predetermined reference signals in accordance with information indicating a memory state to which said memory cell is to be programmed, each reference signal corresponding to a different memory state of said memory cell;

applying a programming signal to said memory cell; and

comparing a signal corresponding to the state of said memory cell with the selected reference signal to verify whether said memory cell is programmed to the state indicated by said information.

40. A method according to claim **39**, wherein said comparing includes comparing a bit line signal of said memory cell with the selected reference signal.

41. A method according to claim **39**, wherein said comparing includes comparing a bit line voltage of said memory cell with a voltage of the selected reference signal.

42. A method of programming an electrically alterable non-volatile memory cell having more than two predetermined memory states, said method comprising:

selecting one of a plurality of reference signals in accordance with information indicating a memory state to which said memory cell is to be programmed, each reference signal corresponding to a different memory state of said memory cell;

applying a programming signal to said memory cell;

detecting a parameter indicating the state of said memory cell; and

verifying whether said memory cell is programmed to the state indicated by said information based on the detected parameter and the selected reference signal.

43. A method according to claim **42**, wherein said parameter is detected at a bit line terminal of said memory cell.

44. A method according to claim **42**, wherein said parameter is a bit line voltage of said memory cell.

45. A method of programming an electrically alterable non-volatile memory cell having more than two predetermined memory states, said method comprising:

selecting one of a plurality of reference signals in accordance with information indicating a memory state to which said memory cell is to be programmed, each reference signal corresponding to a different memory state of said memory cell;

applying a programming signal to said memory cell; and controlling the application of said programming signal to said memory cell based on the selected reference signal.

46. A method according to claim **45**, including detecting a parameter indicating the state of said memory cell, verifying whether said memory cell is programmed to the state indicated by said information based on the detected parameter and the selected reference signal, and wherein the application of said programming signal is controlled based on a result of said verifying.

47. A method according to claim **45**, including comparing a signal corresponding to the state of said memory cell with the selected reference signal, and wherein the application of said programming signal is controlled based on a result of said comparing.

* * * * *

CERTIFICATE OF SERVICE

I hereby certify that on March 25, 2020, I caused a true and correct copy of **CORRECTED OPENING BRIEF OF PLAINTIFF-APPELLANT** to be served on the following counsel of record in the U.S. Court of Appeals for the Federal Circuit Case No. 20-1413 by electronic mail on counsel of record for Defendant-Appellee:

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CERTIFICATE OF COMPLIANCE

I certify under Fed. R. App. P. 32(a) that the text of this brief is proportionately spaced, has a typeface of 14 points, and that I have checked the word count of the word-processing system used to prepare this brief, excluding those portions of the brief properly excluded under Fed. R. App. P. 32(a)(7)(B)(iii) and Fed. Cir. R. 332(b). According to its calculation, this brief contains 13,735 words. Based on that calculation, this brief complies with the type-volume limitation of Fed. R. App. P. 32(a)(7)B)(i).

Dated: March 25, 2020

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