

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

CARRIER CORPORATION,)
)
Plaintiff,)
)
V.)
)
GOODMAN GLOBAL, INC.,)
GOODMAN MANUFACTURING)
COMPANY, L.P., GOODMAN GLOBAL)
HOLDINGS, INC., GOODMAN)
DISTRIBUTION, INC., AND)
GOODMAN SALES COMPANY,)
)
Defendants,)

Civ. No. 12-930-SLR

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MEMORANDUM OPINION

Dated: February 22, 2016
Wilmington, Delaware


ROBINSON, District Judge

I. INTRODUCTION

On July 19, 2012, plaintiff Carrier Corporation (“Carrier”) commenced this litigation against defendants Goodman Global, Inc., Goodman Manufacturing Company, L.P., Goodman Global Holdings, Inc., Goodman Distribution, Inc., and Goodman Sales Company (collectively, “Goodman”) alleging infringement of U.S. Patent No. 7,243,004 (“the ‘004 patent”).¹ (D.I. 1) Carrier filed an unopposed motion for leave to file a first amended complaint on January 31, 2013, which amended complaint was filed on February 5, 2013.² (D.I. 50; D.I. 51) On November 22, 2013, the court granted Goodman’s unopposed motion to file first amended answers, which amended answers were filed the same day. (D.I. 173; D.I. 174; D.I. 175) On December 9, 2013, Carrier answered the counterclaims in the amended answers. (D.I. 185)

On June 19, 2014, the court denied Goodman’s motion for leave to file second amended answers. (D.I. 304) In opinions issued August 14, 2014, the court resolved the parties’ claim construction disputes and several summary judgment motions.³ (D.I. 315; D.I. 316; D.I. 317) The parties proceeded to trial on September 8, 2014, arguing infringement and invalidity of certain claims of the ‘004 patent. On September 15, 2014, the jury returned a verdict for Carrier, finding the ‘004 patent valid and infringed. (D.I.

¹ U.S. Patent No. 7,775,452 is no longer at issue; the parties having stipulated to the dismissal of such patent. (D.I. 273)

² Goodman answered the amended complaint and counterclaimed on February 22, 2013. (D.I. 55; D.I. 56) On March 15, 2013, Carrier answered the counterclaims. (D.I. 60)

³ The court denied Goodman’s motion for summary judgment of non-infringement (D.I. 235) and the competing motions for summary judgment of invalidity (D.I. 240; D.I. 244). The court granted in part and denied in part Goodman’s motion to strike and exclude certain expert testimony (D.I. 236).

383) Presently before the court are Carrier's motion for permanent injunction (D.I. 393) and Goodman's motion for judgment as a matter of law ("JMOL") and, in the alternative, for a new trial (D.I. 394). The court has jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

II. BACKGROUND

A. Parties

Carrier is a corporation organized under the laws of the State of Delaware with a principal place of business in Farmington, Connecticut. Goodman Global, Inc. is a corporation organized under the laws of the State of Delaware. Goodman Manufacturing Company, L.P. is a partnership organized under the laws of the State of Texas. Goodman Global Holdings, Inc. is a corporation organized under the laws of the State of Delaware. Goodman Distribution, Inc. is a corporation organized under the laws of the State of Texas and qualified with the Delaware Secretary of State to do business in Delaware. Goodman Distribution, Inc. has a registered agent in Delaware, The Corporation Trust Company, located in Wilmington, Delaware. Goodman Sales Company is a corporation organized under the laws of the State of Texas. Each of the Goodman defendants has a principal place of business in Houston, Texas. (D.I. 51 at ¶¶ 1-6; D.I. 174 at ¶¶ 2-6)

B. The '004 Patent

The '004 patent, titled "Self-Configuring Controls for Heating, Ventilating and Air Conditioning Systems," was filed January 7, 2004 and issued July 10, 2007. The '004 patent is directed to a self-configuring heating, ventilation and air conditioning ("HVAC") system, wherein HVAC "units are provided with an electronic control that reports the

unit's particular characteristics to a central control. The central control takes in the characteristics of each of the several units, and has available to it optimum operational strategies based upon the combination of several units that have reported.” (1:51-58) At trial, Carrier asserted that certain of Goodman's products – the ComfortNet indoor and outdoor units with one of a CTK01 thermostat, CTK02 thermostat, or CTK03 thermostat (collectively, “the ComfortNet system”) – infringe claims 6, 8, and 13 of the '004 patent.

III. STANDARDS OF REVIEW

A. Renewed Motion for JMOL

To prevail on a renewed motion for judgment as a matter of law following a jury trial, the moving party “must show that the jury's findings, presumed or express, are not supported by substantial evidence or, if they were, that the legal conclusions implied [by] the jury's verdict cannot in law be supported by those findings.” *Pannu v. lolab Corp.*, 155 F.3d 1344, 1348 (Fed. Cir.1998) (quoting *Perkin–Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 893 (Fed. Cir.1984)). “Substantial' evidence is such relevant evidence from the record taken as a whole as might be acceptable by a reasonable mind as adequate to support the finding under review.” *Perkin–Elmer Corp.*, 732 F.2d at 893. In assessing the sufficiency of the evidence, the court must give the non-moving party, “as [the] verdict winner, the benefit of all logical inferences that could be drawn from the evidence presented, resolve all conflicts in the evidence in his favor, and in general, view the record in the light most favorable to him.” *Williamson v. Consol. Rail Corp.*, 926 F.2d 1344, 1348 (3d Cir. 1991); *Perkin–Elmer Corp.*, 732 F.2d at 893. The court may not determine the credibility of the witnesses nor “substitute its

choice for that of the jury between conflicting elements of the evidence.” *Perkin–Elmer Corp.*, 732 F.2d at 893. In sum, the court must determine whether the evidence reasonably supports the jury’s verdict. See *Dawn Equip. Co. v. Kentucky Farms Inc.*, 140 F.3d 1009, 1014 (Fed. Cir. 1998).

B. Motion for a New Trial

Federal Rule of Civil Procedure 59(a) provides, in pertinent part:

A new trial may be granted to all or any of the parties and on all or part of the issues in an action in which there has been a trial by jury, for any of the reasons for which new trials have heretofore been granted in actions at law in the courts of the United States.

Fed. R. Civ. P. 59(a). The decision to grant or deny a new trial is within the sound discretion of the trial court and, unlike the standard for determining judgment as a matter of law, the court need not view the evidence in the light most favorable to the verdict winner. See *Allied Chem. Corp. v. Daiflon, Inc.*, 449 U.S. 33, 36 (1980); *Olefins Trading, Inc. v. Han Yang Chem. Corp.*, 9 F.3d 282 (3d Cir. 1993); *LifeScan Inc. v. Home Diagnostics, Inc.*, 103 F. Supp. 2d 345, 350 (D. Del. 2000) (citations omitted); see also 9A Wright & Miller, *Federal Practice and Procedure* § 2531 (2d ed. 1994) (“On a motion for new trial the court may consider the credibility of witnesses and the weight of the evidence.”). Among the most common reasons for granting a new trial are: (1) the jury’s verdict is against the clear weight of the evidence, and a new trial must be granted to prevent a miscarriage of justice; (2) newly-discovered evidence exists that would likely alter the outcome of the trial; (3) improper conduct by an attorney or the court unfairly influenced the verdict; or (4) the jury’s verdict was facially inconsistent. See *Zarow–Smith v. N.J. Transit Rail Operations*, 953 F. Supp. 581, 584-85 (D.N.J. 1997) (citations omitted). The court must proceed cautiously, mindful that it should not simply

substitute its own judgment of the facts and the credibility of the witnesses for those of the jury. Rather, the court should grant a new trial on the basis that the verdict was against the weight of the evidence only where a miscarriage of justice would result if the verdict were to stand. See *Williamson*, 926 F.2d at 1352; *EEOC v. Del. Dep't of Health & Soc. Servs.*, 865 F.2d 1408, 1413 (3d Cir. 1989).

IV. MOTION FOR JMOL

A. Infringement Standard

A patent is infringed when a person “without authority makes, uses or sells any patented invention, within the United States . . . during the term of the patent.” 35 U.S.C. § 271(a). To prove direct infringement, the patentee must establish, by a preponderance of the evidence, that one or more claims of the patent read on the accused device literally or under the doctrine of equivalents. See *Advanced Cardiovascular Sys., Inc. v. Scimed Life Sys., Inc.*, 261 F.3d 1329, 1336 (Fed. Cir. 2001). A two-step analysis is employed in making an infringement determination. See *Markman*, 52 F.3d at 976. First, the court must construe the asserted claims to ascertain their meaning and scope. See *id.* Construction of the claims is a question of law subject to de novo review. See *Cybor Corp. v. FAS Techs.*, 138 F.3d 1448, 1454 (Fed. Cir. 1998). The trier of fact must then compare the properly construed claims with the accused infringing product. See *Markman*, 52 F.3d at 976. This second step is a question of fact. See *Bai v. L & L Wings, Inc.*, 160 F.3d 1350, 1353 (Fed. Cir. 1998).

“Direct infringement requires a party to perform each and every step or element of a claimed method or product.” *Exergen Corp. v. Wal-Mart Stores, Inc.*, 575 F.3d 1312, 1320 (Fed. Cir. 2009) (internal quotation marks omitted). “If any claim limitation is

absent from the accused device, there is no literal infringement as a matter of law.” *Bayer AG v. Elan Pharm. Research Corp.*, 212 F.3d 1241, 1247 (Fed. Cir. 2000). If an accused product does not infringe an independent claim, it also does not infringe any claim depending thereon. See *Wahpeton Canvas Co. v. Frontier, Inc.*, 870 F.2d 1546, 1553 (Fed. Cir. 1989). However, “[o]ne may infringe an independent claim and not infringe a claim dependent on that claim.” *Monsanto Co. v. Syngenta Seeds, Inc.*, 503 F.3d 1352, 1359 (Fed. Cir. 2007) (quoting *Wahpeton Canvas*, 870 F.2d at 1552) (internal quotations omitted). The patent owner has the burden of proving literal infringement by a preponderance of the evidence. See *SmithKline Diagnostics, Inc. v. Helena Lab. Corp.*, 859 F.2d 878, 889 (Fed. Cir. 1988) (citations omitted).

To establish indirect infringement, a patent owner has available two theories: active inducement of infringement and contributory infringement. See 35 U.S.C. § 271(b) & (c). To establish active inducement of infringement, a patent owner must show that an accused infringer “knew or should have known [their] actions would induce actual infringements.” *DSU Med. Corp. v. JMS Co., Ltd.*, 471 F.3d 1293, 1306 (Fed. Cir. 2006). To establish contributory infringement, a patent owner must show that an accused infringer sells “a component of a patented machine ... knowing the same to be especially made or especially adapted for use in an infringement of such patent, and not a staple article or commodity of commerce suitable for substantial noninfringing use.” *Golden Blount, Inc. v. Robert H. Peterson Co.*, 365 F.3d 1054, 1061 (Fed. Cir. 2004) (quoting 35 U.S.C. § 271(c)). Liability under either theory, however, depends on the patent owner having first shown direct infringement. *Joy Technologies, Inc. v. Flakt, Inc.*, 6 F.3d 770, 774 (Fed. Cir. 1993).

B. Review of Record

Claim 6 is directed to an HVAC system and recites:

An HVAC system comprising;

an indoor unit having a control operable to communicate characteristic information of said indoor unit to a central control, an outdoor unit having a control operable to communicate characteristic information of said outdoor unit to said central control; and

said central control communicating with said indoor unit and said outdoor unit, and said central control receiving said characteristic information from said indoor unit and said outdoor unit, and determining an optimal control strategy for said indoor unit and said outdoor unit based upon said reported characteristic information, said central control storing a plurality of optimal control strategies, and selecting a particular one of said optimal control strategies to utilize based upon the particular characteristic information reported from said indoor unit and said outdoor unit; and

wherein said indoor unit is one of a furnace and a heater/fan combination, and said outdoor unit is []one of an air conditioner and a heat pump.

(5:15-34) The court construed “optimal control strategy” as “a predetermined control strategy best-suited to operate the system for a given combination of units;” “optimal control strategies,” as “more than one ‘optimal control strategy;’” and “central control” as “a device capable of receiving user desired settings, receiving information from HVAC units, and communicating control signals to HVAC units.” (D.I. 315 at 2-4) Goodman asserts that the jury’s findings of infringement are not supported by substantial evidence.

1. Carrier’s evidence

Goodman’s counsel cross-examined Rajendra Shah (“Shah”), an inventor of the ‘004 patent, on figure 1, asking whether there would be a different control strategy for each combination of units. Carrier’s counsel objected to the questioning and the court

agreed that the witness should not be questioned regarding claim construction, stating that the inventor's description of the invention, if inconsistent with the court's claim construction, would not be particularly relevant. Goodman's counsel moved on to other questions. (D.I. 402 at 318:19-321:9)

Jim Fisher ("Fisher"), a marketing product manager at Goodman Manufacturing, testified⁴ that Emerson⁵ makes the CTK01 thermostat for Goodman. (D.I. 402 at 392:24-393:7) The CTK01 sends information (temperature and humidity demand) to the indoor units and receives information from the indoor and outdoor units. The model and serial number are programmed into the indoor and outdoor units. (D.I. 402 at 397:7-14, 398:2-15) When asked if the features of the CTK02 and CTK03 (including auto-configuration and the use of four wires) were meaningfully different than features of the CTK01, Fisher responded that the core features were the same in the three thermostats and each behaves similarly. (D.I. 402 at 414:8-415:10) He also stated that his house is equipped with a CTK03 with an "Amana outdoor and a Goodman indoor furnace" and that he used to have a CTK02 thermostat. (D.I. 402 at 416:1-22)

Gary Clark ("Clark"),⁶ an executive at Goodman, testified⁷ that the CTK01, CTK02 and CTK03 send and receive information for the indoor and outdoor units. (D.I. 402 at 432:20-433:14) The Goodman thermostat has programmed options and when it

⁴ Referencing PTX38. The court cites exhibits referenced in the briefing without corresponding testimony to the witness with whom the exhibit was admitted.

⁵ The parties identified Emerson Climate Technologies, Inc. in the voir dire. (D.I. 372) Carrier identified Scott Vogel as a representative of Emerson Electric. The court will refer (as the parties did) to Emerson throughout this opinion, without distinguishing the companies.

⁶ Called as an adverse witness as he worked at Carrier for 14 years prior to working at Goodman for the last 12 years. (D.I. 403 at 11-13)

⁷ Referencing PTX14.

is installed, the thermostat picks the best-suited of the available options. (D.I. 402 at 437:18-438:6) Clark agreed that Goodman sold the ComfortNet system with either the CTK01, CTK02 or CTK03 thermostat. (D.I. 402 at 474:1-475:5; PTX46)

Patrick Hudson (“Hudson”), a corporate representative for Honeywell,⁸ testified⁹ that Honeywell manufactures the CTK03 thermostat for Goodman and he assisted in its design and testing. (D.I. 402 at 517:9-18) He explained that a major feature of the CTK03 thermostat is the auto-configure allowing the thermostat to receive configuration information for the equipment on the ClimateTalk network. (D.I. 402 at 518:8-519:23) Hudson explained that whether the CTK03 “choose[s] a particular control algorithm to use based on the system that it’s setting up” depends “on your perspective on the control algorithm, whether you’re looking at the thermostat as having one control algorithm or if it’s a subset of smaller ones.” He agreed that a control algorithm is “just like a logic tree that the thermostat goes through in deciding how to run the system.” If, for example, there was no air conditioner, then “the thermostat would . . . go through [the logic tree] to run that system[, but] would not include the portions for the cooling system.” He also agreed that “[i]f you have just an air handler, then the logic tree would be different than if you had a furnace and an air-conditioning unit in the system.” (D.I. 402 at 521:8-522:23) He testified that the configuration data might include the number of cooling stages for an air conditioning unit and the displays might include the “number of furnace heating stages, the furnace input rate, [and] the furnace indoor blower motor horsepower.” (D.I. 402 at 524:1-525:14)

⁸ Honeywell International Inc.

⁹ Referencing PTX172, PTX196, and PTX946.

Scott Vogel (“Vogel”),¹⁰ a corporate representative and strategic technology manager for connectivity at Emerson, testified¹¹ that the thermostat sends “some signal to the network coordinator” and “the network coordinator communicates with the heating devices.” He stated that “[f]rom a thermostat standpoint . . . it’s not different pieces of code,” but “it’s more like a decision tree,” i.e., it determines what units are connected and then makes a decision. (D.I. 402 at 527:6-528:4) He explained that the thermostat receives a configuration response (how many blower, heat, or cool stages) and a status response (error indications) from each unit. Each individual unit reports its own characteristics. The configuration data is hard coded into the individual HVAC units. Based on the configuration response from the different units, the thermostat decides whether to make the normal heat call versus the auxiliary heat call. The thermostat can then go through the decision tree in the source code. The communicating thermostats only work with ClimateTalk equipment. He further stated that the “decision branches” are different for different scenarios. (D.I. 402 at 529:9-536:11) He explained:

Q. If the network coordinator is in the indoor unit or the outdoor unit, the network coordinator isn’t making calls for heating or cooling; right?

A. No.

Q. It routes a call that it gets [to] the thermostat to the other units?

A. That is correct.

(D.I. 402 at 536:12-18) The “decision tree is independent of where the network controller is located.” (D.I. 402 at 537:4-7, 536:19-541:16)

¹⁰ Certain information in Vogel’s deposition testimony was given under protective order, therefore, the courtroom was cleared.

¹¹ Referencing PTX926 and PTX927.

Carrier's expert, Dr. Greg Henze ("Henze"), testified¹² that the ComfortNet system includes a family of outdoor units, a family of indoor units, and a family of three thermostats (CTK01, CTK02, CTK03). Henze testified that each installed system with "one of the three ComfortNet thermostats," "one of the indoor units," and "one of the outdoor units" would perform auto-configuration. Each of the thermostats are "capable of operating with all of the indoor and outdoor units." (D.I. 402 at 552:10-554:22; PTX59; PTX60) Henze testified that "[t]he network coordinator is basically the software concept that is responsible for routing information on the ClimateTalk network." (D.I. 402 at 556:5-16) Henze agreed that he analyzed all the different potential combination of ComfortNet units and did not find any material differences in how the different combinations would perform the auto-configuration feature. (D.I. 402 at 559:3-10)

Henze described claim 6¹³ as having three physical components, an indoor unit, an outdoor unit, and a central control. In the ComfortNet system, the central controller is the thermostat. He referred to a "family of nine different Goodman ComfortNet indoor models," pointing out that one, "a furnace" that he saw operating, has "its own dedicated control board." He explained that similarly the outdoor units have a control board. Applying the court's construction of "central control" – "a device capable of receiving user desired settings, receiving information from HVAC units, and communicating

¹² Referencing PTX11 and PTX12.

¹³ Henze used a demonstrative showing the claim language highlighted in different colors. He then referenced the colors during his testimony, e.g., "let's start with the green, the first green element about the indoor unit." (D.I. 402 at 563:7-8) The court will not, as Goodman proposes, ignore most of Henze's testimony because the highlighted demonstrative exhibit is not part of the record. Plainly, the claim language is part of the record and can be considered. Goodman's expert also referred to, e.g., "the yellow highlighted section, central control." (D.I. 404 at 996:14-15)

control signals to HVAC units” – Henze testified that each of the CTK thermostats “allow[s] for user desired settings” including temperature adjustments or mode settings. Relying on a manual for condensing units (as well as testimony from engineers and individuals and source code), Henze testified that the thermostat “may request and receive information from both indoor and outdoor units.” For the communicating piece of the construction, Henze explained that the manual states that “[t]he thermostat still sends commands to the indoor and outdoor units.” (D.I. 402 at 562:17-567:6; PTX793)

Henze concluded that the indoor and outdoor units have “a control operable to communicate characteristic information” to the central control. He explained that the characteristic information is size, type, capacity, model, and other parameters, as well as the blower stages, heat stages or cool stages, which fits within the court’s construction. He determined (looking at the source code and Vogel’s deposition testimony) that the characteristic information is preprogrammed. He agreed that “the Goodman ComfortNet system with one of the three thermostats and one of the indoor and outdoor units” meets the indoor and outdoor unit limitations of the claim. (D.I. 402 at 567:13-570:13)

As to the central control, Henze testified (relying on an installation and service manual) that the indoor unit, outdoor unit, and thermostat communicate with one another. Henze pointed to an excerpt of an engineering specification for the CTK02 thermostat, which states that “the thermostat must use the information received from the subsystems to set up the individual subsystem operation and control.” (D.I. 402 at 571:10-12, 570:4-571:12) Moreover, the engineering specification for the CTK02 shows some of the characteristic information, including “the number of heat stages, cool

stages, and the capability for humidification for a furnace.” The “central controller” receives information from units such as a furnace, AC, air handlers and heat pumps. Henze concluded that the ComfortNet system met all of the language in the “central control” limitation. (D.I. 402 at 571:13-572:13) He explained that

the central control determines a strategy based on the information as received. The strategy is found among a plurality of strategies it has on its processor. And then it would select the right one given the configuration it’s dealing with.

So there are basically three elements to this . . . claim limitation, determining, storing and selecting.

(D.I. 402 at 572:19-573:1)

Applying the court’s construction for control strategy and optimal control strategy, Henze testified that “[t]here are more than one optimal control strategies” stored in the CTK thermostats. As to “determining,” Henze explained that “an engineering specification for the CTK02 thermostat made by Honeywell . . . says that the thermostat shall use the information to determine the type of HVAC system it shall be configured as. The thermostat shall determine what type of system it is in control of.” (D.I. 402 at 573:2-575:3) Henze testified that he looked at the source code for each of the CTK thermostats. Henze explained that the auto-configuration source code reads characteristic information into the controller. A “different code” or “routine” determines the system configuration. Henze used an example of “a furnace[,] air conditioner and a thermostat” as the system configuration. He then explained that a series of if/then statements are used to determine if something is true and then “the thermostat would execute the lines of the code that follow that if statement.” The response to the “if” statement determines where in the code the thermostat goes next. He concludes that “the software code offers three options: Either single stage, two stage or modulating.”

He then testified that there are code “provisions for the air handler and air conditioner and the heat pump.” “So . . . any time it hears a configuration response from systems on the network, it will ask, are you an air handler, air conditioner, gas furnace or heat pump, and it will fall into the corresponding code that’s reserved for those types of system.” This allows the thermostat to “know what type of system configurations it is [and the] information pertaining to the individual unit.” The thermostat uses the information to “select the appropriate control strategy for exactly that type of system that were attached to the system.” The “heat load on and cool load on . . . portions of the code. . . send the heating or cooling percentage across the ClimateTalk network.” Henze explained that not all of the code is executed, instead, “[o]nly the pieces of code that are appropriate for this configuration of system and they’re always the same lines of code that are called through the system configuration unless the system configuration changes.” He extracted certain lines of code “and put them into a new file to show that they can stand by themselves. And . . . what you see here is a contiguous piece of code that would be the optimal control strategy for that very combination we were discussing the two-stage air conditioner and two-stage furnace.” (D.I. 402 at 575:19-588:17; PTX734)

Henze testified that a set of instructions “is optimal because it is best-suited for the combination of systems that we just learned is connected to the system.” As to the court’s claim construction, he explained that “what you see here is for a given combination of units, . . . this particular strategy is adopted each and every time there’s a need for heating or cooling. And it is presumably the best-suited strategy for that combination of systems.” He further explained that the strategy is “predetermined,”

because “[w]hen the configuration process is complete, no other strategy is executed, and it is residing in memory on the . . . central control.” (D.I. 402 at 587:18-588:17; D.I. 403 at 619:2-620:12)

Henze pointed to pages in the CTK01 manual which recited that “[t]he touchscreen control is the command center of the communicating HVAC system” and described the auto-configuration process whereby the thermostat is searching for the indoor and outdoor units; the CTK02 manual reciting “automatically identifying the communicating equipment installed and configure for the equipment as required;” and the CTK03 manual reciting “the thermostat will automatically identify the ComfortNet communicating equipment.” (D.I. 403 at 614:13-616:15) Turning back to the source code, Henze pulled out lines of code to create a “set of instructions for the two-stage furnace with two-stage heat pump combination” and testified that in the same way there would be “a stack of control strategies that would be available.” These are the plurality of optimal control strategies for the various combinations of units. (D.I. 403 at 620:4-19) He testified that the CTK02 engineering specification was sufficient to show that the claim limitations were met, but the source code confirmed his analysis. Henze explained that he used the same process to review the CTK01 and the CTK03 engineering specifications, which indicated that they were performing the same determining, storing and selecting and that the CTK01 can auto-configure different combinations of units and configurations. (D.I. 403 at 616:22-625:1; PTX734; PTX926)

As to the limitation, “wherein said indoor unit is one of a furnace and a heater/fan combination,” Henze testified that the indoor unit in the ComfortNet system is either a furnace or a heater/fan combination. Moreover, he explained that the outdoor unit in the

ComfortNet system meets the last piece of claim 6 (that the outdoor unit is one of an AC and a heat pump). Henze concluded that the ComfortNet system using a CTK thermostat infringes claims 6. As to claim 7, the central control is in the thermostat, thus, mounted on a unit other than the indoor and outdoor unit. Claim 8 specifically calls for the control to be in the thermostat, which corresponds to the location of the control in the ComfortNet system. Henze concluded that claim 8 was infringed by the ComfortNet system. Henze testified that claim 13 required that “characteristic information collected from the indoor and outdoor unit comes to the central control over [a] single data bus.” Applying the court’s claim construction and relying on the condensing unit installation service reference, Henze concluded that “the indoor unit, outdoor unit and the thermostat communicate digitally with one another, . . . a two-way communicating path.” Henze stated that Vogel’s testimony confirmed that “the units are connected, not separately, but via a common . . . data bus.” Henze concluded that the ComfortNet system infringed claim 13. (D.I. 403 at 625:16-629:23)

On cross-examination, Henze admitted that the term “optimal control strategy” was not in the comments of the source code. When asked whether the reason was “that the people who wrote that source code did not think they were writing optimal control strategies or optimal anything,” he responded “[d]o you . . . think [the engineers] intended to write anything but the best of the industry’s known strategies for a combination?” and “[d]o you think the engineers at Emerson or Honeywell would intentionally program mediocre strategies and label them as mediocre.” (D.I. 403 at 638:12-639:3) Goodman’s counsel attempted to set up a hypothetical based on the Academy Awards regarding the control strategies. At sidebar, the court reminded

Goodman's counsel that the focus of the claim construction was on the predetermined nature of the strategy, not the ultimate result and, therefore, the attempted hypothetical was contrary to the spirit of the claim construction and would not be allowed. (D.I. 403 at 653:25-657:8) After Carrier's counsel objected to the admission of U.S. Patent No. 7,894,943 as being related to the best-suited issue, Goodman's counsel did not pursue the line of questioning. (D.I. 403 at 658:22-659:21) Goodman's counsel then attempted to create a hypothetical involving using a combination of units in a cabin in Vermont and a mansion in Phoenix. The court questioned the purpose of the hypothetical and counsel chose to move on. (D.I. 403 at 660:25-662:4) Outside the presence of the jury, the court restated to the parties that, as explained in the summary judgment opinion, the focus was on the predetermined nature of the control strategy. (D.I. 403 at 663:12-14)

Henze agreed that his infringement opinions were based on a number of sources, including the source code written by Emerson and Honeywell. (D.I. 403 at 639:4-14) He admitted Goodman did not have access to the source code. (D.I. 403 at 640:5-11) Henze conceded that Emerson and Honeywell could not have copied the communication protocols from Carrier. (D.I. 403 at 643:8-24) He agreed that the CTK01 and CTK02 use slightly different source code to achieve the "same thing on the microprocessor" (D.I. 403 at 649:14-22) and that the CTK03 source code was written by Honeywell and was "very different" (D.I. 403 at 649:23-650:5). Henze agreed that the source code contained multiple "if" statements, some of which related to the identification or the determining part of the claims construction. Henze did not agree that the language requiring a plurality of control algorithms is met "by code that goes to one if statement in one instance that would be one control strategy, and if it goes to

another if statement in another instance, that would be another control strategy.” (D.I. 403 at 666:4-667:4) He agreed with the description of a decision tree provided by Goodman’s counsel, which have some branches of code that execute for a certain combination of units. (D.I. 403 at 667:12-668:8) Henze was asked the following:

Q. All right. Now, would you agree with me that one thing that the selecting language of that patent does not cover, it absolutely cannot cover an algorithm or control strategy that simply receives values for its input variables. That’s not what that claim covers in your view?

A. Would you mind paraphrasing that?

Q. Okay. One thing that this claim doesn’t cover are algorithms or control strategies that simply receive values as input variables. That’s not what this claim could possibly cover?

A. That struck me a bit with the language. It is, upon the request of the configuration, the configuration response is parsed into individual pieces. Those are then used to make a decision on whether to go, whether to adopt the blue branch combination or the red branch combination or the green branch combination you’ve used to show.

Q. Okay. And is that in your view different from an algorithm or control strategy that simply receives values as an input variable?

A. I’m, of course, stuck still with that question.

Q. Fair enough. So returning to our tree here?

(D.I. 403 at 669:14-670:10) Using a publication by Henze involving using realtime weather data to inform a model predictive control strategy using if/then conditions, Goodman’s counsel asked whether this would be one strategy or multiple strategies. Henze responded “[i]t’s an effort to make the strategy robust against missing data.” (D.I. 403 at 675:1-676:25)

Goodman’s counsel objected to the admission of PTX793 (the condensing unit installation service reference) and the related testimony. (D.I. 403 at 741:23-742:4)

Goodman then moved for judgment as a matter of law on direct and induced infringement, arguing in part that Henze did not testify consistently with his report, instead, he compared bits and pieces of the thermostats to the claims. (D.I. 403 at 742:25, 742:15-749:21) The parties discussed with the court Henze's reliance "on source code to demonstrate infringement" (*id.* at 750:17), but "on some system[-]wide nebulous information" (*id.* at 750:17) when talking about induced infringement. (*id.* at 750:17-19)

2. Goodman's evidence

Vogel testified¹⁴ that Emerson's work evolved from Varitech messages to ClimateTalk messages. Varitech was not an open standard. ClimateTalk was an open standard, i.e., shared to anyone in the community who joins the ClimateTalk alliance, which was made up of a number of companies. For example, Goodman and Rheem use the ClimateTalk protocol. (D.I. 403 at 787:3-788:18; DTX10) Vogel described that the 1F99, a touchscreen thermostat, was not capable of becoming the network coordinator; however, every other device (air handler, furnace control, the outdoor unit) in that system was so capable. (D.I. 403 at 788:19-789:2) Vogel explained the steps taken by the coordinator to satisfy a request: the coordinator polls the devices sending out a request to receive messages; the thermostat communicates the set point change calling for heat; the coordinator goes through the devices capable of providing heat and then routes the heat message; the response is routed back to the coordinator and then the coordinator routes the message back to the thermostat. "[T]he overall effect is that the message is routed to the coordinator, to the device, and then the response is routed

¹⁴ Referencing DTX178 and DTX382.

back to the coordinator and back to the requesting device.” (D.I. 403 at 789:3-790:12) Vogel also provided an example where “commands from the outdoor unit will go to the indoor unit to control any operation of the indoor unit.” He testified that Emerson closely guarded its code and did not provide it to Goodman. (D.I. 403 at 790:13-791:12) An open protocol allows more flexibility: A customer can buy a thermostat from one company and an air conditioner from another, for example, a Goodman ComfortNet thermostat used with a Rheem indoor and outdoor unit. (D.I. 403 at 794:5-21; 798:1-5) The ClimateTalk protocol was set up to be a distributed control. (D.I. 403 at 796:7-11) Vogel was asked the following:

Q. You mentioned a defrost feature earlier . . . where . . . the outdoor unit has to stop providing a heating function for the home and calls for the heat from the indoor units . . . [and i]n that situation, the outdoor unit hasn’t made a decision or determined that the house needs heating. The thermostat decided that. Fair?

A. No, the outdoor unit itself made the determination it needed to defrost.

(D.I. 403 at 797:15-25) Vogel testified that only one decision tree is used to determine where to send information. (D.I. 403 at 800:21-801:4)

Rolf Strand (“Strand”), an engineer with Honeywell who worked on the CTK03 thermostat, testified¹⁵ that the ClimateTalk protocol is “used to communicate between a thermostat, an indoor furnace or air handler and [an] outdoor air conditioner and a few other devices in the system.” (D.I. 403 at 805:8-14) Strand explained the priority device routing control in the CTK03:

In CTK03 it sends one of those commands, heat, cool, fan, emergency, defrost or aux[i]liary heat. Those commands are sent to the [integrated furnace control (“IFC”)], and then the IFC actually looks at the system and says, are any of these other devices installed? And if they

¹⁵ Referencing DTX175.

are, it chooses to send the command on to that system based on the priority list.

(D.I. 403 at 820:19-820:24; DTX178 at 20) For example, the heat command is processed as follows:

So that central box called network coordinator, that's a software process that exists inside the IFC in the [furnace]. And it sends requests to the thermostat to say do you have any information you would like to send me.

And then the . . . thermostat might send out, I would like to have some heat, because the house needs to be heated.

The [network] coordinator function receives that request, consults the priority array list to see which systems are installed. In this system, there's a heat pump controller and integrated furnace control.

Next, it would route that message to the heat pump control rather than the integrated furnace control.

(D.I. 403 at 819:16-821:20) If there were no heat pump control available, Strand testified that "it would be routed to the integrated furnace control instead," with the decision being made "in the network coordinator which resides in the integrated first control." (D.I. 403 at 821:21-822:2) Moreover, he stated that the control strategy in the CTK03 is "just a digital simulation of what goes on in that mechanical thermostat" and agreed that "Honeywell has been doing [this simulation] since 1950." (D.I. 403 at 822:6-23)

Hudson testified that he and other engineers wrote the application software for CTK03. (D.I. 403 at 832:17-24) He considers the CTK03 to be a distributed control device. Responding to a hypothetical, Hudson agreed that the "algorithm or logic which would be used to operate a two-stage Goodman furnace and the CTK03 is the exact same logic or algorithm which would be accessed to operate a two-stage Trane furnace [and a CTK03]." (D.I. 403 at 833:11-834:11) Hudson explained that the CTK03 communicates only with the network coordinator. It does not communicate with the

devices on the network, unless one of the devices is the network coordinator. Hudson testified that the thermostat is not capable of being a network coordinator. (D.I. 403 at 835:17-836:24) “The decision that the thermostat makes in the control algorithm to turn a heating stage on or off is identical []regardless of the type of equipment [present]. There are variables, but that is not one of them.” (D.I. 403 at 837:16-20) Hudson also explained that the control of defrost is not done by CTK03. (D.I. 403 at 838:11-13)

On cross examination, Dr. Douglas Scott Notaro (“Notaro”), a principal controls engineer at Goodman, testified¹⁶ that ClimateTalk is a distributed control because the network coordinator can move around in the equipment, but cannot be located in the thermostat. Referring to a marketing specification for the CTK03, he concluded that the thermostat does not become the network coordinator or have network coordinator capability. Using two examples of systems, Notaro illustrated “that the same message that comes from the thermostat in one instance gets routed outside and in the other instance gets routed inside, and that shows that the network coordinator has intelligence to it and it makes decisions.” (D.I. 403 at 875:15-19, 871:22-876:24, 877:9-19; DTX173; DTX178) Notaro read from a ClimateTalk Application Profile, which stated that the “thermostat shall transmit a heat demand control command to the furnace.” (D.I. 404 at 944:13-18; DTX179) He admitted that Goodman has the set of rules for the software, so it has the knowledge of “how the communications happen[,] . . . what communications are sent and where they’re sent to.” He agreed that no matter where the network coordinator is, the thermostat, the indoor unit, and the outdoor unit are each capable of sending and receiving information. He also agreed that the messages are

¹⁶ Referencing DTX179, DTX458, and DTX460.

sent over a data bus and some messages include certain information (number of stages and possible airflow) about the indoor and outdoor units. (D.I. 404 at 946:8-947:20) In his opinion, the actual information is being transmitted to the thermostat or indoor and outdoor unit from the network coordinator. In response to a hypothetical, he agreed that if a call is placed he would be communicating with the Verizon network, not with the person. (D.I. 404 at 949:21-23) He agreed that, according to Emerson, the thermostat transmits heat and cool control commands. (D.I. 404 at 950:11-951:7) On redirect, Notaro explained that engineers may speak to each other differently or more technically than with lay people. (D.I. 404 at 956:24-957:17)

Dr. David Auslander (“Auslander”), Goodman’s expert, testified as follows regarding non-infringement. For claim 6, Auslander acknowledged the court’s constructions of “central control” and “optimal control strategies.” He explained (with reference to figure 1 of the patent) that the patent labeled three different types of devices – indoor, outdoor and ventilation devices. The patent points out “the four control strategies.” Auslander testified that ClimateTalk uses a generic code. (D.I. 404 at 996:2-999:22) For example, the combination of Goodman units, “the GMVC95 furnace connected to a DXC616 outdoor heat pump,” uses the same stored code as the combination of the thermostat in the same indoor unit with a different Goodman outdoor unit, model DSXC18. (D.I. 404 at 999:25-1000:17) The CTK thermostats will also work with Rheem indoor and outdoor units using the same code as with like Goodman units. Auslander agreed with Hudson’s testimony that the CTK thermostats do not store optimal control strategies. Auslander testified that each of the CTK thermostats operates in the same manner. As to the determining step, Auslander explained that

there are a number of variables that must be set manually, including the DIP switches, therefore, the CTK thermostats do not “determine an optimal control strategy.” He stated that this conclusion was consistent with Hudson’s testimony. (D.I. 404 at 1000:18-1006:2) As to the selecting limitation, Auslander explained that the patent uses “characteristic information drawn from . . . this combination of units . . . and that characteristic information is then used to select one of these . . . algorithms.” Looking at figure 1, the patent illustrates different control strategies for different combinations of units. According to Auslander, the CTK thermostats do not operate in this way. (D.I. 404 at 1006:3-1008:4) Looking at the source code for the CTK02 thermostats, he explained that the basic thermal control calculations are done without the use of characteristic information and used to determine exactly what kind of heat and cool is needed to meet the temperature settings on the thermostat. (D.I. 1010:15-1013:18) He continued:

So up to the time that these functions are called and the program splits off into these four different functions, heat load on, heat load off, cool load on, cool load off, no characteristic information has been [used] at all. Inside these functions, then, the characteristic information is scattered throughout the function so that they can properly deliver whatever kind of load on or load off is required and deliver it appropriately for whatever units are installed.

(D.I. 404 at 1013:18-1014:2) Auslander concluded that the “organization of the software is entirely different from what is called for in the patent.” Therefore, the “selecting” limitation is not met. (D.I. 404 at 1014:5-16; DTX403) He testified that Goodman’s code was generic and if one “look[s] inside the heat load on, heat load off functions, which is where the characteristic information is found, [one] see[s] that only a minimal amount of characteristic information is used.” (D.I. 404 at 1014:19-22) Looking at a

section of code from the CTK01 thermostat, Auslander opined that it had “almost exactly the same structure” as the other [CTK02] code and “shows . . . that the code is not organized according to the way that the patent requires,” as it relates to the storing and selecting steps. The Honeywell code for the CTK03 “has the same sort of structure in which the control calculation is done and then the characteristic information is scattered throughout the code.” He concluded that none of the CTK thermostats meet the storing, determining, and selecting limitations of claim 6. (D.I. 404 at 1018:20-1020:13; DTX399) Auslander opined that the network coordinator resided in either the indoor or outdoor unit. He explained that for the CTK03, the receiving user goes into the thermostat and the “receiving information from HVAC units and the communicating control signals to HVAC units” could be either in the indoor or outdoor unit. This is the same for the CTK02. (D.I. 404 at 1024:3-1025:22)

On cross-examination, Auslander agreed that in his opinion the four limitations – central control, storing, selecting, and determining were not met by the ComfortNet system. (D.I. 404 at 1121:1-10) Auslander admitted that information about the HVAC unit leaves the HVAC unit and is ultimately received at the thermostat. (D.I. 404 at 1128:16-1129:1) He agreed that the communicating control signals to the HVAC unit are capable of originating at the thermostat in all three of Goodman’s systems and that those control signals are ultimately received in all of Goodman’s systems by HVAC units. (D.I. 404 at 1131:13-20) He also agreed that the network coordinator can reside in an indoor unit or an outdoor unit and when it does so the information comes directly from the unit to the thermostat in Goodman’s system, adding “in terms of pieces of

equipment.” (D.I. 404 at 1135:5-17) He stated that “the characteristic information is used somewhere in the code for all three systems” (D.I. 404 at 1139:3-8)

In closing, Goodman’s counsel stated that Auslander’s testimony regarding the Rheem units was brought up to illustrate the lack of multiple control strategies under the court’s construction, as the thermostat uses the same code for Goodman’s units. Strand testified that the Honeywell system uses a digital representation of the same control strategy that it implemented after World War II. (D.I. 405 at 1369:15-1371:11) Counsel argued that the control strategy only “get[s] you partway,” per Auslander’s explanation that the accused thermostats do not meet the determining language because the installer can make a manual adjustment. (D.I. 405 at 1376:13-1377:3) After Goodman’s closing, Carrier’s counsel objected to Goodman’s use of argument relating to “auto-configuration” and the need for modifications because the system might not be best suited for the home. (D.I. 405 at 1398:23-1399:13)

C. Analysis¹⁷

1. Claim construction of “optimal control strategy”

For the limitation “optimal control strategy,” the court explained that the central control “has available to it optimum operational strategies based upon the combination of several units that have reported” and “can identify and utilize appropriate controls for the particular combination.” (1:56-58, 3:43-45) Moreover, the court cautioned that the parties were expected to present the claim construction to the jury consistently with any explanation or clarification provided by the court, even if such language was not

¹⁷ The court does not consider the parties’ citation to evidence not admitted, e.g., Henze’s declaration to the PTO and Carrier’s reliance on demonstratives.

included within the quotes. (D.I. 315 at 3-4, 6) In rejecting Goodman’s argument for indefiniteness, the court emphasized that the construction and Henze’s explanation for “optimal control strategy” focused on the “predetermined” nature of such strategy. Moreover, one of ordinary skill in the art is apprised with reasonable certainty that the claims focus on whether a manufacturer has predetermined control strategies that it deems optimal for a given set of HVAC units, that is, the central control would select the optimal control strategy provided to it by the manufacturer. (D.I. 316 at 13-14)

The evidence summarized above shows that, at trial, Goodman tried repeatedly to focus this claim limitation on the “best-suited” aspect instead of the “predetermined” nature of the algorithm as required by the court. Concentrating again on the “best-suited” aspect in its briefing, Goodman argues that “Carrier’s expert offered conclusory allegations not linked to any particular thermostat, and pointed to nothing in the code identifying a ‘best-suited’ ‘strategy.’” (D.I. 397 at 8) The court declines to reconsider its claim construction¹⁸ and concludes that Henze properly applied the predetermined nature of such construction in testifying that a particular strategy is adopted for a given combination of units.

2. Particularized evidence

Goodman argues that Carrier’s witnesses did not address all of the limitations of at least one asserted claim, i.e., Henze “did not present particularized evidence that any specific accused thermostat combined with an identified indoor unit and outdoor unit would meet every limitation.”¹⁹ (D.I. 397 at 3) Henze testified that the ComfortNet

¹⁸ Or the corresponding decision that the claim limitation is not indefinite.

¹⁹ Noting that “[t]he only evidence of a specific complete ComfortNet System in the record was the mention of one installed in Mr. Fisher’s home.” (D.I. 397 at 4)

system included a family of outdoor units, indoor units, and three CTK thermostats. PTX60 states that the "ComfortNet™ Communicating System is compatible with a wide variety of Goodman® and Amana® brand condensing units and gas furnaces" and lists certain model numbers for air conditioners/heat pumps, gas furnaces, and air handlers/blowers. Referring to this exhibit, Henze testified that each of the thermostats may operate with each of the indoor and outdoor units. Moreover, he stated that he analyzed all of the different combinations and did not find any material differences. At least for the model numbers listed on the admitted exhibits, the court concludes that Henze sufficiently identified the system and its component units.

As to the indoor and outdoor units, Henze testified that for a certain list of indoor and outdoor units, each unit had a control board. Fisher and Vogel testified that certain characteristic information was preprogrammed into the indoor and outdoor units, and the units reported certain of the characteristics. Henze concluded that the indoor and outdoor unit claim limitation was met. Such testimony is sufficient.

For the central control limitation, Henze concentrated his testimony on the CTK02 thermostat and separated out portions of code (responsive to if/then statements regarding which units are present in the system) to put together a control strategy. Although Henze conceded that the CTK03 source code was "very different," he testified that he reviewed the CTK03 engineering specification and it performed the determining, storing and selecting requirements. Fisher testified that the core features were the same in the three CTK thermostats and that they behaved similarly. Auslander also testified that the three CTK thermostats operated in the same manner. Having reviewed

the record at bar, the court concludes that Carrier presented evidence of the “determining,” “storing,” and “selecting” steps.²⁰

3. Plurality of optimal control strategies

For the CTK03 thermostat, Hudson testified that the source code is a “logic tree” used by the thermostat to run the system. It receives configuration information for the equipment and auto-configures. Vogel testified that the CTK01 and 02 thermostats use a “decision tree” to run the system and to make decisions after determining what units are connected. The thermostat receives a configuration response from each unit. Henze agreed that the code was a “decision tree,” with branches of code that execute for a certain combination of units. He explained that the thermostat uses configuration responses from the units to respond to if/then statements, after which the thermostat executes lines of code based on those responses. Henze demonstrated this by selecting the different lines of code, i.e., different branches of the decision tree, to arrive at a control strategy for a specific combination of units. According to Henze, such a strategy is “stored” or “selected.”

The parties’ dispute is whether multiple “optimal control strategies” may be found in a single decision tree by agglomeration of “tree branches.” The court construed “optimal control strategy” to mean “a predetermined control strategy best-suited to operate the system for a given combination of units.” The “predetermined” nature of the strategy is reflected in the patent specification – the central control “has available to it optimum operational strategies based upon the combination of several units that have

²⁰ For the same reasons, Goodman’s motion for a new trial based on the same arguments is denied.

reported” and “can identify and utilize appropriate controls for the particular combination.” (1:56-58, 3:43-45) The evidence reasonably supports the jury’s conclusion, applying the court’s construction, that multiple optimal control strategies are present in the decision tree.²¹

4. Central control

Goodman argues that the network coordinator receives information from and communicates with the HVAC units, whereas the claim language requires that the “central control,” here the thermostat, “directly” perform this function. Goodman adds that, for systems with the CTK01 and 03 thermostats, the network coordinator cannot be on the thermostat and Carrier has no evidence that it was ever on the CTK02 thermostat. (D.I. 420 at 7) The court construed “central control” as “a device capable of receiving user desired settings, receiving information from HVAC units, and communicating control signals to HVAC units.” The court specifically declined to limit “central control” to the preferred embodiment in which the central control is both a bus master and a system master, as suggested by Goodman. (D.I. 315 at 2-3) The specification explains that the various HVAC units “communicate with the [central control],” the microprocessors of the various HVAC units “receive instructions from the [central control],” and the central control “sends instruction to achieve temperature, etc. as requested by a user through the thermostat.” (2:44-51)

Vogel testified that the network coordinator (not the thermostat) communicates with the various devices. He also explained that a certain touchscreen thermostat was

²¹ Therefore, the court does not reach Goodman’s request for a new trial based on the same evidence.

not capable of becoming the network coordinator. However, he also testified that the thermostat receives the configuration response and a status response from each unit. Further, the thermostat can then go through the decision tree in the source code. Hudson testified that the CTK03 thermostat is not capable of being a network coordinator. However, he explained that the thermostat receives configuration information for the equipment and agreed that the thermostat goes through the logic tree to run the system. Notaro agreed that no matter where the network coordinator is, the thermostat, the indoor unit, and the outdoor unit are each capable of sending and receiving information. Henze testified that the thermostats meet the requirements of the “central control” limitation.²²

The various witnesses testified about a network coordinator and answered questions regarding what the “thermostat” does. Using this testimony and the court’s provided construction, the jury’s conclusion that the thermostats satisfy the various requirements of the “central control” limitation is reasonable.²³

V. MOTION FOR A NEW TRIAL

A. Arguments to the Jury

Goodman alleges that the jury’s verdict finding the patent valid and infringed was a result of Carrier’s presentation of “irrelevant and highly prejudicial emotional issues” at trial. (D.I. 397 at 17) Specifically, Goodman alleges that Carrier made improper

²² While Goodman objects to Henze’s reliance on the manual for condensing units (PTX793), such document is listed in the materials considered in Henze’s report.

²³ For the same reasons, Goodman’s motion for a new trial based on the same arguments is denied.

arguments to the jury concerning indemnity, presented a moving target of “copying,” and compared invalidating a patent to the termination of parental rights. (*Id.* at 17-22)

1. Indemnification

To introduce the issue,²⁴ Goodman points the court to Clark’s deposition testimony, identifying a “standard purchase order” with “kind of some statements on the back that [Goodman] uses with all [its] transactions.” (D.I. 399, ex. 2 at 118:11-119:2) Clark also testified that White-Rodgers and Emerson declined to enter into a purchase agreement that had an indemnity provision. (D.I. 399, ex. 2 at 203:8-13) During trial, Fisher testified that the vendor (Emerson or Honeywell) would have been responsible for searching for patents. In 2009, Emerson promoted the circuitry for the ComfortNet Communicating System, for which Emerson designed the control boards, the control and the motor. Fisher did not know if Goodman deliberately or accidentally did not search for patents. Fisher admitted that a conceptual design report for the “4-wire communication project at Goodman” stated “assess the intellectual property issues;” however, those lines were marked as excluded. (D.I. 402 at 387:2-3; 390:13-395:11) Carrier’s counsel asked Clark if Goodman had a “deal in [its] purchase order and a standard term that if the product you make or sell is infringing, well, maybe Emerson has to pay for that and not” Goodman. (D.I. 402 at 477:2-5) The court overruled Goodman’s objection that the question was irrelevant as it related to indemnification.

²⁴ The court notes that the pre-trial order requested that “Carrier . . . be precluded from offering evidence, testimony or argument regarding indemnity between Goodman and either of its third-party suppliers, Emerson Electric Company or Honeywell International, Incorporated;” however, to the best of the court’s knowledge, such issue was not raised at the pre-trial conference or at any point before the first objection during trial. (D.I. 309, ex. 15 at ¶ 9)

(D.I. 402 at 477:6-15) Clark then testified that the standard conditions and terms (on the back of Goodman's purchase order) included an indemnification clause from Emerson for goods furnished by Emerson alone or in combination with other goods not furnished by Emerson. Clark testified that he believed Goodman "did look for patents" and disagreed with the characterization that Goodman would not look for patents because Emerson would be responsible. (D.I. 402 at 477:17-480:24; PTX40) Looking at a Goodman document, Clark testified that for the CTK02, Goodman did not assess the intellectual property, because Emerson, the supplier was supposed to do so. (D.I. 402 at 482:25-483:23)

During Carrier's closing rebuttal, counsel argued Goodman knew of the infringement, but put the responsibility on Emerson who built the central control for Goodman. (D.I. 405 at 1410:15-1412:1) Specifically,

[Goodman] could have asked and found out [about patents] and they didn't. It's willful blindness. You can't put your head in the sand. Not asking. Is that a defense to infringement, I didn't ask? And the reason you may remember . . . why they didn't ask is because they just don't care, because you heard with Mr. Clark that when they entered a contract with Emerson, they tried to put the exposure on Emerson. For inducement, this is evidence of why they did what they did and what they knew. If Emerson is going to pay, what's the harm here? I can get in the marketplace and make more money and I've got something in my back pocket. I don't have to pay for that. Emerson has to pay for it. At some point, maybe at Goodman the desk is empty, but at some point, you have to take responsibility.

(D.I. 405 at 1412:2-18) In a sidebar, Carrier's counsel argued that Goodman outsourced the patent search process to Emerson and the purchase order containing the indemnity statement was in evidence, thus, properly referred to in closing. Goodman's counsel responded that Emerson and Goodman did not agree on the application of the indemnity clause, the clause has limitations and should not have been

used to suggest that Emerson would bear any and all responsibility if the jury found against Goodman. (D.I. 1414:11-1427:1) The court stated that “it is not my practice to allow inferences that are not consistent with the truth to influence the jury.” (D.I. 1418:8-19) Moreover, “if I had realized what was going on, I would have thought this was a more important issue at the time than it is, because to have a standard form that you sign with respect to every product and change it into a motivation to ignore [intellectual property], that’s a pretty big stretch.” (D.I. 405 at 1423:3-13) After further discussion, the court declined to issue a curative instruction as there was “no good way to fix” the issue, partly because of Goodman’s “position that the key to infringement is in Emerson’s hands,” making Emerson part of the case. (D.I. 405 at 1425:4-1426:25) The court instructed the jury on direct infringement in pertinent part: “Goodman’s knowledge or intent to infringe is not relevant to whether Goodman directly infringes the asserted claims, but is relevant to whether Goodman induces customers to infringe.” (D.I. 405 at 1441:14-17)

Federal Rule of Evidence 411 states that “[e]vidence that a person was or was not insured against liability is not admissible to prove whether the person acted negligently or otherwise wrongfully. But the court may admit this evidence for another purpose, such as proving a witness’s bias or prejudice or proving agency, ownership, or control.” Fed. R. Evid. 411. The Federal Circuit has explained that “an indemnification agreement will generally not establish an intent to induce infringement, but . . . such intent can be inferred when the primary purpose is to overcome the deterrent effect that the patent laws have on would-be infringers.” *MEMC Elec. Materials, Inc. v. Mitsubishi Materials Silicon Corp.*, 420 F.3d 1369, 1378 (Fed. Cir. 2005) (citing *Hewlett–Packard*

Co. v. Bausch & Lomb, Inc., 909 F.2d 1464, 1470 (Fed. Cir. 1990)). In the case at bar, the evidence does not show that Goodman continued to sell its products after obtaining indemnification or sought to insure itself against liability via indemnification from Emerson. *Jurgens v. McKasy*, 927 F.2d 1552, 1562 (Fed.Cir.1991) (affirming award of increased damages for infringement where, among other things, the infringer continued to sell accused products after obtaining an indemnity agreement); *Church & Dwight Co. v. Abbott Labs.*, Civ. No. 05-2142 GEB JJH, 2008 WL 2565349, at *10 (D.N.J. June 24, 2008) (affirming jury's verdict of willful infringement where, among other things, the infringer "sought to 'insure' itself against liability exposure via indemnifications"). Instead, the indemnification issue came up in connection with the use of a standard purchase order unrelated to the issues of patents or infringement. Although Goodman presented "the key to infringement" as being in Emerson's hands, Carrier's counsel exploited the evidence of a standard purchase order indemnification clause in his rebuttal argument. The words chosen by counsel (and the last to be heard by the jury) compound the prejudice. The court grants the motion for a new trial as to indirect infringement.²⁵

2. Copying and burden of proof

During opening, Carrier's counsel stated "[t]his is a case about two companies, two different companies. One, a leader, and one a follower. One, an innovator, and one an imitator." (D.I. 401 at 117:25-118:2) Counsel argued that Carrier sought patent protection "because if we don't, we're just teaching everybody else how to do it and

²⁵ As such, the court does not reach Carrier's additional arguments regarding a new trial or Goodman's motion for JMOL on this issue.

they're just going to copy us." (D.I. 401 at 132:5-8) Thereafter, during a lengthy sidebar, the parties agreed to take the issue of copying out of the case. (D.I. 402 at 343:24-346:9; 362:5-25) The parties also argued willful blindness and inducement to the court. (D.I. 402 at 352:24-358:11) Carrier's counsel maintained that Goodman's knowledge of Carrier's system and of the project leading to the '004 patent (as well as Carrier's patent strategy and history of innovation)²⁶ was enough evidence to show that Goodman made a choice not to look into patents when designing its system and, therefore, was evidence of willful blindness and inducement. (D.I. 402 at 352:24-358:11)

In closing, Carrier's counsel reminded the jury that Clark saw Carrier's Infinity System press release and sent it around at Goodman (D.I. 405 at 1320:7-9); Goodman acquired an Infinity communicating system and tore it down (D.I. 405 at 1324:1-14); and Clark took documents from Carrier (D.I. 405 at 1328:20-1329:3). Rather than relate this evidence to willful blindness, as forecast above, Carrier's counsel instead related it to infringement: "If Goodman didn't infringe, why did it spend so much time comparing Goodman's ComfortNet system to Carrier's Infinity [S]ystem in open protocols . . . ? Why would they have done that if they truly didn't infringe?" (D.I. 405 at 1346:4-9)

Carrier's counsel also stated during closing that the clear and convincing standard for invalidity is the "exact same standard in this State [used] . . . to terminate someone's parental rights, meaning that that level of proof is required to take away someone's kid." Carriers' counsel then argued that "you have to have an abiding conviction, a clear and convincing proof, that this patent should be taken away from Mr.

²⁶ Knowledge obtained thru Clark.

Shah.” (D.I. 405 at 1343:12-18) At sidebar, the court acknowledged that such a comparison was “dramatic . . . and also very emotional.” (D.I. 405 at 1359:22-23) Carrier’s counsel argued that such comparison had been used against him before. (D.I. 405 at 1360:9-10) After listening to the sidebar arguments, the court read an instruction to the jury:

Members of the jury, before defendant presents its closing argument, I want to make sure that we’re all operating within the same framework. In terms of the issues that you are to decide and the burdens of proof, first, you are to disregard any description of defendants’ burden of clear and convincing evidence other than those provided in your jury instructions. Second, there is no issue in this case directed to copying. I will instruct you as to the law on induced infringement.

(D.I. 405 at 1362:4-1362:14) The question presented is whether, in Carrier’s closing argument, counsel simply approached the line drawn by the court (on the issue of copying) or by the traditional protocol practiced in this court (in describing the burden of proof), or crossed it? Despite the curative instruction, the trial record was complex enough and, more significantly, balanced²⁷ enough to make any gratuitous argument sufficient to tip the balance for the wrong reason. The court reluctantly concludes that a new trial is warranted on the basis of these arguments.

B. Infringement Arguments

1. Henze’s testimony

²⁷ And by “balance,” the court refers to the fact that both parties were aggressive litigators to the detriment of the trial record. Moreover, as reflected by the review of the trial record (and the number of sidebars), the evidence presented by both parties resulted in a most confusing agglomeration of testimony.

Goodman argues that Henze testified outside the scope of his report,²⁸ when he opined that the limitation “said central control storing a plurality of optimal control strategies” was met by a series of “if/then” statements (tests on conditions asking if something is true) are used. If the condition is true, a certain portion of the code applies. (D.I. 402, 572:14-582:9) Goodman avers that Henze’s testimony was designed to align with Vogel’s testimony that the thermostat operates more like a decision tree, i.e., it determines what units are connected and then makes a decision. Vogel concluded that there were not “different control strategies.” (D.I. 402 at 527:13-528:7) Vogel explained that only one decision tree is used to determine where to send information. (D.I. 403 at 800:21-801:4)

Goodman points the court to a portion of Henze’s report concluding that “the ComfortNet thermostats infringe this claim element at least under the doctrine of equivalents[, because t]he differences, if any, between a plurality of separate computer code files each containing an optimal control strategy and a single computer code file containing a plurality of nested optimal control subroutines are insubstantial.” (D.I. 239, ex. 11 at ¶ 111) Contrary to Goodman’s argument, Henze’s testimony is within the scope of his report on direct infringement, which stated, in relevant part that:

Another way of arranging the code would be to have separate computer code files for each strategy. But since many subroutines are common between systems despite different system configurations, this would result in many copies of the same subroutines across the various computer code files. Thus, it is common practice to capture in a single computer code file a larger set of subroutines than are used for different system configurations. Either arrangement contains multiple control strategies, i.e., sets of instructions. Accordingly, the central control in each ComfortNet thermostat includes a plurality of optimal control strategies

²⁸ Such objection was properly made during trial. (D.I. 402 at 499:20-501:9; D.I. 403 at 741:23-742:4)

tailored to the nodes reporting on the system where an optimal control strategy is identified during auto-configuration.

(D.I. 239, ex. 11 at ¶ 110) The court denies the motion in this regard.

2. Plurality of optimal control strategies

Goodman argues that its algorithm operates the system based on input variables, therefore, such algorithm does not meet the “selecting” portion of the “central control” limitation as the choice of “optimal control strategy” is not based upon the particular characteristic information reported from a particular indoor and outdoor unit. Auslander testified (based on the source code for the CTK02 thermostat) that the basic thermal control calculations are done without the use of characteristic information and such calculations are used to determine exactly what kind of heat and cool is needed to meet the temperature settings on the thermostat. However, Auslander also testified that a minimal amount of characteristic information is used by the source code. Henze explained that the thermostats receive and use characteristic information from the units. Vogel and Hudson also testified that the thermostat received and used such information. Goodman’s singular argument does not support a conclusion that the jury’s verdict is against the great weight of the evidence. The motion for a new trial is denied in this regard.

C. Motions for Reargument²⁹

1. Standard

²⁹ While Goodman frames the following arguments as reasons for a new trial, such arguments are more properly considered as motions for reconsideration of the court’s decisions.

A motion for reconsideration is the “functional equivalent” of a motion to alter or amend judgment under Federal Rule of Civil Procedure 59(e). See *Jones v. Pittsburgh Nat’l Corp.*, 899 F.2d 1350, 1352 (3d Cir. 1990) (citing *Fed. Kemper Ins. Co. v. Rauscher*, 807 F.2d 345, 348 (3d Cir. 1986)). The standard for obtaining relief under Rule 59(e) is difficult to meet. The purpose of a motion for reconsideration is to “correct manifest errors of law or fact or to present newly discovered evidence.” *Max’s Seafood Cafe ex rel. Lou–Ann, Inc. v. Quinteros*, 176 F.3d 669, 677 (3d Cir. 1999). A court should exercise its discretion to alter or amend its judgment only if the movant demonstrates one of the following: (1) a change in the controlling law; (2) a need to correct a clear error of law or fact or to prevent manifest injustice; or (3) availability of new evidence not available when the judgment was granted. See *id.* A motion for reconsideration is not properly grounded on a request that a court rethink a decision already made and may not be used “as a means to argue new facts or issues that inexcusably were not presented to the court in the matter previously decided.” *Brambles USA, Inc. v. Blocker*, 735 F. Supp. 1239, 1240 (D. Del. 1990); see also *Glendon Energy Co. v. Borough of Glendon*, 836 F. Supp. 1109, 1122 (E.D. Pa. 1993).

2. Reexamination evidence

The court allowed the parties to present the fact of reexamination to the jury, but excluded several proffers of evidence by Goodman regarding reexamination. Specifically, the court excluded testimony regarding reexamination from Clark (D.I. 371 at 3); an opinion from an attorney regarding the reexamination status (pre-trial transcript at 45:13-49:14); and the argument that any “reexamination filings”³⁰ that Henze would

³⁰ Attaching a particular office action as an exhibit.

have considered in his analysis are proper fodder for cross-examination. (D.I. 377; D.I. 404 at 1142:23-1144:4) Goodman now argues that such decisions improperly prevented it from impeaching Henze regarding his infringement opinion, with a contradictory statement³¹ he made in a sworn declaration during reexamination. (D.I. 397 at 24, citing D.I. 171, ex. E at ¶ 79, an exhibit to Goodman’s claim construction answering brief) The court’s decisions were directed at specific uses for the reexamination. Although the court ruled (before and during trial) that Goodman could not cross-examine Henze on the general “filings” of the reexamination, it did not preclude Goodman from impeaching Henze with a specific declaration. Nor did Goodman raise such a precise request at trial.³²

Goodman also argues that the court’s decision to exclude such evidence prevented Goodman from fully cross-examining Henze regarding obviousness and, more specifically, motivation to combine. The court maintains its position that generally introducing reexamination “filings” at trial is more confusing than helpful to a jury, particularly when such “filings” are for the most part preliminary findings. Goodman’s motion is denied in this regard.

3. Exclusion of the Enviracom System

The court excluded presentation of the Enviracom System at trial, finding that the underlying evidence had not been fully vetted through discovery; the system was not clearly defined from the materials; and Auslander’s expert report did not offer a precise

³¹ “One of skill in the art would not interpret an algorithm receiving values for its input variables as selecting an algorithm. Thus, Hoon does not select an algorithm based on a combination of characteristics or equipment.”

³² Indeed, such declaration was not mentioned in Goodman’s bench brief regarding cross-examination (D.I. 377) discussed by the court at trial.

invalidity analysis. (D.I. 316 at 23-24; D.I. 371 at 2) At trial, the parties discussed with the court the admissibility of certain documents pertaining to the Enviracom System. (D.I. 401 at 109:11-115:25) Goodman's counsel presented an article to the court for review pointing out that:

The important portions of the article are in the abstract at the beginning, which refers to digital communications in residential HVAC applications, the Enviracom system. So it's a system which was developed. Robust communicating architecture that requires little processing or hardware overhead is easily expandable and is self-configuring.

(D.I. 401 at 184:8-14) The court stated that the Enviracom System "seem[ed] like an idea and not anything that happened." (D.I. 401 at 184:6-7, 19-21) Goodman's counsel clarified with the court that Strand was not to refer to the Enviracom System during his testimony. (D.I. 401 at 184:22-25) As the court considered the evidence related to the Enviracom System several times both pre-trial and during trial, the court declines to now reconsider the decision to exclude this evidence.

4. Anticipation evidence

Goodman submitted a proffer regarding its evidence of anticipation in view of the court's construction of "optimal control strategy" discussed above. Goodman explained what anticipatory references it would put in at trial and how Auslander's expert report supported such argument. (D.I. 328) The court rejected the proffer, finding among other things that the expert report was conclusory.³³ (D.I. 335 at 1) The court declines to revisit this decision.

5. Construction of "optimal control strategy"

³³ Goodman points the court to ¶ 88 of the Auslander's expert report arguing that such paragraph was omitted from Carrier's response. However, such paragraph was included in exhibit 1 to Goodman's proffer.

As discussed above,³⁴ the court provided claim constructions for the disputed limitations, including “optimal control strategy” to mean “a predetermined control strategy best-suited to operate the system for a given combination of units.” (D.I. 315 at 3-4; D.I. 316 at 13; D.I. 380 at 19) Goodman argues that it was denied the opportunity to explore with Henze and Strand that the control strategies were not “best-suited” for a given combination of units. (D.I. 397 at 26-27) This argument is again analogous to disagreeing with the court’s decision to focus such construction on the “predetermined” nature of the control strategies rather than the “best-suited” aspect. Indeed, for this reason, the court denied Goodman the opportunity to pursue such questioning at trial. The court declines to revisit claim construction or the subsequent decisions made at trial in this regard.³⁵

6. Other

Goodman requests that the court reconsider its denial of Goodman’s motion to file second amended answers issued June 19, 2014, three months before trial. (D.I. 303; D.I. 304) Goodman argues that the court’s decision was wrong and prevented Goodman from presenting evidence of inequitable conduct at trial. (D.I. 397 at 38-39) Goodman also argues that the jury instructions were incorrect, as they provided the jury with the court’s claim constructions (D.I. 315) rather than Goodman’s proposed constructions. (D.I. 172; D.I. 192) In other words, Goodman seeks to have the court

³⁴ *Supra*, IV.B.3.a. Claim construction of “optimal control strategy.”

³⁵ Goodman’s argument that the jury was not provided the court’s summary judgment opinion is of no moment, as the court’s cautionary language in the claim construction order makes clear that the onus is on the parties to present the construed limitations to the jury consistently with any explanation the court has provided, which would include the explanation in the summary judgment opinion.

reconsider a motion to amend and the claim construction order. The court declines to do so.

D. Obviousness

1. Standard

“A patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art.” 35 U.S.C. § 103(a). Obviousness is a question of law, which depends on underlying factual inquiries.

Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.

KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398, 406 (2007) (quoting *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966)).

“[A] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *KSR*, 550 U.S. at 418. Likewise, a defendant asserting obviousness in view of a combination of references has the burden to show that a person of ordinary skill in the relevant field had a reason to combine the elements in the manner claimed. *Id.* at 418-19. The Supreme Court has emphasized the need for courts to value “common sense” over “rigid preventative rules” in determining whether a motivation to combine existed. *Id.* at 419-20. “[A]ny need or problem known in the field of endeavor at the time of

invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.” *Id.* at 420. In addition to showing that a person of ordinary skill in the art would have had reason to attempt to make the composition or device, or carry out the claimed process, a defendant must also demonstrate that “such a person would have had a reasonable expectation of success in doing so.” *PharmaStem Therapeutics, Inc. v. ViaCell, Inc.*, 491 F.3d 1342, 1360 (Fed. Cir. 2007).

A combination of prior art elements may have been “obvious to try” where there existed “a design need or market pressure to solve a problem and there [were] a finite number of identified, predictable solutions” to it, and the pursuit of the “known options within [a person of ordinary skill in the art’s] technical grasp” leads to the anticipated success. *Id.* at 421. In this circumstance, “the fact that a combination was obvious to try might show that it was obvious under § 103.” *Id.*

“Because patents are presumed to be valid, see 35 U.S.C. § 282, an alleged infringer seeking to invalidate a patent on obviousness grounds must establish its obviousness by facts supported by clear and convincing evidence.” *Kao Corp. v. Unilever U.S., Inc.*, 441 F.3d 963, 968 (Fed. Cir. 2006) (citation omitted). In conjunction with this burden, the Federal Circuit has explained that,

[w]hen no prior art other than that which was considered by the PTO examiner is relied on by the attacker, he has the added burden of overcoming the deference that is due to a qualified government agency presumed to have properly done its job, which includes one or more examiners who are assumed to have some expertise in interpreting the references and to be familiar from their work with the level of skill in the art and whose duty it is to issue only valid patents.

PowerOasis, Inc. v. T-Mobile USA, Inc., 522 F.3d 1299, 1304 (Fed. Cir. 2008) (quoting *Am. Hoist & Derrick Co. v. Sowa & Sons*, 725 F.2d 1350, 1359 (Fed. Cir. 1984)).

A fact finder is required to consider secondary considerations, or objective indicia of nonobviousness, before reaching an obviousness determination, as a “check against hindsight bias.” See *In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.*, 676 F.3d 1063 (Fed. Cir. 2012). “Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.” *Graham*, 383 U.S. at 17-18.

Secondary considerations, such as commercial success, are “only significant if there is a nexus between the claimed invention and the commercial success.” *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1312 (Fed. Cir. 2006). “When a patentee can demonstrate commercial success, usually shown by significant sales in a relevant market, and that the successful product is the invention disclosed and claimed in the patent, it is presumed that the commercial success is due to the patented invention.” *Id.* (citing *J.T. Eaton & Co. v. Atlantic Paste & Glue Co.*, 106 F.3d 1563, 1571 (Fed. Cir. 1997); see also *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1130 (Fed. Cir. 2000) (stating the presumption that commercial success is due to the patented invention applies “if the marketed product embodies the claimed features, and is coextensive with them.”). Unclaimed features of the device or features known in the prior art may not form the basis for commercial success. See *Ormco Corp.*, 463 F.3d at 1312; see also *J.T. Eaton*, 106 F.3d at 1571 (“[T]he asserted commercial success of the product must be due to the merits of the claimed invention beyond what was readily available in the prior art.”) (citing *Richdel, Inc. v. Sunspool Corp.*, 714 F.2d 1573, 1580 (Fed. Cir. 1983)) (holding claims obvious despite purported showing of commercial

success when patentee failed to show that “such commercial success as its marketed system enjoyed was due to anything disclosed in the patent in suit which was not readily available in the prior art”). The patentee bears the burden of showing that a nexus exists between the claimed features of the invention and the objective evidence offered to show non-obviousness. See *WMS Gaming, Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1359 (Fed. Cir. 1999) (citing *Cable Elec. Prods., Inc. v. Genmark, Inc.*, 770 F.2d 1015, 1027 (Fed. Cir. 1985); *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988) (citing *Cable Elec. Prods.*, 770 F.2d at 1027).

2. Review of obviousness record

a. Goodman's evidence

Comparing claim 6 to what was present in the prior art and identifying auto-configuration, Auslander testified³⁶ that “an HVAC system comprising an indoor unit having a control” was routine in the art, for example, the Varitech system. The next element, “a central control,” using the court’s construction, is a notion that has been around a long time. “An outdoor unit having a control” was also well-known for several decades. The limitation, “central control communicating with said indoor and outdoor unit,” was known. The Varitech system met each one of these limitations. (DTX86-88) The last two limitations, “wherein said indoor unit is one of a furnace and a heater/fan combination” and “where the outdoor units either one of an air conditioner and heat pump” were both known in the art. The limitations “determining an optimal control strategy for said indoor and outdoor unit based upon reported characteristic

³⁶ Goodman’s briefing also cites to DTX1, 4, 6, 10, 21, 26, 32, 35, 39, 46, 48, 51, and 90-92.

information,” “said control storing a plurality of optimal control strategies,” and “selecting a particular one of said optimal control strategies” are from applicant-admitted prior art according to the patent. The limitations “operable to communicate characteristic information of said indoor control,” “operable to communicate characteristic information from the indoor and outdoor units,” and “said central control receiving said characteristic information from said indoor and outdoor unit” are part of auto-configuration and have been present in the art for a long time. (D.I. 404 at 1033:8-1040:8)

Auslander testified that auto-configuration was known in the art, pointing to the Bahel patent,³⁷ wherein “the system may be programmed to perform self-tests and self-configuration” (D.I. 404 at 1042:25-1043:2, 1041:6-1043:22; DTX95); the Matsumoto patent,³⁸ which “describes a process whereby information from exterior and interior units are used to set the system up, obviating the need to set[] the switches . . . resulting in a good installation process” (D.I. 404 at 1043:23-1045:10; DTX112); and the HVAC handbook³⁹ (*id.* at 1045:11-25; DTX157).

Auslander determined which of the claim elements were present in the prior art references and analyzed the motive to combine. He presented the combination of the Bahel patent with the HVAC handbook and the Matsumoto patent with applicant-admitted prior art found in the '004 patent.⁴⁰ Auslander described the Bahel patent as

³⁷ U.S. Patent No. 5,475,986.

³⁸ Japanese Patent No. JP 07-12392.

³⁹ Handbook of Heating, Ventilation, and Air Conditioning (Jan F. Kreider, Ph.D., P.E. ed., 2001).

⁴⁰ According to Auslander, the person of ordinary skill in the art is one “with a Bachelor's degree in engineering and approximately two years of experience with HVAC control systems, plus experience and education or background in network, networking for controls and embedded control computing” or “with some education, but not a Bachelor's degree, and ten years [of] experience, along with similar networking and

providing a “primary disclosure” of “a four-wire communication system used for a networking of HVAC components and networking those components together.” He explained “that the networking technology is really the enabling technology for self-configuration.” He testified that the Varitech technology demonstrated the use of networking technology. (D.I. 404 at 1050:1-1055:14)

Auslander further explained that the HVAC handbook is readily available in the industry and describes what the state of the art is, therefore, would be the first place a person of ordinary skill would look. (D.I. 404 at 1060:1-13) The Bahel patent discloses a master control in the indoor control, which uses the desired setting. The Bahel patent also states that the master control can be located in any of the three units. Auslander opined that “the thermostat can be the central control.” (D.I. 404 at 1058:5-1059:7) The Bahel patent does not disclose “receiving characteristic information,” but such limitation is found in the HVAC handbook. (D.I. 404 at 1059:8-25; 1060:1-13) The limitation requiring “determining, selecting or storing of optimal control strategies” is also found in the HVAC handbook:

The analog for building HVAC systems and controls is a system by which the hardware is installed and networked, the hardware announces its presence and preferred operating conditions over the network, and the control system automatically develops the algorithms and control code needed to operate the systems.

(D.I. 404 at 1060:25-1061:8; DTX157) There is a “section that directs the user to utilize the best appropriate control strategies” which covers the limitation “optimal control

embedded computing.” Henze did not include the embedded computing and networking skills in his definition of the person of ordinary skill in the art.

strategies.” (D.I. 404 at 1061:12-15) As to motivation to combine the Bahel patent with the HVAC handbook, Auslander testified that:

The Bahel reference, as we pointed out earlier, has in it . . . a suggestion that self-configuration is something that would be . . . interesting and useful to do, and so given the suggestion in the patent that self-configuration^[41] is relevant to the patent, one would be motivated to look into the literature to find other references and other information about self-configuration.

(D.I. 404 at 1055:15-23; 1063:18-23) Auslander also identified the additional limitations of dependent claims 7, 8, and 13 and concluded that the combination of the Bahel patent with the HVAC handbook invalidated each asserted claim. (1063:24-1064:24)

Auslander opined that the Matsumoto patent describes a system in which auto-configuration is used to avoid errors made by installers. (D.I. 404 at 1065:4-16) The Matsumoto patent solved the problem presented by the inventors of the '004 patent. He then walked through the claim elements identifying those present in the Matsumoto patent. (1065:17-1071:14; 1072:16-1073:18; 1074:18-23) As to the stringing, determining and selecting optimal control strategies limitation, Auslander relied on the applicant-admitted prior art as these limitations are not explicitly disclosed in the Matsumoto patent. As to the motivation to combine, Auslander opined that one of ordinary skill would be directed by the “Matsumoto patent itself . . . [which] refers to good controllability, indicating that . . . the purpose of the patent is provide good controllability.” Moreover, the person of ordinary skill would “know about optimal control strategies and so simply reading the patent and looking at the patent and knowing of optimal control strategy would be naturally thinking about the application.” (D.I. 404 at

⁴¹ Which Auslander equates to auto-configuration.

1071:19-1072:15; 1073:19-1074:17) He concluded that claim 6 was invalid. (1074:24-1075:2) As to dependent claim 8 (dependent from claim 7), the limitations “said central control mounted on a unit other than said indoor unit and outdoor unit” and “wherein said central control is mounted on a thermostat” are disclosed by the Bahel patent. (D.I. 404 at 1075:3-19) He testified that the added limitation of claim 13 is present in the Matsumoto patent. (1075:20-1076:15)

On cross-examination, Auslander clarified that he combined (1) the Bahel patent and the HVAC handbook and (2) the Matsumoto patent with applicant-admitted prior art. (D.I. 404 at 1083:5-18; 1103:9-23) Auslander admitted that he did not look at source code to arrive at his opinions regarding obviousness. (D.I. 404 at 1089:6-18) He testified that the Bahel patent “suggests auto-configuration” called “self-configuration,” but he agreed that it does “not disclose self-configuring.” (D.I. 404 at 1091:6-1092:6) He agreed that the HVAC handbook stated: “[P]lug and play functionality is broadly forecast to be a key feature of building controls in the future;” “[t]he vision of plug and play controls will not be achieved overnight;” and “[a]t its most primitive level, initial plug and play capability might be achieved by quasi-manual methods.” Auslander admitted that a “quasi-manual method is not self-configuring.” The HVAC handbook further described the plug and play system as involving specifying equipment on a website; maintaining a library of control strategies on a website; “the controls designer . . . specify[ing] operating strategies and modes in electronic form mapped to that electronic blueprint;” and, the system of a house retrieving the relevant information. He agreed that the HVAC handbook’s statement that “ultimately, plug and play controls might truly mimic computer system functionality” is a “third level or third generation of future HVAC

plug and play as described in the HVAC handbook.” (D.I. 404 at 1096:18-1101:24) He agreed that the Matsumoto patent did not disclose the determining or selecting limitations. (D.I. 404 at 1107:4-9; 1109:8-17) He also agreed that for a certain element, he relied on the Matsumoto patent plus a portion of the '004 patent. (D.I. 404 at 1111:22-1112:2)

b. Carrier’s evidence

Shah testified on the '004 patent and the Infinity System. (D.I. 401 at 255:18-24) He testified that self-configuration contributes to home energy management and benefits both homeowners and dealers. (D.I. 401 at 272:23-273:25) He testified that the Infinity control “acts like a thermostat.” The startup feature brings up a number of options, representing combinations of indoor and outdoor units. The installer “install[s] the respective equipment wired together, turn[s] the power on, and everything else is automatic” The main indoor and outdoor equipment communicates and the installer selects “accessories,” as needed. Shah specified that at the end of the startup, the installer sees an “equipment summary” representing “some of the aspects of the equipment . . . specific characteristics of the equipment.” The central control received certain information from the units of the system. (D.I. 402 at 303:9-310:15; PTX898; PTX994)

On cross-examination, Shah did not dispute that the patent discloses that a worker of ordinary skill in the art would recognize how each of several units are best used in combination with each other dependent upon the characteristics of each unit and how optimal operation algorithms can be determined. (D.I. 402 at 330:3-331:10) Shah explained that the “specification is not about the algorithms, but about the

selection of the right ones based on the characteristics.” (D.I. 402 at 331:19-21) The control algorithms may be known in the art. (D.I. 402 at 333:4-7)

Henze testified that the self-configuration reference in the Bahel patent did not disclose self-configuration as claimed in the '004 patent. The system disclosed in the Bahel patent was limited to a heat pump system and did not include a furnace or any other options. (D.I. 404 at 1147:6-1148:15) The Bahel patent did not disclose characteristic information being sent from the indoor/outdoor units to a central control (as construed by the court), because the parameters disclosed are not preprogrammed information regarding the unit. (D.I. 404 at 1148:16-1149:19) The “master” described by the Bahel patent is in the indoor unit, not in the thermostat as required by claim 8. Moreover, Henze agreed that “to move the central control as construed by the [c]ourt from an indoor unit to a thermostat and all the functionality associated with it” would not be a trivial matter. (D.I. 404 at 1150:2-10) He opined that the statements utilized by Auslander from the HVAC handbook were “concerned with what might be possible in the future,” i.e., “very aspirational.” For example, the HVAC handbook describes a vision where “continuous commissioning,” a labor intensive service offered by energy services companies “nowadays” to tune the building to make the building work properly, is done automatically. Other examples are automatically installing the equipment properly and detecting errors. As to the combination of the Bahel patent and the HVAC handbook, Henze disagreed with Auslander and opined that the two references did not disclose or provide a reason to combine to achieve the limitations in claim 6 of the '004 patent. (D.I. 404 at 1150:24-1157:19)

Henze described the system in the Matsumoto patent as limited to “a so-called multi-split heat pump system.” He explained that the central control did not send control signals and does not control the temperature. He concluded that the Matsumoto patent did not disclose several elements of the asserted claim, such as using the characteristic information and selecting an algorithm based on the characteristics. (D.I. 404 at 1157:25-1165:4)

On cross-examination, Henze was asked to compare certain disclosures in the HVAC handbook to the ComfortNet system and opined that the “hardware is not announcing the preferred operating conditions,” but characteristic information. He also disagreed that the HVAC handbook’s disclosure of “the control system automatically develop[ing] the algorithms and control code needed to operate the system” was not as defined in the patent. (D.I. 404 at 1175:13-1176:10) Henze agreed that the HVAC handbook “propose[d] one way of doing auto-configuration.” (D.I. 404 at 1176:14-16)

3. Review of secondary considerations record

a. Carrier’s evidence

David Meyers (“Meyers”), Carrier’s vice president of sales and distribution for North America, testified that contractors hesitated to promote the advanced HVAC systems due to the increased complexity of installation. Carrier’s solution was the Infinity System with “self-auto-configuration,” which “took the worry or the uncertainty out of the installation process. [Installers] didn’t have to worry about which DIP switch to configure.” The system allowed homeowners to receive exactly what they purchased. (D.I. 401 at 199:10-201:2) Meyers testified that a brochure for dealers and distributors showed “the story around plug and play and walk away” and “how the

system would actually configure itself.” The brochure illustrated ease and simplicity of installation. (D.I 401 at 205:22-206:7; PTX-392 at 621) The Infinity System did very well after its launch, with orders exceeding expectation and the demand for the user interfaces exceeded inventory. (D.I. 401 at 208:22-210:14; PTX266) By mid-August 2004, Carrier was “able to supply demand for the back half of the year.” (D.I. 401 at 211:5-212:4; PTX626) Meyers testified that Carrier won several awards for, in part, the “product configuration.” (D.I. 401 at 219:20-25; PTX899; PTX629; PTX38) Meyers stated that there was approximately \$2 billion in sales from 2004-2011, for Infinity capable units only.⁴² The sales numbers “basically more than doubled for 2004 through 2009” and declined slightly in 2010. The numbers included a partial year of sales in 2011. (D.I. 401 at 220:21-222:3, 223:20-225:12; PTX624; PTX3) He concluded that the Infinity System was very successful and became a significant piece of Carrier’s business. (D.I. 401 at 223:20-225:12, 228:8-229:12; PTX3; PTX29; PTX2; PTX248)

On cross examination, Meyers agreed that multiple factors impacted the sales of the Infinity products and he did not do any economic analysis to determine how any one factor impacted the sales. Such analysis would be a “hard thing to try and calculate.” (D.I. 401 at 239:25-240:8) Meyers agreed that Infinity is the “highest tier of Carrier products” and Carrier had other products in lower tiers. He disagreed that the purpose of the tiering system was necessarily to drive “sales up and away from the lower tiers to the higher tiers.” (D.I. 401 at 240:10-23) Goodman’s counsel pointed out and Meyers agreed that driving sales was at least one of the reasons for the tiered system, as stated

⁴² Including air conditioning units, heat pumps, gas furnaces, fan coils for the two indoor units, and the controls, i.e. the user interface.

in Carrier's marketing literature. (D.I. 401 at 241:24-243:1; DTX148) Meyers did not know how much money Carrier or its dealers and distributors spent on promoting Infinity. (D.I. 401 at 243:5-244:15) He testified that Carrier promoted the energy efficiency of its Infinity gas furnaces both with and without the Infinity control thermostat. (D.I. 401 at 244:16-246:11, 247:13-248:4; DTX105; DTX106) Meyers was aware that tax credits were available to homeowners purchasing HVAC systems with certain efficiency levels, but did not determine the impact of such credits on sales. (D.I. 401 at 248:8-249:1) Meyers stated that the numbers speak for themselves in concluding that Carrier's revenue and volume of units showed dramatic growth in the subsequent years. (D.I. 401 at 249:17-250:2; DTX123; DTX125)

Clark testified that the more sophisticated HVAC systems were harder to install and the performance was affected by the setup. The auto-configuration allowed contractors to sell more high-end systems. (D.I. 402 at 422:11-423:13) There was a need in the industry to make the installation easier and more efficient. (D.I. 402 at 431:13-15; PTX41; PTX615; PTX617) Goodman told its distributors and dealers that the CTK01 thermostat would be automatically configured once plugged in, eliminating the need for thermostat programming or circuit board DIP switch setup. (D.I. 402 at 431:23-432:2; 435:4-7; 439:15-22; PTX691 at 835; PTX699 at 135; PTX474 at 141) He testified that the CTK01, CTK02 and CTK03 thermostats send and receive information for the indoor and outdoor units. (D.I. 402 at 432:20-433:14) The Goodman thermostat has programmed options and when it is installed, the thermostat picks the best suited of the available options. (D.I. 402 at 437:18-438:6) He agreed that Goodman sold the ComfortNet system with either the CTK01, CTK02 or CTK03

thermostat. (D.I. 402 at 474:1-475:5; PTX46) Henze concluded that the Infinity System practiced the asserted claims based on the product literature and the source code based on a series of yes/no questions.⁴³ (D.I. 404 at 1166:4-25)

b. Goodman's evidence

Dr. Seth Kaplan ("Kaplan"), Goodman's expert on commercial success, explained the factors used in his analysis. (D.I. 405 at 1243:9-1244:1) As to product and market definition, the system practicing the '004 patent includes a controller or thermostat, an indoor unit, and an outdoor unit. He testified that the number of sales of individual Infinity units is not enough to determine commercial success since such data does not reflect a system. (D.I. 405 at 1244:2-1245:14) As to the change in the standard to more efficient units, the high efficiency Infinity products reached the market first. This early entry gave Carrier both an advantage and name recognition. Kaplan

⁴³ Q. Dr. Henze, did you consider whether the claims of the '004 patent are met by the Carrier Infinity System?

A. Yes.

Q. And did you conclude that the Infinity System that included an Infinity thermostat, indoor unit and outdoor unit, practiced the claims, all of the limitations in claim 6?

A. Yes.

Q. [Did] your analysis . . . involve[] analyzing the product literature for the Infinity system?

A. Yes.

Q. And did it involve looking at the source code for the Infinity System?

A. Yes.

Q. And based on that, you concluded that the Infinity System meets all the limitations of claim 6?

A. Yes. Correct.

Q. And how about claim 8?

A. Same for claim 8.

Q. And how about claim 13?

A. And the same for claim 13.

analyzed the market share of Infinity high efficiency units, in 2004-05 before the standard change and in 2006 after the standard change. For air conditioners and heat pumps with SEER ratings of 13 and above, the market share declined from 1.3% in 2006 to 1.2% in 2011. For air conditioners and heat pumps SEER rated 14 and above (all the Infinity products), Carrier lost share continuously after 2006. (D.I. 405 at 1245:15-1252:24) Kaplan then performed a nexus analysis of the available information, including internal records and external websites, to determine what was driving sales. Brand recognition and reputation for high efficiency positively impacted sales. Tax credits for buying high efficiency systems like the Infinity System also drove sales. Rising energy costs drove up sales of high efficiency units. Such factors drove sales, but did not have anything to do with the auto-configuration feature of the '004 patent. (D.I. 405 at 1259:24-1266:1)

4. Analysis

The burden of proof of obviousness is one of clear and convincing evidence. Auslander stepped through each prior art reference for both combinations presented to the jury and explained why there was a motivation to combine. Henze disagreed with Auslander and pointed out the speculative nature of the HVAC handbook's presentation on auto-configuration. Goodman argues that the speculative nature of the HVAC handbook's disclosure is legally irrelevant, as a reference does not have to be enabling to qualify as prior art in the context of obviousness.

Goodman also disputes whether the jury had sufficient evidence to conclude that the Infinity System practiced the asserted claims.⁴⁴ Henze's testimony was limited to a

⁴⁴ Having moved for JMOL based on the same at trial. (D.I. 404 at 1196:24-1197:14)

series of yes/no questions regarding whether the Infinity System practiced the claim elements. Conclusory testimony is generally insufficient as it “lack[s] any substantive explanation tied to the intrinsic record.” *SkinMedica, Inc. v. Histogen Inc.*, 727 F.3d 1187, 1210 (Fed. Cir. 2013) (The Federal Circuit agreed with the District Court’s decision to grant no weight to an expert’s “oneword confirmations of directed conclusions in leading questions [as] simply lack[ing] any helpful or informative detail regarding the benefits of” the invention.). Carrier points the court to Shah’s testimony regarding the Infinity System. However, Shah testified as an inventor and described the patent. Carrier’s counsel was cautioned during trial that Shah was not to “apply” claim constructions. (D.I. 402 at 318:19-23; 319:20-23; 320:21-321:9; 362:20-25) Nor in fact did Shah testify that the Infinity System practices each claim limitation as construed by the court.

The court concludes that Carrier did not provide legally sufficient evidence that the Infinity System practices the asserted claims.⁴⁵ The jury, however, was instructed to consider the objective evidence which may tend to show non-obviousness (including commercial success) (D.I. 380 at 34), and the verdict form did not have a separate question regarding secondary considerations. As related and summarized in footnote 27, the trial record is not so compelling as to give the court confidence in the verdict

⁴⁵ Assuming that the Infinity System did practice the claims at bar, Carrier presented evidence of Infinity sales and evidence that such sales were due (in large part) to the self-configuration and ease of installation of its system. Although Goodman’s expert pointed out other reasons which may have contributed to the success of the Infinity System, Carrier showed a sufficient nexus for the jury to consider the evidence of commercial success.

being based only on the properly admitted evidence presented to the jury. The court reluctantly grants Goodman's motion for a new trial.⁴⁶

VI. CONCLUSION

For the foregoing reasons, the court grants in part and denies in part Goodman's post-trial motions. (D.I. 394) As such, Carrier's motion for permanent injunction (D.I. 393) is moot.

⁴⁶ As noted throughout this opinion, both parties pushed the evidentiary lines drawn by the court to the extent that the record (and the parties' recitation of such) is (at best) abstruse. As both parties bear responsibility for the muddled state of the record, both parties shall bear responsibility for the waste of resources a retrial will entail.