

**United States Court of Appeals
for the Federal Circuit**

POWER INTEGRATIONS, INC.,
Plaintiff-Cross-Appellant

v.

**FAIRCHILD SEMICONDUCTOR
INTERNATIONAL, INC., FAIRCHILD
SEMICONDUCTOR CORPORATION,
FAIRCHILD (TAIWAN) CORPORATION,**
Defendants-Appellants

2015-1329, 2015-1388

Appeals from the United States District Court for the District of Delaware in No. 1:08-cv-00309-LPS, Chief Judge Leonard P. Stark.

Decided: December 12, 2016

FRANK E. SCHERKENBACH, Fish & Richardson, P.C., Boston, MA, argued for plaintiff-cross-appellant. Also represented by CRAIG E. COUNTRYMAN, San Diego, CA; MICHAEL R. HEADLEY, HOWARD G. POLLACK, Redwood City, CA.

BLAIR M. JACOBS, Paul Hastings LLP, Washington, DC, argued for defendants-appellants. Also represented

by STEPHEN B. KINNAIRD, CHRISTINA A. ONDRICK, PATRICK J. STAFFORD.

Before PROST, *Chief Judge*, SCHALL, and CHEN, *Circuit Judges*.

CHEN, *Circuit Judge*.

This appeal follows a ten-day jury trial in the District of Delaware that resulted in verdicts that (1) Power Integrations Inc.'s U.S. Patent Nos. 7,110,270 and 7,834,605 were neither anticipated nor obvious and were not directly or indirectly infringed by Fairchild Semiconductor International, Inc., Fairchild Semiconductor Corporation, and Fairchild (Taiwan) Corporation (collectively, Fairchild); (2) Power Integrations' U.S. Patent Nos. 6,107,851 and 6,249,876 were not anticipated and were directly and indirectly infringed by Fairchild; (3) Fairchild's U.S. Patent No. 7,259,972 was not obvious, was infringed by Power Integrations under the doctrine of equivalents, but was not literally infringed or indirectly infringed by Power Integrations; and (4) Fairchild's U.S. Patent No. 7,352,595 was not anticipated and was not infringed by Power Integrations. Following trial, the district court granted Power Integrations' motion for judgment as a matter of law (JMOL) that Fairchild directly infringed the '605 patent, but denied the parties' other JMOL motions and motions for a new trial. *Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.*, 935 F. Supp. 2d 747 (D. Del. 2013) (*JMOL Decision*). The court subsequently granted Power Integrations' motion for a permanent injunction and denied Fairchild's motion for a permanent injunction. *Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.*, No. 1:08-cv-00309-LPS, 2014 WL 2960035 (D. Del. June 30, 2014) (*Permanent Injunction Order*); *Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.*, No. 1:08-cv-00309-LPS (D. Del. June 16, 2014) (Dkt. No. 790). The district

court entered final judgment as to liability on January 13, 2015. *Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.*, No. 1:08-cv-00309-LPS (D. Del. Jan. 13, 2015) (Dkt. No. 819). All damages claims were bifurcated by the district court and remain pending.

Fairchild appeals and Power Integrations cross-appeals various decisions from the district court.¹ We hold as follows:

- The jury's verdict that the asserted claims of the '876 patent were not anticipated by Martin² or Wang³ is *affirmed*.
- Because the district court's jury instruction incorrectly stated the law on inducement, the jury's verdict that Fairchild induced infringement of the asserted claims of the '876 and '851 patents is *vacated*.
- The jury's verdict that the asserted claims of the '605 patent were not anticipated by Maige⁴ is *reversed*.
- The district court's construction that the asserted claims of the '972 patent require "sampling a voltage from the auxiliary winding of the transformer when the transformer is discharging" is *affirmed*.

¹ Neither party appeals the jury's verdicts on the '270 and '595 patents.

² U.S. Patent No. 4,638,417.

³ Andrew C. Wang and Seth R. Sanders, Programmed Pulsewidth Modulated Waveforms for Electromagnetic Interference Mitigation in DC-DC Converters, *IEEE Transactions on Power Electronics*, Vol. 8, No. 4 (Oct. 1993).

⁴ U.S. Patent No. 4,763,238.

- The jury’s verdict that the asserted claims of the ’972 patent would not have been obvious in view of Majid⁵ is *affirmed*.
- The jury’s verdict that Power Integrations infringed the asserted claims of the ’972 patent under the doctrine of equivalents is *reversed*.
- The district court’s grant of Power Integrations’ motion for a permanent injunction is *vacated* in view of the above holdings.
- The district court’s denial of Fairchild’s motion for a permanent injunction is *moot* in view of the above holdings.

In sum, we *affirm-in-part*, *reverse-in-part*, and *vacate-in-part* the final judgment entered by the district court and *remand* for further proceedings.

BACKGROUND

Power Integrations and Fairchild are direct competitors in the power supply controller chip market. They have engaged in a long-running and multi-fronted patent dispute involving actions in at least the United States District Courts for the District of Delaware⁶ and the Northern District of California,⁷ as well as the United States Patent and Trademark Office Patent Trial and

⁵ U.S. Patent No. 5,956,242.

⁶ See *Power Integrations, Inc. v. Fairchild Semiconductor Int’l, Inc.*, No. 1:08-cv-00309-LPS (D. Del. filed May 23, 2008); *Power Integrations, Inc. v. Fairchild Semiconductor Int’l, Inc.*, No. 1:04-cv-01371-LPS (D. Del. filed Oct. 20, 2004).

⁷ See *Power Integrations, Inc. v. Fairchild Semiconductor Int’l, Inc.*, No. 3:09-cv-05235-MMC (N.D. Cal. filed Nov. 4, 2009).

Appeal Board.⁸ We are not unfamiliar with the parties or their disputes. In fact, we have heard appeals of at least two decisions that involved two of the very patents at issue here. *See Power Integrations, Inc. v. Lee*, 797 F.3d 1318 (Fed. Cir. 2015) (vacating Patent Board’s decision that claims of the ’876 patent were unpatentable as anticipated); *Power Integrations, Inc. v. Fairchild Semiconductor Int’l, Inc.*, 711 F.3d 1348 (Fed. Cir. 2013) (reviewing jury verdict on ’851 and ’876 patents, among others).

Power supplies are ubiquitous in modern society. Anyone who has purchased an electronic device in recent times—whether a cellular phone, computer, television, or the like—is familiar with the different cords and plugs provided to power and/or charge those devices. Somewhere in the cord/plug combination resides a power supply. The power supply is often integrated into the plug itself, as is the case with many cellular phones. In other configurations, the power supply resides in a standalone module, as with many laptop computers.



Figure 1: Power supply



Figure 2: Power supply as

⁸ *See Power Integrations, Inc. v. Fairchild Semiconductor Corp.*, No. 2015-00769, 2015 WL 9595648 (PTAB Dec. 31, 2015); *see also Ex parte Power Integrations, Inc.*, No. 2010-011021, 2010 WL 5244756 (BPAI Dec. 22, 2010).

integrated into plug a standalone module

The power supply does more than simply allow power to flow from a wall outlet to the connected electronic device. Power supplies serve the integral role of converting the power supplied by the wall outlet into a form the electronic device can use. The power a wall outlet provides is of a relatively high voltage and uses alternating current (AC). In contrast, electronic devices generally require a relatively low voltage and direct current (DC). These devices would likely be damaged if exposed to high-voltage AC power. Power supplies convert the high-voltage AC power supplied by the wall outlet into the low-voltage DC power required by the electronic device.⁹

The controller chip is the “brains” of the power supply. It ensures that the power supply functions properly. Over time, controller chips have evolved to incorporate new features that make power supplies smaller, cheaper, and more efficient. The patents at issue in this appeal relate to some of the features that have been incorporated into modern controller chips.

I. The '851 and '876 Patents

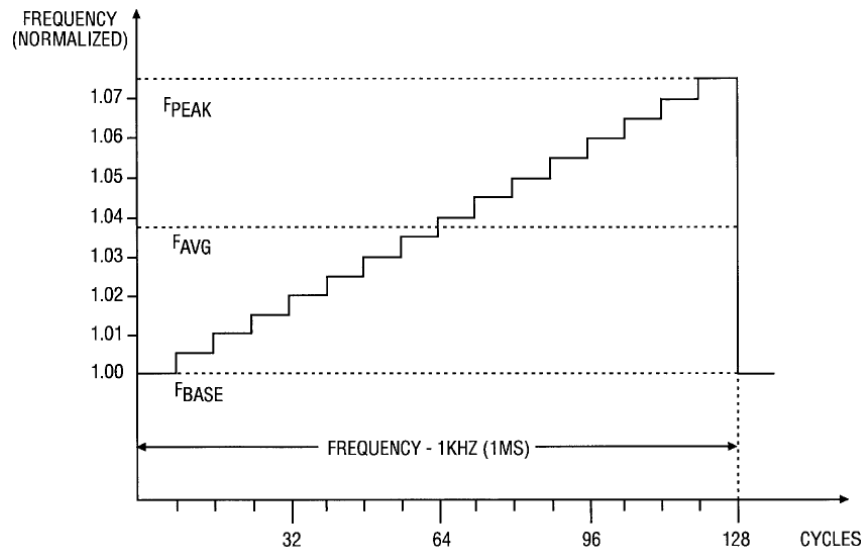
Power Integrations is the assignee of the '851 and '876 patents. These patents relate to “frequency jitter” in power supplies.

Modern power supplies operate in what is known as “switched mode.” Switched-mode power supplies conserve energy by rapidly switching between on and off states. They differ from older, linear power supplies, which remained in an on state. The switched-mode power supply’s controller chip commands the alternating on/off

⁹ For a more detailed explanation of AC and DC power and the conversion between the two, see our prior opinion in *Power Integrations*, 711 F.3d at 1357–58.

states through the use of an oscillator. Prior art switch-mode power supplies most often used a high-frequency oscillator operating at a fixed frequency. '851 patent, 1:22–26; '876 patent, 1:12–18. The fixed, high-frequency operation of the oscillator tended to inject noise in the form of electromagnetic interference (EMI) into the power supply at the specific frequency of the oscillator. This noise would, in turn, impact the operation of downstream and co-located components. '851 patent, 1:22–40; '876 patent, 1:19–33.

The '851 and '876 patents claim circuits that “jitter”—or vary—the frequency of the controller chip’s oscillator to reduce the amount of EMI the switched-mode power supply generates. '851 patent, 3:43–48; '876 patent, 1:66–67. One form of jitter is captured in Figure 2 of the '876 patent:



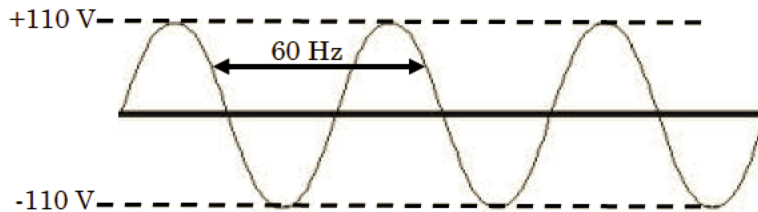
As shown in the figure, the oscillator frequency increases by a fixed amount every eight clock cycles before resetting after 128 clock cycles. By jittering the oscillator frequency—using a step function like the one shown above or some other scheme—the power supply divides any EMI it

generates among the different frequencies used instead of concentrating it at a single frequency.

II. The '605 Patent

Power Integrations is also the assignee of the '605 patent. The '605 patent relates to “current limiting” in power supplies.

In the United States, the power supplied by a wall outlet should take the form of a sine wave with peaks at approximately ± 110 V and a frequency of 60 Hz:



In reality, however, the power supplied can fluctuate—sometimes significantly. Prior art switched-mode power supplies would pass on these power fluctuations, in the form of changes in output current, to downstream components. Particularly where the power received by the power supply exceeded that which was expected, the power supply could output a level of current that would damage downstream components.

Over time, designers added circuits to switched-mode power supplies that imposed a fixed current limit on the output of the device. The current-limiting circuit acted as a failsafe that would monitor the power supply's output current and switch the power supply to an off state if the current exceeded a predetermined threshold. However, a delay existed between the time the current-limiting circuit sensed the overcurrent situation and the time the power supply switched to an off state. During that delay, the power supply would “overshoot” the current limit and, potentially, still damage downstream components.

The invention of the '605 patent attempts to solve this problem. It introduces a regulator to the current-limiting circuit that steadily increases the current threshold during the time the power supply is in an on state. '605 patent, 1:51–59. This variable current limit is shown in Figure 2 of the '605 patent:

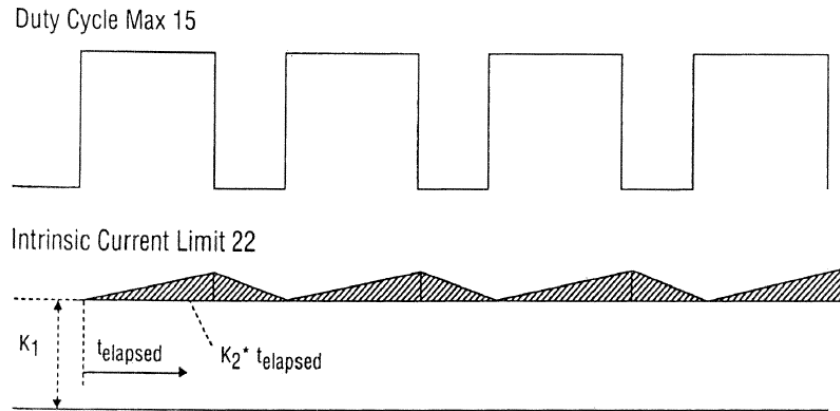


FIG. 2

The square wave—labeled “Duty Cycle Max 15”—represents the alternating on and off states of the power supply: when the wave is high, the power supply is on; when the wave is low, the power supply is off. The current limit (i.e., “Intrinsic Current Limit 22”) steadily increases throughout the period the power supply is on; it decreases throughout the period the power supply is off.

This increasing current limit provides advantages over prior art power supplies. For instance, with this improved design, an immediate surge in output current will trip the current limit at a lower level. This offers additional protection to downstream components without impacting operation of the power supply at normal power levels.

III. The '972 Patent

Fairchild is the assignee of the '972 patent. The '972 patent is a combination patent and claims a power supply

that includes frequency jitter—similar to that claimed in the '851 and '876 patents—and overcurrent protection—similar to the claimed invention of the '605 patent. '972 patent, 1:9–12.

However, the '972 patent discloses an approach to overcurrent protection that differs from that of the '605 patent. Whereas the regulator claimed in the '605 patent monitored the power supply's output voltage and current at the actual output of the power supply, '605 patent, 6:16–18, the power converter claimed in the '972 patent monitors the output voltage and current at what is known as the “primary side” of the power supply's transformer, '972 patent, 2:42–46.

This is best explained with reference to Figure 1 of the '972 patent:

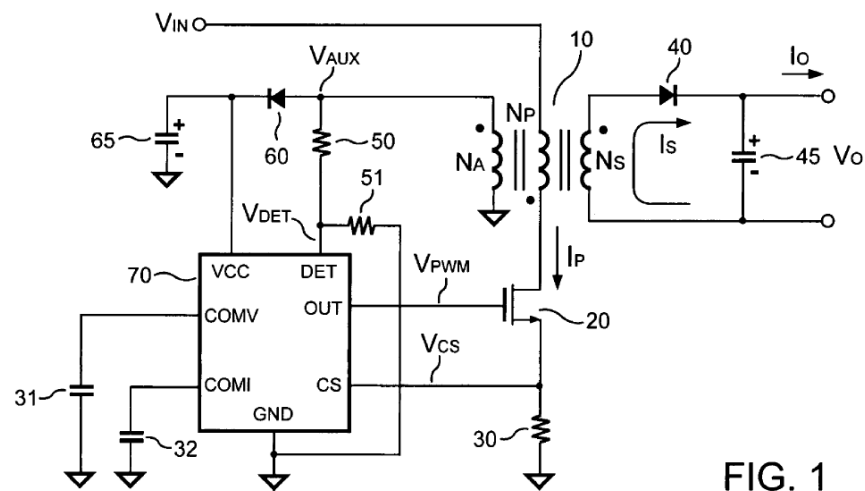


FIG. 1

The figure is a schematic diagram of a power supply. *Id.* at 2:62–64. The transformer, labeled “10,” divides the power supply. All circuitry to the left of transformer 10 in the schematic is the “primary side” of the power supply; all circuitry to the right of transformer 10 is the “secondary side” of the power supply. *See id.* at 2:64–66. Power supplies use a transformer to isolate the input terminals

of the power supply (V_{IN}) from the output terminals (V_O) for safety and reliability reasons. *Id.* at 1:17–20.

Prior art power supplies, like that claimed in the '605 patent, monitored output voltage and/or current on the secondary side of the power supply. *Id.* at 1:24–30. Such a scheme required a regulator on the secondary side as well as an opto-coupler to provide feedback from the secondary side of the power supply to the primary side. *Id.* at 1:30–33. The addition of these components increased the size and cost of the power supply. *Id.*

The power supply claimed in the '972 patent, in contrast, controls the output power at the primary side of the transformer based on feedback received on the primary side. *Id.* at 2:42–46. The power supply thereby does not require the secondary-side regulator or the opto-coupler found on prior art devices. *Id.* at 2:50–51. As a result, the power supply could be smaller in size and lower in cost.

PROCEDURAL HISTORY

Power Integrations filed suit against Fairchild on May 23, 2008 in the District of Delaware alleging that Fairchild directly and indirectly infringed the '851, '876, and '270 patents. Power Integrations subsequently amended its complaint to add allegations that Fairchild directly and indirectly infringed the '605 patent. Fairchild filed counterclaims alleging that Power Integrations directly and indirectly infringed the '972 and '595 patents and U.S. Patent No. 7,061,780. Each party denied the infringement allegations made against it and alleged that all patents asserted against it were invalid and/or unenforceable.

The district court bifurcated the liability and damages phases of the case prior to trial. A ten-day jury trial on

liability commenced on April 11, 2012.¹⁰ At the conclusion of trial, the jury returned a mixed verdict. The jury found all claims asserted by Power Integrations not invalid. Specifically, the jury found claims 1 and 2 of the '605 patent neither anticipated nor obvious; claims 6 and 7 of the '270 patent neither anticipated nor obvious; claims 1 and 21 of the '876 patent not anticipated; and claim 18 of the '851 patent not anticipated.

The jury found Fairchild liable for infringement of the '876 and '851 patents. It found that: Fairchild's SG5841J-type products did not literally infringe claims 1 or 21 of the '876 patent but did infringe those claims under the doctrine of equivalents; Fairchild's FAN103-type products literally infringed claims 1 and 21 of the '876 patent; Fairchild induced others to infringe claims 1 and 21 of the '876 patent; Fairchild's SG5841J- and SG6842J-type products literally infringed claim 18 of the '851 patent; and Fairchild induced others to infringe claim 18 of the '851 patent. The jury found that Fairchild did not directly infringe or induce infringement of claims 1 or 2 of the '605 patent or claims 6 or 7 of the '270 patent.

Turning to Fairchild's patents, the jury found all asserted claims not invalid. In particular, the jury found claims 6, 7, 18, and 19 of the '972 patent not obvious and claims 17 and 22 of the '595 patent not anticipated. On infringement, the jury found for Fairchild under a single theory: Power Integrations infringed the asserted claims of the '972 patent under the doctrine of equivalents. The jury found that Power Integrations did not literally infringe those claims nor did it induce others to infringe those claims. The jury found that Power Integrations did not infringe the asserted claims of the '595 patent literally, under the doctrine of equivalents, or by inducement.

¹⁰ By the time of trial, the '780 patent was no longer at issue.

The parties filed a multitude of post-trial motions challenging aspects of the jury's verdict or seeking a new trial. The district court granted Power Integrations' motion for JMOL of direct infringement of the '605 patent. *JMOL Decision*, 935 F. Supp. 2d at 756. It denied all other motions. *Id.* at 764.

Later, the court granted Power Integrations' motion for a permanent injunction and enjoined "Fairchild from selling, offering to sell, and importing the products found at trial to infringe and those products 'not colorably different' from them." *Permanent Injunction Order*, 2014 WL 2960035, at *2. The district court denied Fairchild's motion for a permanent injunction.

The district court entered final judgment as to liability on January 13, 2015. Fairchild filed a timely appeal and Power Integrations cross-appealed. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(1).

DISCUSSION

The parties raise twelve issues on appeal. The issues can be categorized as follows: (1) challenges to the district court's construction of certain claim terms; (2) a challenge to the district court's jury instructions; (3) a challenge to the verdict form adopted by the district court; (4) challenges to the district court's denial of certain of the parties' motions for JMOL; (5) challenges to the district court's denial of certain of the parties' motions for a new trial; and (6) challenges to the district court's grant or denial of a party's motion for a permanent injunction.

We apply the framework established in *Teva Pharmaceuticals U.S.A., Inc. v. Sandoz, Inc.* when reviewing a district court's construction of a patent's claims. 135 S. Ct. 831, 835 (2015). Under that framework, we review the district court's ultimate claim construction de novo with any underlying factual determinations involving extrinsic evidence reviewed for clear error. *Id.* at 841–42.

We review “the legal sufficiency of jury instructions on an issue of patent law without deference to the district court.” *DSU Med. Corp. v. JMS Co., Ltd.*, 471 F.3d 1293, 1304 (Fed. Cir. 2006) (en banc). “A jury verdict will be set aside only if the jury instructions were ‘legally erroneous’ and the ‘errors had prejudicial effect.’” *Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1225 (Fed. Cir. 2014) (quoting *Sulzer Textil A.G. v. Picanol N.V.*, 358 F.3d 1356, 1363 (Fed. Cir. 2004)).

We review the verdict form adopted by the district court for an abuse of discretion. *See Wyers v. Master Lock Co.*, 616 F.3d 1231, 1248 (Fed. Cir. 2010) (“[I]t must be left to the sound discretion of the trial court what form of verdict to request of a jury.” (quoting *Structural Rubber Prods. Co. v. Park Rubber Co.*, 749 F.2d 707, 720 (Fed. Cir. 1984))).

“We review the denial of a motion for JMOL . . . under the law of the pertinent regional circuit. The Third Circuit exercises plenary review of a denial of JMOL, applying the same standard as the district court.” *Siemens Med. Sols. USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc.*, 637 F.3d 1269, 1277–78 (Fed. Cir. 2011) (citations omitted). “To prevail on a renewed motion for JMOL following a jury trial, a party must show that the jury’s findings, presumed or express, are not supported by substantial evidence or, if they were, that the legal conclusion(s) implied by the jury’s verdict cannot in law be supported by those findings.” *Pannu v. Iolab Corp.*, 155 F.3d 1344, 1348 (Fed. Cir. 1998) (internal quotation marks and citations omitted).

“In reviewing a district court’s disposition of . . . a new trial motion, this court applies the law of the regional circuit where the district court sits.” *Bettcher Indus., Inc. v. Bunzl USA, Inc.*, 661 F.3d 629, 638 (Fed. Cir. 2011) (citation omitted). The Third Circuit “review[s] a district court’s grant or denial of a new trial motion by applying the deferential ‘abuse of discretion’ standard to the rul-

ing.” *Olefins Trading, Inc. v. Han Yang Chem Corp.*, 9 F.3d 282, 289 (3d Cir. 1993).

We review a district court’s ultimate decision to grant or deny a permanent injunction for an abuse of discretion. *Apple, Inc. v. Samsung Elecs. Co., Ltd.*, 809 F.3d 633, 639 (Fed. Cir. 2015). We review the district court’s conclusions on each of the underlying factors set forth in *eBay Inc. v. MercExchange, LLC*, 547 U.S. 388 (2006), for an abuse of discretion and its underlying factual findings for clear error. *Apple*, 809 F.3d at 639.

For simplicity, we address all issues associated with a particular patent—or group of patents—together. We therefore depart from our normal practice and intersperse the issues raised in Fairchild’s appeal with the issues raised in Power Integrations’ cross-appeal as necessary.

I. The ’851 and ’876 Patents (Frequency Jitter)

Fairchild commits much of its briefing to its argument that it is entitled to JMOL that it did not induce infringement of the ’851 and ’876 patents or, at the very least, that it is entitled to a new trial on the issue. Before reaching the jury’s induced infringement verdict, however, we must first address Fairchild’s argument that claims 1 and 21 of the ’876 patent are invalid as anticipated.¹¹

A. Validity of the ’876 Patent

The jury found that neither Martin nor Wang anticipated claims 1 and 21 of the ’876 patent. The ’876 patent claims a “frequency jittering” circuit used in switched-mode power supplies to reduce EMI emissions produced by the power supply. ’876 patent, Abstract. Claim 1 reads as follows:

¹¹ Fairchild does not appeal the jury’s verdict that claim 18 of the ’851 patent was not invalid as anticipated.

1. A digital *frequency jittering* circuit for varying the switching frequency of a power supply, comprising:

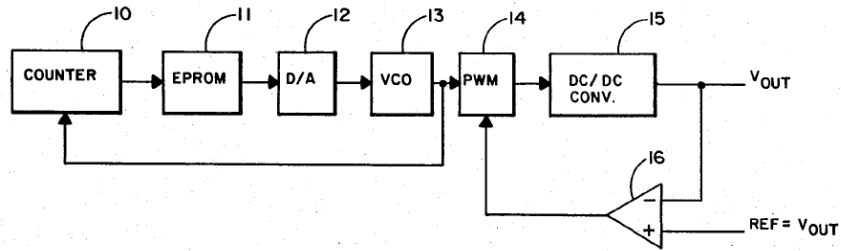
an oscillator for generating a signal having a switching frequency, the oscillator having a control input for varying the switching frequency;

a digital to analog converter coupled to the control input for varying the switching frequency; and

a counter coupled to the output of the oscillator and to the digital to analog converter, the counter causing the digital to analog converter to adjust the control input and to vary the switching frequency.

Id. at 8:42–53 (emphases added). Claim 21 is similar. It too is directed to a “frequency jittering circuit.” *Id.* at 9:55–65. It includes a limitation analogous to the one emphasized above in claim 1: “a counter coupled to the output of the oscillator and to the one or more current sources.” *Id.* at 9:64–65.

Martin and Wang each disclose a controller circuit used to reduce the EMI signature associated with a power supply’s oscillator. *See* Martin, 1:55–56; Wang at 585. The circuits accomplish this reduction by varying the oscillator frequency through the use of a pseudo-random code stored in read-only memory (ROM). *See, e.g.,* Martin, 1:53–55. The below figure from Martin is exemplary:



Martin, Fig. 1. In this circuit, counter 10 acts as an index to EPROM 11. As the output of counter 10 increases, it accesses the pseudo-random code value stored at the corresponding address of EPROM 11. *Id.* at 2:39–44. This value is outputted to digital-to-analog converter 12, which in turn drives the circuit’s oscillator (i.e., VCO 13). *Id.* at 2:44–49. The result is an oscillator with a frequency that varies according to the pseudo-random code stored in EPROM 11.

At trial, Power Integrations disputed Fairchild’s argument that Martin and Wang anticipated claims 1 and 21. It argued to the jury that the invention of the ’876 patent differed from the prior art references in at least two key ways: (1) the circuits of Martin and Wang do not vary about a “target frequency” as required by the district court’s construction of “frequency jittering;” and (2) the counters of Martin and Wang are not “coupled” to the digital-to-analog converter as the district court construed that term. The jury agreed and found that the claims were not anticipated by Martin or Wang.

We find that the jury’s verdict was supported by substantial evidence. The district court construed “frequency jittering” to mean “varying the switching frequency of a switch mode power supply about a target frequency in order to reduce electromagnetic interference.” *Power Integrations, Inc. v. Fairchild Semiconductor Int’l, Inc.*,

No. 1:08-cv-00309-LPS, 2009 WL 4928029, at *20 (D. Del. Dec. 18, 2009) (*Claim Construction Order*).¹² Fairchild does not challenge this construction. Rather, it contends that the claim limitation was disclosed in the prior art, using an argument akin to the symmetric property in mathematics.¹³ Fairchild first notes that one type of target frequency (“a”) disclosed in the ’876 patent is an average frequency (“b”). It next contends that one can take the pseudo-random frequencies used in Martin and Wang and calculate an average frequency (“b”). It finally argues that if the ’876 patent’s target frequency can be an average frequency (i.e., $a = b$), then Martin’s and Wang’s average frequency (that Fairchild proposed can be calculated) must be a target frequency (i.e., $b = a$).

While Fairchild’s argument is creative, it fails to account for the temporal aspect of the district court’s claim construction. The district court explained that “frequency jittering” requires “varying the switching frequency of a switch mode power supply about a target frequency in order to reduce electromagnetic interference.” *Id.* Under this construction, the claimed circuit—or its designer—must have *a priori* knowledge of the target frequency in order to vary the switching frequency about that target frequency. *See id.* (explaining that the patent specification “refer[s] to varying the switching frequency about a narrow, *known*, or fixed range of frequencies in order to reduce EMI”). As the district court correctly noted, Fairchild’s proposed calculation of Martin’s and Wang’s average frequency is done entirely “after the fact.” *JMOL Decision*, 935 F. Supp. 2d at 761 (“Calculating an average frequency after the fact does not teach one of skill in the art how to vary the switching frequency, and does not

¹² The district court adopted then-Magistrate Judge Stark’s Report and Recommendation Regarding Claim Construction on July 20, 2010. J.A. 49–50.

¹³ Under the symmetric property, if $a = b$ then $b = a$.

produce the desired result of reducing electromagnetic interference.”). Neither reference teaches use of a *known* target frequency about which switching frequencies are varied. Therefore, substantial evidence supports the jury’s findings that the references do not anticipate claim 1 or 21.

Martin and Wang likewise do not teach the “coupled to” limitations of claims 1 and 21. The district court construed “coupled” to mean that “two circuits are coupled when they are connected such that voltage, current or control signals pass from one to another.” J.A. 17137. Martin and Wang each disclose a circuit that includes a counter linked to a digital-to-analog converter by way of a ROM. *See* Martin, Fig. 1; Wang at 604. The ROM takes the output of the upstream counter as its input. Martin, 2:22–24; Wang at 604. It then outputs a different, stored value to the digital-to-analog converter. Martin, 2:29–32; Wang at 604. The addition of the ROM thereby ensures that no “voltage, current or control signals pass from” the counter to the digital-to-analog converter. In other words, the ROM “decouples” the counter from the digital-to-analog converter. As such, substantial evidence supports the jury verdict that neither Martin nor Wang anticipates claim 1 or 21. The district court therefore correctly denied Fairchild’s JMOL motion.

B. Induced Infringement of the ’851 and ’876 Patents

The jury found that Fairchild’s SG5841J- and SG6842J-type products literally infringed claim 18 of the ’851 patent; its SG5841J-type products infringed claims 1 and 21 of the ’876 patent under the doctrine of equivalents; and its FAN103-type products literally infringed claims 1 and 21 of the ’876 patent. The jury further found that Fairchild induced others to infringe these claims. Fairchild does not appeal the jury’s direct infringement verdicts. It does appeal the jury’s indirect infringement verdicts.

Fairchild raises three issues with respect to the jury's induced infringement verdict. Fairchild first argues that the verdict should be reversed because its foreign sales of and sales activities related to the infringing products cannot constitute specific intent to bring about infringement in the United States. Alternatively, Fairchild argues that the verdict should be vacated because the jury was improperly instructed that Fairchild need not successfully induce a third party to infringe to be liable for induced infringement. Finally, Fairchild argues that the district court's failure to include interrogatories on the verdict form requiring identification of direct infringers is a separate ground to vacate the jury verdict.

We agree with Fairchild that the district court's jury instruction misstated the law on induced infringement in a way that prejudiced Fairchild. We therefore vacate the jury's verdict. Because we do not find that the record as a whole requires a finding of non-infringement as a matter of law, we do not go further and, as Fairchild requests, enter judgment in its favor. Our decision to vacate the jury verdict due to the improper jury instruction renders Fairchild's argument with respect to the verdict form moot.¹⁴

¹⁴ While we do not reach Fairchild's appeal on the verdict form, we are not unsympathetic to the Seventh Amendment concerns Fairchild raises. On remand, we "le[ave] to the sound discretion of the trial court what form of verdict to request of a jury." *Wyers*, 616 F.3d at 1248. We nonetheless note that the court's decision to bifurcate liability and damages in this case does raise the possibility that both the liability jury and the damages jury will be asked to determine which of Fairchild's customers were induced to infringe by Fairchild. Such a result may run afoul of the Seventh Amendment. See *Blyden v. Mancusi*, 186 F.3d 252, 268 (2d Cir. 1999)

i. Jury Instruction

Induced infringement is defined in 35 U.S.C. § 271(b): “Whoever actively induces infringement of a patent shall be liable as an infringer.”

In the lead-up to trial, Power Integrations and Fairchild proposed competing jury instructions on induced infringement. Fairchild’s proposed instruction tracked the then-current Federal Circuit Bar Association model, while Power Integrations’ proposal was a variation of an instruction given in a prior trial in the District of Delaware. The parties’ dispute continued through trial, with each party advocating for its proposed instruction and objecting to its opponent’s proposed instruction.

The district court adopted an instruction that largely tracked the one proposed by Power Integrations. It read:

Each party alleges that the other is liable for infringement by actively inducing others to directly infringe the patents in suit. The direct infringement may either be literal or under the doctrine of equivalents. A party induces patent infringement if it purposefully causes, urges, or encourages another to use a product in a manner that infringes an asserted claim. Inducing infringement cannot occur unintentionally.

A party is liable for active inducement only if the patent owner proves by a preponderance of the evidence that:

(“Issues may be divided and tried separately, but a given issue may not be tried by different successive juries.” (citing *Byrd v. Blue Ridge Rural Elec. Coop.*, 356 U.S. 525, 537–38 (1958); *Gasoline Prods. Co. v. Champlin Ref. Co.*, 283 U.S. 494, 500 (1931))).

1. the party took some action during the time the patents in suit were in force intending to encourage or assist actions by others;
2. the party was aware of the patent and knew that the acts, if taken, would constitute infringement of that patent or the party believed there was a high probability that the acts, if taken, would constitute infringement of the patent but deliberately avoided confirming that belief; and
3. use by others of the party's product infringes one or more of the asserted claims of the patent.

In order to establish active inducement of infringement, it is not sufficient that others directly infringe the claim. Nor is it sufficient that the party accused of infringement was aware of the acts by others that directly infringe. Rather, in order to find inducement, you must find that the party accused of infringement intended others to use its products in at least some ways that would infringe the asserted claims of the patent. *However, that infringement need not have been actually caused by the party's actions. All that is required is that the party took steps to encourage or assist that infringement, regardless of whether that encouragement succeeded, or was even received.*

Intent to encourage or assist the acts that constitute direct infringement must be proven by evidence of active steps taken to encourage direct infringement, such as providing products, advertising any infringing use, or instructing how to engage in any use that is infringing.

Proof of intent to induce infringement may be based on circumstantial evidence, rather than direct evidence.

J.A. 510–11 (emphasis added).

This instruction left the jury with the incorrect understanding that a party may be liable for induced infringement even where it does not successfully communicate with and induce a third-party direct infringer.¹⁵ The Supreme Court has explained that the term “induce” as it is used in § 271(b) “means [t]o lean on; to influence; to prevail on; to move by persuasion.” *Global-Tech Appliances, Inc. v. SEB S.A.*, 563 U.S. 754, 760 (2011) (alteration in original) (citations omitted). Each definition requires successful communication between the alleged inducer and the third-party direct infringer.

¹⁵ Power Integrations argues that Fairchild did not preserve this issue for appeal. Appellee’s Opening Br. 44–46. We disagree. Fairchild repeatedly and consistently argued to the district court—in the context of the jury instructions and the verdict form—that a finding of induced infringement required evidence that Fairchild actually induced third-party direct infringers. *See, e.g.*, J.A. 16946–47 (1941:18–1942:4).^{*} Moreover, Fairchild expressly objected to the jury instruction on induced infringement. J.A. 17179 (2495:6–9) (“Your Honor, we want to make sure we state on the record that we object to Jury Instruction 4.5 and we are very interested to see how we sort this out at a later point in time, depending on the verdict.”).

^{*} The trial transcript included in the joint appendix contains four transcript pages for each single page of the joint appendix. Whenever citing to the trial transcript, we cite to both the joint appendix page(s) (i.e., J.A. #####) and the specific trial transcript page(s) and line(s) (i.e., PPPP:LL–PPPP:LL).

We have further held that “[t]o prevail under a theory of indirect infringement, [plaintiff] must first prove that the defendants’ actions led to direct infringement of the [patent-in-suit].” *Dynacore Holdings Corp. v. U.S. Philips Corp.*, 363 F.3d 1263, 1274 (Fed. Cir. 2004) (citation omitted); *see also DSU Med. Corp.*, 471 F.3d at 1304 (“[T]he plaintiff has the burden of showing that the alleged infringer’s actions induced infringing acts” (internal quotation marks and citation omitted)); *Crystal Semiconductor Corp. v. TriTech Microelects. Int’l, Inc.*, 246 F.3d 1336, 1351 (Fed. Cir. 2001) (induced infringement occurs only “if the party being induced directly infringes the patent” (citation omitted)).

Under this precedent, a finding of induced infringement requires actual inducement. The inducement may be proven via circumstantial evidence. *See MEMC Elec. Materials, Inc. v. Mitsubishi Materials Silicon Corp.*, 420 F.3d 1369, 1380 (Fed. Cir. 2005) (finding “sufficient circumstantial evidence for a reasonable jury to conclude that [defendant] was not only aware of the potentially infringing activities in the United States by [a third-party infringer], but also that [defendant] intended to encourage those activities” (citations omitted)). But the jury must still find that it occurred. The jury instruction incorrectly stated that liability exists even where no inducement actually occurred. This is contrary to the law.

Power Integrations attempts to salvage the jury instruction—and, by extension, the jury verdict—by claiming that the disputed portion of the instruction related to Fairchild’s *intent* to induce a third-party direct infringer, not whether Fairchild actually induced a third party. It cites the Supreme Court’s decision in *Grokster*¹⁶ and our

¹⁶ *Metro-Goldwyn-Mayer Studios Inc. v. Grokster, Ltd.*, 545 U.S. 913 (2005).

decision in *Ricoh*¹⁷ for the proposition that “a defendant’s acts to encourage direct infringement are probative of an unlawful intent, even if customers do not learn of them or the acts don’t cause the customers’ direct infringement.” Appellee’s Opening Br. 46. Power Integrations’ statement of the law is correct. However, it is irrelevant here. The district court instructed the jury that “[direct] infringement need not have been actually caused by the [alleged inducer]’s actions. All that is required is that the party took steps to encourage or assist that infringement, regardless of whether that encouragement succeeded, or was even received.” J.A. 510. Nothing in this statement suggests that it applies to simply Fairchild’s intent to induce infringement. Rather, it expressly misstates the law on actual inducement. *See Dynacore*, 363 F.3d at 1274 (“To prevail under a theory of indirect infringement, Dynacore must first prove that defendants’ actions led to direct infringement of the [patent-in-suit].”).

We conclude that the district court’s instruction misstated the law of induced infringement. As discussed more fully below, Power Integrations’ claim for induced infringement was a close call. Therefore, we cannot say that the instruction did not tip the scales in favor of Power Integrations at trial. We thus vacate the jury’s verdict that Fairchild induced infringement of the ’851 and ’876 patents. *See Ericsson*, 773 F.3d 1201, 1225 (Fed. Cir. 2014) (“A jury verdict will be set aside only if the jury instructions were ‘legally erroneous’ and the ‘errors had prejudicial effect.’” (citation omitted)).

ii. Jury Verdict

While we have already determined that the flawed jury instruction requires that we vacate the jury’s verdict, we must still address Fairchild’s argument that it is

¹⁷ *Ricoh Co., Ltd. v. Quanta Computer, Inc.*, 550 F.3d 1325 (Fed. Cir. 2008).

entitled to JMOL of no induced infringement. After all, if Power Integrations did not present sufficient evidence to allow a reasonable jury to find in its favor, a new trial on induced infringement would be unnecessary—and improper—regardless of the jury instruction given by the district court. *See Verizon Servs. Corp. v. Cox Fibernet Va., Inc.*, 602 F.3d 1325, 1337–38 (Fed. Cir. 2010) (“In reviewing the jury verdict of obviousness, we review whether the jury was correctly instructed on the law, *and whether there was substantial evidence whereby a reasonable jury could have reached its verdict upon application of the correct law to the facts*, recognizing that invalidity must be proved by clear and convincing evidence.” (emphasis added) (citation omitted)). Because the evidentiary record permits more than one reasonable finding on induced infringement, we cannot say that, had the jury been instructed properly, the jury’s verdict would have lacked substantial supporting evidence. Therefore, we do not enter judgment in favor of Fairchild.

“To prove inducement of infringement, the patentee must []show that the accused inducer took an affirmative act to encourage infringement with the knowledge that the induced acts constitute patent infringement.” *Astor-net Techs. Inc. v. BAE Sys., Inc.*, 802 F.3d 1271, 1279 (Fed. Cir. 2015) (quoting *Info-Hold, Inc. v. Muzak LLC*, 783 F.3d 1365, 1372 (Fed. Cir. 2015)). In other words, Power Integrations was required to prove that: (1) a third party directly infringed the asserted claims of the ’851 and ’876 patents; (2) Fairchild induced those infringing acts; and (3) Fairchild knew the acts it induced constituted infringement.

Fairchild does not seriously dispute that Power Integrations proved infringement of the ’851 and ’876 patents by third parties. Power Integrations presented evidence that it purchased at least three products containing infringing Fairchild chips in the United States: an HP printer packaged with an Astec power supply that con-

tained an infringing Fairchild SG6846A controller chip; an Acer notebook computer packaged with a Lite-On power supply that contained an infringing Fairchild LTA703S controller chip; and a Samsung notebook computer packaged with a power supply that contained an infringing SG6842J controller chip. Fairchild makes no argument that these controller chips do not necessarily infringe the relevant claims of the '851 and '876 patents if made, used, or sold in the United States. *See* Appellants' Opening Br. 19 (conceding that Power Integrations proved "limited instances . . . of direct infringement by third-party sellers").

Fairchild likewise does not seriously dispute it knew that importation, use, and sale of these controller chips in the United States constituted infringement of the '851 and '876 patents. In the single paragraph of argument on this issue in its briefing, Fairchild cites the conclusory trial testimony of one of its executives that he and his sales team told customers that "we don't infringe the Power Integrations patents" and makes the equally conclusory statement that "Fairchild presented strong non-infringement defenses as to both patents." Appellants' Opening Br. 32–33 (quoting J.A. 16787 (1470:3)). Fairchild needs more to meet its burden of "show[ing] that the jury's findings . . . are not supported by substantial evidence," as it must to succeed on appeal. *Pannu*, 155 F.3d at 1348. This is particularly true considering this court has already found that "Fairchild competed with Power Integrations by reverse engineering and copying of Power Integrations' products" and that "Fairchild fostered a corporate culture of copying" with respect to at least the '876 patent. *Power Integrations*, 711 F.3d at 1369.

Fairchild's appeal instead focuses on whether substantial evidence supports the jury's verdict that Fairchild actually induced third-party direct infringement. Fairchild explains that it sells its controller chips over-

seas into a worldwide distribution system with no knowledge of where its chips will ultimately end up. It contends that, because it sells the same chips for use in foreign and domestic markets, its sales activities are market agnostic and Power Integrations “marshaled no evidence that Fairchild took affirmative steps to encourage incorporation of the accused products into U.S.-bound products with the specific intent to induce infringement.” Appellants’ Opening Br. 25.

We disagree with Fairchild’s characterization of the evidence. Power Integrations, in fact, introduced significant—though not necessarily overwhelming—evidence that would allow a jury to find that Fairchild took affirmative acts to induce third parties to import its products into the United States. As examples, Power Integrations presented evidence that: Fairchild designed its controller chips to meet certain United States energy standards, including Energy Star and those imposed by the California Energy Commission (CEC), J.A. 16400 (569:17–571:20), J.A. 16500–01 (795:9–796:3), J.A. 16523–24 (887:25–891:10), J.A. 16778 (1435:8–1437:18), J.A. 25065; Fairchild competed for business it knew was directed to the United States, J.A. 16929 (1871:25–1873:1), J.A. 16931 (1878:4–1879:8); J.A. 24492, J.A. 24495; Fairchild provided demonstration boards containing the infringing controller chips to customers and potential customers in the United States, J.A. 16514 (848:19–849:10), J.A. 16524 (889:22–890:5), J.A. 16794 (1498:25–1499:3); Fairchild’s website enabled customers to locate a United States-based distributor that sold Fairchild’s infringing controller chips, J.A. 16927 (1864:1–1866:1); Fairchild maintained a technical support center in the United States that provided support for the infringing controller chips to customers based in the United States, J.A. 16402 (579:13–580:6), J.A. 24174; and Fairchild’s standard terms and conditions indemnified customers against claims for infringement of United States patents, J.A. 16773 (1416:1–24).

Fairchild endeavors to explain away or otherwise diminish the value of each piece of evidence presented by Power Integrations. For instance, Fairchild argues that its provision of demonstration boards was “ordinary commercial activity” that cannot lead to liability for induced infringement because its controller chips have non-infringing uses. Appellants’ Opening Br. 25 (citing *Grokster*, 545 U.S. at 937). But, Fairchild ignores that the only non-infringing use of its controller chips was *foreign use*. Power Integrations introduced evidence that Fairchild shipped demonstration boards to customers and potential customers *in the United States*. The jury was therefore entitled to consider this evidence in determining if Fairchild induced infringement in the United States.

As another example, Fairchild argues that its promotion of its products as compliant with certain energy efficiency standards—such as Energy Star and those imposed by CEC—that originated in the United States cannot constitute inducing acts, because the standards had been adopted by many other countries. Appellants’ Opening Br. 29–31. But, the jury heard testimony, including from Fairchild’s own witnesses, that the Energy Star and CEC standards are United States standards. *See, e.g.*, J.A. 16467 (660:21–25); J.A. 16500 (795:9–23); J.A. 16523–24 (887:22–888:1); J.A. 16524 (890:25–891:10). The jury also heard testimony that, while other countries initially adopted the United States energy efficiency standards, certain countries had established different, more stringent standards of their own. J.A. 16778 (1435:3–20). In light of this testimony, it was reasonable for a juror to view Fairchild’s promotion of its products as Energy Star and/or CEC compliant as targeted to the United States market, and therefore relevant to inducement.

Rather than addressing each of Fairchild’s remaining, discrete attacks on Power Integrations’ evidence of inducement, we note that Fairchild misses the forest for the

trees. While each piece of evidence may not individually be sufficient to establish Fairchild’s liability, *see, e.g., MEMC*, 420 F.3d at 1378–79 (holding that an indemnity provision alone cannot establish intent to induce infringement unless “the primary purpose” of the provision was to induce infringement), the evidence as a whole provided the jury substantial evidence upon which to find inducement by Fairchild, *see, e.g., Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1323 (Fed. Cir. 2009) (“Having perused the evidence, we agree with [defendant] that the evidence is not strong, but we are not persuaded that the jury was unreasonable in finding that [defendant] possessed the requisite intent to induce at least one user of its products to infringe the claimed methods.”).

Fairchild offers an alternative theory why it is entitled to JMOL of no induced infringement: Power Integrations failed to establish a nexus between Fairchild’s allegedly inducing acts and the acts of direct infringement Power Integrations proved at trial. It contends that Power Integrations introduced evidence of only three acts of direct infringement—sales of an HP printer, Acer notebook computer, and Samsung notebook computer containing infringing Fairchild controller chips—and that Power Integrations was required to present evidence that Fairchild specifically induced HP, Acer, Samsung, or the retailers from which Power Integrations purchased the infringing products to incorporate the infringing controller chips into products bound for the United States. Appellants’ Opening Br. 20 (“[Power Integrations] put on no evidence of the provenance of the chips in these devices, or that Fairchild induced Best Buy, Wal-Mart, HP, Acer, Samsung, or any downstream reseller to incorporate accused chips into U.S.-bound products with specific intent to bring about these U.S. infringements.”).

We find this argument without merit. As detailed above, Power Integrations presented substantial evidence that Fairchild took affirmative acts to induce third parties

to import its controller chips into the United States wherein—Fairchild does not seriously dispute—the chips necessarily infringed. While none of this evidence can be directly linked to the particular HP printer, Acer notebook computer, or Samsung notebook computer Power Integrations introduced at trial as representative acts of direct infringement, it was sufficient to allow the jury to find that Fairchild had induced its customers (including HP, Acer, and Samsung) to infringe as a class. This is all that we require. See *Dynacore*, 363 F.3d at 1274–75 (contrasting the proof required to prove individual acts of induced infringement as opposed to inducement of “an entire category of infringers (e.g., the defendant’s customers)”). Indeed, we have affirmed induced infringement verdicts based on circumstantial evidence of inducement (e.g., advertisements, user manuals) directed to a class of direct infringers (e.g., customers, end users) without requiring hard proof that any individual third-party direct infringer was actually persuaded to infringe by that material. See, e.g., *Ericsson*, 773 F.3d at 1220, 1222 (affirming jury’s induced infringement verdict where defendant advertised compliance with an infringing standard); *Arthrocare Corp. v. Smith & Nephew, Inc.*, 406 F.3d 1365, 1377 (Fed. Cir. 2005) (affirming jury’s induced infringement verdict where defendant distributed “sales literature” and “manuals” that instructed how to use product in infringing manner); cf. *Liquid Dynamics Corp. v. Vaughan Co., Inc.*, 449 F.3d 1209, 1223 (Fed. Cir. 2006) (affirming infringement verdict under 35 U.S.C. § 271(f) and explaining that distribution of “engineering manual . . . replete with examples” of infringing use was substantial evidence of inducement).

Accordingly, having reviewed the record as a whole, we cannot conclude that no reasonable jury—if instructed properly—could have found that Fairchild induced infringement of the ’851 and ’876 patents.

II. The '605 Patent (Current Limiting)

Fairchild appeals the jury's verdict that claims 1 and 2 of the '605 patent were not anticipated by Maige. Power Integrations cross-appeals and argues that it is entitled to a new trial on induced infringement due to certain prejudicial statements made by Fairchild during trial. We find the jury's verdict that Maige did not anticipate claims 1 and 2 of the '605 patent unsupported by substantial evidence. We therefore reverse the jury's verdict of no anticipation. As a result, Power Integrations' cross-appeal is moot.

The '605 patent claims “[a] power supply regulator including a variable current limit threshold that increases during an on time of a switch.” '605 patent, Abstract. Claim 1 reads as follows:

1. A power supply regulator, comprising:

a comparator having a first input coupled to sense a voltage representative of a current flowing through a switch during an on time of the switch, *the comparator having a second input coupled to receive a variable current limit threshold that increases during the on time of the switch;*

a feedback circuit coupled to receive a feedback signal representative of an output voltage at an output of a power supply; and

a control circuit coupled to generate a control signal in response to an output of the comparator and in response to an output of the feedback circuit, the control signal to be coupled to a control terminal of the switch to control switching of the switch.

Id. at 6:10–27 (emphasis added). Claim 2 depends from claim 1 and further requires “an oscillator having a first

output to generate a sawtooth waveform, wherein the variable current limit threshold is generated in response to the sawtooth waveform.” *Id.* at 6:28–29.

Maige describes “[a] protection device for switch mode power supplies.” Maige, Abstract. Like the regulator claimed in the ’605 patent, Maige’s protection device uses a current limit threshold to protect downstream components in the event of a power surge. The specific type of threshold employed by Maige depends on the mode of the protection device. When the protection device is in start-up mode, Maige uses “soft start circuitry” to introduce an increasing current threshold that prevents a large in-rush of current. When the protection device is in its normal operation mode, Maige uses a fixed current limit.

At trial, the parties disputed whether Maige discloses “a variable current limit threshold that increases during the on time of the switch.” ’605 patent, 6:11–15. Fairchild presented the testimony of its expert, Dr. Gu-Yeon Wei, that Maige’s current threshold increased throughout the period of start-up—during which the device alternates between on and off states—and thereby satisfied the limitation. Power Integrations countered with the testimony of its own expert, Dr. Arthur Kelley. Dr. Kelley testified that Maige’s current threshold did not increase “during the on time of the switch” as required by the claim and presented test data in the form of an oscilloscope screen capture to show that the current threshold remained constant during start-up. The jury sided with Power Integrations and found that Maige did not anticipate claims 1 and 2 of the ’605 patent.

We find that the jury’s verdict is not supported by substantial evidence. Dr. Kelley testified at trial that (1) Maige’s current threshold increases “[d]uring the whole process of startup,” J.A. 16907 (1785:4–14); and (2) Maige’s power supply is on “for some period of time” during startup, J.A. 16908 (1786:22–1787:4). Taken together, Dr. Kelley’s testimony is a concession that

Maige’s current threshold “increases during the on time of the switch.”

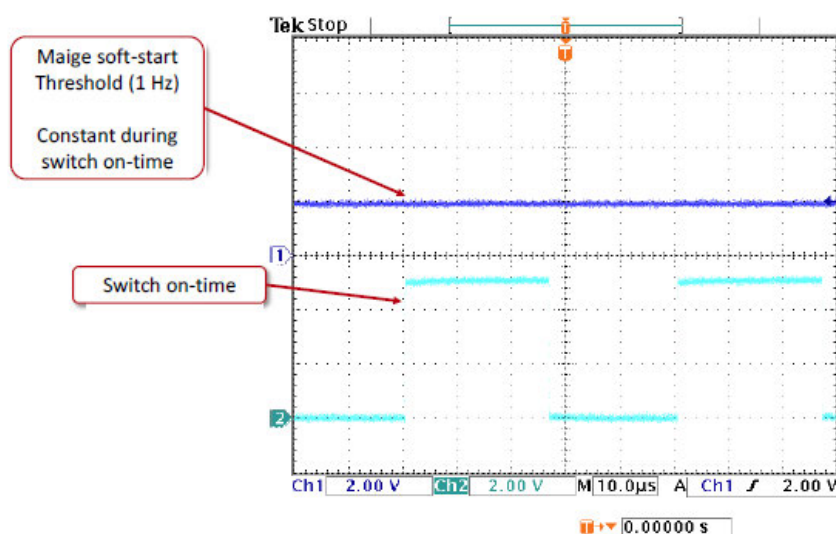
This is all that claims 1 and 2 require. Nothing in the claims requires that the current threshold increase during the power supply’s normal operation. Indeed, Dr. Kelley testified to this effect at trial:

Q. Okay. So you would agree with me, I hope, that there is nothing in Claim 1 that limits the operation to what is claimed here to normal conditions only. Right?

A. Sure.

J.A. 16980 (1786:18–21). Therefore, that Maige’s current threshold only increases during start-up mode—not normal operation—is irrelevant to the analysis. See *Unwired Planet, LLC v. Google Inc.*, --- F.3d ---, 2016 WL 6694955, at *5 (Fed. Cir. Nov. 15, 2016) (“[C]ombinations of prior art that sometimes meet the claim elements are sufficient to show obviousness.”); see also *Hewlett-Packard Co. v. Mustek Sys., Inc.*, 340 F.3d 1314, 1326 (Fed. Cir. 2003) (“Just as ‘an accused product that sometimes, but not always, embodies a claimed method nonetheless infringes,’ a prior art product that sometimes, but not always, embodies a claimed method nonetheless teaches that aspect of the invention.” (quoting *Bell Commc’ns Research, Inc. v. Vitalink Commc’ns Corp.*, 55 F.3d 615, 622–623 (Fed. Cir. 1995))).

Equally irrelevant is the oscilloscope screen capture presented at trial by Dr. Kelley:



Appellee’s Opening Br. 57. The screen capture purports to show that the current threshold (shown in dark blue) remains constant during the power supply’s on time (represented by the two higher portions of the light-blue waveform). But the screen capture is limited to a 100 μsec ¹⁸ window of operation. It is not surprising that the current threshold did not measurably increase during this time. By Dr. Kelley’s own admission, the current threshold increases over the full one-second start-up period. *See* J.A. 16980 (1787:20–25). As such, the current threshold would increase only 1/10,000th of its full range over the course of the entire screen capture. It is not surprising that such a small increase is not visible to the human eye considering the 2-volt-per-division scaling used in the screen capture.

All that matters for anticipation is that Maige disclose “a variable current limit threshold that increases during the on time of the switch.” Power Integrations’ expert, Dr. Kelley, admitted that it does. The jury therefore

¹⁸ 1 μsec (also known as 1 microsecond) is 0.000001 seconds. 100 μsec is equal to 0.0001 seconds.

lacked substantial evidence to find that Maige did not anticipate claims 1 and 2 of the '605 patent.

III. The '972 Patent (Primary-Side Control)

The jury found that claims 6, 7, 18, and 19 were not invalid. It further found that Power Integrations infringed the claims under the doctrine of equivalents, but did not infringe literally and did not induce others to infringe. Fairchild appeals the jury's verdict that Power Integrations did not induce infringement of the asserted claims. Power Integrations cross-appeals and raises the following arguments: (1) the district court improperly construed the claim limitation "sampling a voltage from the auxiliary winding of the transformer and a discharge time of the transformer;" (2) the jury's verdict that the claims would not have been obvious in view of Majid in combination with the '876 patent is not supported by substantial evidence; and (3) the jury's verdicts that Power Integrations did not literally infringe the claims but did infringe under the doctrine of equivalents result in claim vitiation.

We affirm the district court's claim construction and the jury's verdict that claims 6, 7, 18, and 19 would not have been obvious. We agree with Power Integrations that the jury's infringement verdicts vitiate the requirement that the claimed feedback signals be "distinct." We therefore reverse the jury's verdict that Power Integrations infringed claims 6, 7, 18, and 19 under the doctrine of equivalents. In view of these decisions, Fairchild's appeal is moot.

A. Claim Construction

The '972 patent claims a power supply that includes frequency jittering and primary-side feedback to prevent overcurrent. '972 patent, 1:9–12. Fairchild asserted claims 6, 7, 18, and 19 of the patent against Power Integrations. Claim 6 depends from claim 1. Claim 1 reads as follows:

1. A power converter comprising:
 - a switch, responsive to a switching signal, to control electrical power in the power converter; and
 - a controller to generate the switching signal and to control the switching signal in response to a first feedback signal associated with a voltage control loop and a second feedback signal associated with a current control loop;wherein the controller includes a pattern generator to generate a digital pattern and the controller uses the digital pattern for use in generating the switching signal as a frequency-hopping switching signal to the switch.

Id. at 15:22–49. Claim 6¹⁹ further requires “wherein the controller generates the first feedback signal by *sampling a voltage from the auxiliary winding of the transformer and a discharge time of the transformer.*” *Id.* at 15:50–53 (emphasis added). Claim 7 depends from claim 6 and further limits independent claim 1’s “second feedback signal.” It is not relevant to the parties’ claim construction dispute. Claims 18 and 19 depend from claim 15 and are analogous to claims 6 and 7, but in method form.

The parties dispute the construction of the limitation “sampling a voltage from the auxiliary winding of the transformer and a discharge time of the transformer.” The district court adopted Fairchild’s proposed construction: “sampling a voltage from the auxiliary winding of the transformer when the transformer is discharging.”

¹⁹ Claim 6 depends from claim 1 by way of claims 2 and 5. None of the limitations added in claims 2 or 5 are relevant to this issue.

Claim Construction Order, 2009 WL 4928029, at *25. Power Integrations contends that the district court’s construction departs from the plain and ordinary meaning of the claims, which it claims requires sampling both a voltage and a discharge time.

“[T]he words of a claim ‘are generally given their ordinary and customary meaning.’” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (quoting *Vitronics Corp. v. Conceptoronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). The “ordinary and customary meaning” 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. “Properly viewed, the ‘ordinary meaning’ of a claim term is its meaning to the ordinary artisan after reading the entire patent.” *Id.* at 1321.

We disagree with Power Integrations that the limitation at issue is clear on its face. *See* Appellee’s Opening Br. 25 (“The claims’ ordinary meaning could not be clearer.”). Specifically, it is ambiguous what clauses are linked by the conjunction “and.” The limitation could be construed to require that the controller sample (1) “a voltage from the auxiliary winding of the transformer,” and (2) “a discharge time of the transformer,” as Power Integrations argues. Alternatively, the limitation could be construed to require that the controller sample a voltage from (1) “the auxiliary winding of the transformer,” and (2) “a discharge time of the transformer.” In this alternative construction, the limitation defines both where the voltage is sampled (i.e., the auxiliary winding of the transformer) and when the voltage is sampled (i.e., during the discharge time of the transformer). The district court adopted this latter construction.

While the limitation is ambiguous in isolation, we find its meaning clear when viewed in the context of the patent specification. *Phillips*, 415 F.3d at 1313 (“Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the

particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.”).

The specification explains that, when the power supply’s switch is turned off, electrical energy stored in the power supply’s transformer flows from the primary side of the transformer to the secondary, or auxiliary, side of the transformer. ’972 patent, 3:36–42. It is during this “discharge time” that voltage is generated at the auxiliary winding of the transformer. *Id.* at 3:56–58. The specification later explains that the power supply’s controller samples this voltage (V_{AUX}) during the discharge time. *See id.* at 7:48–51; *id.* at 8:49–9:30. The power supply uses the sampled voltage as a mechanism to generate the first feedback signal. *See id.* at 4:29–42 (describing how V_{AUX} is used to generate detector voltage V_{DET}); *id.* at 5:1–16 (describing how V_{DET} is used to generate feedback V_V). The patent specification’s description is thus consistent with the district court’s construction that “sampling a voltage from the auxiliary winding of the transformer and a discharge time of the transformer” means “sampling a voltage from the auxiliary winding of the transformer when the transformer is discharging.”

Power Integrations’ argument that the district court’s construction “create[s] problems for the analogous language in unasserted claims 8 and 20” does not change this result. Appellee’s Opening Br. 27. Claims 8 and 20 depend from asserted claims 7 and 19, respectively, and require “generating the second feedback signal by sampling of sensed current and the discharge time of the transformer.” ’972 patent 16:58–61; *see also id.* at 15:58–61 (“generat[ing] the second feedback signal by sampling of the sensed current from the sense circuit and the discharge time of the transformer”). Power Integrations contends that replacing “and” with “when”—its characterization of the district court’s construction of claims 6 and 18—would require that the sensed current be sampled

from the sensed circuit *when* the transformer is discharging, an impossibility because the sensed current does not exist when the transformer is discharging. Appellee’s Opening Br. 27–28.

Power Integrations’ argument is based on a faulty premise. The district court was not asked to construe the word “and” in claims 6 and 18. And, it did not do so. Rather, it construed the entire claim term “sampling a voltage from the auxiliary winding of the transformer and a discharge time of the transformer.” One cannot assume that an individual portion of the district court’s construction can be imported into claims 8 and 20 simply because those claims use similar language. Similar language in different claims may be construed differently based on the context in which it is used and other intrinsic evidence. *See Wilson Sporting Goods Co. v. Hillerich & Bradsby Co.*, 442 F.3d 1322, 1328 (Fed. Cir. 2006) (“Under this court’s case law, the same terms appearing in different claims in the same patent—e.g. ‘gap’ in claims 1 and 15—should have the same meaning ‘unless it is clear from the specification and prosecution history that the terms have different meanings at different portions of the claims.’ In this case, the claims use the term ‘gap,’ but then modify it differently to suggest differences in the geometry of the ‘gap’ in the various claims.” (citation omitted)).

We therefore affirm the district court’s construction.

B. Validity

Power Integrations argues that claims 6, 7, 18, and 19 of the ’972 patent would have been obvious in view of Majid and the ’876 patent. The jury rejected this argument at trial. We affirm the jury’s verdict.

Majid describes a switched-mode power supply that uses feedback to control output voltage, thereby preventing damage to downstream components. *See* Majid, Abstract. The ’876 patent—described above, *supra* at 7–8—claims a circuit that introduces “jitter” to a power

supply's oscillator frequency to reduce the amount of EMI generated by the power supply. '876 patent, 1:66–67. Power Integrations contends a combination of these two references discloses every limitation of claims 6, 7, 18, and 19 of the '972 patent. It further contends that combining the features disclosed in the references would have been easy for one of ordinary skill in the art, thereby rendering the claims obvious. Fairchild counters that the asserted claims would not have been obvious for two reasons. First, it argues that Majid does not disclose the specific second feedback signal claimed in the '972 patent. Second, it argues that one of ordinary skill in the art would have experienced great difficulty in combining Majid with the '876 patent.

At trial, the parties supported their arguments with the testimony of their respective experts, Dr. Kelley for Power Integrations and Dr. Wei for Fairchild. Each expert testified in rather conclusory fashion. With little explanation, Dr. Kelley highlighted the portions of Majid and the '876 patent that he believed disclosed the different claim limitations. J.A. 17048 (2171:14–2174:19). The focus of his testimony was whether it would have been difficult for a skilled artisan to combine frequency jitter (i.e., the '876 patent) with primary-side control (i.e., Majid); he concluded that it would not have been. J.A. 17048–49 (2174:20–2178:8). Dr. Wei, likewise with little explanation, testified that Majid did not disclose the “second feedback signal” claimed in the '972 patent and that it would have been difficult to combine frequency jitter with primary-side control. J.A. 17057–58 (2208:3–2211:20).

Each expert's credibility was called into question during cross-examination. Counsel for Fairchild raised an apparent inconsistency between Dr. Kelley's expert report on non-infringement and his testimony on invalidity. In opining that Power Integrations did not infringe the '972 patent, Dr. Kelley stated that the current output of a

conventional current limit circuit—like that supposedly employed by Power Integrations—did not satisfy the “second feedback signal” required by the claims. J.A. 17055–56 (2200:12–2203:8). Yet, in testifying that the claims would have been obvious, Dr. Kelley testified that Majid’s conventional current limit circuit did satisfy the “second feedback signal” limitation of the claims. J.A. 17055 (2200:3–11).

Counsel for Power Integrations similarly exposed an apparent inconsistency between Dr. Wei’s trial testimony and his testimony during deposition. At trial, Dr. Wei testified that Majid did not disclose the “second feedback signal” limitation. J.A. 17057 (2208:24–2209:7). But, during deposition, Dr. Wei testified that the combination of Majid and the ’876 patent disclosed all claim limitations. J.A. 17061–62 (2226:19–2227:9).

“When reviewing a denial of judgment as a matter of law of obviousness, where there is a black box jury verdict, as is the case here, we presume the jury resolved underlying factual disputes in favor of the verdict winner and leave those presumed findings undisturbed if supported by substantial evidence.” *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1326 (Fed. Cir. 2016). Dr. Wei’s testimony provided the jury with substantial evidence for its presumed findings that Majid did not disclose the “second feedback signal” limitation of claims 6, 7, 18, and 19 and that a skilled artisan would have had difficulty combining frequency jitter with primary-side control. While Dr. Kelley testified to the contrary, “when there is conflicting testimony at trial, and the evidence overall does not make only one finding on the point reasonable, the jury is permitted to make credibility determinations and believe the witness it considers more trustworthy.” *MobileMedia Ideas LLC v. Apple Inc.*, 780 F.3d 1159, 1168 (Fed. Cir. 2015) (citation omitted). “Where there is substantial evidence for a reasonable jury finding, it is not our function to second guess or reevaluate the weight

given to that evidence.” *Id.* This is particularly true here, where it was Power Integrations’ burden to prove *by clear and convincing evidence* that the claims were invalid.

We therefore find the jury’s verdict that claims 6, 7, 18, and 19 would not have been obvious in view of Majid and the ’876 patent supported by substantial evidence.

C. Doctrine of Equivalents

Claims 6 and 7 of the ’972 patent depend from claim 1, which includes the following limitation:

a controller to generate the switching signal and to control the switching signal in response to a first feedback signal associated with a voltage control loop and a second feedback signal associated with a current control loop

’972 patent, 15:25–29. Claims 18 and 19 depend from claim 15, which includes an equivalent limitation. *Id.* at 16:36–40. The district court construed this limitation to require that the claimed second feedback signal be “distinct from the first feedback signal.” *Claim Construction Order*, 2009 WL 4928029, at *12. Neither party appeals this construction.

The patent’s Figure 3 graphically depicts the claimed voltage control loop and current control loop and their respective first and second feedback signals.

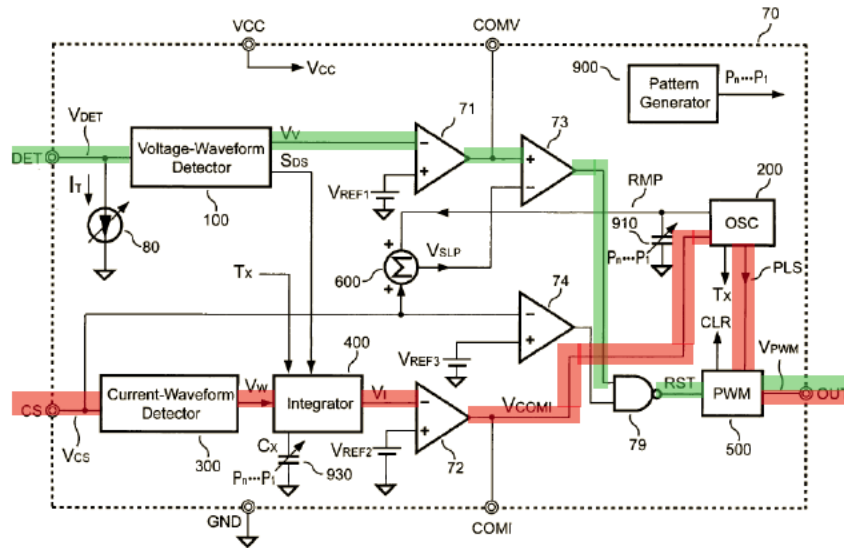
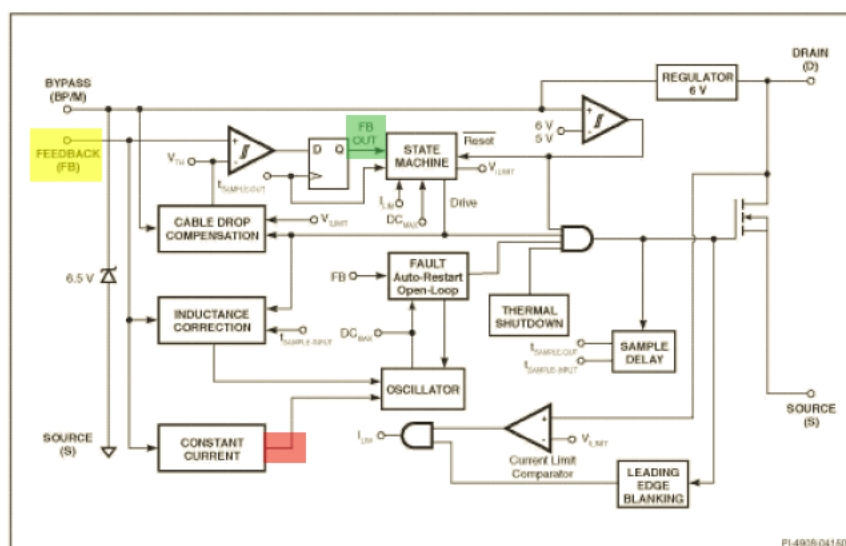


FIG. 3

'972 patent, Fig. 3 (highlighting added). The claimed "first feedback signal" is represented by the voltage V_{DET} . V_{DET} enters the circuit at the DET pin and is used in the voltage control loop (highlighted in green). The "second feedback signal" is represented by the voltage V_{CS} . V_{CS} enters the circuit at the CS pin and is used in the current control loop (highlighted in red). The figure shows that the two feedback signals are distinct.

Fairchild asserted the '972 patent against Power Integrations' LinkSwitch-II products. Below is a block diagram of the product.



J.A. 24292 (highlighting added). At trial, Fairchild introduced evidence that the product contained the requisite two, distinct feedback signals. It identified “FB OUT” (highlighted above in green) as the “first feedback signal associated with a voltage control loop” and the output of the constant current block (highlighted above in red), which it referred to as “I REDUCE,” as the “second feedback signal associated with a current control loop.” Power Integrations countered that the product contained a single feedback signal—labeled “FEEDBACK (FB)” (highlighted above in yellow)—and therefore could not infringe.

The jury agreed with Power Integrations that its LinkSwitch-II products did not literally infringe the ’972 patent. However, it found that the products infringed under the doctrine of equivalents.

Power Integrations argues on appeal that the jury’s verdicts cannot be reconciled. It contends that, in finding no literal infringement, the jury necessarily found that Power Integrations’ products contain only a single feedback signal, not the two “distinct” feedback signals required by the claims. It then reasons that any finding that the single feedback signal is equivalent to the

claimed two “distinct” feedback signals would vitiate the “distinct”-ness required by the claims. Pursuant to this understanding, Power Integrations argues that it is entitled to JMOL of no infringement.

In response, Fairchild first argues that Power Integrations’ invocation of claim vitiation is misplaced. It states that Power Integrations presented two, separate non-infringement theories at trial: first, that the two feedback signals Fairchild’s expert, Dr. Wei, identified were not “distinct;” and second, that the current signal Dr. Wei identified as the claimed “second feedback signal” was not actually a “feedback signal.” It contends that only Power Integrations’ first theory could conceivably result in claim vitiation and argues that we should not assume the jury relied on this theory when it could have, just as easily, relied on Power Integrations’ alternate theory. The district court adopted Fairchild’s reasoning in denying Power Integrations’ motion for JMOL of no infringement under the doctrine of equivalents. *JMOL Decision*, 935 F. Supp. 2d at 754.

We disagree with Fairchild and the district court. Power Integrations’ expert, Dr. Kelley, presented a single non-infringement theory at trial, namely, that Power Integrations’ products include only a single feedback signal. *See, e.g.*, J.A. 17041 (2145:11–14) (Dr. Kelley: “It uses just a single feedback signal that arrives at one pin that is indicative of the output voltage, and that is used to regulate the output voltage, but it does not have any kind of current feedback signal.”); J.A. 17043 (2151:23–2152:2) (Dr. Kelley testifying that the LinkSwitch-II does not have two feedback signals). When Dr. Kelley testified that the output of the LinkSwitch-II’s constant current block (i.e., “I REDUCE”) was not a “feedback signal,” he did not introduce a new non-infringement theory. Rather, he made clear that the output was not a “feedback signal” because the LinkSwitch-II used only a single feedback signal (i.e., “FEEDBACK (FB)”):

Q. Okay. Focusing on the constant current block, is the output of the constant current block a second feedback signal associated with a current control loop?

A. No, it's not.

Q. Why not?

A. There's no current input, the constant current block. All it has as an input *is the same voltage feedback signal that's used elsewhere.*

J.A. 17043 (2152:18–25) (emphasis added). As such, the jury necessarily found that the LinkSwitch-II products contain a single feedback signal when it rendered its verdict of no literal infringement.

We must therefore weigh the merits of Power Integrations' claim vitiation argument. Under claim vitiation, "if a court determines that a finding of infringement under the doctrine of equivalents would entirely vitiate a particular claimed element, then the court should rule that there is no infringement under the doctrine of equivalents." *Lockheed Martin Corp. v. Space Systems/Loral, Inc.*, 324 F.3d 1308, 1321 (Fed. Cir. 2003) (internal quotation marks, alternations, and citation omitted); *see also Warner-Jenkinson Co., Inc. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 40 (1997) ("[I]f a theory of equivalence would entirely vitiate a particular claim element, partial or complete judgment should be rendered by the court.").

We agree with Power Integrations that a finding of infringement under the doctrine of equivalents would vitiate the requirement that the claimed feedback signals be "distinct." The inventor of the '972 patent detailed at trial the difficulty he and his team had in designing a power supply with accurate primary-side control and the breakthrough he achieved by adding a second feedback signal specifically related to output current. J.A. 16917 (1822:8–1824:24). He went on to testify that having a

second feedback signal—related to current—that is distinct from the first feedback signal—related to voltage—is what distinguished the claimed invention from the prior art. J.A. 16924 (1851:15–1852:11).

Here, the jury implicitly found that Power Integrations’ LinkSwitch-II products contain a single feedback signal, not two “distinct” feedback signals as required by the claims. “[N]ot using two distinct signals to control voltage and current can’t be equivalent to using distinct signals—the signals are either distinct or they aren’t.” Appellee’s Opening Br. 29. A finding to the contrary would render the requirement that the feedback signals be “distinct”—the feature described by the inventor as critical to the invention’s novelty—meaningless. *See Am. Calcar, Inc. v. Am. Honda Motor Co.*, 651 F.3d 1318, 1339 (Fed. Cir. 2011) (rejecting plaintiff’s doctrine of equivalents theory and reasoning that “finding a signal from one source to be equivalent to ‘signals from a plurality of sources’ would vitiate that claim limitation by rendering it meaningless”).

We therefore reverse the jury’s verdict that Power Integrations infringed claims 6, 7, 18, and 19 under the doctrine of equivalents.

IV. Permanent Injunction

Following trial, the district court granted Power Integrations’ motion for a permanent injunction and enjoined “Fairchild from selling, offering to sell, and importing the products found at trial to infringe and those products ‘not colorably different’ from them.” *Permanent Injunction Order*, 2014 WL 2960035, at *2. The district court denied Fairchild’s motion for a permanent injunction. Fairchild appeals both of these rulings.

We first note that Fairchild’s appeal of the district court’s denial of Fairchild’s motion for a permanent injunction is moot. The district court entered judgment of infringement against Power Integrations on the ’972

patent alone. We have reversed that judgment. *See supra* at 43–48. Without a judgment of infringement by Power Integrations, issuance of a permanent injunction is not appropriate.

Turning to the district court’s grant of Power Integrations’ motion for a permanent injunction, we vacate that decision. We have significantly reduced the scope of Fairchild’s infringement liability in this case. As a result of our above holdings, only the district court’s judgment that Fairchild is liable for direct infringement of the ’851 and ’876 patents remains untouched. We leave it to the district court to determine in the first instance if a permanent injunction is appropriate in view of Fairchild’s infringement liability. Though, we recognize that the district court may exercise its discretion and defer its decision until Power Integrations’ claims that Fairchild induced infringement of the ’851 and ’876 patent are resolved.

CONCLUSION

For the preceding reasons, we *affirm-in-part, reverse-in-part*, and *vacate-in-part* the final judgment entered by the district court and *remand* for further proceedings.

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

COSTS

Each party shall bear its own costs.