

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TOSHIBA MEMORY CORPORATION,
Petitioner,

v.

ANZA TECHNOLOGY, INC.,
Patent Owner.

IPR2018-01597
Patent 6,354,479

Before GEORGE C. BEST, CHRISTOPHER L. CRUMBLEY, and
MICHELLE N. ANKENBRAND, *Administrative Patent Judges*.

BEST, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

A. Background and Summary

On September 7, 2018, Petitioner Toshiba Memory Corporation (“TMC”) filed a Petition requesting an *inter partes* review (“IPR”) of U.S. Patent 6,354,479 B1. Paper 1 (“Petition” or “Pet.”). TMC asks us to declare claims 37 and 39 of the ’479 patent unpatentable. Pet. 1. As discussed in greater detail below, TMC asserts five different grounds of alleged unpatentability. *See id.* at 1–2.

Anza Technology, Inc. is identified as the real party in interest with respect to ownership of the ’479 patent. Paper 6, 2.

On December 12, 2018, Anza filed its Patent Owner’s Preliminary Response. Paper 7 (“Prelim. Resp.”). In the Preliminary Response, Anza argued that we could not institute an IPR because (1) TMC had not identified all of the real parties in interest and (2) a real party in interest or privy was served with a complaint alleging infringement of the ’479 patent s more than one year before the Petition was filed. Prelim. Resp. 1, 7–25. Anza also argued that we should exercise our discretion to deny institution of an IPR under 35 U.S.C. § 314(a) and 37 CFR § 42.108(a). *Id.* at 1–2, 25–29.

On March 12, 2019, we instituted an IPR as requested by TMC. Paper 12 (“Dec.”). In our institution decision, we determined that TMC had not identified all of the real parties in interest. *Id.* at 6–18. In particular, we determined that TMC had not established that Toshiba Corporation was not a real party in interest. *Id.* at 10–14. In view of this determination, we authorized TMC to file a motion to amend the mandatory disclosures in its Petition to add an identification of Toshiba Corporation as a real party in

interest. *Id.* at 16–17 (citing *Proppant Express Invs., LLC v. Oren Techs., LLC*, IPR2017-01917, Paper 86 at 8 (PTAB Feb. 13, 2019) (precedential)).

On March 26, 2019, TMC filed a motion to amend the mandatory disclosures, which Anza opposed. Papers 18, 21. On June 6, 2019, we granted TMC’s motion to amend its mandatory disclosures. Paper 35.

On June 21, 2019, Anza filed its Response to TMC’s Petition. Paper 36 (“Resp.”).

On September 9, 2019, TMC filed its Reply to Anza’s Response. Paper 41 (“Reply”).

On October 18, 2019, Anza filed a Sur-Reply. Paper 46 (“Sur-Reply”).

Oral argument in this IPR was consolidated with oral argument in IPR2018-01598 and held on November 20, 2019. Paper 47 (Order Granting Requests for Oral Argument). The record includes a transcript of the argument. Paper 55 (“Transcript” or “Tr.”).

B. Related Matters

TMC and Anza have identified the following related matters. *See* Pet. iii–iv; Paper 4, 2–3; Paper 6, 2–3.

1. District Court Proceedings

- a. *Reiber v. Western Digital Corp.*, No. 2:07-cv-01874 (E.D. Cal.)
- b. *CoorsTek, Inc. v. Reiber*, No. 1:08-cv-01133 (D. Colo.)
- c. *Reiber v. TDK Corp.*, No. 2:11-at-00570 (E.D. Cal.)
- d. *Reiber v. TDK Corp.*, No. 2:11-cv-01057 (E.D. Cal.)
- e. *Reiber v. Western Digital Corp.*, No. 2:14-cv-00763 (E.D. Cal.)
- f. *Anza Technology, Inc. v. Xilinx, Inc.*, No. 3:16-cv-06302 (N.D. Cal.)

- g. *Anza Technology, Inc. v. Xilinx, Inc.*, No. 1:17-cv-00687 (D. Colo.)
 - h. *Anza Technology, Inc. v. Toshiba America Electronic Components, Inc.*, No. 5:17-cv-07289 (N.D. Cal.)
 - i. *Anza Technology, Inc. v. Mushkin, Inc.*, No. 1:17-cv-03135 (D. Colo.)
 - j. *Anza Technology, Inc. v. Avant Technology, Inc.*, No. 1:17-cv-01193 (W.D. Tex.)
 - k. *Atkin v. Reiber*, Nos. 2:09-2017, -3483 (E.D. Cal.)
2. *Patent & Trademark Office Proceedings*
- a. *Inter Partes* Reexamination No. 95/002,283
 - b. *Inter Partes* Reexamination No. 95/002,295
 - c. *Xilinx, Inc. v. Anza Technology, Inc.*, IPR2018-00527, filed January 25, 2018
 - d. *Xilinx, Inc. v. Anza Technology, Inc.*, IPR2018-00528, filed January 25, 2018
 - e. *Toshiba Memory Corp. v. Anza Technology, Inc.*, IPR2018-01598, filed September 11, 2018.
3. *Other Administrative Proceedings*
- a. *In re Hard Drives, Components Thereof, and Products Containing the Same*, No. 337-TA-616 (Int'l Trade Comm'n)

We note that there were two additional proceedings involving the '479 patent in the Patent & Trademark Office: (1) *Avant Technology, Inc. v. Anza Technology, Inc.*, IPR2018-00828, filed March 26, 2018, and (2) *Avant Technology, Inc. v. Anza Technology, Inc.* IPR2019-00042, filed October 8, 2018. The Board denied institution of trial in both cases.

C. *The '479 Patent*

The '479 patent issued on March 12, 2002, from Application No. 09/514,454, filed February 25, 2000. Ex. 1001, at [21], [22], [45]. The '454 Application claimed benefit of the filing date of Provisional Application No.

60/121,694, filed February 25 1999. *Id.* at 1:5–7. Steven Frederick Reiber and Mary Louise Reiber are the named inventors. *Id.* at [75].

The '479 patent's Specification describes bonding tool tips, particularly ceramic tips for bonding tools that fabricate electrical connections. *Id.* at 1:11–13. As the Specification explains:

Integrated circuits are typically attached to a lead frame, and individual leads are connected to individual bond pads on the integrated circuit with wire. The wire is fed through a tubular bonding tip having a bonding pad at the output end. These tips are called capillary tips. An electrical discharge at the bonding tool tip supplied by a separate EFO (electronic flame off) device melts a bit of the wire, forming a bonding ball. . . .

When the bonding tip is on the integrated circuit die side of the wire connection, the wire will have a ball formed on the end of the wire, as above, before reaching the next die bonding pad. The ball then makes intimate contact with the film formed on the die pad on the integrated circuit. The bonding tip is then moved from the integrated circuit die pad, with gold wire being fed out as the tool is moved, onto the bond pad on the lead frame, and then scrubbed laterally by an ultrasonic transducer. Pressure from the bonding tool tip and the transducer, and capillary action, 'flows' the wire onto the bonding pad where molecular bonds produce a reliable electrical and mechanical connection.

Bonding tool tips must be sufficiently hard to prevent deformation under pressure, and mechanically durable so that many bonds can be made before replacement. . . . *Bonding tool tips must also be electrically designed to produce a reliable electrical contact, yet prevent electrostatic discharge damage to the part being bonded. Certain prior art devices have a one or more volt emission when the tip makes bonding contact. This could present a problem, as a 1 volt static discharge could generate a 20 milliamp current to flow, which, in certain*

instances, could cause the integrated circuit to fail due to this unwanted current.

Id. at 1:15–53 (emphasis added).

According to the Specification, the problems created by electrostatic discharge can be avoided by using a bonding tool tip that conducts electricity at a rate sufficient to prevent charge buildup, but not at so high a rate as to overload the device being bonded. *Id.* at 1:66–2:6. “In other words, it is desirable for the bonding tip to discharge slowly. The tip needs to discharge to avoid a sudden surge of current that could damage the part being bonded.” *Id.* at 2:6–9.

D. Claims Under Review

Claim 37 is the sole independent claim subject to review. It is reproduced below:

37. A method of using a bonding tip, comprising:
bonding a device using a bonding tip made with a dissipative material that has a resistance low enough to prevent a discharge of charge to said device and high enough to avoid current flow large enough to damage said device.

Id. at 8:54–59.

Claim 39 is the other claim subject to this IPR. It is reproduced below:

39. The method of claim 37, wherein said dissipative material has a high enough stiffness to resist bending when hot and has a high enough abrasiveness to function for at least two uses.

Id. at 8:62–65.

E. Evidence

TMC relies upon the following references as establishing the unpatentability of claims 37 and 39 of the '479 patent:

| Reference | | Date | Exhibit |
|---------------------|-----------------|-----------------------------------|---------|
| Mikaki ¹ | US 6,274,524 B1 | <i>See</i> § II.E.1, <i>infra</i> | 1022 |
| Alfaro | US 4,974,767 | Issued December 4, 1990 | 1024 |
| Shikata | US 5,830,819 | Issued November 3, 1998 | 1025 |
| Popp | DE 3,743,630 C1 | Published March 16, 1989 | 1026 |
| Schneider | US 5,610,442 | Issued March 11, 1997 | 1027 |
| Linn | US 5,816,472 | Issued October 6, 1998 | 1037 |

TMC also relies upon the declaration of John Bravman. *See* Ex. 1003.

Anza relies upon the declaration of Bruce Kim. *See* Ex. 2048. Anza also relies upon the declaration of one of the inventors, Steven F. Reiber and the exhibits cited therein. *See* Ex. 2028 (citing, *inter alia*, Exs. 2028–2031, 2033, 2034, 2036–2040, 2042, 2043).

F. Asserted Grounds

Petitioner asserts that claims 37 and 39 would have been unpatentable on the following grounds:

| Claim(s) Challenged | 35 U.S.C. § | Reference(s)/Basis |
|---------------------|-------------|--------------------|
| 37, 39 | 102(e) | Mikaki |
| 37, 39 | 103(a) | Mikaki, Linn |
| 37, 39 | 103(a) | Alfaro, Shikata |
| 37, 39 | 103(a) | Popp |
| 37, 39 | 103(a) | Popp, Schneider |

¹ In the Petition, TMC refers to the '524 patent as “Shinji.” *See, e.g.*, Pet. 29. This is the first name of the first-named inventor, Shinji Mikaki. We follow our established practice and refer to the reference by the surname of the first-named inventor.

II. ANALYSIS

A. *Real Party in Interest and Privity*

In its Preliminary Response, Anza argued that institution of trial was barred for two reasons stemming from theories of real party in interest and privity. First, Anza contended that two companies related to TMC, Toshiba Corporation and Toshiba America Information Systems (“TAIS”) should have been named in TMC’s mandatory notices as real parties-in-interest. Prelim. Resp. 1. Second, Anza contended that TAIS was either a real party in interest or privy of TMC, and as such, a prior complaint alleging infringement of the ’479 patent by TAIS more than one year prior to the Petition barred institution of trial under 35 U.S.C. § 315(b). *Id.*

We reviewed these allegations in our institution decision, and held that TMC had failed to establish that Toshiba Corporation was not a real party in interest, and as such, and should have been named in the Petition. Dec. 10–14. As noted above, we permitted TMC a short period to file a motion to amend its mandatory disclosures, and subsequently granted TMC’s motion to amend. Paper 35.²

² In its Patent Owner Response, Anza argues that the Motion to Amend was made in bad faith and should not have been granted. Resp. 7–12. Anza bases this argument on its evaluation of the testimony of TMC’s witness Scott Nelson, and in particular certain testimony developed during cross-examination that allegedly shows that Nelson was not competent to testify as to the matters in his Declaration. *Id.* (citing Ex. 2026). We have reviewed this evidence and find no support for Anza’s claim of bad faith, and find that Mr. Nelson was competent to provide the testimony in his Declaration. In any event, our decision to grant the Motion to Amend considered whether TMC’s original real party-in-interest *identification* was made in bad faith, *not* whether the Motion itself was in bad faith. Paper 35, 4–5 (“it does not appear that TMC acted in bad faith in omitting Toshiba Corp. as a real party

As to TAIS, however, we determined that TMC had shown sufficiently that TAIS was not a real party in interest to this proceeding. *Id.* at 14–16. We also held that TAIS had not been shown to be in privity with TMC. *Id.* at 18–24. As such, the fact that TAIS was not named as a real party in interest did not bar institution of trial, nor did the prior complaint against TAIS more than a year prior to the Petition invoke the statutory bar of § 315(b).

During the instituted trial, Anza renewed its arguments regarding TAIS and its relationship to this proceeding and TMC. Specifically, Anza argues that evidence developed during trial calls into question our preliminary determination at institution that TAIS is not a real party in interest.³ Resp. 2–6. We have reconsidered our determination in light of the full record, including evidence developed during trial, and provide the following discussion

1. Legal Standards

“A petition filed under section 311 may be considered only if . . . (2) the petition identifies all real parties in interest.” 35 U.S.C. § 312(a); *see also* 37 CFR § 42.101(b) (“A person who is not the owner of a patent may file with the Office a petition to institute an *inter partes* review of the patent

in interest”). Anza’s arguments regarding Mr. Nelson’s testimony do not call that original determination into question.

³ On occasion, Anza uses the term “privity” instead of “real party in interest,” but both of its merits briefs following institution focus on the argument that TAIS is a real party in interest. Resp. 2 (“TAIS is a Real Party in Interest”); Sur-Reply 24 (same). The briefs do not address our determination regarding privity; we consider that matter settled at this point and do not re-evaluate it here.

unless . . . [t]he petition requesting the proceeding is filed more than one year after the date on which the petitioner, the petitioner's real party in interest, or a privy of the petitioner is served with a complaint alleging infringement of the patent.”).

A petitioner bears the ultimate burden of persuasion in establishing that all real parties in interest have been named. *Worlds Inc. v. Bungie, Inc.*, 903 F.3d 1237, 1242 (Fed. Cir. 2018). Absent a challenge from the patent owner, we accept the petitioner's identification of the real parties in interest as correct. *See id.* (“[A]n IPR petitioner's initial identification of the real parties in interest should be accepted unless and until disputed by a patent owner.”). If a patent owner alleges that the petitioner omitted a real party in interest and produces some evidence to support its argument, the petitioner bears the ultimate burden of persuasion to show patent owner's allegations are incorrect. *Id.*

The Federal Circuit has found that “Congress intended that the term ‘real party in interest’ have its expansive common-law meaning.” *Applications in Internet Time, LLC v. RPX Corp.*, 897 F.3d 1336, 1351 (Fed. Cir. 2018) (“*AIT*”). Whether a non-party is a “real party-in-interest” for the purposes of an IPR is a “highly fact-dependent question” that takes into account how courts generally have used the term to “describe relationships and considerations sufficient to justify applying conventional principles of estoppel and preclusion.” Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,759 (August 14, 2012) (“Trial Practice Guide”); *see also* Consolidated Trial Practice Guide 13 (Nov. 2019), <https://www.uspto.gov/TrialPracticeGuideConsolidated>. As the Federal Circuit has noted, the Trial Practice Guide “explain[s] that the two questions

lying at its heart of the inquiry are whether a non-party ‘desires review of the patent’ and whether a petition has been filed at a non[-]party’s ‘behest.’” *AIT*, 897 F.3d at 1351. Determining whether a non-party is a real party in interest requires analysis of a wide range of both equitable and practical considerations. *Id.*

Depending on the circumstances, various factors may be considered, including whether the non-party “exercised or could have exercised control over [the petitioner’s] participation in [the] proceeding,” the non-party’s “relationship with the petitioner,” the non-party’s “relationship to the petition itself, including the nature and/or degree of involvement in the filing,” and “the nature of the entity filing the petition.” Trial Practice Guide, 77 Fed. Reg. at 48,759–60; *see also AIT*, 897 F.3d at 1351. A potentially relevant factor is whether the non-party is funding or directing the proceeding. Trial Practice Guide, 77 Fed. Reg. at 48,760. For example, “a party that funds and directs and controls an IPR . . . petition or proceeding constitutes a ‘real party-in-interest,’ even if that party is not a ‘privy’ of the petitioner.” *Id.* Complete funding or control is not required for a non-party to be considered a real party in interest; the exact degree of funding or control necessary to support a finding that a non-party is a real party in interest depends upon consideration of all of the pertinent facts. *Id.*

2. *Determination at Institution*

We first summarize the factual background provided at the time of institution, and our reasoning that TAIS was not a real party in interest to this proceeding.

Prior to institution, TMC submitted the January 23, 2019, declaration of Scott Nelson, the Senior Vice President of the Memory Business Unit at

TMA. Ex. 1040. The declaration includes a pair of organization charts, reproduced below, showing the relevant portions of the Toshiba corporate family structure both before and after a 2017 corporate reorganization.

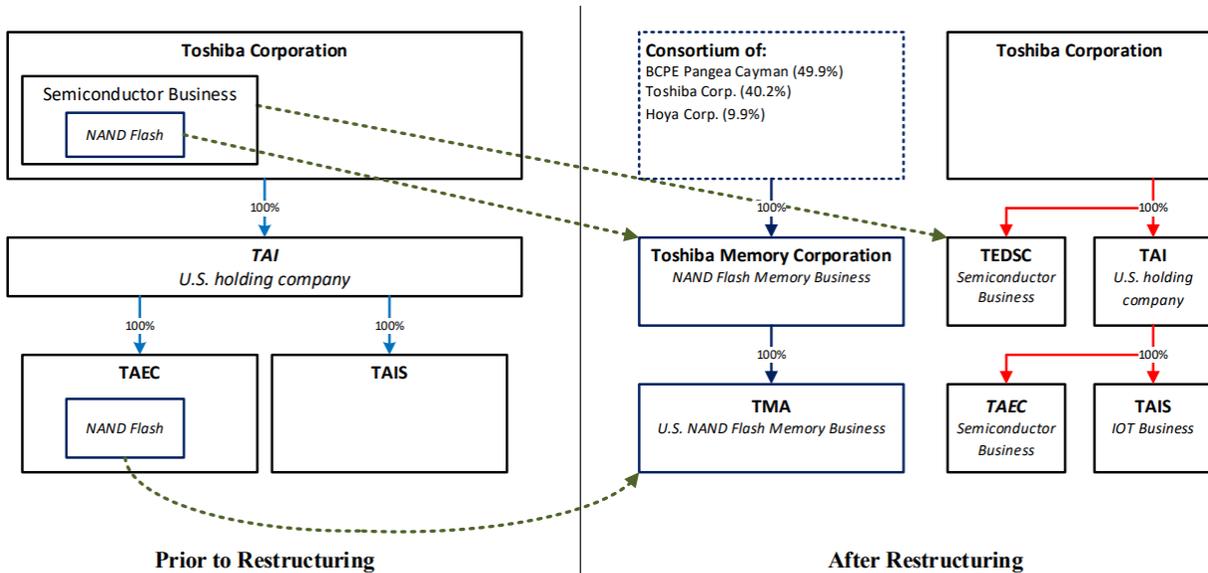


Illustration of relevant portions of Toshiba corporate structure before and after 2017 corporate restructuring. *Id.* ¶ 17.

The evidence showed that Toshiba Corporation is a Japanese company with a wholly-owned U.S. holding company subsidiary, Toshiba America, Inc. (“TAI”). *Id.* ¶ 5. Prior to 2017, TAI had at least two wholly-owned subsidiaries: TAEC and TAIS. *Id.* ¶¶ 12–13, 16–17.

Prior to April 1, 2017, Toshiba Corporation had several internal business units, including a semiconductor business that manufactured, *inter alia*, NAND flash memory devices. *Id.* ¶¶ 8–10; Ex. 2002, 6. TAEC was responsible for U.S. sales of the NAND flash memory devices and other semiconductor products. Ex. 1040 ¶¶ 12–13.

On April 1, 2017, Toshiba Corporation spun out its Japanese NAND flash memory business to TMC, a wholly-owned subsidiary. Prelim. Resp. 6; Ex. 2001, 4. In a transaction that closed June 1, 2018, Toshiba

Corporation sold all of the shares of TMC to K.K. Pangea and, in return, received cash and 40.2% ownership in K.K. Pangea. Prelim. Resp. 6; Ex. 2005. Due to a subsequent merger between K.K. Pangea and TMC, Toshiba Corporation now owns 40.2% of TMC. Exs. 2007, 2010. Toshiba Corporation recognizes TMC as “an affiliate accounted for by the equity method” in Toshiba Corporation’s annual reports. Ex. 2002, 17 n.2. On October 1, 2017, the NAND flash memory device business unit of TAEC was spun out as TMA, which is a wholly-owned subsidiary of TMC. Ex. 1040 ¶ 4.

Relying on “equitable and practical considerations,” we determined that TAIS is not a real party in interest to this proceeding. Dec. 14–16. Applying the reasoning set forth by the Federal Circuit in *AIT*, we found that:

Anza’s only argument that there is a pre-existing established relationship between TAIS and TMC is the use of a collective shorthand term—“Toshiba entities”—in a court filing by a third corporate entity, TMA. Anza’s argument is without merit. As TMC points out, “TAIS is *at most* simply a cousin corporation of TMC, twice removed.” Paper 9, 10. In addition, this is not a situation where two “corporate cousins” are both wholly owned under the same corporate umbrella; rather, Toshiba Corporation, the grandparent corporation to TAIS, is only a minority shareholder in TMC. And the record contains no evidence that this tenuous relationship has any connection to the ’479 patent, or patents in general, unlike the relationship examined in *AIT*.

Dec. 15–16. We rejected Anza’s argument, which essentially advocated a standard that “any entity that is part of an extended corporate family is a real party in interest to any IPR brought by any other member of the corporate family, if that entity could conceivably benefit in any way from the results of the IPR.” *Id.* at 16.

1. *Evidence During Trial*

Following institution of trial, Anza cross-examined Mr. Nelson via deposition, and submitted the transcript with its Response. Ex. 2026. Anza claims that this newly-developed evidence calls into question our determination that TMC is not a real party in interest to this proceeding. Resp. 2–6.

Anza’s evidence primarily focuses on the fact that, at the time of the Petition, various entities within the Toshiba corporate structure were in the business of selling NAND flash memory products, which are also the products at issue in the copending district court infringement proceeding. *Id.* at 3–4. According to Anza, Toshiba Corporation supplied NAND memory to these various entities, including TAIS. *Id.* at 4. And following the corporate reorganization, TMC received the NAND flash memory business of Toshiba Corporation. *Id.* at 5. Anza concludes from this that “Toshiba Corp., TAEC, and TAIS were all closely involved in the manufacture, importation, and sale of non-volatile flash memory that is at issue. And not just *any* flash memory—but certain of the very flash memory accused of infringement in the district court.” *Id.* at 4–5.

Upon evaluating these arguments in light of the record as a whole, we cannot conclude that the information regarding the sales of NAND flash memory is new evidence that should change our determination at institution that TMC is not a real party in interest. As summarized above, we were aware at the time of institution that Toshiba Corporation had various sub-entities, some of which were involved in selling NAND flash memory products. The only “new” evidence that Anza directs us to is the cross-examination of Mr. Nelson, but his testimony primarily provides the

additional fact that Toshiba Corporation’s NAND flash memory business (subsequently spun off into TMC) supplied NAND flash memory products to TAIS. Ex. 2026, 32–34, 91. At best, this establishes a sort of customer-supplier relationship between, as we have previously termed it “corporate cousins.” But customer-supplier relationships, without more, are insufficient to establish the requisite “close relationship” required to find that a party is a real party in interest. *See Samsung Electronics Co. Ltd. v. Seven Networks, LLC*, IPR2018-01108, Paper 31 at 11 (PTAB Nov. 28, 2018) (“Samsung and Google have a standard customer-supplier relationship, which by itself does not make Google an RPI.”); *see also WesternGeco LLC v. ION Geophysical Corp.*, 889 F.3d 1308, 1321 (Fed. Cir. 2018) (“ION and PGS had a contractual and fairly standard customer-manufacturer relationship regarding the accused product,” which “does not necessarily suggest that the relationship is sufficiently close . . . that the parties were litigating . . . the IPRs as proxies for the other.”). Nor does the fact that the customer and supplier are in separate branches of a corporate family tree, without any evidence of ownership, control, or other imbricated financial relationship, suffice.

Anza cites the Board’s precedential decision in *Ventex Co. Ltd. v. Columbia Sportswear North America, Inc.*, IPR2017-00651, Paper 148 at 8 (PTAB Jan. 24, 2019) (precedential), as supporting the conclusion “that the parties had a mutual interest in the continuing commercial and financial success of each other.” Sur-Reply 25. But *Ventex* is, in our view, distinguishable from the present case. *Ventex* involved two parties, Ventex and Serius, that had a customer-supplier relationship. *Id.* at 7. But the record also contained two contracts between the parties that required exclusivity

and contained indemnification provisions. *Id.* The Board there held that the contracts between the parties “incentivize[] both parties to invalidate claims of the ’119 and ’270 patents.” IPR2017-00651, Paper 148, 8. And the panel cited additional evidence that Ventex had sought to invalidate the subject patents to “aid prospective buyers of its products” and its actions were “grounded in concern of potential legal jeopardy for its customers and prospective buyers.” *Id.* (internal quotations omitted). The panel concluded that the “exclusive business relationship between Ventex and Seirus relating to the accused Heatwave fabric, and Ventex’s express desire to shield its customers and potential buyers from infringement lawsuits by Columbia strongly suggest that Ventex filed the Petition, at least in part, on Seirus’s behalf.” *Id.* at 9.

The present case is lacking most of the facts that led the *Ventex* panel to its conclusion. There is no evidence of any exclusivity agreement between Toshiba Corporation and TAIS as to the NAND memory, and the record does not contain any contracts between the entities that might show indemnity.⁴ Nor does the record contain any evidence that TMC’s reason for filing the instant Petition was to shield TAIS, rather than to protect itself.

For these reasons, we conclude that the evidence adduced during trial is insufficient to alter our prior determination that TAIS is not a real party in interest to this proceeding. Upon reviewing the record as a whole, TMC and TAIS are “corporate cousins, twice removed” that have no ownership in or

⁴ Anza alleged that Toshiba Corporation has agreed to indemnify TMC for losses incurred as a result of patent infringement. Prelim. Resp. 12. But there is no similar allegation regarding TMC and TAIS, which is the relevant corporate relationship for our determination here.

control over one another, and there is no additional evidence beyond a customer-supplier relationship that would establish that TMC is pursuing this *inter partes* review on behalf of TAIS.

B. Level of Ordinary Skill in the Art

According to TMC,

[a] person of ordinary skill (“POSITA”) in the art in the field of the ’479 patent would have been someone with a bachelor’s degree in electrical engineering, mechanical engineering, materials science, physics, or a similar field, and one to two years of experience in semiconductor device fabrication and packaging. Relevant practical or educational experience in other subject areas that allow a person to gain knowledge of semiconductor device fabrication and packaging also may suffice to qualify that person as a POSITA.

Pet. 2 (citing Ex. 1003 ¶ 54).

Anza does not agree with TMC’s proposed definition of the level of ordinary skill in the art. Resp. 13. Rather, Anza argues that a person of ordinary skill in the art at the time of the invention claimed in the ’479 patent

is one who holds a Ph.D. in Material Science and Engineering, and 4-5 years of experience in the field of electronic packaging technology in electrostatic discharge (“ESD”). Ex.2048 at ¶43. Alternatively, one skill[ed] in the art would have at least a Master’s degree in Physics, Material Sciences and/or Electrical Engineering and also have at least 5-7 years of experience in the field. *Id.* Additional education might substitute for some of the experience[,] and substantial experience might substitute for some of the educational background. *Id.*

Id. (citing Ex. 2048 ¶ 43).

Although TMC and Anza do not agree upon the proposed level of ordinary skill in the art at the time of the invention, they do not identify any instance in which the difference between their proposed definitions affects

either a factual or a legal determination. Nor do we see any instance in which the difference in the proposed definitions would have an effect on the outcome of this IPR. To the extent that it is important to select one or the other of the proposed definitions, we determine that the parties agree that the level of skill is at least as much as TMC's proposal. This lower level of skill is consistent with the level of ordinary skill in the art reflected in the prior art and the '479 patent's Specification. Accordingly, we adopt this definition for the purpose of this decision.

C. Claim Construction

To compare prior art with the claims at issue properly, we must construe the disputed claim terms to ascertain their scope and meaning. *In re Paulsen*, 30 F.3d 1475, 1479 (Fed. Cir. 1997). Before we do so, however, we must determine whether to apply the broadest reasonable interpretation in view of the '479 patent's specification or a district court-type claim interpretation.

1. A District Court-Type Claim Construction Applies

In an IPR filed before November 13, 2018, we ordinarily give claim terms in an unexpired patent their broadest reasonable construction in light of the specification of the patent in which they appear. 37 CFR § 42.100(b) (2017).⁵ Section 42.100(b) provides that

⁵ A recent amendment to this rule does not apply here because the Petition was filed before November 13, 2018. *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340 (October 11, 2018) (to be codified at 37 C.F.R. part 42). We, therefore, only cite the 2017 version of this regulation.

A party may request a district court-type claim construction approach to be applied if a party certifies that the involved patent will expire within 18 months from the entry of the notice of filing date accorded to the petition. *The request, accompanied by a party's certification, must be made in the form of a motion under § 42.20, within 30 days from the filing of the petition.*

37 C.F.R. § 42.100(b) (emphasis added).

In this case, neither TMC nor Anza filed the requisite motion seeking application of the district court-type claim construction standard. The parties, however, both agree that the '479 patent will have expired before the date of this final written decision.⁶ Pet. 8; Resp. 14. Both the Petition and the Response, therefore, request that we apply the district court-type claim construction standard under *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312, 1327 (Fed. Cir. 2005). Pet. 8; Resp. 14.

We do not regard this statement as the functional equivalent of the required motion and accompanying certification. Nevertheless, we apply the district court-type claim construction out of an abundance of caution regarding the date of issuance of this final written decision relative to the expiration date of the '479 patent. In any event, at the hearing, both TMC and Anza agreed that the disputed claim terms applying either the broadest reasonable interpretation or the *Phillips* claim interpretation standard would result in the same construction for each term. Tr. 7, 48.

⁶ The parties, however, do not agree upon the expiration date of the '479 patent. TMC states that the '479 patent expires on February 2, 2020. Pet. 8. Anza, on the other hand, asserts that February 25, 2020 is the expiration date. Resp. 14. For the purpose of our decision, we need not resolve this discrepancy.

2. *Claim Construction under Phillips*

Under *Phillips*, claim terms are accorded “their ordinary and customary meaning.” *Phillips*, 415 F.3d at 1312. “[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.” *Id.* at 1313. Only terms that are in controversy need to be construed, and then only to the extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

3. “*Resistance*”

TMC argues that the claim term “resistance” as used in claim 37 is indefinite. Pet. 16–20. In particular, TMC argues that claim 37 refers to the resistance of a material, which, according to TMC, is not a physical property that can be determined. *Id.* at 16–17. According to TMC, resistance is an electrical property of an object, while resistivity is an electrical property of a material. *Id.* at 16 (citing Ex. 1003 ¶ 80; Ex. 1018, 17). Moreover, resistivity can refer to two different properties of a material: “surface resistivity” or “volume resistivity.” TMC, therefore, proposes multiple constructions of the term “resistance” and argues that claims 37 and 39 are invalid under each of its proposed constructions. Pet. 16–20; Reply 2–3.

Anza argues that we should adopt the interpretation of the term “resistance” set forth in the district court’s claim construction memorandum in *CoorsTek, Inc. v. Steven F. Reiber*, No. 08-cv-01133-KMT-CBS, slip op.

(D. Colo. May 2, 2011).⁷ In that case, the district court construed the term “resistance” to mean “opposition to electrical current flow.” Ex. 1018, 44; Resp. 17. The district court, however, did not conduct a detailed analysis as to whether or not this construction was appropriate because the *CoorsTek* parties stipulated to this construction. Ex. 1018, 14–15.

As discussed above, the terms used in a claim are normally given “their ordinary and customary meaning.” *Phillips*, 415 F.3d at 1312. “[T]he ordinary and customary meaning of the claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.” *Id.* at 1313.

In this case, the ’479 patent’s Specification repeatedly uses the term resistance and refers to measuring the resistance in ohms. *See, e.g.*, Ex. 1001, 2:9–10, 4:9–14. Neither the term resistivity nor the units used to measure surface resistivity (ohms per square) appear in the Specification. We, therefore, find that a person of ordinary skill in the art at the time of the invention would have understood the term resistance, as it is used in the claims of the ’479 patent, to have its plain and ordinary meaning of “opposition to the flow of electrical current.” This is consistent with the Specification’s repeated statement that “[f]or best results, a resistance in the tip assembly itself should range from 10^5 - 10^{12} ohms.” *E.g.*, Ex. 1001, 4:12–14. In other words, the ’479 patent uses resistance to refer to an electrical property of an object, not an electrical property of a material.

⁷ A copy of the district court’s claim construction opinion appears in the record of this IPR as Exhibit 1018.

TMC argues that people of ordinary skill in the art sometimes use the term “resistance” interchangeably with the term “surface resistivity.” Pet. 18–20; Ex. 1003, ¶¶ 80–85. TMC, however, relies upon extrinsic evidence to support this argument. *Id.* Because we believe that the ’479 patent’s Specification is unambiguous in its use of the term resistance to mean “opposition to the flow of electrical current,” we do not believe that resort to extrinsic evidence is either necessary or proper in this instance.

For the reasons set forth above, we construe the term resistance to mean “opposition to the flow of electric current.”⁸

4. “*High Enough Stiffness . . . for at Least Two Uses*”

Claim 39 depends from claim 37 and adds the further limitations that the claimed dissipative material “has a high enough stiffness to resist bending when hot and has a high enough abrasiveness to function for at least two uses.” We address the interpretation of each of these phrases separately below.

a) “*High Enough Stiffness to Resist Bending When Hot*”

In its Petition, TMC does not provide a specific construction for the claim term “high enough stiffness to resist bending when hot.” Pet. 26–29. Rather, TMC argues that this claim term is indefinite. *Id.* For the purposes of

⁸ In our institution decision, we construed additional terms from claim 37 that TMC identified in the Petition, specifically, “bonding,” “dissipative material,” and “that has a resistance low enough to prevent a discharge of charge to said device and high enough to avoid current flow large enough to damage said device.” Dec. 29–31. Based on the record developed during the trial, it is not necessary to construe those claim terms to resolve the parties’ dispute. Accordingly, we decline to construe those claim terms as part of this decision. *See Vivid Techs., Inc.*, 200 F.3d at 803.

this proceeding, TMC argues that that a person of ordinary skill in the art would have understood that any material that either “(1) . . . has Rockwell C hardness of 32 or above or (2) when material hardness is equal to or greater than the hardness of a zirconia- or alumina-based compound” satisfies this limitation. *Id.*

Anza argues that the claim language “has a high enough stiffness to resist bending when hot” should be interpreted to mean either “high enough stiffness to resist bending when the bonding tool reaches a temperature otherwise sufficient to melt the wire being used in the bonding process” or “high enough stiffness or hardness to resist bending when the bonding tool reaches a temperature otherwise sufficient to melt the wire being used in the bonding process.” Resp. 29–30. Anza’s second proposed interpretation is that which was adopted by the district court in *CoorsTek*. See Resp. 24; Ex. 1018, 46.

For the reasons set forth below, we adopt Anza’s second proposed claim construction.

We begin by explaining why we cannot adopt TMC’s proposed construction.

As an initial matter, we note that TMC’s proposed construction ignores the words “when hot,” which appear in claim 39. An interpretation which essentially ignores words appearing in the claim is unlikely to be correct. See, e.g., *In re Wilson*, 424 F.2d 1382, 1385 (CCPA 1970) (holding that every word in a claim must be considered in determining the claim’s scope).

Furthermore, TMC’s proposed construction appears to be an attempt to limit the claim’s scope to the preferred embodiments discussed in the ’479

patent's Specification. *See, e.g.*, Ex. 1001, 4:23–25 (“The tip should have a Rockwell hardness of about 25 or above, preferably of about 32 or above.”). TMC, however, does not explain why the '479 patent's Specification and prosecution history justify so limiting claim 39's scope. Pet. 26–29. In the absence of such intrinsic evidence, we decline TMC's invitation to limit claim 39's scope to the preferred embodiments described in the Specification. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1323 (Fed. Cir. 2005) (“[W]e have expressly rejected the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment.”).

As TMC and its expert, Dr. Bravman, recognize, the phrase “high enough stiffness to resist bending when hot” contains several terms of degree. *Id.* at 28 (citing Ex. 1003, ¶¶ 122, 123). TMC argues that the Specification provides insufficient guidance for a person of ordinary skill in the art to have understood and determined the sufficiency a bonding tip's stiffness. *Id.* at 27. Thus, TMC is attempting to justify its proposed claim interpretation by setting forth its arguments that claim 39 is indefinite. We, however, are precluded from addressing the question of whether claim 39 complies with 35 U.S.C. § 112, ¶ 2. *See* 35 U.S.C. § 311(b) (limiting the scope of an IPR to grounds raised under § 102 or § 103). At this point, it is sufficient for us to note that claims that include terms of degree are not necessarily indefinite. Rather, an important question is whether the intrinsic evidence provides some standard for measuring the degree. *Exxon Research & Eng'g, Inc. v. U.S.*, 265 F.3d 1371, 1381 (Fed. Cir. 2001); *see also* Ex. 1018, 41–44.

Due to the nature of the arguments TMC and Anza make regarding the alleged invalidity of claim 39, we have determined that it is not necessary for us to construe the claim language in any greater detail than did the district court in *CoorsTek*. We, therefore, conclude that the claim term “high enough stiffness to resist bending when hot” means “high enough stiffness or hardness to resist bending when the bonding tool reaches a temperature otherwise sufficient to melt the wire being used in the bonding process.”

b) *“High Enough Abrasiveness to Function for at Least Two Uses”*

In its Petition, TMC does not provide a specific construction of the claim term “high enough abrasiveness to function for at least two uses.” Pet. 26–29. Rather, TMC argues that this claim term is indefinite. *Id.* For the purposes of this proceeding, TMC argues that that a person of ordinary skill in the art would understand that any material that either “(1) . . . has Rockwell C hardness of 32 or above or (2) when material hardness is equal to or greater than the hardness of a zirconia- or alumina-based compound” would satisfy this limitation. *Id.*

As discussed above, Anza generally argues that we should construe the terms in the ’479 patent in the manner the district court adopted in the *Coorstek* litigation. Resp. 24–25. In that case, the district court did not construe the phrase “high enough abrasiveness to function for at least two uses.” Ex. 1018, 46 (“The Court has determined that the entirety of the phrase does not need construction by the Court, however, the term ‘abrasiveness’ is construed to mean ‘the ability to wear away another object or to resist being worn away by another object.’”). Anza, therefore, does not

offer any construction of the phrase “has a high enough abrasiveness to function for at least two uses.” Resp. 24.

Due to the nature of the arguments TMC and Anza make regarding the alleged invalidity of claim 39, we determine that it is not necessary for us to specifically construe the phrase “has a high enough abrasiveness to function for at least two uses.”

D. Anticipation under 35 U.S.C. § 102(e) by Mikaki

TMC argues that claims 37 and 39 of the '479 patent are unpatentable as anticipated by Mikaki. Pet. 29–38. TMC’s analysis, however, is premised upon our construing the claim term “resistance” as referring to the volume resistivity of the material. *See* Pet. 32–33. At the hearing, TMC acknowledged that if we did not construe the term “resistance” to refer to the volume resistivity of the material, its anticipation analysis would fall short. Tr. 9–10. As discussed above, we have construed the claim term “resistance” to have its plain and ordinary meaning of “opposition to the flow of electric current.” *See* § II.C.3, *supra*. We, therefore, need not address TMC’s argument in detail. We conclude that TMC has not shown by a preponderance of the evidence that claims 37 and 39 are unpatentable as anticipated by Mikaki.

E. Obviousness under 35 U.S.C. § 103(a) over the combination of Mikaki and Linn

TMC argues that claims 37 and 39 are invalid as obvious over the combination of Mikaki and Linn. Pet. 38–45. Anza responds that this ground of alleged unpatentability is inadequate for two reasons: (1) Mikaki is not prior art to the '479 patent, Resp. 47, and (2) the combination of Mikaki and Linn is inoperable, *id.* at 47–48. Significantly, Anza does not argue that,

assuming Mikaki is available as prior art, the combination of Mikaki and Linn fails to describe or suggest all elements of the challenged claims. *Id.* at 47–48; *see also* Tr. 54. Anza also presents an additional argument for the patentability of claim 39. *Id.* at 48.

We address each of these arguments below. For the following reasons, we determine that claims 37 and 39 of the '479 patent are unpatentable as obvious over the combination of Mikaki and Linn.

1. Is Mikaki Prior Art?

Before we address the parties' arguments regarding whether the combination of Mikaki and Linn would have rendered the subject matter of claims 37 and 39 of the '479 patent obvious, we must determine whether Mikaki is prior art to the '479 patent.

TMC argues that Mikaki's priority date for the purposes of § 102(e) is December 24, 1998, which is the filing date of Mikaki's US patent application. Pet. 29. This is consistent with the face of Mikaki, which states that its § 102(e) date is December 24, 1998. Ex 1022, at [86].

To antedate Mikaki, Anza must establish either (1) prior reduction to practice of the claimed invention or (2) prior conception coupled with reasonable diligence from just prior to Mikaki's priority date until reduction to practice or constructive reduction to practice. *See ATI Techs ULC v. Iancu*, 920 F.3d 1362, 1369 (Fed. Cir. 2019).

Anza does not assert a date for the reduction to practice of the inventions of the '479 patent prior to Mikaki's priority date of December 24, 1998. *See* Resp. 34–35.

Rather, Anza asserts that the '479 patent's inventors, Steven Frederick Reiber and Mary Louise Reiber, conceived the claimed invention no later

than December 4, 1998, and exercised reasonable diligence in reducing the invention to practice during the legally relevant period, i.e., until the invention was constructively reduced to practice by filing the application that became the '479 patent. *See* Resp. 34–35. To support this contention, Anza relies upon the Declaration of Steven F. Reiber. *See* Ex. 2028. In his declaration, Mr. Reiber testifies that “[n]o later than December 4, 1998, we [referring to the inventors] disclosed each element of our claimed invention to our patent lawyers in order to facilitate a prior art search to determine novelty and patentability.” *Id.* ¶ 18; *see also id.* ¶ 15 (Mr. Reiber’s testimony that he and Ms. Reiber “conceived the invention at least by December 4, 1998).

Conception is the formation, in the mind of the inventor, of a definite and permanent idea of the complete and operative invention, as it is thereafter to be applied in practice. *Kolcraft Enters., Inc. v. Graco Children’s Prods., Inc.*, 927 F.3d 1320, 1324 (Fed. Cir. 2019).

“[C]onception is established when the invention is made sufficiently clear to enable one skilled in the art to reduce it to practice without the exercise of extensive experimentation or the exercise of inventive skill.” *Hiatt v. Ziegler*, 179 USPQ 757, 763 (Bd. Pat. Inter. 1973).

An inventor’s testimony regarding conception must be corroborated by other, independent information. *Aptor Miitors ApS v. Kamstrup A/S*, 887 F.3d 1293, 1295 (Fed. Cir. 2018). The existence of sufficient evidence to corroborate the inventor’s testimony is governed by a “rule of reason” analysis, which requires consideration of all pertinent evidence to determine whether the inventor’s testimony is credible. *In re NTP, Inc.*, 654 F.3d 1279, 1291 (Fed. Cir. 2011). Conception is a question of law premised on

underlying factual findings. *In re VerHoef*, 888 F.3d 1362, 1365 (Fed. Cir. 2018). The existence of sufficient corroboration is one of these factual findings. *REG Synthetic Fuels, LLC v. Neste Oil Oyj*, 841 F.3d 954, 958 (Fed. Cir. 2016).

As the Federal Circuit has explained:

When the issue of priority concerns the antedating of a reference, the applicant is required to demonstrate, *with sufficient documentation*, that the applicant was in possession of the later-claimed invention before the effective date of the reference. *Demonstration of such priority requires documentary support, from which factual findings and inferences are drawn, in application of the rules and law of conception, reduction to practice, and diligence.* The purpose is not to determine priority of invention . . . but to ascertain whether the applicant was in possession of the claimed invention sufficiently to overcome the teachings and effect of an earlier publication of otherwise invalidating weight.

Thus, the facts and law of conception focus on whether the evidence presented by the applicant demonstrates that the inventor had a definite idea of the invention, as it would thereafter be applied in practice. The principles are legal, but the conclusions of law focus on the evidence, for which the Board's factual findings are reviewed for support by substantial evidence.

In re Steed, 802 F.3d 1311, 1316–17 (Fed. Cir. 2015) (emphasis added).

Anza contends that a December 4, 1998 letter from Mr. Reiber's attorney requesting a prior art search on behalf of the inventors corroborates Mr. Reiber's Declaration testimony. Resp. 36–37 (citing Ex. 2028, ¶ 19; Ex. 2031). In particular, Mr. Reiber's Declaration asserts that two portions of the December 4, 1998 letter to the prior art searcher corroborate the inventors' conception of the limitations recited in the body of claims 37 and 39. Ex. 2028, ¶ 19; *see* Sur-Reply 5.

Claim 37 recites the following limitations in the body of the claim:

bonding a device using a bonding tip made with a dissipative material that has a resistance low enough to prevent a discharge of charge to said device and high enough to avoid current flow large enough to damage said device.

Ex. 1001, 8:54–59.

Mr. Reiber’s Declaration asserts that the following passages of the letter corroborate conception of these limitations.

The invention also includes the use of a dissipative ceramic to fabricate bonding tool tips or bonding tool tip coatings for wire-bonding electrical connections to bonding pads on integrated circuits.

Ex. 2031, 1 (quoted by Exhibit 2028 ¶ 19).

Bonding tool tips must also be electrically designed to produce a reliable electrostatic discharge to form the bonding ball properly, yet to prevent electrostatic discharge damage to the integrated circuit.

Ex. 2031, 2 (quoted by Exhibit 2028 ¶ 19).

We have serious doubts that the general statements contained in the December 4, 1998 letter provide sufficient corroboration for Mr. Reiber’s testimony regarding conception, as there is little in the letter specific enough to show possession of the various limitations of the challenged claims. Even if the December 4, 1998 letter were sufficient corroboration of the conception of the subject matter of claims 37 and 39, Anza’s attempt to antedate Mikaki fails. Anza has not proven reasonable diligence on the part of the inventors for the period between December 4, 1998 and the constructive reduction to practice on February 25, 1999.

“An inventor’s testimony regarding his reasonable diligence must be corroborated by evidence.” *Perfect Surgical Techniques, Inc. v. Olympus Am., Inc.*, 841 F.3d 1004, 1007 (Fed. Cir. 2016) (citing *Brown v. Barbacid*,

436 F.3d 1376, 1380 (Fed. Cir. 2006)); *see also Price v. Symsek*, 988 F.2d 1187, 1196 (Fed. Cir. 1993) (citing *Kendall v. Searles*, 173 F.2d 986, 993, 81 USPQ 363, 368–69 (CCPA 1949)).

We begin by noting that we only have testimony from one of the inventors of the '479 patent—Steven F. Reiber. Although Mr. Reiber sometimes mentions in passing activities toward reduction to practice he undertook with his co-inventor, Mary L. Reiber, Anza has not provided a detailed account of her activities during the relevant time period. Nor has Anza provided any evidence corroborating any actions Ms. Reiber may have taken toward reducing the subject matter of claim 37 to practice. Indeed, Anza's briefing does not attempt to rely upon any independent actions of Ms. Reiber to show reasonable diligence between the alleged date of conception and the construction reductive practice.⁹

Thus, the issues before us are whether Mr. Reiber's actions alone and/or in concert with Ms. Reiber's actions constitute reasonable diligence and whether the evidence of record sufficiently corroborates Mr. Reiber's testimony.

Mr. Reiber's testimony concerning reasonable diligence is set forth in paragraphs 20–28 of his declaration. Ex. 2028, ¶¶ 20–28. Mr. Reiber's Declaration cites Exhibits 2031–2038 as corroborating evidence. *Id.* For the following reasons, we determine that Anza has not proven reasonable diligence on the part of the inventors during the period from alleged

⁹ We note that TMC does not argue that Anza's failure to account for Ms. Reiber's activities is evidence that the inventors failed to exercise reasonable diligence during the relevant time period. Because TMC has not raised this issue, we do not consider it *sua sponte*.

conception, no later than December 4, 1998, through the February 25, 1999 constructive reduction to practice.

First, Mr. Reiber's Declaration does not provide any description of Mr. Reiber's job duties during the relevant time period. The Declaration only states that Mr. Reiber had been working at Anza since 1995. Ex. 2028 ¶ 9. Nor does the Declaration contain any testimony regarding the typical number of hours Mr. Reiber worked at his full-time job with Anza. Similarly, the Declaration does not identify how many days of vacation time Mr. Reiber took during the relevant time period.¹⁰ Without this information, we lack a sufficient basis to judge whether the amount of time Mr. Reiber spent working on the reduction to practice of the subject matter of claims 37 and 39 is reasonable in light of all the circumstances.

Second, Mr. Reiber's testimony is unclear as to whether his work on the subject matter of claims 37 and 39 was within the scope of his duties at Anza or work performed for the benefit of another company.

At several points in his Declaration, Mr. Reiber suggests that his efforts to reduce the subject matter of claim 37 to practice were a side project in addition to his full-time job at Anza:

From the time we received the results from the patentability search, on or around December 17, 1998, through mid-February 1999, Ms. Reiber and I continued to diligently consider the prior art and prepare a thorough invention disclosure in order to draft the specification during our spare

¹⁰ The Declaration states that Mr. Reiber did take time off to celebrate the holidays. Exhibit 2028 ¶¶ 20, 22.

time when we were not working full time, traveling for work, and celebrating the holidays.

Ex. 2028 ¶ 22; *see also id.* ¶ 20 (“I was working a full[-]time job at Anza.”). Moreover, some of the corroborating evidence suggests that work related to the reduction to practice of claims 37 and 39 was performed on behalf of the company called SJM Technology Inc.¹¹ For example, on December 17, 1998, Mr. Reiber’s patent attorneys sent a letter summarizing the results of the prior art search to Ms. Reiber at SJM Technology. Ex. 2033. Similarly, Mr. Reiber testifies that the co-inventors twice visited PE Ceramics for assistance in writing standard firing profiles necessary for making ceramics for dissipative materials. Ex. 2028 ¶ 23. Mr. Reiber points to a Non-Disclosure Agreement between SJM Technology and PE Ceramics as corroborating evidence. *Id.* (citing Ex. 2034).

On the other hand, Mr. Reiber also testifies that he traveled to the Philippines, Hong Kong, Tokyo, and Seoul to attend meetings “with engineers to develop processes to resolve electrostatic discharge (ESD) issues.” *Id.* ¶ 20. He states that these trips were taken on behalf of Anza. *Id.* Controlling electrostatic discharge is the subject matter of the ’479 patent. Furthermore, Mr. Reiber corresponded with the attorneys who prosecuted the ’479 patent using his Anza email address. *See* Ex. 2036; Ex. 2038. He also met with these attorneys at Anza. *See* Ex. 2037.

¹¹ According to Anza, Mr. Reiber sometimes referred to SJM Technology as “MSJ Company.” Paper 46, 8, n.6. Thus, we understand the references to MSJ in Exhibit 2028 ¶ 23 and Ex. 2034 to be references to SJM Technology. For the sake of simplicity, we shall refer to both SJM Technology and MSJ Company as “SJM.”

This lack of clarity makes it impossible for us to determine whether Mr. Reiber's efforts amounted to reasonable diligence under all of the circumstances. If Mr. Reiber's efforts were undertaken on behalf of SJM Technology, we would need to understand Mr. Reiber's role at SJM Technology and how much time he spent working for SJM Technology during a typical week. If, on the other hand, Mr. Reiber's efforts were undertaken on behalf of Anza, we have already discussed why Mr. Reiber's testimony lacks sufficient detail for us to determine whether his efforts amounted to reasonable diligence.

Third, there is insufficient evidence to corroborate Mr. Reiber's testimony regarding his activity between December 7, 1998 and January 3, 1999. According to Mr. Reiber,

from December 7, 1998 through January 3, 1999, I took a trip overseas for the Christmas and New Year holidays and I was working a full[-]time job at Anza. *See* Ex.2035. The images below are from my passport proving that I was traveling during December 1998 and January 1999 for work on behalf of Anza. . . . For example, I traveled to the Philippines, Hong Kong, Tokyo, and Seoul, Korea for work to meet with the companies that Anza does business with designing and building bonding machines. During my travels in December 1998 and January 1999, I was busy attending meetings with engineers to develop processes to resolve electrostatic discharge (ESD) issues.

Ex. 2028 ¶ 20.

In his Declaration, Mr. Reiber includes copies of six pages from his passport that are alleged to corroborate this testimony. *Id.* He has annotated these images to identify four dates indicating where he traveled for work. *See id.*; *see also* Ex. 2035 (unannotated images).

A closer examination of the images, however, shows that they only partially corroborate Mr. Reiber's testimony and call into question the reliability of his memory of the events from approximately 20 years ago. The annotated entries Mr. Reiber identifies show that he arrived in the Philippines on December 7, 1998, arrived in Hong Kong on December 10, 1998, and arrived in Seoul on December 14, 1998. *Id.* The fourth entry Mr. Reiber identifies in his Declaration does not appear to corroborate his assertion that he traveled to Tokyo within the relevant time period. For ease of reference, we reproduce Mr. Reiber's annotated image from Exhibit 2028 below.



The image reproduced above shows an annotated image of two pages from Mr. Reiber's passport.

In the upper right-hand corner of the image, Mr. Reiber has circled a stamp showing a date of December 11, 1998. This stamp is insufficient to corroborate Mr. Reiber's testimony that he traveled to Tokyo. The left side

of this passport image includes stamps showing arrival and departure from Tokyo's Narita Airport in September, 1998. These stamps look nothing like the stamp Mr. Reiber identifies in the upper right-hand corner of the image.

Furthermore, the corroborating evidence provided does not account for the entirety of the December 7, 1998 through January 3, 1999 time period. The passport pages show that Mr. Reiber returned to the United States on December 17, 1998. Ex. 2035, 2. Anza has not provided any evidence that corroborates Mr. Reiber's testimony that he was out of the country for the Christmas and New Year's holidays. Nor does Mr. Reiber provide any testimony regarding how long his vacation was. We, therefore, have no way to determine what portion of the time between December 17, 1998 and January 3, 1999 Mr. Reiber was working or on vacation, and have no basis for determining whether he was reasonably diligent during that time period.

Also, Mr. Reiber testifies that he traveled on behalf of Anza in December 1998 and January 1999 "to meet with the companies that Anza does business with designing and building bonding machines and to meet with engineers to develop processes to resolve ESD issues." Ex. 2028 ¶ 20. There is no record evidence to corroborate this testimony regarding the purpose of his travel, let alone whether there were meetings regarding ESD issues. Indeed, the only evidence Mr. Reiber provides is the passport stamps, which, alone, only corroborate *that* Mr. Reiber traveled, not what he did during those travels.

Fourth, as discussed above, Mr. Reiber testifies that he and Mrs. Reiber visited Auburn, California to meet with PE Ceramics for assistance in writing standard firing protocols for making ceramics for dissipative

materials. Ex. 2028 ¶ 23. Mr. Reiber cites a nondisclosure agreement between SJM and PE Ceramics as corroborating evidence for this testimony. *Id.*

The NDA, however, does not state in any detail the subject matter of the interaction between SJM and PE Ceramics. *See* Ex. 2034. Nor is there any evidence that corroborates Mr. Reiber's testimony regarding the trips to PE Ceramics.

Fifth, Mr. Reiber testifies that between mid-December 1998 and mid-February 1999, he and Ms. Reiber prepared drawings and provided information to their attorneys to prepare a provisional patent application. Ex. 2028 ¶ 24. He further testifies that from mid-February 1999 until February 24, 1999, he and Ms. Reiber reviewed and revised four drafts of the provisional application prior to its filing on February 25, 1999. *Id.* ¶¶ 25–27.

Mr. Reiber cites Exhibits 2036–2038 as corroborating evidence of these activities. These exhibits reflect some degree of communication between Mr. Reiber and Ms. Reiber and their attorneys. They, however, are weak corroborating evidence because they do not contain any indication of how much time or effort Mr. Reiber or Ms. Reiber put into the sorts of activities Mr. Reiber describes in his testimony. For example, Exhibits 2036–2038 do not provide any evidence to corroborate Mr. Reiber's testimony that he reviewed four drafts of the provisional patent application.

In view of the foregoing, we determine that Anza has not established reasonable diligence between December 4, 1998 and the February 25, 1999 constructive reduction to practice. We, therefore, conclude that Mikaki is available as prior art to the '479 patent.

2. *Is the Combination of Mikaki and Linn Inoperable?*

Anza argues that the combination of Mikaki and Linn is inoperable. Resp. 47–48. In particular, Anza argues that the combination of Mikaki and Linn is inoperable because Mikaki is not enabled. *Id.* (incorporating arguments appearing at Resp. 42–44). In support of these arguments, Anza relies upon Mr. Reiber’s Declaration and supporting exhibits. *Id.* (citing Ex. 2028 ¶¶ 29–37; Exs. 2039–2042).

Printed publication and patent prior art references are generally presumed to be enabled. *In re Antor Media Corp.*, 689 F.3d 1282, 1289, 1292 (Fed. Cir. 2012) (printed publications); *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1355 (Fed. Cir. 2003) (patents). The record in this case does not overcome the presumption that Mikaki is enabled.

In his Declaration, Mr. Reiber asserts that he is “very familiar with the technology described in Mikaki.” Ex. 2028 ¶ 29. Mr. Reiber says that he gained his familiarity with the material described in Mikaki because he worked with Mikaki’s assignee, Kyocera Corp. *Id.* ¶ 30. According to Mr. Reiber, the material described in Mikaki would not function in any type of wire binder because the material has micro fractures and is not homogeneous. *Id.* ¶ 29.

Mr. Reiber testifies that he had a great deal of difficulty machining the material he received from Kyocera into bonding tool tips. *Id.* ¶ 31. According to Mr. Reiber, he “was unable to even successfully use one

bonding tip [made from the material provided by Kyocera] with the bonder apparatus.” *Id.*¹²

Mr. Reiber’s testimony is the only evidence that the material provided by Kyocera was unsuitable for the manufacture of bonding tool tips. Mr. Reiber’s Declaration is unsupported by any documentary evidence of test results. Ex. 2028 ¶¶ 30–31.

Furthermore, Mr. Reiber’s hearsay testimony¹³ is the only evidence that ties Kyocera’s material to Mikaki: “I understood through discussions with Mr. Williams [Vice President of Kyocera Industrial Ceramics Corp.] that this material was what Kyocera believed was covered by its Mikaki patent and Shikata patent.” *Id.* ¶ 30. In support of his assertion, Mr. Reiber points to emails that he received from David Williams of Kyocera. *Id.* (citing Ex. 2039). These emails, however, do not tie the material provided by Kyocera to either Mikaki or Shikata. Ex. 2039. Rather, the emails identify the material Kyocera actually provided as “Z21H05.” *Id.* Exhibit 2039 also suggests that Kyocera may have provided a material identified as “Z21H04” to Mr. Reiber. *Id.*

¹² This testimony is ambiguous at best. Mr. Reiber’s testimony could be that he was only able to manufacture one bonding tip from the material provided by Kyocera and that bonding tip could not be used in the bonder apparatus. On the other hand, Mr. Reiber’s testimony could be understood as saying that one of the bonding tips he was able to make from Kyocera’s material could not be used with the bonder apparatus. For the purpose of this opinion, we shall assume that Mr. Reiber intended for us to interpret his testimony in the former sense, which we understand to be more favorable to Anza’s position.

¹³ TMC did not object to this testimony as hearsay.

Mr. Reiber also points to Exhibit 2041 as supporting his testimony. Ex. 2028, ¶ 32 (citing Ex. 2041). According to Mr. Reiber, Kyocera provided the photographs comprising Exhibit 2041. These photographs purportedly are magnified views of materials described in the '479 patent and materials from Mikaki and Shikata. *Id.* Mr. Reiber's testimony, however, is the only basis for the identification of the particular materials shown in these photographs. *Id.*

Finally, Mr. Reiber asserts that Kyocera attempted to license the '479 patent. Ex. 2028 ¶¶ 34–36 (citing Exs. 2042, 2043). Although Exhibits 2042 and 2043 support Mr. Reiber's testimony that Kyocera wished to acquire certain assets from SJM, including patent rights, they do not provide any support for his assertion that the reason Kyocera wished to make this acquisition was because Mikaki was not enabled.

In sum, Anza's evidence that Mikaki is not enabled rests on Mr. Reiber's largely uncorroborated testimony. We are not are not aware of any requirement that evidence of nonenablement be corroborated. Nor do we seek to impose any such requirement. Mr. Reiber, however, is an interested witness testifying about work that he performed in 2002. The lack of any corroboration, combined with Mr. Reiber being an interested witness, leads us to accord his testimony less weight. Finally, even if we were not to give Mr. Reiber's testimony less weight, we note that his testimony on its face fails to persuasively establish any link between the materials he received from Kyocera and the materials described in Mikaki. For example, Mr. Reiber does not explain why he believes the materials he received are the same as those in Mikaki, relying only on a bare assertion that it is, which itself is grounded only in a hearsay statement from a Kyocera employee; nor

does Mr. Reiber give any reason we should conclude that the materials he received are representative of the entire scope of materials disclosed in Mikaki.

For the reasons set forth above, we determine that the full record does not demonstrate nonenablement of Mikaki. We, therefore, do not find that Anza has not demonstrated that the combination of Mikaki and Linn would have been inoperable.

3. TMC Has Demonstrated that Claim 37 Would Have Been Obvious

As discussed above, Anza does not contest that TMC's argument that the combination of Mikaki and Linn describes or suggests each limitation in claim 37. Resp. 47–48; *see* Tr. 54. We have reviewed TMC's showing regarding the presence of each of claim 37's elements in the prior art and are satisfied that TMC has shown that Mikaki and Linn teach or suggest all of claim 37's elements. Pet. 29–36 (describing how Mikaki discloses certain elements of claim 37), 39–44 (setting forth how the combined teachings of Linn and Mikaki disclose a resistance that falls within claim 37's range). We also find (and Anza has not contested) that a person of ordinary skill in the art at the time of the invention would have had a reason to combine Mikaki and Linn with a reasonable expectation of success in arriving at the subject matter of claim 37. Pet. 44–45 (asserting that a person of ordinary skill in the art would have applied Linn's bonding tool dimensions to Mikaki's disclosure, to achieve compatibility with existing bonding tools and machines).

4. Does Mikaki Describe or Suggest the Limitations Recited in Claim 39?

In arguing that the subject matter of claim 39 would have been obvious to a person of ordinary skill in the art in view of the combination of

Mikaki and Linn, TMC asserts that Mikaki describes the claim limitations recited in claim 39. Pet. 44.

Anza challenges TMC's assertions. Resp. 48 (incorporating arguments regarding the anticipation claim 39 by Mikaki). In particular, Anza challenges TMC's argument that a material having the Rockwell C hardness described in Mikaki has the stiffness and abrasiveness recited in claim 39. *Id.* at 44–47. Anza further argues that TMC has failed to present evidence that a material having the Rockwell C hardness described in Mikaki has the stiffness required by claim 39 *when hot*. *Id.*

As discussed above, we have construed claim 39's limitation "high enough stiffness to resist bending when hot" as meaning "high enough stiffness or hardness to resist bending when the bonding tool reaches a temperature otherwise sufficient to melt the wire being used in the bonding process." *See* § II.C.4, *supra*. We have declined to specifically construe the limitation "high enough abrasiveness to function for at least two uses." *See* § II.C.4, *supra*.

TMC has presented ample evidence that Mikaki describes materials that have a Rockwell C hardness of 32 or greater. *See, e.g.*, Ex. 1003 ¶¶ 118–124. TMC argues that, because Mikaki's materials meet this criterion, which the '479 patent's Specification describes as being preferred, Mikaki's materials must satisfy the limitation recited in claim 39.

Anza argues that TMC has not shown by a preponderance of the evidence that Mikaki describes materials meeting the limitations recited in claim 39. Resp. 44–46, 48. In particular, Anza argues that TMC has not presented any evidence that the materials described in Mikaki have the requisite stiffness when the material is hot, as claim 39 requires. *Id.* at 45–46

(citing Ex. 2048 ¶¶ 68–69). Anza relies upon the testimony of its expert, Dr. Bruce Kim, to support this argument. Dr. Kim testifies that “[i]n general, the hardness of a material decreases at the temperature increases. *See* Ex. 2050 at 40. Although Exhibit 2050 describes a metal and measures hardness using the Rockwell E scale, the general principle that a material’s hardness decreases as temperature increases remains the same.” Ex. 2048 ¶ 68. On cross-examination, however, Dr. Kim admitted that there were exceptions to this general principle. Ex. 1052, 25:10–22, 36:25–38:11.

Although TMC’s expert, Dr. Bravman, does not expressly address the question of the stiffness of the materials when hot, he does opine that it is reasonable to infer that materials, such as those described in Mikaki, that have the properties that the ’479 patent describes as preferred, fall within the scope of claim 39. Ex. 1003 ¶ 122.

We agree and note that the Federal Circuit has repeatedly held that a claim construction that excludes the preferred embodiment is rarely, if ever, correct. *InterDigital Commc’ns, LLC v. U.S. Int’l Trade Comm’n*, 690 F.3d 1318, 1326 (Fed. Cir. 2012) (citing *Pfizer, Inc. v. Teva Pharm., USA, Inc.*, 429 F.3d 1364, 1374 (Fed. Cir. 2005); *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed. Cir. 1996)). It is reasonable to conclude, therefore, that the patent’s recitation of a Rockwell C hardness of 32 or above as preferable indicates that a material with that Rockwell C hardness falls within the scope of claim 39.

For these reasons, we determine that TMC has shown by a preponderance of the evidence, that Mikaki describes materials meeting the limitation recited in claim 39.

F. Obviousness under 35 U.S.C. § 103(a) over the combination of Alfaro and Shikata

TMC argues that claims 37 and 39 of the '479 patent are unpatentable as obvious over the combination of Alfaro and Shikata. Pet. 45–56. TMC's analysis, however, is premised upon our construing the claim term "resistance" as referring to the volume resistivity of the material. *See* Pet. 32–33. At the hearing, TMC acknowledged that if we did not construe the term "resistance" to refer to the volume resistivity of the material, its arguments that claims 37 and 39 are unpatentable as obvious over the combination of Alfaro and Shikata would fall short. Tr. 9–10. As discussed above, we have construed the claim term "resistance" to have its plain and ordinary meaning of "opposition to the flow of electric current." *See* § II.C.3, *supra*. We, therefore, need not address TMC's argument in any detail.

G. Obviousness under 35 U.S.C. § 103(a) over Popp

TMC argues that claims 37 and 39 of the '479 patent are unpatentable as obvious over Popp. Pet. 56–61. TMC's analysis, however, is premised upon our construing the claim term "resistance" as referring to the surface resistivity of the material. *See* Pet. 58–60. At the hearing, TMC acknowledged that if we did not construe the term "resistance" to refer to the surface resistivity of the material, its arguments that claims 37 and 39 are unpatentable as obvious over Popp would fall short. Tr. 9–10. As discussed above, we have construed the claim term "resistance" to have its plain and ordinary meaning of "opposition to the flow of electric current." *See* § II.C.3, *supra*. We, therefore, need not address TMC's argument in detail.

We conclude that TMC has not shown by a preponderance of the evidence that claims 37 and 39 are unpatentable as having been obvious over Popp.

H. Obviousness under 35 U.S.C. § 103(a) over the combination of Popp and Schneider

TMC argues that claims 37 and 39 of the '479 patent are unpatentable as obvious over the combination of Popp and Schneider. Pet. 61–65. TMC's analysis, however, is premised upon our construing the claim term "resistance" as referring to the surface resistivity of the material. *See* Pet. 61–62. At the hearing, TMC acknowledged that if we did not construe the term "resistance" to refer to the surface resistivity of the material, its argument that claims 37 and 39 are unpatentable as obvious over the combination of Popp and Schneider would fall short. Tr. 9–10. As discussed above, we have construed the claim term "resistance" to have its plain and ordinary meaning of "opposition to the flow of electric current." *See* § II.C.3, *supra*. We, therefore, need not address TMC's argument in detail. We conclude that TMC has not shown by a preponderance of the evidence that claims 37 and 39 are unpatentable as having been obvious over Popp and Schneider.

III. CONCLUSION

In sum, we have determined that claims 37 and 39 are unpatentable over the combination of Mikaki and Linn.

ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, based on a preponderance of the evidence, claims 37 and 39 of the '479 patent are unpatentable and

FURTHER ORDERED, because this is a final written decision, the parties to this proceeding seeking judicial review of our Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

In summary:

| Claims | 35 U.S.C. § | Reference(s)/Basis | Claims Shown Unpatentable | Claims Not Shown Unpatentable |
|------------------------|--------------------|---------------------------|----------------------------------|--------------------------------------|
| 37, 39 | 103(a) | Mikaki | | 37, 39 |
| 37, 39 | 103(a) | Mikaki, Linn | 37, 39 | |
| 37, 39 | 103(a) | Alfaro, Shikata | | 37, 39 |
| 37, 39 | 103(a) | Popp | | 37, 39 |
| 37, 39 | 103(a) | Popp, Schneider | | 37, 39 |
| Overall Outcome | | | 37, 39 | |

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