United States Court of Appeals for the Federal Circuit

**MENTOR GRAPHICS CORPORATION,
AN OREGON CORPORATION,**
Plaintiff-Cross-Appellant

v.

**EVE-USA, INC., A DELAWARE CORPORATION,
SYNOPSYS EMULATION AND VERIFICATION
S.A.S., FORMED UNDER THE LAWS OF FRANCE,
SYNOPSYS, INC., A DELAWARE CORPORATION,**
Defendants-Appellants

2015-1470, 2015-1554, 2015-1556

Appeals from the United States District Court for the District of Oregon in Nos. 3:10-cv-00954-MO, 3:12-cv-01500-MO, 3:13-cv-00579-MO, Judge Michael W. Mosman.

Decided: March 16, 2017

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Before LOURIE, MOORE, and CHEN, *Circuit Judges.*

MOORE, *Circuit Judge.*

The present appeal arises from litigation in the District of Oregon between Mentor Graphics Corp. ("Mentor") and Synopsys, Inc., Synopsys Emulation and Verification S.A.S., and EVE-USA, Inc. ("EVE") (collectively, "Synopsys").[1] Mentor asserted several patents against Synopsys, including U.S. Patent Nos. 6,240,376 ("the '376 patent"), 6,947,882 ("the '882 patent"), 6,009,531 ("the '531 patent"), and 5,649,176 ("the '176 patent"). Synopsys asserted two patents against Mentor—U.S. Patent Nos. 6,132,109 ("the '109 patent") and 7,069,526 ("the '526 patent").

The '376 patent was the only patent tried to the jury. Prior to trial, the district court granted summary judgment barring Synopsys from challenging the '376 patent's validity because of assignor estoppel. It also granted Synopsys' motion in limine precluding Mentor from

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[1]   EVE is a subsidiary of Synopsys. References to Synopsys refer to all the Synopsys and EVE entities unless otherwise noted.

introducing evidence of willful infringement. The jury found in favor of Mentor and found damages of approximately $36,000,000. Synopsys appeals the infringement verdict, the damages award, and the summary judgment of assignor estoppel. Mentor cross-appeals the motion in limine regarding willfulness.

The district court granted summary judgment on the remaining patents prior to trial. It held that Synopsys' '109 patent was indefinite and Synopsys' '526 patent lacked patent-eligible subject matter. Synopsys appeals both decisions. The district court also held that the claims of Mentor's '882 patent lacked written description support and its infringement allegations relating to the '531 and '176 patents were barred by claim preclusion. Mentor cross-appeals both decisions.

We hold there was substantial evidence to support the jury's infringement verdict regarding the '376 patent and affirm the district court's denial of judgment as a matter of law. We affirm the damages award. We affirm the summary judgment that assignor estoppel bars Synopsys from challenging the validity of the '376 patent. We reverse the summary judgment that Synopsys' '109 patent is indefinite. We affirm the summary judgment that Synopsys' '526 patent lacks patent-eligible subject matter. We vacate the motion in limine precluding Mentor from presenting evidence of willful infringement. We reverse the summary judgment that Mentor's '882 patent lacks written description support. Finally, we reverse the summary judgment that Mentor's infringement allegations regarding the '531 and '176 patents are barred by claim preclusion.

I. Background

Every patent in this case involves simulation/emulation technology. The parties have a complicated litigation history, and only the relevant portions thereof are addressed here. In 1998, Mentor filed the

application that would become the '376 patent. The two inventors, Dr. Alain Raynaud and Dr. Luc Burgun, were Mentor employees and assigned the invention to Mentor. Dr. Raynaud and Dr. Burgun subsequently left Mentor and founded EVE, with Dr. Burgun serving as president and CEO and Dr. Raynaud serving as a Technology Center Director. In 2006, Mentor sued EVE for infringement of the '376, '531, and '176 patents, alleging EVE's "ZeBu" emulation and verification system infringed the patents. Mentor and EVE settled prior to trial, and EVE obtained a license to the three patents. The license contained a provision terminating the license if EVE were acquired by another company in the emulation industry.

In 2012, Mentor learned Synopsys was in discussions to acquire EVE. Mentor's CEO contacted his counterpart at Synopsys and offered to waive the confidentiality provision of the Mentor-EVE license to inform Synopsys that the license would terminate if Synopsys acquired EVE. Synopsys and EVE subsequently filed a declaratory judgment action, seeking a declaration that the '531, '176, and '376 patents were invalid and not infringed. One week later, Synopsys acquired EVE. Mentor answered the declaratory judgment complaint, adding counterclaims of willful infringement of the '531, '176, and '376 patents. Synopsys then amended its complaint to assert claims of infringement of the '526 and '109 patents against Mentor. The district court consolidated the suit with another involving Mentor's '882 patent.

The parties appeal the various summary judgment and post-trial rulings. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(1).

II. ANALYSIS

A. Synopsys' Appeal

1. Infringement of Mentor's '376 Patent

The jury found Synopsys infringed claims 1, 24, and 26–28 of the '376 patent and awarded damages. Synopsys moved for JMOL that its products did not infringe. The district court denied the motion, and Synopsys appeals. We affirm the denial of JMOL.

We apply the law of the regional circuit when reviewing a denial of JMOL after a jury verdict. In the Ninth Circuit, JMOL is appropriate only "if the evidence, construed in the light most favorable to the nonmoving party, permits only one reasonable conclusion, and that conclusion is contrary to the jury's verdict." *Pavao v. Pagay*, 307 F.3d 915, 918 (9th Cir. 2002).

The '376 patent relates to debugging source code after synthesis. Synthesis is the process of transforming Hardware Description Language ("HDL") into gate-level "netlists." '376 patent at 1:26–27. Much of the patent's disclosure addresses Register Transfer Level ("RTL") source code, which is a subset of HDL. *See id*. at 1:27–31. The patent teaches that prior art HDL simulators were limited because a developer could only view the input and ultimate output of a netlist; there was no way to "step through" the intermediate gates. *Id*. at 2:1–17. Without the ability to measure intermediate values, "the ability to debug the design at the gate level [was] severely limited." *Id*. at 2:20–23. Additionally, to the extent intermediate signals could be measured, there was no way to map a value within a netlist to its corresponding RTL logic within the source code. *Id*. at 2:13–17.

The '376 patent seeks to solve these problems by allowing developers to insert test probes at various stages of a netlist to monitor intermediate values. *Id.* at 2:30–39;

Figs. 1, 2. The probe results are referred to as "instrumentation signals." *Id*. at 6:32–34. The system correlates instrumentation signals with corresponding portions of the RTL code and displays the results to a user. *Id*. at 2:30–34. Asserted claim 1 is representative:

> 1. A method comprising the steps of:
>
>> a) identifying at least one statement within a register transfer level (RTL) synthesizable source code; and
>>
>> b) synthesizing the source code into a gate-level netlist including at least one instrumentation signal, wherein the instrumentation signal is *indicative* of an execution status of the at least one statement.

Id. at 15:1–8 (emphasis added).

Mentor accused Synopsys' ZeBu emulators of infringing. The ZeBu emulators allow developers to insert "flexible probes" and "value-change probes" into a netlist. These probes measure values at various intermediate stages of a netlist. The ZeBu emulators output the test results to a waveform viewer. Mentor's expert Dr. Sarrafzadeh testified that each probe signal shown in the waveform viewer identifies a portion of RTL by name, and the RTL name can be used to locate the corresponding source code.

Synopsys argues it does not infringe because its ZeBu emulators do not "indicate" an RTL statement but rather merely provide the name of a block of RTL that a developer can use to locate corresponding code. It argues "you don't 'indicate' information by providing *other* data that might help you indirectly figure out the needed information." Synopsys Br. 32. We note at the outset that neither party asked the district court to construe "indica-

tive," and the parties agreed the plain and ordinary meaning of the term governs.[2] The question presented on appeal is whether there is substantial evidence for the jury verdict that the ZeBu infringed.

We hold there was substantial evidence to support the jury's infringement verdict. A developer using the ZeBu emulator can create a test file called a "Tcl" file and input test probes into a netlist using the "probe signals" command. J.A. 43212. Dr. Sarrafzadeh testified that the probe signal command creates instrumentation signals when the simulation is run. J.A. 41127:12–41129:14. He then explained how a developer could use the simulation results to locate a particular line of RTL code corresponding to an instrumentation signal. He explained that the Tcl file identifies a particular line of RTL code by identifying the name of a block of code, and then a developer can use that name to locate the specific lines of corresponding RTL code. J.A. 41130:7–21. He testified that "you look at the name of the signal, on flexible probes, for example, and you associate that back to the RTL source." J.A. 42417:3–5; *see* J.A. 42423:10–18 ("Q: How do you know if you have tens of thousands of instrumentation signals, which signal corresponds to the RTL that you are looking at? A: Fantastic question. I look at the name of the signal. If the name is S, I go and look for it. If the name is S5, I will go and look for it. So based on the name of the signal, I will know, among millions of lines of code, which ones I'm talking about."); J.A. 42426:7–10 ("Q: How would you find a particular process? A: Same thing, by looking at, for example, the sensitivity list and using its name identifier, you know which process you are talking about."). This is substantial evidence to support the jury's

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[2]   We have considered Synopsys' arguments regarding plain meaning and disclaimer and find them to be without merit.

finding that the instrumentation signal indicates at least one RTL statement.

We affirm the district court's denial of JMOL.

2.   Assignor Estoppel of Mentor's '376 Patent

Synopsys briefly challenges the district court's grant of summary judgment that it was barred from challenging the validity of the '376 patent because of assignor estoppel. Synopsys does not dispute that assignor estoppel applies to the facts of this case, but it argues the Supreme Court "demolished the doctrinal underpinnings of assignor estoppel in the decision that abolished the comparable licensee estoppel in *Lear, Inc. v. Adkins*, 395 U.S. 653 (1969)." Synopsys Br. 42. We disagree. In *Diamond Scientific*, we emphasized the continued vitality of the doctrine of assignor estoppel after *Lear*. *Diamond Sci. Co. v. Ambico, Inc.*, 848 F.2d 1220, 1222–26 (Fed. Cir. 1988); *see also MAG Aerospace Indus., Inc. v. B/E Aerospace, Inc.*, 816 F.3d 1374, 1380–81 (Fed. Cir. 2016). The district court's grant of summary judgment that assignor estoppel applies is affirmed.

3.   Damages for Synopsys' Infringement of Mentor's '376 Patent

At trial, Mentor argued it was entitled to obtain lost profit damages for lost sales of its Veloce emulators resulting from Synopsys' infringing sales of its ZeBu emulators because Mentor would have made additional Veloce sales but for Synopsys' infringing ZeBu sales. The district court gave detailed instructions to the jury about the standard for awarding lost profits, including extensive discussion of each of the four *Panduit* factors. J.A. 164–75. The jury ultimately awarded Mentor $36,417,661 in lost profits and another $242,110.45 in reasonable royalties. J.A. 187. Synopsys appeals arguing that the damage award should be vacated because the district court failed to apportion the lost profits. We do not agree.

The Patent Act provides: "the court shall award [the patent owner] damages adequate to compensate for the infringement but in no event less than a reasonable royalty for the use made of the invention by the infringer." 35 U.S.C. § 284. Under the statute, "damages adequate to compensate" means "full compensation for any 'any damages' [the patent owner] suffered as a result of the infringement." *Gen. Motors Corp. v. Devex Corp.*, 461 U.S. 648, 654–55 (1983). As the Supreme Court explained in *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 377 U.S 476, 507 (1964) (plurality opinion), the statutory measure of damages is "the difference between [the patent owner's] pecuniary condition after the infringement, and what his condition would have been if the infringement had not occurred." The Court went on to distinguish between disgorgement of defendant's profits, which had been allowed prior to the 1946 statutory amendment, and the compensatory damages of § 284, which are defined as "compensation for pecuniary loss he (the patentee) has suffered from the infringement, without regard to the question whether the defendant has gained or lost by his unlawful acts." *Id.* (quoting *Coupe v. Royer*, 155 U.S. 565, 582 (1895)).[3] Section 284 damages "have been said to

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[3]   Synopsys cites a number of pre-1946 Supreme Court cases discussing apportionment in the context of the pre-1946 state of the law which reference disgorgement of the defendant's profits and patentee's damages to argue that lost profits must be further apportioned after applying the *Panduit* factors. *See Garretson v. Clark*, 111 U.S. 120, 121 (1884); *Dowagiac Mfg. Co. v. Minn. Moline Plow Co.*, 235 U.S. 641, 646 (1915); *Seymour v. McCormick*, 57 U.S. 480, 487 (1853). While these pre-§ 284 cases apply to a different damages regime, nonetheless, we find the basic principle of apportionment which they espouse applies in all of patent damages. We do not depart from this principle today. Rather we hold that in

constitute 'the difference between his pecuniary condition after the infringement, and what his condition would have been if the infringement had not occurred.'" *Id.* (quoting *Yale Lock Mfg. Co. v. Sargent*, 117 U.S. 536, 552 (1886)). Put simply, "[t]he question to be asked in determining damages is 'how much had the Patent Holder and Licensee suffered by the infringement. And that question (is) primarily: had the Infringer not infringed, what would Patent Holder-Licensee have made?'" *Id.*

Compensatory damages are a staple across most every area of law. And compensatory damages under the patent statute, which calls for damages adequate to compensate the plaintiff for its loss due to the defendant's infringement, should be treated no differently than the compensatory damages in other fields of law. *See Livesay Window Co. v. Livesay Indus., Inc.*, 251 F.2d 469, 471 (5th Cir. 1958) ("To allow a patent owner to recover lost profits from an infringer is no unique treatment of this one type of wrongdoing, and [it] is essentially the same problem which inheres in other instances of an interference with a valuable business right."). Their form is fairly standard; "but for" some harmful act by a defendant, a plaintiff would be in a certain position. When a plaintiff proves it would have been in a certain position but for a defendant's harmful act, it is entitled to damages to put it in the same position it would have occupied had the harmful act never occurred. In breach of contract disputes, injured parties are awarded expectancy damages designed to replicate full performance of the contract. The goal of expectancy damages is to put the non-breaching party in the position it would have occupied but for the breach. *See, e.g., Fifth Third Bank v. United States*, 518 F.3d 1368, 1374 (Fed. Cir. 2008); *California Fed. Bank v.*

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this case, on these facts, apportionment is achieved though the court's use of the *Panduit* factors.

United States, 395 F.3d 1263, 1267 (Fed. Cir. 2005); *Glendale Fed. Bank, FSB v. United States*, 239 F.3d 1374, 1380 (Fed. Cir. 2001). Similarly, under tort law, injured parties receive damages sufficient to put them in the same position they would have occupied had the injury never occurred. *See, e.g.*, *Cooper Indus., Inc. v. Leatherman Tool Grp., Inc.*, 532 U.S. 424, 432 (2001) ("[Compensatory damages] are intended to redress the concrete loss that the plaintiff has suffered by reason of the defendant's wrongful conduct."); *Kansas v. Colorado*, 533 U.S. 1, 13 (2001) (state against state tort); *New York, L.E. & W.R. Co. v. Estill*, 147 U.S. 591, 616–17 (1893) (business tort). The "but for" damages the patentee must establish in patent law, as the Supreme Court explained, are an answer to a simply stated question: "[H]ad the Infringer not infringed, what would the Patent Holder-Licensee have made?" *Aro Mfg. Co.*, 377 U.S. at 507.

There is no particular required method to prove but for causation. One "useful, but non-exclusive" method to establish the patentee's entitlement to lost profits is the *Panduit* test first articulated by the Sixth Circuit. *Rite-Hite Corp. v. Kelley Co.*, 56 F.3d 1538, 1545 (Fed. Cir. 1995) (en banc) (citing *Panduit Corp. v. Stahlin Bros. Fibre Works, Inc.*, 575 F.2d 1152 (6th Cir. 1978)). When a patentee proves it would have made additional sales but for a defendant's infringement, the patentee is entitled to be made whole for the profits it proves it lost. *See, e.g.*, *Asetek Danmark A/S v. CMI USA Inc.*, 842 F.3d 1350, 1361 (Fed. Cir. 2016); *Versata Software, Inc. v. SAP Am., Inc.*, 717 F.3d 1255, 1263–64 (Fed. Cir. 2013); *Grain Processing Corp. v. Am. Maize-Prods. Co.*, 185 F.3d 1341, 1352–53 (Fed. Cir. 1999); *Photo Elecs. Corp. v. England*, 581 F.2d 772, 784 (9th Cir. 1978); *Livesay Window*, 251 F.2d at 471. The goal of lost profit damages is to place the patentee in the same position it would have occupied had

there been no infringement.[4] In this regard, lost profit patent damages are no different than breach of contract or general tort damages. Thus, the fact finder's job is to determine what would the patent holder have made (what would his profits have been) if the infringer had not infringed.

Under the *Panduit* test, a patentee is entitled to lost profit damages if it can establish four things:

(1) demand for the patented product;

(2) absence of acceptable non-infringing alternatives;

(3) manufacturing and marketing capability to exploit the demand; and

(4) the amount of profit it would have made.

Panduit, 575 F.2d at 1156. Damages under *Panduit* are not easy to prove. *See, e.g.*, Ian Ayres & Paul Klemperer, *Limiting Patentees' Market Power Without Reducing Innovation Incentives: The Perverse Benefits of Uncertainty and Non-Injunctive Remedies*, 97 MICH. L. REV. 985, 1030 (1999) ("The difficulties that patentees frequently have in proving the four *Panduit* prerequisites often mean that instead of being awarded lost profits (what amounts to make-whole damages), patentees must settle for the smaller reasonable royalty measure."); Christopher Seaman, *Reconsidering the Georgia-Pacific Standard for Reasonable Royalty Patent Damages*, 2010 B.Y.U. L. REV. 1661, 1675 (2010) ("[S]uccessful claims for lost profits are becoming less common as courts have insisted on strict standards of proof for entitlement to lost profits." (quota-

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[4] As we explained in *Rite Hite*, lost profit damages are limited to those that are "reasonably foreseeable by an infringing competitor in the relevant market." *Rite-Hite*, 56 F.3d at 1546. Synopsys does not argue that Mentor's lost emulator sales were not reasonably foreseeable.

tions omitted)); Mark Lemley, *Distinguishing Lost Profits from Reasonable Royalties*, 51 WM. & MARY L. REV. 655, 657 (2009) ("Proving lost profits has not been easy, however."); *see also Grain Processing*, 185 F.3d at 1349–53 (patentee could not obtain damages under *Panduit* because a product that was not even sold on the market was considered an acceptable non-infringing alternative); *BIC Leisure Prods., Inc. v. Windsurfing Int'l, Inc.*, 1 F.3d 1214, 1218–19 (Fed. Cir. 1993) (patentee could not obtain damages under *Panduit* because it sold its products in a different price segment in the market than the infringing products); *SmithKline Diagnostics, Inc. v. Helena Labs. Corp.*, 926 F.2d 1161, 1165–66 (Fed. Cir. 1991).

We have explained the relationship between the first two *Panduit* factors. The first factor—demand for the patented product—considers demand for the product as a whole. *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1330–31 (Fed. Cir. 2009). The second factor—the absence of non-infringing alternatives—considers demand for particular limitations or features of the claimed invention. *Id.* at 1331. Together, requiring patentees to prove demand for the product as a whole and the absence of non-infringing alternatives ties lost profit damages to specific claim limitations and ensures that damages are commensurate with the value of the patented features. *See Presidio Components, Inc. v. Am. Tech. Ceramics Corp.*, 702 F.3d 1351, 1361 (Fed. Cir. 2012) ("[P]roducts lacking the advantages of the patented invention can hardly be termed a substitute acceptable to the customer who wants those advantages." (quotations omitted)); *Grain Processing*, 185 F.3d at 1354 (holding that customers would have found a particular claim limitation "irrelevant," so the patentee could not rely on that limitation for the second *Panduit* factor); *Standard Haven Prods., Inc. v. Gencor Indus., Inc.*, 953 F.2d 1360, 1373 (Fed. Cir. 1991) ("If purchasers are motivated to purchase because of particular features available only

from the patented product, products without such fea-
tures–even if otherwise competing in the marketplace–
would not be acceptable noninfringing substitutes.");
SmithKline Diagnostics, 926 F.2d at 1166 ("If purchasers
are motivated to purchase because of particular features
of a product available only from the patent owner and
infringers, products without such features would obvious-
ly not be *acceptable* noninfringing substitutes.").

The second factor, absence of acceptable non-infringing
alternatives, often proves the most difficult obstacle for
patent holders. Under this factor, if there is a non-
infringing alternative which any given purchaser would
have found acceptable and bought, then the patentee
cannot obtain lost profits for that particular sale.[5] For
example, if the customer would have bought the infring-
ing product without the patented feature or with a differ-
ent, non-infringing alternative to the patented feature,
then the patentee cannot establish entitlement to lost
profits for that particular sale. And this determination is
made on a customer-by-customer basis. For this reason,
it is quite common to see damage awards where, as in this
case, the patentee proves entitlement to lost profits for
some of its sales, but not others. *See BIC Leisure*, 1 F.3d
at 1219–20; *DePuy Spine*, 567 at 1333–34. For sales in
which the patentee cannot prove the elements necessary
to establish entitlement to lost profits, the statute guar-

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[5] In a complex market with numerous competitors,
a patentee may be awarded lost profit damages calculated
using its market share among its competitors. *See State
Indus., Inc. v. Mor-Flo Indus., Inc.*, 883 F.3d 1573, 1577–
78 (Fed. Cir. 1989). The market share theory is irrelevant
in this case because the jury made a factual finding,
which Synopsys does not challenge on appeal, that the
relevant emulator market for sales to Intel was a two-
supplier market. *See* J.A. 164.

antees the patentee a reasonable royalty for those sales. In those circumstances, the patentee obtains its lost profits on the sales where it can prove all the *Panduit* factors and a reasonable royalty on the other infringing sales.

The facts of this case are remarkably simple for a patent damages appeal and Synopsys does not dispute any of them. The relevant market (suppliers of emulators to Intel) contained two parties, Synopsys and Mentor. Mentor sold its own Veloce emulators to Intel and Synopsys sold its ZeBu emulators to Intel which were found to infringe Mentor's '376 patent claims. Synopsys does not dispute that but for its infringement, Mentor would have made each of the infringing emulator sales to Intel. Nor does it dispute how much Mentor would have earned, the precise numbers of sales Mentor would have made, whether there were any alternatives that Intel may have preferred over the purchase of Mentor's product, or whether Intel would have chosen to purchase fewer emulators. In short, Synopsys does not dispute on appeal that for each infringing sale it made to Intel, Mentor lost that exact sale.

This is important as it makes this case quite narrow and unlike the complicated fact patterns that impact so many damages models in patent cases. The jury found, and Synopsys does not dispute on appeal, that Mentor satisfied all of the *Panduit* factors with regard to the sales to Intel for which the jury awarded lost profits:

(1) there was a demand by Intel for the patented product;[6]

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[6]   The jury was expressly instructed that it could not award lost profits unless it found that "there were only two acceptable, available alternatives in the Intel market during the damages period: Mentor-Graphics' emulation

(2) there were no non-infringing alternative emulator systems acceptable to Intel;

(3) Mentor had the manufacturing and marketing capability to satisfy Intel's demand; and,

(4) Mentor established the amount of profit it would have made if Synopsys had not infringed.

Synopsys does not challenge the sufficiency of Mentor's evidence with regard to the individual *Panduit* factors. In this case, the jury found, and Synopsys does not dispute, that Intel would not have purchased the Synopsys emulator system without the two patented features and that there were no other alternatives available. Despite hearing evidence that there were many valuable and important features in the emulator system, this jury found that if Synopsys could not have sold its emulator system with the two infringing features (Mentor's patented features), Intel would have bought the emulators from Mentor. There were no other competitors, and the jury found there were no non-infringing alternative emulator systems which would have satisfied Intel. Thus, what did Mentor lose when Synopsys appropriated its two patented features? It lost the profits it would have made on the sale of its emulators to Intel. These are the simple, undisputed facts on appeal.

Synopsys largely ignores these facts and seeks to have us depart from basic compensatory damages principles equally applied across many areas of law. Synopsys advocates for a two-step process for calculating lost profits. First, Synopsys argues a patentee must calculate the amount of profits it lost as a result of the infringement using the *Panduit* factors. Second, Synopsys argues a patentee must further apportion its lost profits to cover

system and Synopsys' allegedly infringing emulation system." J.A. 164.

only the patentee's inventive contribution. *See* Synopsys Br. 51. Synopsys does not dispute that "but for" its infringement, Mentor would have made $36,417,661 in lost profits. Instead, Synopsys argues that the allegedly infringing features were just two features of emulators that comprise thousands of hardware and software features. Synopsys Br. 48. Thus, according to Synopsys, Mentor is not entitled to recover what it lost, the amount necessary to make it whole for the sales it lost, but rather the value attributable to its patented features.

Synopsys argues that "[p]rinciples of apportionment play an especially vital role in this age of complex, multi-component electronic devices." Synopsys Br. 44. Synopsys argues that the patentee does not "deserve," *id.* at 46, lost profits for the whole emulator when it only invented some of the features on the emulator. Thus, according to Synopsys the damages should not be the profits the patentee lost when it lost the emulator sale because of Synopsys' infringement, but rather only the amount of profit properly attributable to its patented features.

We agree with Synopsys that apportionment is an important component of damages law generally, and we believe it is necessary in both reasonable royalty and lost profits analysis. *See Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1226 (Fed. Cir. 2014) ("Apportionment is required even for non-royalty forms of damages." (citing *Garretson*, 111 U.S. at 121)); *VirnetX, Inc. v. Cisco Sys., Inc.*, 767 F.3d 1308, 1326 (Fed. Cir. 2014) ("No matter what the form of the royalty, a patentee must take care to seek only those damages attributable to the infringing features." (citing *Garretson*, 111 U.S. at 120–21)). In this case, apportionment was properly incorporated into the lost profits analysis and in particular through the *Panduit* factors. *Panduit's* requirement that patentees prove demand for the product as a whole and the absence of non-infringing alternatives ties lost profit damages to specific claim limitations and ensures that damages are

commensurate with the value of the patented features. We leave for another day whether a different theory of "but for" damages adequately incorporates apportionment principles.[7] We hold today that on the undisputed facts of this record, satisfaction of the *Panduit* factors satisfies principles of apportionment: Mentor's damages are tied to the worth of its patented features.

The jury found, and Synopsys does not dispute, there were only two acceptable alternatives to Intel: Mentor's emulator and Synopsys' infringing emulator. The jury was properly instructed that if there were any other acceptable, non-infringing emulation system or if there were prototypes that may have been acceptable or if there was any acceptable non-infringing alternative that could have been made available (even if they did not already exist), then Mentor could not receive lost profits on those

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[7] Synopsys argues that we have held in other cases that lost profits must be apportioned. Synopsys Br. 51–56. The cases cited by Synopsys, however, did not address whether lost profits were appropriate under the *Panduit* factors (where the apportionment was subsumed within the *Panduit* analysis). *Id.* (citing *Ferguson Beauregard/Logic Controls v. Mega Sys., LLC*, 350 F.3d 1327, 1345–46 (Fed. Cir. 2003); *Kori Corp. v. Wilco Marsh Buggies & Draglines, Inc.*, 761 F.2d 649, 656 (Fed. Cir. 1985)). Synopsys recognizes, however, that in other cases, we have declined to apportion when the four-part *Panduit* test establishing but for causation has been met. *See, e.g.,* Synopsys Rep. Br. 24–25 (citing *Paper Converting Mach. v. Magna-Graphics Corp.*, 745 F.2d 11, 22–23 (Fed. Cir. 1984) (declining to further apportion a lost profits award because the patentee proved it would have made the sales in question but for the infringing sales)).

particular sales. J.A. 164.[8] The jury was also instructed that it could have found the patented features were not critical to Intel and that it would have purchased Synopsys' emulators without the features. The instruction expressly stated that Mentor could not obtain lost profit damages if "Synopsys could have made available during the damages period an acceptable, non-infringing alternative to Mentor-Graphics' emulation system and Synopsys' infringing emulation system." J.A. 164. Synopsys could have made its emulator system minus the two infringing features—that would have been an alternative to the "Synopsys infringing emulation system." However, the jury concluded, and Synopsys does not dispute on appeal the jury's *Panduit* fact findings, that there was no such non-infringing alternative that Intel would have purchased.

On appeal, Synopsys argues that its emulators "outperform Mentor's in price, size, speed, and capacity." Synopsys Br. 49. If the evidentiary record is as Synopsys claims it is, then it had recourse—it could have appealed the jury's *Panduit* fact findings as not supported by substantial evidence. But it did not. And thus on appeal, it is left with a jury fact finding that Intel would not have bought Synopsys' emulation system without the two infringing features, and Mentor would have made every single sale to Intel that Synopsys otherwise made. This is a highly factual case, and Synopsys did not appeal any of the jury's fact findings relating to damages.

Synopsys and the amicus brief argue that complex multi-feature devices necessitate change in patent damages law. They argue that not requiring an additional

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[8] The instruction also explained that if Intel would have bought fewer or no emulation systems in place of those it bought from Synopsys then lost profits cannot be awarded on those sales. J.A. 165.

apportionment step after the *Panduit* test has been met would "allow multiple entities to obtain lost profits on the same product where each entity holds a patent on a different 'but for' feature of the same product." Amicus Br. 11. This claimed threat of "serial infringement claims" is not correct. Again, we do not speak to all damages models. Under *Panduit*, however, there can only be one recovery of lost profits for any particular sale.

This case, for example, involved lost profits for an emulator system with the two patented features based on certain sales Synopsys made to Intel. To be entitled to lost profits damages, Mentor had to prove no other supplier could have made those specific sales to Intel. If there were any acceptable non-infringing alternative Intel would have purchased instead of Mentor's emulator, then Mentor could not obtain lost profits.

The jury found (and Synopsys does not challenge on appeal) that Intel would not have purchased emulators without the features claimed in Mentor's '376 patent. While there may have been other features of the emulator that were important to Intel, only Mentor could sell Intel an emulator with *all* the features it required. Because Mentor had proprietary rights to the only means of satisfying this demand by Intel, because no other party could sell Intel an emulator with those two components, no one else had the right to sell emulators to Intel that satisfied all of Intel's requirements. In short, for these particular sales, no other party could satisfy the *Panduit* factors, making it impossible for multiple patentees to obtain lost profit damages for the same sales.

Applying this logic to Synopsys' laptop example, Synopsys argues that "nearly every component is a but-for cause of most sales." Synopsys Rep. Br. 20. Synopsys argues that "the reality" is "that sales of a complex product may be driven by 'a plethora of features,'" many of which are patented. *Id.* If true, however, then lost profits

on the laptop would not be available. In Synopsys' example, the customer demands a laptop with a high resolution screen, responsive keyboard, a fast wireless network receiver, and an extended-life battery.[9] *Id.* at 18. If each are patented by separate companies, and no manufacturer has the right to sell them all, then no manufacturer could obtain lost profits on such a laptop (none could satisfy the demand for everything). Thus, each patentee would get a reasonable royalty on their respective component.

With such multi-component products, it may often be the case that no one patentee can obtain lost profits on the overall product—the *Panduit* test is a demanding one. A patentee cannot obtain lost profits unless it and only it could have made the sale—there are no non-infringing alternatives or, put differently, the customer would not have purchased the product without the infringing feature.

Consider the laptop example. If the only patented component is the extended life battery and a customer will only buy a laptop with this battery (meaning a laptop with a lower quality battery is not an acceptable non-infringing alternative to the customer), then when an infringer who appropriates the patented extended life battery sells a laptop, the infringer has deprived the patentee of the lost profits on the laptop sale which only it could have made. If a laptop with a lower-quality battery would be an acceptable non-infringing alternative to certain customers, the patentee would not be entitled to lost profits for these laptop sales. For those customers,

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[9]   Synopsys cites *LaserDynamics* for this example. *LaserDynamics*, however, does not analyze but for causation using the *Panduit* factors and is not even a lost profits case. The *LaserDynamics* analysis was limited to reasonable royalties. *LaserDynamics, Inc. v. Quanta Comp., Inc.*, 694 F.3d 51, 66 (Fed. Cir. 2012).

the patented battery was not a factor in their purchasing decision; it was not necessary for the sale. The only sales for which the patentee can obtain lost profits are the customers who would refuse to purchase laptops without the patented extended-life battery. For these lost customers, the extended-life battery drives their purchasing decisions.

When a patentee proves it is entitled to recover lost profit damages, as Synopsys concedes Mentor has done here, it is entitled to be made whole for the injuries it suffered as a result of the infringement. *See, e.g.*, *State Indus.*, 883 F.2d at 1577 ("The measure of damages is an amount which will compensate the patent owner for the pecuniary loss sustained because of the infringement."). In this case, the jury answered the question: "Had the Infringer not infringed, what would the Patent Holder/licensee have made?" Mentor has proven it would have earned certain profits but for Synopsys' infringement. It is entitled to be made whole for the profits it proves it lost because Synopsys infringed. The jury found that if Synopsys had not infringed the Mentor patent by incorporating the two patented features into its emulators, Intel would not have purchased these products from Synopsys and would instead have purchased the emulators from Mentor—there were no non-infringing alternative emulators which would have satisfied Intel. *Panduit* limits lost profits to sales where there are no acceptable non-infringing alternatives that the customer would have purchased. We hold that the district court did not err in refusing to further apportion lost profits after the jury returned its verdict applying the *Panduit* factors. We conclude that, when the *Panduit* factors are met, they incorporate into their very analysis the value properly attributed to the patented feature. We affirm the district court's denial of judgment as a matter of law and/or motion for new trial with regard to damages.

4.   Indefiniteness of Synopsys' '109 Patent

The district court granted summary judgment that claim 1 of Synopsys' '109 patent is indefinite. J.A. 121. A claim is indefinite if the claim, "read in light of the specification delineating the patent, and the prosecution history, fail[s] to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014). Definiteness requires clarity, though "absolute precision is unattainable." *Id.* at 2129. Claims reciting terms of degree "ha[ve] long been found definite" if they provide reasonable certainty to a skilled artisan when read in the context of the patent. *Biosig Instruments, Inc. v. Nautilus, Inc.*, 783 F.3d 1374, 1378 (Fed. Cir. 2015) (quoting *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1370 (Fed. Cir. 2014)). This requires a patent to provide "some standard for measuring that [term of] degree." *Id.* For example, in *Nautilus* we found the phrase "spaced relationship" definite because a "skilled artisan would understand the inherent parameters of the invention as provided in the intrinsic evidence." *Id.* at 1384. In *Sonix Technology*, we found the phrase "visually negligible" definite based on examples from the specification and prosecution history. *Sonix Tech. Co. v. Publ'ns Int'l, Ltd.*, 844 F.3d 1370, 1379–80 (Fed. Cir. 2017). And in *DDR Holdings, LLC v. Hotels.com, L.P.,* we found the phrase "look and feel" definite because it had "an established meaning in the art by the relevant timeframe" consistent with how the phrase was used in the specification. 773 F.3d 1245, 1261 (Fed. Cir. 2014).

The '109 patent discloses "a method for displaying the results of synthesized circuit analysis visually *near* the HDL source specification that generated the circuit." '109 patent at 7:57–59 (emphasis added). It explains that the method "uses information developed during translation to relate the results of the analysis to the HDL source . . . ." *Id.* at 11:29–32. It teaches that by displaying the circuit

analysis results "near" the corresponding HDL code, "the present invention allows a designer to make more effective use of logic synthesis and reduce the complexity of the circuit debugging process." *Id*. at 8:59–63.

Claim 1 requires "displaying said characteristics associated with those said final circuit's nets and parts that correspond directly with said initial circuit's nets and parts *near* said portions of said synthesis source text file that created said corresponding initial circuit parts and nets." *Id*. at 22:52–56 (emphasis added). Mentor moved for summary judgment that the word "near" was indefinite. The district court granted the motion, holding "[t]he patent's claims and specification do not permit a person of ordinary skill in the art to define the claim term 'near' with reasonable certainty." J.A. 121. We conclude that the court erred as a matter of law.

We hold the term "near" informs a person of ordinary skill in the art about the scope of the invention with reasonable certainty. A goal of the '109 patent is to aid developers when debugging HDL. '109 patent at 8:59–63. To accomplish this, the patent "relates" circuit analysis results with the HDL corresponding to a particular result, and then places the two pieces of information "near" each other on the display screen. *Id*. at 7:57–64. This allows a developer to identify and fix problems with specific lines of HDL when debugging. *Id*. at 11:29–35. In order for the patent's stated objective to occur, the system must display the related HDL and analysis results "near" enough to each other such that a developer would "relate" the two. Thus, we hold a skilled artisan would understand "near" requires the HDL code and its corresponding circuit analysis to be displayed in a manner that physically associates the two.

The patent provides examples of HDL displayed near the corresponding circuit tracing results. Figure 11

discloses HDL code fragment 400 displayed next to timing
result 500:
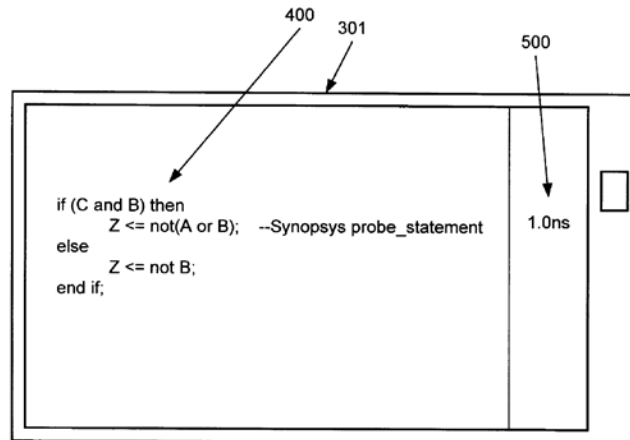
Id. at Fig. 11. The specification explains that the circuit
analysis "can be displayed next to the appropriate line of
the output." *Id*. at 13:25–28. Similarly, Figure 19 dis-
plays "timing and area analysis" next to the correspond-
ing HDL code:

```
                                                    TIME   AREA
entity interrupt_controller is
  port(new_request  : in bit_vector(3 downto 1);
    current_level: in bit_vector(1 downto 0);

    should_service: out bit);
end:

architecture synthesizable of interrupt_controller is

  signal new_level: bit_vector(1 downto 0);

begin
  --Synopsys block_probe_begin                      9 ns   5 gates
  decode: process(new_request)
  begin
    if(new_request(3) = '1') then
      new_level <= "11";
    elsif(new_request(2) = '1') then
      new_level <= "10";
    elsif(new_request(1) = '1') then
      new_level <= "01";
    else
      new_level <= "00";
    end if;
end process:
  --Synopsys block_probe_end

  compare: process(current_level,new_level)        15 ns   6 gates
  begin

    if(new_level(1) > current_level(1)) then
      should_service <= '1';
    elsif(new_level(1) < current_level(1)) then
      should_service <= '0';
    elsif(new_level(0) > current_level(0)) then
      should_service <= '1';
    else
      should_service <= '0';
    end if;
  end process;
end;
```

Figure 19

Id. at Fig. 19, 14:32–34. A skilled artisan viewing Figures 11 and 19 would readily understand which HDL code corresponds to which timing result, based on the way the information is displayed on the screen. These examples support the conclusion that skilled artisans would understand the meaning of "near" with reasonable certainty. *See Sonix Tech.*, 844 F.3d at 1379–80 (relying on specific examples from the specification to find a term definite).

Mentor cites Figure 30, which it argues demonstrates "near" is ambiguous:
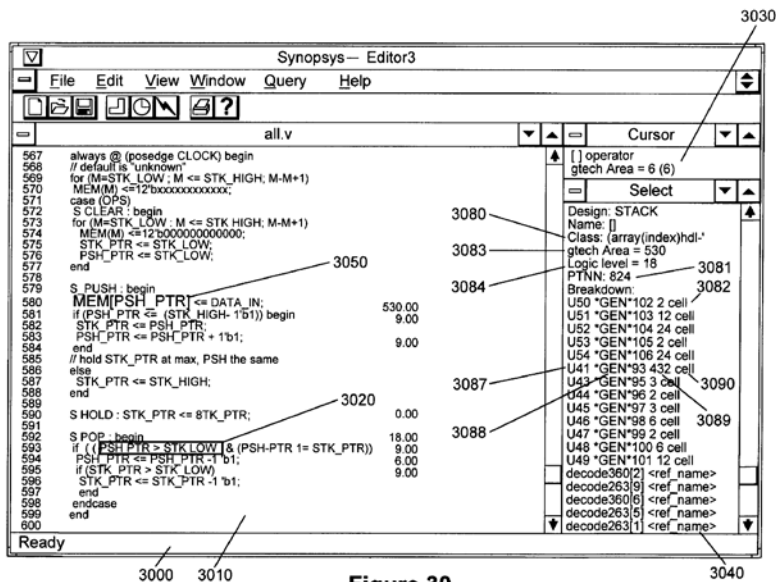
Figure 30

'109 patent at Fig. 30. Figure 30 discloses an embodiment where the circuit analysis 3030 is displayed in a separate window in the corner of the display screen. *Id.* at 21:2–3. Circuit analysis 3030 corresponds to the HDL code highlighted in text box 3020. *Id.* at 21:8–9. In this embodiment, the circuit analysis and corresponding HDL are not displayed necessarily "near" each other.

We conclude that the Figure 30 embodiment is a different embodiment than the claimed embodiment. *See Intamin Ltd. v. Magnetar Techs., Corp.*, 483 F.3d 1328, 1336–37 (Fed. Cir. 2007) (claims may exclude embodiments if the specification discloses multiple embodiments); *Baran v. Med. Device Techs., Inc.*, 616 F.3d 1309, 1316 (Fed. Cir. 2010). The purpose of the claimed "near" requirement is to allow a developer to associate HDL with its corresponding tracing analysis. *See* '109 patent at 7:61–64 ("The present invention relates the analysis results of each portion of the synthesized circuit to the particular part of the HDL specification that generated

that circuit portion."). This includes the embodiments shown in Figures 11 and 19. Figure 30 discloses an alternative scheme for associating HDL and circuit analysis. Rather than placing HDL code and tracing results "near" one another, the HDL code is highlighted (3020 in Fig. 30) and the tracing results for the highlighted code are placed in a separate window (3030 in Fig. 30). *Id.* at 21:2–9. Thus, there is no need to place the HDL code and circuit analysis near each other because they are already associated by alternative means. *See id.* at 21:15–16 ("Here, cursor window 3030 could display other characteristics *associated with* the object under the cursor.") (emphasis added).

We reverse the grant of summary judgment of indefiniteness of claim 1 of the '109 patent. We hold that the term "near" informs those of skill in the art about the scope of the invention with reasonable certainty.

5.   Patent-eligibility of Synopsys' '526 Patent

The district court granted summary judgment that claims 19, 24, 28, 30, and 33 of the '526 patent lack patentable subject matter, holding the "claims embrace unpatentable electromagnetic carrier waves." J.A. 121. We affirm.

Mentor argues the term "machine-readable medium," present in every challenged claim, renders the claimed subject matter invalid under 35 U.S.C. § 101. A patentee is free to be his own lexicographer. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005) (en banc). Here, the specification expressly defines the term: "The computer readable medium is any data storage device that can store data which can be thereafter be [sic] read by a computer system. Examples of the computer readable medium include read-only memory, random-access memory, CD-ROMs, magnetic tape, optical data storage devices, *carrier waves*." '526 patent at 52:31–36 (emphasis added). Mentor argues that because the '526 patent

defines a "machine-readable medium" as including "carrier waves," the claims are invalid under *In re Nuijten*, 500 F.3d 1346 (Fed. Cir. 2007).

In *Nuijten*, we addressed whether a claim covering a signal was eligible for patenting under 35 U.S.C. § 101. The claimed signal in *Nuijten* was not limited to a particular medium or carrier but rather covered "*any* tangible means of information carriage." *Id.* at 1353. We held that a "transitory, propagating signal" did not fall within any statutory category of subject matter: process, machine, manufacture, or composition of matter. *Id.* Therefore, because the claims covered "the signal itself," they were not eligible subject matter. *Id.* at 1357.

Because the challenged '526 claims are expressly defined by the specification to cover carrier waves, they are similar to the ineligible *Nuijten* claims. Here, the specification defined the claimed machine-readable medium as including read-only memory, random-access memory, CD-ROMs, magnetic tape, optical data storage devices, and carrier waves. Even though carrier waves differ greatly from the other disclosed mediums (such as CD-ROMs or magnetic tape), we are bound by the patentee's lexicography. *See Thorner v. Sony Comput. Entm't Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012). Thus, the claims cover carrier signals themselves. The "presence of [other] acts recited in the claim[s] does not transform a claim covering a thing—the signal itself—into one covering the process by which that thing was made." *Nuijten*, 500 F.3d at 1355.

The challenged '526 claims present a scenario where there are multiple covered embodiments, and not all covered embodiments are patent-eligible. For example, if the machine-readable medium used was a "random-access memory" or "optical data storage device," the claims would not run afoul of *Nuijten*. Synopsys contends a "nonexclusive example, from an alternate embodiment"

does not render the entire claim ineligible. Synopsys Br. 69. While not binding on our court, the Manual of Patent Examining Procedure ("MPEP") is instructive on this point. The MPEP instructs that when a claim covers "both statutory and non-statutory embodiments," it is not eligible for patenting. MPEP § 2106 (9th ed. Mar. 2014). As an example, it states that "a claim to a computer readable medium that can be a compact disc or a carrier wave covers a non-statutory embodiment and therefore should be rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter."[10] *Id.*

We affirm the district court's grant of summary judgment that claims 19, 24, 28, 30, and 33 of the '526 patent lack patentable subject matter.

B. Mentor's Cross-Appeal

1. Mentor's Allegations of Willful Infringement of the '376 Patent

The district court granted a motion in limine precluding Mentor from presenting evidence of willful infringement of the '376 patent. J.A. 40,545–47. We reverse.

We review evidentiary rulings under Ninth Circuit law, which reviews for abuse of discretion. *Advance Cardiovascular Sys. v. Medtronic, Inc.*, 265 F.3d 1294, 1308 (Fed. Cir. 2001). After Synopsys filed an action seeking declaratory judgment that the '376 patent was invalid and not infringed, Mentor answered and counterclaimed that Synopsys willfully infringed. The district court granted Synopsys' motion in limine to preclude

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[10] We note that Synopsys was later granted a second patent based on the '526 patent's disclosure (U.S. Patent No. 8,099,271) in which Synopsys drafted its claims to cover a "*non-transitory* machine-readable medium," thereby excluding the carrier waves embodiment.

Mentor from presenting evidence of willfulness. The court held that Mentor was precluded from presenting evidence of willfulness because it relied exclusively on post-suit willfulness conduct, and it had not first sought a preliminary injunction. It stated, "I think Synopsys is right about what we will call the *Seagate* rule, which is if you don't seek an injunction, you can't seek willful infringement for post-filing conduct." J.A. 40,547; *see In re Seagate Tech., LLC*, 497 F.3d 1360, 1374 (Fed. Cir. 2007) ("[W]hen an accused infringer's post-filing conduct is reckless, a patentee can move for a preliminary injunction, which generally provides an adequate remedy for combating post-filing willful infringement." (citations omitted)). On route to this conclusion, the district court made two errors. First, it erred in determining that the alleged conduct was post-suit conduct because it erred in determining the filing date of the relevant suit. Second, it erred in concluding that Synopsys could not present evidence of post-filing willful infringement because Synopsys did not seek a preliminary injunction.

The relevant date for determining which conduct is pre-suit is the date of the patentee's affirmative allegation of infringement, in this case the date of Mentor's counterclaim. *See Seagate*, 497 F.3d at 1374 (explaining that "in ordinary circumstances, willfulness will depend on an infringer's prelitigation conduct" because "a patentee must have a good faith basis for alleging willful infringement"). Mentor relies on Synopsys' acquisition of EVE, which terminated the license and rendered all subsequent sales infringing. These events occurred after the declaratory judgment was filed but prior to Mentor's counterclaim for infringement. The alleged acts of infringement are thus pre-suit acts, and there is accordingly no basis for excluding Mentor's evidence of willfulness.

We also disagree with the district court's second decision—that Mentor could not assert willful infringement because it did not seek a preliminary injunction. As we

noted in *Aqua Shield*, there is "no rigid rule" that a patentee must seek a preliminary injunction in order to seek enhanced damages. *Aqua Shield v. Inter Pool Cover Team*, 774 F.3d 766, 773–74 (Fed. Cir. 2014); *see Halo Elecs., Inc. v. Pulse Elecs., Inc.*, 136 S. Ct. 1923, 1934 (2016) ("[W]e eschew any rigid formula for awarding enhanced damages under § 284 . . . .").

We hold that the district court abused its discretion in precluding Mentor from presenting evidence of willful infringement. Because the district court determined Mentor's willfulness allegations were improper, there are no findings on willfulness for appellate review. We vacate the district court's grant of the motion in limine and remand for further proceedings consistent with *Halo*.

2.   Written Description of Mentor's '882 Patent

The district court granted summary judgment that claims 7, 9, and 13 of the '882 patent are invalid for lack of written description. We reverse.

The '882 patent discloses an emulator comprised of a series of field programmable gate arrays (FPGAs, also referred to as "reconfigurable logic devices" in the patent). '882 patent at 2:10–13. Each FPGA is comprised of a collection of smaller logic elements (called "reconfigurable logic elements"). *Id.* Some simulations require more than one FPGA to model. *Id.* at 2:13–21. When that occurs, the emulator connects multiple FPGAs to create larger circuits. *Id.* This can lead to timing errors if signals progress through individual FPGAs at different lengths of time. *Id.* at 1:21–32. To address this problem, the '882 patent discloses using at least two different clocks: a user clock for the logic elements within a FPGA, and a signal routing clock for the timing between FPGAs. *Id.* at 4:13–16.

Each asserted claim requires that "the signal routing clock is independent of the first clock signal and the

second clock signal." The district court construed "independent" as "wherein there is no required timing relationship between clock edges." J.A. 10,848. Synopsys moved for summary judgment that the '882 patent's specification failed to disclose written description support for an "independent" signal routing clock. The district court granted the motion:

> The motion is GRANTED with respect to invalidity of claims 7, 9, and 13 of U.S. Patent No. 6,947,882. The 882 Patents [sic] specification describes the minimum frequency relationship between the signal routing clock signal and the first and second clock signals as an exception to independent clocking. As a result, the specification does not demonstrate possession of the unqualifiedly independent clocking that the asserted claims require, and the claims do not meet the written description requirement.

J.A. 23,749–50.

A patent satisfies the written description requirement when "the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date." *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010). We review a grant of summary judgment of no written description de novo. *Crown Packaging Tech. v. Ball Metal Beverage*, 635 F.3d 1373, 1380 (Fed. Cir. 2011).

Synopsys' argument before the district court and on appeal is based on the following passage from the '882 patent's specification:

> As illustrated in FIG. 2, I/O circuitry 115 and 116 are clocked by signal routing clocks 117 whereas the LEs are clocked by a different clock signal (or signals), user clock(s) 118. *Except for the relation-*

ship that each of signal routing clock 117 having a higher frequency than an associated user clock 118, signal routing clocks 117 are independent of user clocks 118.

'882 patent at 4:13–19 (emphasis added). Synopsys argues this passage requires each signal routing clock to run faster than its associated user clock. It argues this means there is a relationship between the signal routing clock and the user clock, given that the signal routing clock must operate at a higher frequency than the user clock. Therefore, the specification does not disclose an "independent" signal routing clock.

We do not agree. The very language of claim 1 which the court held was not supported by the specification was present in the originally-filed claims. Original claims are part of the original specification and in many cases will satisfy the written description requirement. *Ariad*, 598 F.3d at 1349; *see ScriptPro LLC v. Innovation Assocs., Inc.*, 833 F.3d 1336, 1341 (Fed. Cir. 2016); *Crown Packaging*, 635 F.3d at 1381. These claims raise none of the genus/species concerns that have caused us to question whether originally filed claims satisfy written description. *See, e.g., Ariad*, 598 F.3d at 1349–51. The claims at issue in this case are indistinguishable from other cases relying on originally-filed claims to satisfy the written description requirement. Like *Crown Packaging*, the "original claims clearly show that the applicants recognized and were claiming [the disputed limitation]. . . . These claims show, as *Ariad* recognized many original claims do, that the applicants had in mind the invention as claimed" and described it. 635 F.3d at 1381. Original claim 1 recites "one or more signal routing clock signals which are independent of the first and second clock signals." J.A. 19,441. This is the precise language the district court found missing from the '882 specification. *See* J.A. 23,749–50 ("[T]he specification does not demonstrate possession of the unqualifiedly independent clocking that

the asserted claims require . . . .") (JMOL order); *compare ScriptPro*, 833 F.3d at 1341 (finding written description support when the original claims and the challenged claims recited the same limitation). We conclude that this original claim language clearly demonstrates that the inventor possessed an invention including "one or more signal routing clock signals which are independent of the first and second clock signals" and described it.

We reverse the grant of summary judgment that claims 7, 9, and 13 of the '882 patent are invalid for lack of written description and remand for further proceedings.[11]

3. Claim Preclusion Relating to Mentor's '531 and '176 Patents

The '176 and '531 patents are two of the three patents litigated in the 2006 lawsuit between Mentor and EVE. Mentor and EVE settled the litigation when EVE took a license to the asserted patents, and Mentor dismissed its claims with prejudice. Synopsys' 2012 acquisition of EVE automatically terminated the Mentor/EVE license. Synopsys then filed a declaratory judgment action for non-infringement of the '176 and '531 patents, and Mentor counterclaimed for infringement. Mentor contends its infringement allegations were "based exclusively on acts

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[11]   Synopsys filed a motion to strike portions of Mentor's reply brief. Docket No. 90. Synopsys argues Mentor raised five new arguments relating to the '882 patent's written description that it did not raise before the district court or in its opening brief to our court, and it contends those arguments should be struck. Because we decide the written description issue in Mentor's favor on the argument it undisputedly properly raised, we need not consider the arguments arguably made for the first time in the reply brief. We deny the motion.

of infringement that occurred after October 4, 2012"—the date Synopsys acquired EVE. Mentor Br. 72. Synopsys moved for summary judgment that claim preclusion barred Mentor's infringement allegations, and the district court granted the motion.

Whether a cause of action is barred by claim preclusion is a question of law reviewed without deference. *Brain Life, LLC v. Elekta Inc.*, 746 F.3d 1045, 1052 (Fed. Cir. 2014). We apply regional circuit law when determining whether claim preclusion applies. *Id.* In the Ninth Circuit, claim preclusion applies when the prior suit: (1) involved the same claim or cause of action as the later suit; (2) reached a final judgment on the merits; and (3) involved the same parties or privies. *Id.* (citing *Mpoyo v. Litton Electro-Optical Sys.*, 430 F.3d 985, 987 (9th Cir. 2005)). Whether two infringement allegations constitute the same claim or cause of action is an issue particular to patent law, and we apply our own law. *Id.*

Mentor and Synopsys dispute the applicable law. Our recent decisions in *Aspex Eyewear* and *Brain Life* are squarely on point. In *Aspex Eyewear*, we addressed the third suit in a series of related actions involving the same patent and patentee. *Aspex Eyewear, Inc. v. Marchon Eyewear, Inc.*, 672 F.3d 1335 (Fed. Cir. 2012). In the first action, the patentee asserted the patent against a first defendant. *Id.* at 1338. The district court found the patent infringed and not invalid. *Id.* at 1339. After a jury trial on damages, we affirmed. *Id.* In the second action, the patentee asserted the patent against a second defendant. *Id.* The parties ultimately settled. *Id.* The settlement agreement contained a provision that the parties "stipulate to dismissal with prejudice of [the action], including all claims and counterclaims, and any claim which would have been had by and between the Parties arising from or connected with [the action]." *Id.* (alterations in original). Subsequently, the patentee filed a third action asserting the same patent against the same de-

fendants from the two prior actions, this time alleging infringement by newer models of the previously-accused products. *Id*. at 1340. The district court granted summary judgment that the patentee's claims were barred by claim preclusion. *Id*. It held that the patentee's infringement allegations "were the same as the claims that either were, or could have been, raised in the [previous actions]" and that the new accused products were "essentially the same" as the previously litigated ones. *Id*.

We reversed. We explained that claim preclusion does not bar later infringement allegations "with respect to accused products that were not in existence at the time of the [previous actions] for the simple reason that [claim preclusion] requires that in order for a particular claim to be barred, it is necessary that the claim either was asserted, or could have been asserted, in the prior action." *Id*. at 1342. We explained that claim preclusion did not bar infringement allegations that "did not exist at the time of the earlier action." *Id*. We held that "if the party could not have asserted particular claims [in a previous action]—because the tortious conduct in question had not occurred at that time—those claims could not have been asserted and therefore are not barred." *Id*. (citing *Lawlor v. Nat'l Screen Serv. Corp.*, 349 U.S. 322, 328 (1955)). And we explained that for products made or sold after the previous actions, it did not matter whether the new products were "essentially the same" as the previously accused products—claim preclusion did not bar the infringement allegations as to the new products. *Id*.

We reemphasized that decision in *Brain Life*, where we addressed a second action involving the same patent as a prior litigation. *Brain Life*, 746 F.3d at 1050. In the first action, the jury found infringement and awarded damages. *Id*. We reversed on claim construction grounds, and the district court entered final judgment of no infringement. *Id*. After the final judgment, the patentee licensed the asserted patent to a new entity, and the new

licensee filed suit against the same defendant from the first action. *Id.* at 1050–51. The licensee accused new products (that were not at issue in the prior litigation) of infringement, but it conceded "there was no material difference between the currently accused products and the previously adjudicated noninfringing products." *Id.* at 1051. The district court granted summary judgment that claim preclusion barred the licensee's infringement allegations. *Id.* We reversed. We held that claim preclusion did not bar any infringement allegations that postdated the prior judgment. *Id.* at 1054 ("We find that [the patentee's] second suit is not barred by claim preclusion— regardless of whether the same transactional facts are present in both suits—to the extent [the patentee's] current infringement allegations are temporally limited to acts occurring after the final judgment was entered in the first suit."). We explained that claim preclusion did not bar allegations of infringement occurring after the prior final judgment because the patentee *could not* have brought those claims in the prior case. *Id.*

Exactly like *Aspex Eyewear* and *Brain Life*, Mentor's infringement allegations are based on alleged acts of infringement that occurred after the Mentor/EVE license terminated and were not part of the previous lawsuit. *See* J.A. 1223–27 (Mentor's 2013 counterclaims of infringement); Mentor Br. 72. Claim preclusion does not bar these allegations because Mentor could not have previously brought them. *See Brain Life*, 746 F.3d at 1054. The present lawsuit is based on post-license conduct, so the alleged infringement did not exist during the previous action. *See Lawlor*, 349 U.S. at 328 ("[The prior judgment] cannot be given the effect of extinguishing claims which did not even then exist and which could not possibly have been sued upon in the previous case."); *Asetek Danmark*, 842 F.3d at 1362 ("It is well established, however, that the difference in timing means that the two situations do not involve the same 'claim' for claim-

preclusion purposes, even if all the conduct is alleged to be unlawful for the same reason."). Thus, Mentor's allegations are not barred. *See Aspex Eyewear*, 672 F.3d at 1342. Because the allegations could not have been brought in the first action, we need not determine whether the newly accused products are "essentially the same" as the products litigated in the first action. *See id.*

Synopsys contends *Aspex Eyewear* and *Brain Life* are inconsistent with our decisions in the *Foster* cases, which it argues control because they were issued prior to *Aspex Eyewear* and *Brain Life*. *See Foster v. Hallco Mfg. Co.*, 947 F.2d 469 (Fed. Cir. 1991) ("*Foster I*"); *Hallco Mfg. Co. v. Foster*, 256 F.3d 1290 (Fed. Cir. 2001) ("*Foster II*"). *Foster I* addressed a second action after a previous action ended with a consent judgment. *Foster I*, 947 F.2d at 472. In the first action, the parties settled, and the defendant obtained a license to the asserted patents. *Id.* The consent judgment contained a provision saying the asserted patents were "valid and enforceable in all respects." *Id.* The defendant subsequently began manufacturing new products and filed suit seeking a declaration that the asserted patents were invalid and the new products did not infringe. *Id.* at 473. We held that claim preclusion barred relitigation of the patents' validity only if the patentee's "claim" was identical to its previous claims. *Id.* at 478. We explained that "a 'claim' rests on a particular factual transaction or series thereof on which a suit is brought." *Id.* at 479. We were "unpersuaded that an 'infringement claim,' for purposes of claim preclusion, embraces more than the specific devices before the court in the first suit." *Id.* In *Foster II*—an unrelated lawsuit involving the same parties—we addressed whether a defendant could challenge a patent's validity in a second action after a first action involving the patent was dismissed with prejudice after a settlement. *Foster II*, 256 F.3d at 1294. We held that claim preclusion bars relitigation of the patent's validity only if the accused

devices "are essentially the same, or if any differences between them are merely colorable." *Id*. at 1297.

There is language in the *Foster* cases that could be read as inconsistent with *Aspex Eyewear* and *Brain Life*. However, the cases addressed different factual issues. *Foster I* and *Foster II* both addressed whether a *defendant* could re-raise *validity* challenges in a subsequent action. In *Foster II*, we specifically characterized *Foster I* as addressing "under what circumstances, if any, claim preclusion would operate to prevent a subsequent challenge to patent validity when the device in the second action was not involved in the first action." *Foster II*, 256 F.3d at 1295. Neither case addressed whether a *patentee* could bring new *infringement* allegations based on conduct occurring after a previous litigation ended. This is the precise issue addressed in *Aspex Eyewear* and *Brain Life* and the precise issue now before us.

Reading the *Foster* cases as Synopsys requests—that claim preclusion bars successive infringement suits when the accused products are essentially the same—would not only create an intra-circuit split, but also would be inconsistent with the Supreme Court's decision in *Lawlor*. In *Lawlor*, the Supreme Court instructed that a prior judgment "cannot be given the effect of extinguishing claims which did not even then exist and which could not possibly have been sued upon in the previous case." *Lawlor*, 349 U.S. at 328. *Aspex Eyewear* and *Brain Life* are consistent with this holding. Conversely, interpreting the *Foster* cases as barring a patentee from asserting infringement allegations that did not exist at the time of a previous action would be at odds with *Lawlor*.

The facts of the underlying case further weigh against Synopsys' position. Synopsys consciously terminated the Mentor/EVE license by acquiring EVE. Similarly, EVE consciously terminated the Mentor/EVE license by allowing itself to be acquired by Synopsys. Synopsys/EVE

should not be able to use the fact that it voluntarily terminated the Mentor/EVE license as a shield from further infringement liability. If we adopted Synopsys' position, any licensee holding a license obtained through litigation could breach that license, yet prevent the patentee from asserting infringement against new products not covered by the license. A licensee should not be able to use the fact that it voluntarily terminated a license as a shield against future infringement liability.[12]

Synopsys also argues Mentor's infringement allegations are barred by the *Kessler* decision. *See Kessler v. Eldred*, 206 U.S. 285 (1907). The *Kessler* decision permits an adjudicated non-infringer "to continue the same activity in which it engaged prior to the infringement allegations once it ha[s] defeated those contentions in the first suit." *Brain Life*, 746 F.3d at 1056. It allows "an adjudged *non-infringer* to avoid repeated harassment for continuing its business as usual post-final judgment in a patent action where circumstances justify that result." *Id.* (emphasis in original). EVE is not an adjudicated non-infringer; it was a willing licensee that was granted a license to the '176 and '531 patents, which terminated when it was acquired by Synopsys. Without a valid license from Mentor, it could not "continue the same activity in which it engaged prior to the infringement allegations." The *Kessler* decision does not apply.

Consistent with the Supreme Court's *Lawlor* decision and our decisions in *Aspex Eyewear* and *Brain Life*, we hold that claim preclusion does not bar a patentee from

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[12] Mentor filed its '176 and '531 infringement allegations as a counterclaim to Synopsys' declaratory judgment of non-infringement. J.A. 1216–29. It would be strange to hold that claim preclusion barred a patentee from raising a counterclaim of infringement when it was sued for a declaration of non-infringement.

bringing infringement claims for acts of infringement occurring after the final judgment in a previous case. We reverse the grant of summary judgment that claim preclusion barred Mentor's assertion of the '531 and '176 patents and remand for further proceedings.

III. CONCLUSION

We hold there was substantial evidence to support the jury's infringement verdict regarding the '376 patent and affirm the district court's denial of judgment as a matter of law. We affirm the damages award. We affirm the summary judgment that assignor estoppel bars Synopsys from challenging the validity of the '376 patent. We reverse the summary judgment that Synopsys' '109 patent is indefinite. We affirm the summary judgment that Synopsys' '526 patent lacks eligible subject matter. We vacate the order granting the motion in limine precluding Mentor from presenting evidence of willful infringement and remand for a trial of that issue and assessment of Mentor's claim for enhanced damages. We reverse the summary judgment that Mentor's '882 patent lacks written description support. Finally, we reverse the summary judgment that Mentor's infringement allegations regarding the '531 and '176 patents are barred by claim preclusion.

We remand for further proceedings consistent with this opinion.

AFFIRMED-IN-PART, REVERSED-IN-PART, VACATED-IN-PART, AND REMANDED

COSTS

Costs to Mentor.