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**UNITED STATES INTERNATIONAL TRADE COMMISSION**
**WASHINGTON, D.C. 20436**

| | |
|---|---|
| **In the Matter of**<br><br>**CERTAIN SMART THERMOSTATS, SMART HVAC SYSTEMS, AND COMPONENTS THEREOF** | **Inv. No. 337-TA-1185** |

# INITIAL DETERMINATION

**Administrative Law Judge David P. Shaw**

Pursuant to the notice of investigation, 84 Fed. Reg. 65421 (Nov. 27, 2019), this is the initial determination in *Certain Smart Thermostats, Smart HVAC Systems, and Components Thereof*, United States International Trade Commission Investigation No. 337-TA-1185.

It is held that no violation of section 337 of the Tariff Act, as amended, has occurred in the importation into the United States, the sale for importation, or the sale within the United States after importation, of certain smart thermostats, smart HVAC systems, and components thereof, with respect to asserted claims 1, 2, and 5 of U.S. Patent No. 8,131,497, asserted claims 1, 2, and 5 of U.S. Patent No. 8,423,322, and asserted claim 9 of U.S. Patent No. 10,018,371.

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The following abbreviations may be used in this Initial Determination:

| | | |
|---|---|---|
| ALJ | - | Administrative Law Judge |
| CDX | - | Complainant's Demonstrative Exhibit |
| CPX | - | Complainant's Physical Exhibit |
| CX | - | Complainant's Exhibit |
| Dep. | - | Deposition |
| EDIS | - | Electronic Document Imaging System |
| JPX | - | Joint Physical Exhibit |
| JX | - | Joint Exhibit |
| MPEP | - | Manual of Patent Examining Procedure |
| P.H. | - | Prehearing |
| PTO | - | U.S. Patent and Trademark Office |
| RDX | - | Respondents' Demonstrative Exhibit |
| RPX | - | Respondents' Physical Exhibit |
| RWS | - | Rebuttal Witness Statement |
| RX | - | Respondents' Exhibit |
| Tr. | - | Transcript |
| WS | - | Witness Statement |

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## I. Background

### A. Institution of the Investigation; Procedural History

By publication of a notice in the *Federal Register* on November 27, 2019, pursuant to subsection (b) of section 337 of the Tariff Act of 1930, as amended, the Commission instituted this investigation to determine:

> [W]hether there is a violation of subsection (a)(1)(B) of section 337 in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain products identified in paragraph (2) by reason of infringement of one or more of claims 1-12 of the '497 patent [U.S. Patent No. 8,131,497]; claims 1-7 of the '322 patent [U.S. Patent No. 8,423,322]; claims 1-20 of the '753 patent [U.S. Patent No. 8,498,753]; and claims 1-24 of the '371 patent [U.S. Patent No. 10,018,371]; and whether an industry in the United States exists as required by subsection (a)(2) of section 337.

84 Fed. Reg. 65421 (Oct. 3, 2019).

The Commission named as complainant EcoFactor, Inc. of Palo Alto, California ("EcoFactor" or "complainant"). *Id.*

The Commission named as respondents ecobee Ltd. of Toronto, Canada and ecobee, Inc. of Toronto, Canada (collectively "ecobee"); Google LLC ("Google") of Mountain View, California; Alarm.com Incorporated of Tysons, Virginia and Alarm.com Holdings, Inc. of Tysons, Virginia (collectively "Alarm.com"); Daikin Industries, Ltd. of Osaka, Japan, Daikin America, Inc. of Orangeburg, New York, and Daikin North America LLC of Houston, Texas (collectively "the Daikin Respondents"); Schneider Electric USA, Inc. of Andover, Massachusetts and Schneider Electric SE of Rueil-Malmaison, France (collectively "the Schneider Respondents"); and Vivint, Inc. ("Vivint") of Provo, Utah (collectively, "respondents"). *Id.*

The Office of Unfair Import Investigations is also a party to this investigation. *Id.*

The target date for completion of this investigation was originally set at fifteen months and two weeks, *i.e.*, March 15, 2021, with an evidentiary hearing scheduled to commence on July 21, 2020. Order No. 3 (Dec. 19, 2019).

On March 30, 2020, the administrative law judge issued Order No. 8, granting the parties' joint motion to amend the procedural schedule in view of the COVID-19 pandemic. Order No. 8 at 1. Accordingly, the administrative law judge postponed certain events in the procedural schedule, including the evidentiary hearing scheduled to commence on July 21, 2020. *Id*.

On May 4, 2020, EcoFactor and the Daikin Respondents filed a joint motion to terminate the investigation as to the Daikin Respondents based on a settlement agreement. The administrative law judge granted the motion in an initial determination. Order No. 10 (June 11, 2020). The Commission affirmed the initial determination. Notice of a Commission Decision Not to Review an Initial Determination Granting a Motion for Partial Termination of the Investigation as to Certain Respondents Based on Settlement (July 1, 2020) (EDIS Doc. No. 713726).

On July 14, 2020, EcoFactor and the Schneider Respondents filed a joint motion to terminate the investigation as to the Schneider Respondents based on a settlement agreement. The administrative law judge granted the motion in an initial determination. Order No. 15 (Aug. 10, 2020). The Commission affirmed the initial determination. Notice of a Commission Decision Not to Review an Initial Determination Granting a Motion for Termination of the Investigation in Part as to Certain Respondents Based on Settlement (Aug. 31, 2020) (EDIS Doc. No. 718460).

On September 16, 2020, the administrative law judge issued Order No. 16, amending the procedural schedule generally in the manner proposed in a joint motion filed by the parties with a hearing to begin on November 16, 2020, although one additional hearing day was added (November 23, 2020) for the express purpose of accommodating one of respondents' expert witnesses. Order No. 16 at 1-2 & n.2.

On October 8, 2020, the administrative law judge issued Order No. 17, which granted in part respondents' "Motion to Strike New Domestic Industry Products and Expert Opinions Regarding Domestic Industry." Order No. 17 addressed whether the witness statement of complainant's expert, Mr. Miguel Gomez, exceeded his expert report, in violation of Ground Rule 4.b. *See* Order No. 17 at 3. In Order No. 17, the administrative law judge ruled, "The Gomez statement may not seek to define or to analyze the alleged domestic industry or the asserted domestic industry product or products beyond the EcoFactor platform alone or in combination with the Simple Thermostat." *Id.* at 9.

On November 2, 2020, in accordance with Order No. 16, the administrative law judge issued an initial determination setting the target date at approximately 20 months and three weeks (20.75 months), *i.e.*, August 20, 2021, which makes the deadline for this initial determination April 20, 2021. Order No. 22 (Nov. 2, 2020), *aff'd*, Notice of a Commission Determination Not to Review an Initial Determination Extending the Target Date (Nov. 17, 2020) (EDIS Doc. No. 725366).

A prehearing conference was held on November 13, 2020, with the evidentiary hearing in this investigation commencing on November 16, 2020. Complainant EcoFactor and respondents ecobee, Google, Alarm.com, and Vivint participated in the hearing. The hearing concluded on November 19, 2020. *See* Order No. 16 (Sept. 16, 2020); P.H. Tr. 1-38; Tr. 1-992. The parties

were requested to file posthearing briefs not to exceed 300 pages in length, and to file reply briefs not to exceed 80 pages in length. Order No. 23 (Nov. 6, 2020).

On November 16, 2020, EcoFactor filed a motion to terminate the investigation as to certain claims. The administrative law judge granted the motion in an initial determination. Order No. 27 (Nov. 28, 2020). The Commission affirmed the initial determination. Notice of Commission Decision Not to Review an Initial Determination Granting an Unopposed Motion for Partial Termination of the Investigation as to Certain Patent Claims (Dec. 15, 2020) (EDIS Doc. No. 728057).

On December 11, 2020, EcoFactor filed its post-hearing brief, which asserts the following claims against the following parties:

- claims 1, 2, and 5 of the '497 patent against Google, Vivint, and ecobee (Compl. Br. at 300);
- claims 1, 2, and 5 of the '322 patent against Google, Vivint, and Alarm.com (*id.*); and
- claim 9 of the '371 patent against Google (*id.*).

Pursuant to Order No. 2 (Ground Rules), the parties also submitted a joint outline of the issues to be decided in the Final Initial Determination. *See* Joint Outline of Issues to Be Decided in the Final Initial Determination (EDIS Doc. ID No. 728782) ("Joint Outline").

On December 14, 2020, EcoFactor filed a "Notice of Supplemental Authority" regarding "a claim construction hearing in U.S. District Court for the Western District of Texas in Case Nos. 20-cv-00075, -00078, and -00080 [] on December 9, 2020." Notice of Supp. Auth. at 1. EcoFactor argued, "[T]he district court claim construction disputes involved multiple disputed terms that overlap with those at issue in this Investigation, in patents that include overlapping specifications and similar priority dates to those asserted here." On December 18, 2020,

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respondents filed a response to EcoFactor's Notice, arguing, among other things, that EcoFactor's Notice involves four patents not at issue in this investigation, and lacks a written order from the district court.

### B. The Parties

The complainant is EcoFactor, Inc. of Palo Alto, California. EcoFactor is a privately held company organized and existing under the laws of California. *See* Complaint, ¶ 10. EcoFactor was founded in 2006 for the purpose of researching, developing, and providing smart home energy management services. *See id.*

Respondent ecobee Ltd. is a limited liability company established under the laws of Nevada. *See id.*, ¶ 14. Respondent ecobee Inc. is a corporation organized under the laws of Canada. *See id.* Respondents ecobee Ltd. and ecobee Inc. import and sell within the United States Accused Products. *See id.*, ¶¶ 15-16; CX-0816C (ecobee Importation and Inventory Stipulation) at 2.

Respondent Google LLC is a wholly-owned subsidiary of Alphabet, Inc., and a limited liability company organized under the laws of Delaware. *See* Complaint, ¶ 17. Google imports into and sells within the United States Accused Products. *See id.*, ¶ 18; CX-0815C (Google Importation and Inventory Stipulation) at 2.

Respondents Alarm.com Incorporated and Alarm.com Holdings, Inc. are both corporations organized under the laws of Delaware. *See* Complaint, ¶ 19. Respondents Alarm.com Incorporated and Alarm.com Holdings, Inc.. import and sell within the United States Accused Products. *See id.*, ¶¶ 20-21; CX-0817C (Alarm.com Importation and Inventory Stipulation) at 2.

Respondent Vivint Inc. is a corporation organized under the laws of Utah. *See* Complaint, ¶ 31. Vivint imports into and sells within the United States Accused Products. *See id.*, ¶ 32; CX-0818C (Vivint Importation and Inventory Stipulation) at 2.

### C. The Accused Products

The accused products in this investigation are listed in a joint filing required by the procedural schedule. *See* Order No. 5 (requiring a "file joint statement identifying accused products"). By listing a product in the joint filing, respondents have not admitted infringement. Nevertheless, the joint filing indicates the final extent of EcoFactor's accusations in this investigation. *See* Joint Statement Regarding the Identification of Accused Products (EDIS Doc. No. 702683).

EcoFactor accuses Google's Nest Learning Thermostat Third Generation and Nest Thermostat E of infringing claims 1, 2, and 5 of the '497 patent; claims 1, 2, and 5 of the '322 patent; and claim 9 of the '371 patent. *See* Compl. Br. at 7, 27, 154, 238; Joint Identification of Accused Products at 2.

EcoFactor accuses ecobee's ecobee3 lite and the ecobee SmartThermostat with Voice Control of infringing claims 1, 2, and 5 of the '497 patent. *See* Compl. Br. at 8, 62; Joint Identification of Accused Products at 2.

EcoFactor accuses Alarm.com's T2000 and T3000 Smart Thermostats of infringing claims 1, 2, and 5 of the '322 patent. *See* Compl. Br. at 8, 184; Joint Identification of Accused Products at 2.

EcoFactor accuses Vivint's CT-100 and CT-200 smart thermostats and the Vivint SkyControl panels of infringing claims 1, 2, and 5 of the '497 patent; and claims 1, 2, and 5 of the '322 patent. *See* Compl. Br. at 8-9, 99, 209; Joint Identification of Accused Products at 2.

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### D. The Domestic Industry Products

EcoFactor identifies the domestic industry products for the '497 patent, the '322 patent, and the '371 patent as follows:

> The record evidence shows that the EcoFactor Platform practices the Asserted Patents, both on its own and when used as a cloud or backend platform that provides features for any supported thermostat, including EcoFactor's Simple Thermostat.

Compl. Br. at 6.

## II. Jurisdiction

No party has contested the Commission's personal jurisdiction over it. *See, e.g.*, Compl. Br. at 26. Indeed, all parties appeared at the evidentiary hearing and presented evidence. It is found that the Commission has personal jurisdiction over all parties. *See, e.g.*, *Certain Liquid Crystal Display Modules, Products Containing Same, and Methods for Using the Same*, Inv. No. 337-TA-634, Final Initial and Recommended Determinations at 3 (June 12, 2009) (not reviewed).

EcoFactor has filed a complaint alleging a violation of section 337, and the Commission, therefore, has subject matter jurisdiction. *See Amgen, Inc. v. United States Int'l Trade Comm'n*, 902 F.2d 1532, 1535-37 (Fed. Cir. 1990).

The Commission also has *in rem* jurisdiction, as the respondents have admitted to importing the accused products. *See* CX-0816C (ecobee Importation and Inventory Stipulation) at 2; CX-0815C (Google Importation and Inventory Stipulation) at 2; CX-0817C (Alarm.com Importation and Inventory Stipulation) at 2; CX-0818C (Vivint Importation and Inventory Stipulation) at 2; *Sealed Air Corp. v. Int'l Trade Comm'n*, 645 F.2d 976, 985–86 (C.C.P.A. 1981) (noting that the Commission has jurisdiction over imported goods).

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## III. Importation

As indicated in the notice of investigation, quoted above, this investigation was instituted to determine whether a violation of section 337 has occurred in "the importation into the United States, the sale for importation, or the sale within the United States after importation" of certain products. *See* 84 Fed. Reg. 65421 (Nov. 27, 2019); 19 U.S.C. § 1337(a)(1)(B) (making unlawful, in certain circumstances, the "importation into the United States, the sale for importation, or the sale within the United States after importation by the owner, importer, or consignee, of articles that . . . infringe a valid and enforceable United States patent . . . ."). It has long been recognized that an importation of even one accused product can satisfy the importation requirement of section 337. *See Certain Trolley Wheel Assemblies*, Inv. No. 337-TA-161, Comm'n Op. at 7-8, USITC Pub. No. 1605 (Nov. 1984) (deeming the importation requirement satisfied by the importation of a single product of no commercial value).

In this investigation, it is uncontested that the importation requirement is satisfied with respect to the products alleged to infringe the asserted claims of the '497, the '322, and the '371 patents. *See* Compl. Br. at 26 (citing CX-0816C (ecobee Importation and Inventory Stipulation); CX-0815C (Google Importation and Inventory Stipulation); CX-0817C (Alarm.com Importation and Inventory Stipulation); CX-0818C (Vivint Importation and Inventory Stipulation)).

Regarding whether there is a sufficient nexus between the imported articles and the alleged infringement to satisfy the "articles that . . . infringe" requirement of 19 U.S.C. § 1337, respondents argue, in part:

> The Commission's jurisdiction extends only to addressing, as relevant here, "importation" of "articles that … infringe." 19 U.S.C. § 1337(a)(1)(B). The imported articles therefore must "infringe" within the meaning of Section 271 of the Patent Act. *Suprema v. ITC*, 796 F.3d 1338, 1346 (Fed. Cir. 2015). But where, as here, the imported articles do not themselves satisfy any element of the claims,

and do not contain any of the software or source code necessary to perform the allegedly infringing functionalities; and where all of the accused functionalities resides entirely on U.S.-based servers, or in the cloud, the articles are in no sense "articles that infringe." Nothing about the imported articles in this Investigation infringes on the patentees' protected rights and therefore the Commission lacks jurisdiction under §337. *See Certain Cardiac Pacemakers and Components Thereof,* Inv. No. 337-TA-162, Order No. 37, 1984 ITC Lexis 102 (Mar 21, 1984) at *6 ("the evidence now establishes that [Respondent] has committed no unfair acts within the meaning of §337. No nexus can be established between the importation and the alleged infringement; consequently, the Commission cannot find a violation of the statute and lacks jurisdiction to issue a remedy."); *Certain Digital Video Receivers, Broadband Gateways, & Related Hardware & Software Components*, Inv. No. 337-TA-1158, Initial Determination, 2020 WL 5836563, at *70-73 (July 28, 2020) (ALJ McNamara) (no § 337 violation where a cloud server "perform[ed] virtually all of the claimed method steps" and the imported articles "[we]re, at most, tangentially involved"); *In re Certain Network Devices, Related Software & Components Thereof (II),* Inv. No. 337-TA-945, USITC Pub. 4910 (June 2019) at December 9, 2016 Final Initial Determination (ALJ McNamara) at 104-05 (*also available at* 2018 ITC Lexis 1450 at *497) (noting that because the accused products could only infringe when combined with specific software post-importation, there "cannot be a Section 337 violation based ***solely on*** [Respondents] importation of [Accused Products] that lack the EOS software.") (emphasis added); *contra Comcast Corp. v. Int'l Trade Comm'n,* 951 F.3d 1301, 1309, 2020 U.S. App. LEXIS 6357 at *15 ("The 'products are designed only for Comcast' and Comcast restricts ARRIS's 'ability to sell the products without Comcast's permission."); *Certain Blood Cholesterol Testing Strips,* 337-TA-1116 at 29-31 (May 1, 2020 Commission Opinion) (finding an actionable remedy under Section 337 only after specifically finding the accused products were designed solely to process fluid according to respondent's direction and in a manner that carried out the claimed method steps); *see also* Vivint's Motion For Summary Determination Of No Available Remedy And Lack Of Jurisdiction (EDIS Doc. ID 721592) (October 8, 2020).

For many of Complainant's infringement allegations in this Investigation, and all of them as to certain Respondents, it is impossible for the imported thermostats to infringe before they were imported, at the time of importation, or after importation. Indeed, even under EcoFactor's own theories of infringement, no alleged direct infringement of the Asserted Patents can occur until after the Accused Products are imported and later combined with domestic servers, which constitutes a substantial modification of those products. And because the alleged infringement takes place entirely on servers or the cloud, there is not even an arguable nexus between importation of the accused products—the only conduct that the Commission has authority to address—and the alleged infringement. The Commission does not have the authority to exclude the importation of thermostats whose features and functionality are irrelevant to the alleged infringement of the

[redacted]

patents-in-suit. Complainant cannot show that Respondents or the imported thermostats indirectly infringe at any time because smart thermostats have substantial non-infringing uses. *See infra*, Sections V.A. 8., V.B.5., V.C.4., and V.D.4. (discussing Respondents' positions on indirect infringement).

In these circumstances, a remedial order would be contrary to law and unenforceable in practice. Section 337 confers only *in rem* authority: it authorizes the Commission to exclude "*articles* that infringe," not to regulate the *in personam* conduct of alleged infringers. 19 U.S.C. § 1337(a)(1)(B). Accordingly, the remedy for violating Section 337—an exclusion order—is *in rem*, running directly against the articles themselves. *Id.* § 1337(d). But U.S. Customs and Border Protection cannot possibly know if an imported thermostat is infringing when the thermostats may not be connected to U.S.-based servers, when U.S. customers may not make use of the accused server features at all, or if a Respondent could simply turn off an accused feature on its U.S.-based servers. *See, e.g.*, RX-0156C (Henze WS), QA224 ("Henze QA"); RX-0157C (Burger WS), QA55, 65, 73 ("Burger QA"); Gomez 8/19 QA69, 234; RX-0163C (S. Souri WS-Sept. 2), QA29, 69 (Souri 9/2 QA"); Hutz QA109-110, 161-162; RX-0159C (Goodman WS), at QA29-36, 58-59, 69-70 ("Goodman QA"); RX-0164C (James WS), QA203 ("James QA"); RX-0165C, Bunker QA34-37, 73, 199-202; CX-0675C, de la Iglesia QA230. Thus, even if Complainant could demonstrate infringement based on functionalities that reside on U.S.-based servers, or in the cloud, a remedial order applicable to the accused smart thermostats would not address "articles . . . that infringe" the patents-in-suit.

Resps. Br. at 12-14.

EcoFactor argues, in part:

Respondents acknowledge that the Commission has authority to prevent importation of articles that have been part of inducement as an unfair trade act, even if the articles would not infringe on their own at the time of importation. *Suprema, Inc. v. ITC,* 796 F.3d 1338, 1349 (Fed. Cir. 2015). However, Vivint argues that its imported thermostats and panels have no nexus to the alleged infringement functionalities, including features that require connecting the thermostats and panels to Vivint's backend servers.

There is a clear nexus here between the Vivint Products and the accused functionalities. The Vivint Products were specifically designed to work with the accused software functionalities that require the Vivint Cloud. Likewise, these accused software features are Vivint thermostat features, available only to Vivint customers who have installed a thermostat. These cloud-supported features can only benefit the user if there is a thermostat available to receive and upload particular types of thermostat data to the Vivint Cloud.

Compl. Br. at 98-99.

[redacted]

The facts supporting a Section 337 violation here are stronger than those in *Suprema*. Here, Google designs both the imported article (Nest Thermostat) [redacted] to operate together. But in *Suprema,* one entity (Suprema) designed the imported article, and a different entity (Mentalix) wrote infringing the software. *Suprema,* 796 F.3d at 1341-1342. As a result, there was a dispute about whether Suprema was aware or had encouraged Mentalix to design the custom software in an infringing manner. *Suprema,* 796 F.3d at 1343. Here, this issue does not exist, because Google itself designed the software for its thermostat in an infringing manner.

* * *

First, the [redacted] CX-0674C (Gomez DWS) Q/A 79, citing CX-0657 ("Nest is testing a **new thermostat feature** that can help you look after your home. **Your Nest thermostat** can now help identify potential issues with your heating, ventilation and air conditioning (HVAC) systems. If a potential issue is detected, we'll send you an alert via email.").

Second, Nest Thermostat users are **automatically enrolled** in the cooling degradation feature. CX-0674C (Gomez DWS) Q/A 79, citing CX-0657 ("Nest is testing a new thermostat feature….If you are signed up to get the Nest Home Report, you'll be **automatically enrolled** to get these new HVAC alert emails.").

Third, the sole purpose of this feature is to **monitor** the current Nest Thermostat's data and **alert** the user when the Nest Thermostat has detected a problem with the customer's HVAC equipment based on the data that it constantly receives and stores. CX-0674C (Gomez DWS) QA 77, citing CX-0659 ("based on information like your thermostat's historical data and current weather, Nest will learn to detect some unusual HVAC patterns that might indicate something is wrong."). Each day, this feature [redacted]. CX-0674C (Gomez WS) Q. 143. When the [redacted] the system [redacted] and ultimately [redacted]. CX-0674C (Gomez WS) Q. 146-147.

* * *

Given these facts, *Suprema* clearly applies to the facts of this investigation. Thus, even if installing the products as intended is necessary for a finding of infringement of the asserted claims [redacted] there is still an available remedy under 19 U.S.C. § 1337 as to the Nest Thermostats, because the Nest Thermostats [redacted] into an infringing system upon importation, and all of the elements of indirect infringement are satisfied as to Google, who both induces infringement and contributorily

[redacted]

infringes. CX-0674C (Gomez DWS) QA 556-562.

*Id*. at 177-81.

> As described earlier in EcoFactor's discussion of *Suprema, Inc. v. ITC,* the Commission has authority to prevent importation of articles that indirectly infringe under an inducement or a contributory theory as an unfair trade act, even if the articles would not infringe on their own at the time of importation. That discussion is incorporated by reference. Nonetheless, Alarm.com argues that their imported thermostats have no nexus to the alleged infringement functionalities because the accused features of the Alarm.com Smart Thermostat systems allegedly run on the Alarm.com backend.
>
> There is a clear nexus here between the Alarm.com T2000 and T3000 Smart Thermostats and the accused functionalities. In particular, the T2000 and T3000 Smart Thermostats make up smart thermostat systems with Alarm.com hubs and the Alarm.com backend. CX-0675C (de la Iglesia WS) Q/A Q/A 22-38, 143-144; 161-62; RX-0159C (Hutz WS) Q/A 19-23; RDX-0007C-10. The accused features of Alarm.com, HVAC Alerts and CFC/CFH are features ***of the T2000*** and ***T3000*** smart thermostats:
>
> [redacted] Thus, as Mr. de la Iglesia explains, the T2000 and T3000 are designed to work with HVAC Analytics and CFC/CFH, and vice versa. *Id.*

*Id.* at 206-07.

The Staff argues that, because EcoFactor's infringement allegations include theories of inducement and contributory infringement, and EcoFactor has presented evidence that the thermostats are specifically designed to operate and be a component of the system that allegedly infringes, EcoFactor's allegations of indirect infringement confer jurisdiction on the Commission to adjudicate this investigation. *See* Staff Br. at 9-11.

The administrative law judge finds that EcoFactor's infringement allegations include allegations of inducement and contributory infringement, and thus confer jurisdiction on the Commission to adjudicate this investigation. There is an available remedy under 19 U.S.C. §

1337 as to imported products that are designed to be combined with software after importation in a manner that results in patent infringement, even if the imported products themselves do not infringe the asserted claims of a patent prior to their importation and infringing use within the United States. *See Suprema, Inc. v. ITC*, 796 F.3d 1338, 1351-53 (Fed. Cir. 2015). For example, in these circumstances, the importation of the products constitutes part of the inducement of a direct infringer (the customer) to create an infringing system after importation. *See id*. at 1343.

EcoFactor has presented evidence that the accused products are designed to operate and to be a component of a system that allegedly infringes, including software in back-end cloud services with which it may be combined after importation. *See* Section IX, below. Thus, even if the respondents' back-end cloud services are excluded from consideration because they are not imported, EcoFactor's allegations of indirect infringement confer jurisdiction on the Commission to adjudicate this investigation. *See Comcast Corp. v. Int'l Trade Comm'n,* 951 F.3d 1301, 1308 (Fed. Cir. 2020) ("The Commission correctly held that Section 337 applies to articles that infringe after importation.") (citing *Suprema*, 796 F.3d at 1352-53). Whether indirect infringement occurs, and how the alleged indirect infringement compares to the framework set forth in *Suprema* and similar cases, is discussed below.

## IV. General Principles of Law

### A. Claim Construction

Claim construction begins with the plain language of the claim.[1] Claims should be given their ordinary and customary meaning as understood by a person of ordinary skill in the art,

[1] Only those claim terms that are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *Vanderlande Indus. Nederland BV v. Int'l Trade Comm'n*, 366 F.3d 1311, 1323 (Fed. Cir. 2004); *Vivid Tech., Inc. v. American Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

viewing the claim terms in the context of the entire patent.[2] *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005), *cert. denied*, 546 U.S. 1170 (2006).

In some instances, claim terms do not have particular meaning in a field of art, and claim construction involves little more than the application of the widely accepted meaning of commonly understood words. *Phillips*, 415 F.3d at 1314. "In such circumstances, general purpose dictionaries may be helpful." *Id.*

In many cases, claim terms have a specialized meaning, and it is necessary to determine what a person of skill in the art would have understood the disputed claim language to mean. "Because the meaning of a claim term as understood by persons of skill in the art is often not immediately apparent, and because patentees frequently use terms idiosyncratically, the court looks to 'those sources available to the public that show what a person of skill in the art would have understood disputed claim language to mean.'" *Id*. (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1116 (Fed. Cir. 2004)). The public sources identified in *Phillips* include "the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art." *Id.*

In cases in which the meaning of a claim term is uncertain, the specification usually is the best guide to the meaning of the term. *Phillips*, 415 F.3d at 1315. As a general rule, the particular examples or embodiments discussed in the specification are not to be read into the

[2] Factors that may be considered when determining the level of ordinary skill in the art include: "(1) the educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of active workers in the field." *Environmental Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 696 (Fed. Cir. 1983), *cert. denied*, 464 U.S. 1043 (1984).

claims as limitations. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (*en banc*), *aff'd*, 517 U.S. 370 (1996). The specification is, however, always highly relevant to the claim construction analysis, and is usually dispositive. *Phillips*, 415 F.3d at 1315 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). Moreover, "[t]he construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction." *Id.* at 1316.

Claims are not necessarily, and are not usually, limited in scope to the preferred embodiment. *RF Delaware, Inc. v. Pacific Keystone Techs., Inc.*, 326 F.3d 1255, 1263 (Fed. Cir. 2003); *Decisioning.com, Inc. v. Federated Dep't Stores, Inc.*, 527 F.3d 1300, 1314 (Fed. Cir. 2008) ("[The] description of a preferred embodiment, in the absence of a clear intention to limit claim scope, is an insufficient basis on which to narrow the claims."). Nevertheless, claim constructions that exclude the preferred embodiment are "rarely, if ever, correct and require highly persuasive evidentiary support." *Vitronics*, 90 F.3d at 1583. Such a conclusion can be mandated in rare instances by clear intrinsic evidence, such as unambiguous claim language or a clear disclaimer by the patentees during patent prosecution. *Elekta Instrument S.A. v. O.U.R. Sci. Int'l, Inc.*, 214 F.3d 1302, 1308 (Fed. Cir. 2000); *Rheox, Inc. v. Entact, Inc.*, 276 F.3d 1319 (Fed. Cir. 2002).

If the intrinsic evidence does not establish the meaning of a claim, then extrinsic evidence may be considered. Extrinsic evidence consists of all evidence external to the patent and the prosecution history, and includes inventor testimony, expert testimony, and learned treatises. *Phillips*, 415 F.3d at 1317. Inventor testimony can be useful to shed light on the relevant art. In evaluating expert testimony, a court should discount any expert testimony that is clearly at odds with the claim construction mandated by the claims themselves, the written description, and the

prosecution history, in other words, with the written record of the patent. *Id*. at 1318. Extrinsic evidence may be considered if a court deems it helpful in determining the true meaning of language used in the patent claims. *Id.*

### B. Infringement

#### 1. Direct Infringement

Under 35 U.S.C. §271(a), direct infringement consists of making, using, offering to sell, or selling a patented invention without consent of the patent owner. The complainant in a section 337 investigation bears the burden of proving infringement of the asserted patent claims by a "preponderance of the evidence." *Certain Flooring Products*, Inv. No. 337-TA-443, Comm'n Notice of Final Determination of No Violation of Section 337, 2002 WL 448690, at *59, (Mar. 22, 2002); *Enercon GmbH v. Int'l Trade Comm'n*, 151 F.3d 1376 (Fed. Cir. 1998).

Literal infringement of a claim occurs when every limitation recited in the claim appears in the accused device, *i.e.*, when the properly construed claim reads on the accused device exactly.[3] *Amhil Enters., Ltd. v. Wawa, Inc.*, 81 F.3d 1554, 1562 (Fed. Cir. 1996); *Southwall Tech. v. Cardinal IG Co.*, 54 F.3d 1570, 1575 (Fed Cir. 1995).

If the accused product does not literally infringe the patent claim, infringement might be found under the doctrine of equivalents. "Under this doctrine, a product or process that does not literally infringe upon the express terms of a patent claim may nonetheless be found to infringe if there is 'equivalence' between the elements of the accused product or process and the claimed elements of the patented invention." *Warner-Jenkinson Co., Inc. v. Hilton Davis Chemical Co.*,

[3] Each patent claim element or limitation is considered material and essential. *London v. Carson Pirie Scott & Co.*, 946 F.2d 1534, 1538 (Fed. Cir. 1991). If an accused device lacks a limitation of an independent claim, the device cannot infringe a dependent claim. *See Wahpeton Canvas Co. v. Frontier, Inc.*, 870 F.2d 1546, 1552 n.9 (Fed. Cir. 1989).

520 U.S. 17, 21 (1997) (citing *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605, 609 (1950)). "The determination of equivalence should be applied as an objective inquiry on an element-by-element basis."[4] *Id*. at 40.

"An element in the accused product is equivalent to a claim limitation if the differences between the two are insubstantial. The analysis focuses on whether the element in the accused device 'performs substantially the same function in substantially the same way to obtain the same result' as the claim limitation." *AquaTex Indus. v. Techniche Solutions*, 419 F.3d 1374, 1382 (Fed. Cir. 2005) (quoting *Graver Tank*, 339 U.S. at 608); *accord Absolute Software*, 659 F.3d at 1139-40.[5]

Prosecution history estoppel can prevent a patentee from relying on the doctrine of equivalents when the patentee relinquished subject matter during the prosecution of the patent, either by amendment or argument. *AquaTex*, 419 F.3d at 1382. In particular, "[t]he doctrine of prosecution history estoppel limits the doctrine of equivalents when an applicant makes a narrowing amendment for purposes of patentability, or clearly and unmistakably surrenders subject matter by arguments made to an examiner." *Id*. (quoting *Salazar v. Procter & Gamble Co.*, 414 F.3d 1342, 1344 (Fed. Cir. 2005)).

[4] "Infringement, whether literal or under the doctrine of equivalents, is a question of fact." *Absolute Software, Inc. v. Stealth Signal, Inc.*, 659 F.3d 1121, 1130 (Fed. Cir. 2011).

[5] "The known interchangeability of substitutes for an element of a patent is one of the express objective factors noted by *Graver Tank* as bearing upon whether the accused device is substantially the same as the patented invention. Independent experimentation by the alleged infringer would not always reflect upon the objective question whether a person skilled in the art would have known of the interchangeability between two elements, but in many cases it would likely be probative of such knowledge." *Warner-Jenkinson*, 520 U.S. at 36.

[redacted]

### 2. Indirect Infringement

#### a. Induced Infringement

Section 271(b) of the Patent Act provides: "Whoever actively induces infringement of a patent shall be liable as an infringer." 35 U.S.C. § 271(b).

Under 35 U.S.C. § 271(b), whoever actively induces infringement of a patent shall be liable as an infringer. In contrast to direct infringement, liability for inducing infringement attaches only if the defendant knew of the patent and that the induced acts constituted patent infringement. *Commil USA, LLC v. Cisco Sys., Inc.*, 135 S. Ct. 1920, 1926 (2015); *see also Microsoft Corp. v. Datatern, Inc.*, 755 F.3d 899, 904 (Fed. Cir. 2014) (to prove induced infringement, patentee must show that accused inducer took an affirmative act to encourage infringement with knowledge that the induced acts constitute patent infringement). Induced infringement requires a finding that the infringer possessed a specific intent to encourage another's infringement. *i4i Ltd. Partnership v. Microsoft Corp.*, 598 F.3d 831, 851 (Fed. Cir. 2010), *aff'd*, 564 U.S. 91 (2011).

#### b. Contributory Infringement

Section 271(c) of the Patent Act provides: "Whoever offers to sell or sells within the United States or imports into the United States a component of a patented machine, manufacture, combination or composition, or a material or apparatus for use in practicing a patented process, constituting a material part of the invention, 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, shall be liable as a contributory infringer." 35 U.S.C. § 271(c).

Section 271(c) "covers both contributory infringement of system claims and method claims."[6] *Arris Grp., Inc. v. British Telecomms. PLC*, 639 F.3d 1368, 1376 (footnotes omitted). To hold a component supplier liable for contributory infringement, a patent holder must show, *inter alia*, that (a) the supplier's product was used to commit acts of direct infringement; (b) the product's use constituted a material part of the invention; (c) the supplier knew its product was especially made or especially adapted for use in an infringement" of the patent; and (d) the product is not a staple article or commodity of commerce suitable for substantial noninfringing use. *Id.*

### C. Validity

One cannot be held liable for practicing an invalid patent claim. *See Pandrol USA, LP v. AirBoss Railway Prods., Inc.*, 320 F.3d 1354, 1365 (Fed. Cir. 2003). Nevertheless, each claim of a patent is presumed to be valid, even if it depends from a claim found to be invalid. 35 U.S.C. § 282; *DMI Inc. v. Deere & Co.*, 802 F.2d 421 (Fed. Cir. 1986).

A respondent that has raised patent invalidity as an affirmative defense must overcome the presumption by "clear and convincing" evidence of invalidity. *Checkpoint Systems, Inc. v. United States Int'l Trade Comm'n*, 54 F.3d 756, 761 (Fed. Cir. 1995).

#### 1. Anticipation

Anticipation under 35 U.S.C. § 102 is a question of fact. *z4 Techs., Inc. v. Microsoft Corp.*, 507 F.3d 1340, 1347 (Fed. Cir. 2007). Section 102 provides that, depending on the circumstances, a claimed invention may be anticipated by variety of prior art, including

[6] "Claims which recite a 'system,' 'apparatus,' 'combination,' or the like are all analytically similar in the sense that their claim limitations include elements rather than method steps. All such claims can be contributorily infringed by a component supplier." *Arris*, 639 F.3d at 1376 n.8.

publications, earlier-sold products, and patents. *See* 35 U.S.C. § 102 (*e.g.*, section 102(b) provides that one is not entitled to a patent if the claimed invention "was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States").

The general law of anticipation may be summarized, as follows:

> A reference is anticipatory under § 102(b) when it satisfies particular requirements. First, the reference must disclose each and every element of the claimed invention, whether it does so explicitly or inherently. *Eli Lilly & Co. v. Zenith Goldline Pharms., Inc.*, 471 F.3d 1369, 1375 (Fed. Cir. 2006). While those elements must be "arranged or combined in the same way as in the claim," *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1370 (Fed. Cir. 2008), the reference need not satisfy an *ipsissimis verbis* test, *In re Bond*, 910 F.2d 831, 832-33 (Fed.Cir.1990). Second, the reference must "enable one of ordinary skill in the art to make the invention without undue experimentation." *Impax Labs., Inc. v. Aventis Pharms. Inc.*, 545 F.3d 1312, 1314 (Fed. Cir. 2008); *see In re LeGrice*, 49 C.C.P.A. 1124, 301 F.2d 929, 940-44 (1962). As long as the reference discloses all of the claim limitations and enables the "subject matter that falls within the scope of the claims at issue," the reference anticipates -- no "actual creation or reduction to practice" is required. *Schering Corp. v. Geneva Pharms., Inc.*, 339 F.3d 1373, 1380-81 (Fed. Cir. 2003); *see In re Donohue*, 766 F.2d 531, 533 (Fed.Cir.1985). This is so despite the fact that the description provided in the anticipating reference might not otherwise entitle its author to a patent. *See Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1562 (Fed. Cir. 1991) (discussing the "distinction between a written description adequate to support a claim under § 112 and a written description sufficient to anticipate its subject matter under § 102(b)").

*In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009).

**2. Obviousness**

Under section 103 of the Patent Act, a patent claim is invalid "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 to which said subject matter pertains."[7] 35 U.S.C. § 103. While the ultimate determination of whether an invention would have been obvious is a legal conclusion, it is based on "underlying factual inquiries including: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness." *Eli Lilly and Co. v. Teva Pharmaceuticals USA, Inc.*, 619 F.3d 1329 (Fed. Cir. 2010).

The objective evidence, also known as "secondary considerations," includes commercial success, long felt need, and failure of others. *Graham v. John Deere Co.*, 383 U.S. 1, 13-17 (1966); *Dystar Textilfarben GmbH v. C.H. Patrick Co.*, 464 F.3d 1356, 1361 (Fed. Cir. 2006). "[E]vidence arising out of the so-called 'secondary considerations' must always when present be considered en route to a determination of obviousness." *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538 (Fed. Cir. 1983). Secondary considerations, such as commercial success, will not always dislodge a determination of obviousness based on analysis of the prior art. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 426 (2007) (commercial success did not alter conclusion of obviousness).

"One of the ways in which a patent's subject matter can be proved obvious is by noting that there existed at the time of invention a known problem for which there was an obvious solution encompassed by the patent's claims." *KSR*, 550 U.S. 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*.

[7] The standard for determining whether a patent or publication is prior art under section 103 is the same as under 35 U.S.C. § 102, which is a legal question. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1568 (Fed. Cir. 1987).

Specific teachings, suggestions, or motivations to combine prior art may provide helpful insights into the state of the art at the time of the alleged invention. *Id*. at 420. Nevertheless, "an obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation, or by overemphasis on the importance of published articles and the explicit content of issued patents. The diversity of inventive pursuits and of modern technology counsels against limiting the analysis in this way." *Id*. "Under the correct analysis, any 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*. A "person of ordinary skill is also a person of ordinary creativity." *Id*. at 421.

Nevertheless, "the burden falls on the patent challenger to show by clear and convincing evidence 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, and 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); *see KSR*, 550 U.S. at 416 (a combination of elements must do more than yield a predictable result; combining elements that work together in an unexpected and fruitful manner would not have been obvious).[8]

**2. Written Description**

The issue of whether a patent is invalid for failure to meet the written description requirement of 35 U.S.C. § 112, ¶ 1 is a question of fact. *Bard Peripheral Vascular, Inc. v. W.L. Gore & Assocs., Inc.*, 670 F.3d 1171, 1188 (Fed. Cir. 2012). A patent's written description must

[8] Further, "when the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be nonobvious." *KSR*, 550 U.S. at 416 (citing *United States v. Adams*, 383 U.S. 39, 52 (1966)).

clearly allow persons of ordinary skill in the art to recognize that the inventor invented what is claimed. The test for sufficiency of a written description is "whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date." *Id.* (quoting *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (*en banc*)).

**3. Enablement**

The Patent Act requires that "[t]he full scope of the claimed invention . . . be enabled." *Sitrick v. Dreamworks, LLC*, 516 F.3d 993, 999 (Fed. Cir. 2008); *see also Northpoint Tech. Ltd. v. MDS America Inc.*, 413 F.3d 1301, 1308-10 (Fed. Cir. 2005) (affirming a finding of invalidity for lack of enablement due to the patent's failure to disclose an embodiment with an antenna that met the "directional reception range" limitation of each claim). Namely, "[a] patentee who chooses broad claim language must make sure the broad claims are fully enabled. 'The scope of the claims must be less than or equal to the scope of enablement' to 'ensure[] that the public knowledge is enriched by the patent specification to a degree at least commensurate with the scope of the claims.'" *Sitrick*, 516 F.3d at 999 (quoting *Nat'l Recovery Techs., Inc. v. Magnetic Separation Sys., Inc.*, 166 F.3d 1190, 1195-96 (Fed. Cir. 1999)). The enablement requirement is satisfied when one skilled in the art, after reading the specification, could practice the claimed invention without undue experimentation. *AK Steel Corp. v. Sollac & Ugine*, 344 F.3d 1234, 1244 (Fed. Cir. 2003), citing *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).

> The question of undue experimentation is a matter of degree, and what is required is that the amount of experimentation not be "unduly extensive." *Chiron Corp. v. Genentech, Inc.*, 363 F.3d 1247, 1253 (Fed. Cir. 2004) (quoting *PPG Indus., Inc. v. Guardian Indus., Corp.*, 75 F.3d 1558, 1564 (Fed. Cir. 1996)). For example, the fact that a clinician's involvement may be necessary to determine effective amounts of the single compound effervescent agent and its corresponding soluble acid source does not itself constitute undue experimentation. *See Ortho–*

> *McNeil Pharm., Inc. v. Mylan Labs., Inc.*, 520 F.3d 1358, 1365–66 (Fed. Cir. 2008) ("[E]ven if clinical trials informed the anticonvulsively effective amount, this record does not show that extensive or 'undue' tests would be required to practice the invention."). In addition, extensive experimentation does not necessarily render the experiments unduly extensive where the experiments involve repetition of known or commonly used techniques. *See Johns Hopkins Univ. v. CellPro, Inc.*, 152 F.3d 1342, 1360 (Fed. Cir. 1998) (finding that the difficulty in producing certain antibodies could not be attributed to the shortcomings in the disclosure of the patent at issue, but rather, the difficulty was attributed to the technique commonly used during experimentation that generally required repetition). Thus, the focus "is not merely quantitative, since a considerable amount of experimentation is permissible, if it is merely routine, or if the specification in question provides a reasonable amount of guidance . . . ." *PPG Indus., Inc.*, 75 F.3d at 1564 (citation and quotation omitted).

*Cephalon, Inc. v. Watson Pharms., Inc.*, 70 F.3d 1330, 1338-39 (Fed. Cir. 2013).

Enablement is determined from the viewpoint of persons of ordinary skill in the field of the invention at the time the patent application was filed. *Ajinomoto Co., Inc. v. Archer-Daniels-Midland Co.*, 228 F.3d 1338, 1345 (Fed. Cir. 2000). Thus, a claim in an issued patent can be rendered invalid due to lack of enablement if its scope is not fully enabled. *Id*.

**4. Indefiniteness**

The definiteness requirement of 35 U.S.C. § 112 ensures that the patent claims particularly point out and distinctly claim the subject matter that the patentee regards to be the invention. *See* 35 U.S.C. § 112, ¶ 2; *Metabolite Labs., Inc. v. Lab. Corp. of Am. Holdings*, 370 F.3d 1354, 1366 (Fed. Cir. 2004). If a claim's legal scope is not clear enough so that a person of ordinary skill in the art could determine whether or not a particular product infringes, the claim is indefinite, and is, therefore, invalid. *Geneva Pharm., Inc. v. GlaxoSmithKline PLC*, 349 F.3d 1373, 1384 (Fed. Cir. 2003).[9]

[9] Indefiniteness is a question of law. *IGT v. Bally Gaming Int'l, Inc.*, 659 F.3d 1109 (Fed. Cir. 2011).

[redacted]

Thus, it has been found that:

> When a proposed construction requires that an artisan make a separate infringement determination for every set of circumstances in which the composition may be used, and when such determinations are likely to result in differing outcomes (sometimes infringing and sometimes not), that construction is likely to be indefinite.

*Halliburton Energy Servs. v. M-I LLC*, 514 F.3d 1244, 1255 (Fed. Cir. 2008).

A patent is not indefinite if the claims, "viewed in light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable certainty." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014). "If, after a review of the intrinsic and extrinsic evidence, a claim term remains ambiguous, the claim should be construed so as to maintain its validity." *Certain Consumer Electronics and Display Devices With Graphics Processing and Graphics Processing Units Therein*, Inv. No. 337-TA-932, Order No. 20 (Apr. 2, 2015) (quoting *Phillips*, 415 F.3d at 1327).

The burden is on the accused infringer to come forward with clear and convincing evidence to prove invalidity. *See Young v. Lumenis, Inc.*, 492 F.3d 1336, 1344 (Fed. Cir. 2007) ("A determination that a patent claim is invalid for failing to meet the definiteness requirement in 35 U.S.C. § 112, ¶ 2 is a legal question reviewed de novo.").

### D. Domestic Industry

A violation of section 337(a)(1)(B), (C), (D), or (E) can be found "only if an industry in the United States, with respect to the articles protected by the patent, copyright, trademark, mask work, or design concerned, exists or is in the process of being established." 19 U.S.C. § 1337(a)(2). Section 337(a) further provides:

> (3) For purposes of paragraph (2), an industry in the United States shall be considered to exist if there is in the United States, with respect to the articles protected by the patent, copyright, trademark, mask work, or design concerned—

(A) significant investment in plant and equipment;

(B) significant employment of labor or capital; or

(C) substantial investment in its exploitation, including engineering, research and development, or licensing.

19 U.S.C. § 1337(a)(3).

These statutory requirements consist of an economic prong (which requires certain activities)[10] and a technical prong (which requires that these activities relate to the intellectual property being protected). *Certain Stringed Musical Instruments and Components Thereof*, Inv. No. 337-TA-586, Comm'n Op. at 13 (May 16, 2008) ("*Stringed Musical Instruments*"). The burden is on the complainant to show by a preponderance of the evidence that the domestic industry requirement is satisfied. *Certain Multimedia Display and Navigation Devices and Systems, Components Thereof, and Products Containing Same*, Inv. No. 337-TA-694, Comm'n Op. at 5 (July 22, 2011) ("*Navigation Devices*").

"With respect to section 337(a)(3)(A) and (B), the technical prong is the requirement that the investments in plant or equipment and employment in labor or capital are actually related to 'articles protected by' the intellectual property right which forms the basis of the complaint."

[10] The Commission practice is usually to assess the facts relating to the economic prong at the time that the complaint was filed. *See Certain Coaxial Cable Connectors and Components Thereof and Products Containing Same*, Inv. No. 337-TA-560, Comm'n Op. at 39 n.17 (Apr. 14, 2010) ("We note that only activities that occurred before the filing of a complaint with the Commission are relevant to whether a domestic industry exists or is in the process of being established under sections 337(a)(2)-(3).") (citing *Bally/Midway Mfg. Co. v. U.S. Int'l Trade Comm'n*, 714 F.2d 1117, 1121 (Fed. Cir. 1983)). In some cases, however, the Commission will consider later developments in the alleged industry, such as "when a significant and unusual development occurred after the complaint has been filed." *See Certain Video Game Systems and Controllers*, Inv. No. 337-TA-743, Comm'n Op., at 5-6 (Jan. 20, 2012) ("[I]n appropriate situations based on the specific facts and circumstances of an investigation, the Commission may consider activities and investments beyond the filing of the complaint.").

*Stringed Musical Instruments* at 13-14. "The test for satisfying the 'technical prong' of the industry requirement is essentially same as that for infringement, i.e., a comparison of domestic products to the asserted claims." *Alloc, Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1375 (Fed. Cir. 2003). "With respect to section 337(a)(3)(C), the technical prong is the requirement that the activities of engineering, research and development, and licensing are actually related to the asserted intellectual property right." *Stringed Musical Instruments* at 13.

With respect to the economic prong, and whether or not section 337(a)(3)(A) or (B) is satisfied, the Commission has held that "whether a complainant has established that its investment and/or employment activities are significant with respect to the articles protected by the intellectual property right concerned is not evaluated according to any rigid mathematical formula." *Certain Printing and Imaging Devices and Components Thereof*, Inv. No. 337-TA-690, Comm'n Op. at 27 (Feb. 17, 2011) ("*Printing and Imaging Devices*") (citing *Certain Male Prophylactic Devices*, Inv. No. 337 TA-546, Comm'n Op. at 39 (Aug. 1, 2007) ("*Male Prophylactic Devices*"). Rather, the Commission examines "the facts in each investigation, the article of commerce, and the realities of the marketplace." *Id.* "The determination takes into account the nature of the investment and/or employment activities, 'the industry in question, and the complainant's relative size.'" *Id.* (citing *Stringed Musical Instruments* at 26). Moreover, "[t]here is no Commission precedent supporting the proposition that a comparison of domestic and foreign producers' assets must be performed." *Male Prophylactic Devices* at 43 n.15. There is no minimum monetary expenditure that a complainant must demonstrate, and there is no need to define or quantify an industry in absolute mathematical terms. *See id.* at 39 ("[T]here is no mathematical threshold test."). When a complainant conducts operations abroad, a comparative analysis of a complainant's domestic expenditures

versus its foreign expenditures, or an analysis of the value added by the domestic activities, is conducted to determine the significance of the domestic activities. *See, e.g.*, *Certain Carburetors and Prod. Containing Such Carburetors* ("*Carburetors*"), Inv. No. 337-TA-1123, Comm'n Op. at 8–9, 19 (Oct. 28, 2019).

## V. Claim Construction

### A. Level of Ordinary Skill in the Art

According to respondents and the Staff, the parties agree that a person of ordinary skill in the art would have a bachelor's degree in engineering, computer science or a comparable field of study and relevant industry experience. *See* Resps. Br. at 16; Staff Br. at 13; RX-0156C (Henze RWS) at Q/A 18-19. EcoFactor does not address the level of ordinary skill in the art in its posthearing brief. *See generally* Compl. Br.[11] According to respondents, EcoFactor contends that one of ordinary skill in the art would need only two years of industry experience while respondents contend that five years would be required. *See* Resps. Br. at 16; Staff Br. at 13. The Staff agrees with EcoFactor that only two years of industry experience is required. *See* Staff Br. at 13.

The administrative law judge adopts respondents' proposal, which is that a person of ordinary skill in the art has a bachelor's degree in engineering, computer science or a comparable field of study and five years of relevant industry experience. *See* RX-0156C (Henze RWS) at Q/A 18.

[11] In the Comprehensive Joint Outline of Issues, EcoFactor states: "III.A.1, pg. 27" regarding its discussion of the required level of skill of a person of ordinary skill in the art (EDIS Doc. No. 728782) ("GR11 Filing"). The administrative law judge found no such discussion in the referenced section.

[redacted]

### B. Disputed Constructions[12]

#### 1. "HVAC System" / "heating, ventilation and air conditioning (HVAC) system" / "heating, ventilation and air conditioning system" (collectively, "HVAC system") ('497 patent, claims 1, 2, 5; '322 patent, claims 1, 5; '371 patent, claim 9)

Below is a chart showing the parties' proposed claim constructions.

The administrative law judge has adopted the format used by the parties, where all claim terms for all patents are discussed in the same section. The '497 and '322 patents share the same specification, and the only overlapping term between the '497 and '322 patents and the unrelated '371 patent is the term addressed here: "HVAC system."

| EcoFactor's Proposed Construction | Respondents' Proposed Construction | Staff's Proposed Construction |
|---|---|---|
| No construction necessary | a group of components working together to move heat or remove heat from the conditioned [structure/location] | Plain and ordinary meaning, an example of which is: heating, ventilation, and/or cooling devices that transfer heat into or out of a structure/location |

*See* Compl. Br. at 10; Resps. Br. at 11; Staff Br. at 13-14; Joint Claim Construction Chart, EDIS Doc. ID 704350, at 4.

The claim term "heating, ventilation and air conditioning (HVAC) system" appears in independent claim 1; the claim term "HVAC system" appears in independent claim 1 and dependent claims 2 and 5 of the '497 patent. JX-0001 ('497 patent) at col. 13, lns. 32-33, col. 14, ln. 3, col. 14, ln. 13. The claim term "HVAC system" appears in independent claim 1 and

[12] This initial determination addresses only the disputed claim terms identified by the parties as needing construction. *See* GR11 Filing. The parties identified the claim terms for construction in a joint filing required by Ground Rule 11, which provides: "On the same day the initial posthearing briefs are due, the parties shall file a comprehensive joint outline of all of the issues, including sub-issues, to be decided in the final Initial Determination. Exemplary issues and sub-issues include . . . disputed claim terms (The claim terms briefed by the parties must be identical. . .)." Ground Rule 11 (emphasis original) (attached to Order No. 2 (Ground Rules)).

dependent claim 5 of the '322 patent. JX-0002 ('322 patent) at col. 13, ln. 31; col. 14, ln. 4. The claim term "heating, ventilation and air conditioning (HVAC) system" appears in independent claim 9 of the '371 patent. JX-0004 ('371 patent) at col. 9, ln. 5.

EcoFactor argues, in part:

> The dispute here—to the extent one that matters really exists—concerns the term "HVAC system," is ubiquitously used across the entire industry defined by it and at issue in this case, namely, that of "HVAC" controls. Moreover, the asserted patents and various claims in them make clear that it is a device with one or more of the following; "heating, ventilation, and air conditioning" devices. The term is plainly—and repeatedly—used in the patents in a manner that is perfectly consistent with its plain meaning.
>
> The Staff's construction is consistent with EcoFactor's position and the plain meaning. Indeed, it reflects the plain meaning. And all parties agree that, for this term, the plain meaning should apply. In other words, everyone agrees the patentee did not act as its own lexicographer in drafting this term or else disclaim aspects of the scope of the plain meaning. EcoFactor's intrinsic and extrinsic evidence confirms this as well. *See, e.g.*, '497 patent at Abstract, 1:16-26, 1:54-62, 2:37-67, 3:16-34, 3:62-5:35, 7:14-9, 7:40-67, 8:1-36, 8:46-10:5, 10:30-41, 10:57-13:21, Figs 5, 11, 12, 13.
>
> Where a term is used in accordance with its plain meaning, the court should not replace it with different language. *Thorner v. Sony Computer Ent. Am. LLC*, 669 F.3d 1362, 1366-67 (Fed. Cir. 2012) ("***we do not redefine words.*** Only the patentee can do that."). That is because claim construction is "not an obligatory exercise in redundancy." *United States Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1568 (Fed. Cir. 1997).
>
> For their part, Respondents do not dispute that this term is ubiquitously used in the industry of "HVAC controls." But they nevertheless seek to replace the term with *seventeen* words of their own choosing under the premise that a POSITA in the industry would need further defining of this term—despite the fact that the acronym "HVAC" and "HVAC controls" has been used to define the entire industries in which the same POSITA works in. That fails.
>
> * * *
>
> Accordingly, this is a textbook example in which no further construction is necessary, because the exercise of interpreting the claim term "involves little more than the application of the widely accepted meaning of commonly understood words." *Phillips*, 415 F.3d at 1313-14. And in any event, the term certainly should not be re-defined according to Respondents' incorrect proposal, which is foreign

[redacted]

to, and creates tension with, the intrinsic record. And in any event, the term certainly should not be re-defined the way as Respondents propose.

Compl. Br. at 10-12 (footnote omitted).[13]

Respondents argue, in part:

> The asserted patents do not clearly define what constitutes the claimed "HVAC system," and so, contrary to Complainant's proposal, claim construction is necessary. Respondents' expert, Dr. Henze testified that a POSITA would understand an HVAC system to be "a group of components working together to move heat or remove heat from the conditioned [structure/location]." RX-0156C, Henze QA39; RX-0670 (HVAC Fundamentals (Sugarman)), at 4-5 (defining "HVAC system" as "simply a group of components working together to move heat to where it is wanted (the condition space), or remove heat from where it is not wanted (the conditioned space), and put it where it is unobjectionable (the outside air)."). The specifications are consistent. For instance, each of the '497 and '322 patents depict in Fig. 2 an HVAC unit 110—which is part of an HVAC system—and explain that "[t]he HVAC units may be conventional air conditioners, heat pumps, or other devices for transferring heat into or out of a building." '497 Patent, at 7:19-21, Fig. 2; '322 Patent, at 7:19-21, Fig. 2. Accordingly, the ALJ should adopt Respondents' proposed construction and construe HVAC system as "a group of components working together to move heat or remove heat from the conditioned [structure/location].

Resps. Br. at 16-17.

The Staff argues, in part:

> The patent specification uses these terms in a manner consistent with their plain meaning, as proposed by the Staff. For instance, each of the '497 and '322 patents depict in Fig. 2 an HVAC unit 110 - which is part of an HVAC system - and explain that "[t]he HVAC units may be conventional air conditioners, heat pumps, or other devices for transferring heat into or out of a building." JX-1 ('497 Patent) at 7:19-21, Fig. 2; JX-0002 ('322 Patent) at 7:19-21, Fig. 2. EcoFactor appears to agree with the Staff's construction, but also argues that no construction is necessary. CPreHBr. at 12. However, where the meaning of a claim term is disputed, it should be construed. The Staff agrees with EcoFactor that Respondents' proposed construction does not track with the specification's language, discussed above. Therefore, the ALJ should adopt the Staff's proposed construction of "HVAC system."

[13] Emphasis in original unless noted otherwise.

Staff Br. at 14 (footnote omitted).

It is determined that the term "HVAC system" is construed to have its plain and ordinary meaning, an example of which is: heating, ventilation, and/or cooling devices that transfer heat into or out of a structure/location. EcoFactor argues that no construction is necessary, and states that its construction is consistent with the Staff's. *See* Compl. Br. at 10-11. The intrinsic evidence also supports that this term should be construed according to its plain and ordinary meaning, because the patentee did not act as its own lexicographer in drafting this term or else disclaim aspects of the scope of the plain meaning. *See, e.g.*, JX-0001 ('497 patent) at Abstract; col. 1, lns. 16-26; col. 1, lns. 54-62; col. 2, lns. 37-67.

By contrast, respondents' construction introduces language that is not found in the intrinsic record, such as the phrase "working together to move or remove heat". Thus, respondents' proposed construction is rejected. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005). Moreover, replacing the term "HVAC" with "a group of components working together to move or remove heat" introduces unnecessary ambiguity.

**2. "operational efficiency" / "operational efficiency of an HVAC system" / "operational efficiency of a heating, ventilation, and air conditioning (HVAC) system" / "operational efficiency of the HVAC system" ('497 patent, claim 1; '322 patent, claim 1)**

| EcoFactor's Proposed Construction | Respondents' Proposed Construction | Staff's Proposed Construction |
|---|---|---|
| "energy or time to change inside temperature by any given amount for a set of one or more indoor or outdoor conditions" | "energy required by the HVAC system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions" | Same as respondents' |

*See* Compl. Br. at 12; Resps. Br. at 17-21; Staff Br. at 14-15; Joint Claim Construction Chart, EDIS Doc. ID 704350, at 4.

[redacted]

The claim term "operational efficiency of a heating, ventilation, and air conditioning (HVAC) system" appears in independent claim 1 of the '497 patent. JX-0001 ('497 patent) at col. 13, lns. 31-33. The claim term "operational efficiency of an HVAC system" appears in independent claim 1 of the '322 patent. JX-0002 ('322 patent) at col. 13, lns. 30-31, 48-49.

**a. Whether the Preambles of Claim 1 of the '497 Patent and '322 Patents Are Limiting**

EcoFactor argues, in part:

> There are two questions at the center of this next dispute. The first question is whether the term is limiting in the '497 patent claims. It is not. In contrast to the manner in which the patentee used the term in the '322 patent, "operational efficiency" is found ***only*** in the preamble of the '497 patent claims. Under controlling law, this creates a presumption that it is not limiting. *E.g.*, *Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002) (a preamble is generally not limiting, unless there is "clear reliance on the preamble during prosecution to distinguish the claimed invention from the prior art."). Respondents have not shown—and cannot show—that there is any reason for it to be limiting.
>
> Indeed, Respondents' expert testimony at trial proves beyond debate that the term is not limiting as it is used in the '497 patent. Under a long line of Federal Circuit precedent, a preamble term *must not* be construed to limit the claim where it is used to "state a purpose or intended use for the invention." *Catalina Mktg.*, 289 F.3d at 808. But that is precisely the way it is used here, according to *Respondents' own claim construction expert*, Dr. Henze:
>
> 4 It's also your opinion that that preamble is the
> 5 intended use of the claim, correct?
> 6 A. I wonder what else -- what other use would it be
> 7 for than what is stated in the preamble that that claim is
> 8 for.
>
> Hearing Tr. at 774: 4-8. Respondents' other expert witnesses, including Dr. Auslander, also confirmed that the term is merely part of the stated "purpose" of the claim. Hearing Tr. at 900:15-901:9. Thus, Respondents' interpretation to find the term limiting in '497 patent would lead to reversible error.

Compl. Br. at 12-15.

Respondents argue, in part:

[redacted]

> There is no dispute that claim 1, as recited in the preamble, is directed to a system for "calculating a value for the operational efficiency of an [HVAC] system." '497 patent, cl. 1; RX-0156C, Henze QA45-46; RX-0001C, Auslander QA46; RX-0163C, Souri 9/2 QA36-37; Hearing Tr. vol. 1, 237:20-24, Nov. 16, 2020 (Gomez); Hearing Tr. vol. 4, 949:18-50:14, Nov. 19, 2020 (Palmer). Dr. Henze and Dr. Auslander testified that a POSITA would understand that the preamble of claim 1 is limiting and "breathes life into the claim by providing a purpose for the calculations recited in the rest of the claim." RX-0001C, Auslander QA69; RX-0156C, Henze QA64-65. A POSITA would understand that performing limitations [1a] through [1d] would result in calculating a value for the operational efficiency of an HVAC system, as recited by [1pre]. RX-0156C, Henze QA65; RX-0001C, Auslander QA69. Without the preamble, a POSITA would not understand the purpose of limitations [1a] through [1d]. RX-0156C, Henze QA65; RX-0001C, Auslander QA69. As Dr. Henze testified, "[t]he final limitation does not explain how the result of the calculations that follow produce the claimed value for the operational efficiency of an HVAC, making the claim nonsensical." RX-0156C, Henze QA65. Mr. Gomez similarly testified that the rates of change calculated in limitation [1d] are used "to derive a value for the operational efficiency." Hearing Tr. vol. 1, 241:23-42:6, Nov. 16, 2020 (Gomez).

Resps. Br. at 146-47.

The Staff argues, in part:

> The Staff agrees with Google that the preamble of claim 1 of the '497 patent is limiting. RPreHBr. at 107. A person of ordinary skill would understand that performing limitations [1a] through [1d] would result in calculating a value for the operational efficiency of an HVAC system, as recited in the preamble, and without the preamble, a person of ordinary skill would not understand the purpose of limitations [1a] through [1d]. *See* RX-0156C (Henze) QA 65; RX-001C (Auslander) QA 69; Hearing Tr. 900:15-901:1-9 (Auslander).

Staff Br. at 27-28.

The administrative law judge finds that the preamble is limiting in claim 1 of the '497 patent. "If the claim preamble, when read in the context of the entire claim, recites limitations of the claim, or, if the claim preamble is 'necessary to give life, meaning, and vitality' to the claim, then the claim preamble should be construed as if in the balance of the claim." *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed. Cir. 1999) (quoting *Kropa v. Robie*, 187 F.2d 150, 152 (CCPA 1951)).

[redacted]

In the case at hand, the preamble recites: "A system for calculating a value for the operational efficiency of a heating, ventilation, and air conditioning (HVAC) system." JX-0001 ('497 patent) at col. 13, lns. 31-32. The body of the claim then recites "at least one HVAC control system that receives temperature measurements", "one or more databases that store at least said temperatures, and one or more processors that receive outside temperature measurements from at least one source other than said HVAC system, wherein said one or more processors are configured to calculate" rates of change in temperature and "to relate said calculated rates of change to said outside temperature measurements." *Id.* at col. 13, lns. 34-51.

Without the preamble term "operational efficiency", one of ordinary skill in the art would not understand the purpose for the calculations provided in the body of the claim. *See* RX-0001C (Auslander DWS) at Q/A 69. As such, the preamble provides "life, meaning, and vitality to the claim." *Pitney Bowes*, 182 F.3d at 1305. The administrative law judge finds that the preamble of claim 1 of the '497 patent is limited to a system for calculating a value for the operational efficiency of a heating, ventilation, and air conditioning (HVAC) system.

EcoFactor asserts that a preamble is not limiting "unless there is a 'clear reliance on the preamble during prosecution to distinguish the claimed invention from the prior art,'" and "a preamble term must not be construed to limit the claim where it is used to 'state a purpose or intended use for the invention.'" *See* Compl. Br. at 12-13 (quoting *Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002)) (emphasis removed). However, the Federal Circuit in *Catalina Marketing* did not limit the circumstances to those in which a preamble is limiting. Instead, the Federal Circuit clearly stated that "[n]o litmus test defines when a preamble limits claim scope." *Catalina Mktg. Int'l*, 289 F.3d at 808. Moreover, the Federal Circuit stated that "a preamble is not limiting where a patentee defines a structurally

complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention." *Id.* (quotation marks and citation omitted).

The administrative law judge further finds that the preamble of the '322 patent is also limiting. The preamble is limiting because it defines that the subject matter for the claims is the evaluation of operational efficiency. *August Tech. Corp. v. Camtek, Ltd.*, 655 F.3d 1278, 1284 (Fed. Cir. 2011) ("A claim's preamble may limit the claim when the claim drafter uses the preamble to define the subject matter of the claim.").

The preamble of claim 1 of the '322 patent recites, "A system for evaluating changes in the operational efficiency of an HVAC system over time." One of ordinary skill in the art would understand that in order to "evaluate changes" in operational efficiency, the system must compute and compare values for operational efficiency. *See* RX-0156C (Henze RWS) at Q/A 106. Furthermore, limitation 1[d] of the '322 patent relies on the preamble for antecedent basis, further indicating that the preamble is intended to define the claimed invention. *See Catalina Mktg. Int'l*, 289 F.3d at 808.

**b. Construction of "operational efficiency"**

EcoFactor argues, in part:

> The second question concerning this term is: whether operational efficiency can only be measured in terms of energy and energy alone—or else whether it can be measured in terms of energy or time. The plain meaning of the term and its usage throughout the intrinsic record make clear that the only correct answer is that this term must cover *energy or time*. Moreover, Respondents' construction would *exclude* embodiments in the patent, as their own claim construction expert admitted at the hearing.
>
> The plain meaning of the term obviously includes using less time to achieve a goal or complete a task, such reaching a temperature setpoint within a particular amount of time or under a particular set of conditions. The intrinsic and extrinsic evidence confirms this obvious point, for example, where it describes diagnosing problems with the HVAC system's estimated operational efficiency if it has

"significantly longer ***cycle times.***" JX-0001 ('497 patent) / JX-0002 ('322 patent), 3:1-4:14, 8:46-65, 9:10-44, 11:48-12:24, FIG. 8.

"The server will also record the responses of each house to changes in outside conditions and cycling behavior over time. That will allow the server to diagnose problems as and when they develop. For example, FIG. 8 a shows a graph of outside temperature 402, inside temperature 404 and HVAC cycle times 406 in House A for a specific 24-hour period on date X. Assume that, based upon comparison of the performance of House A on date X relative to House A's historical performance…the HVAC system in House A is presumed to be **operating at normal efficiency**…FIG. 8 b shows a graph of outside temperature 408, inside temperature 410 and HVAC cycle times 412 in House A for the 24-hour period on date X+1. House A's HVAC system now requires **significantly longer cycle times in order to try to maintain the same internal temperature**. If those longer cycle times were due to higher outside temperatures, those cycle times would not indicate the existence of any problems. But because server 106 is aware of the outside temperature, the system can eliminate that possibility as an explanation for the higher cycle times." JX-0001, 9:10-44 (emphasis added).

Thus, in the examples used by the patent, it is clear that operational efficiency of an HVAC system is determined in terms of cycle ***times***. As just one example, the patent explains that "Many factors affect the efficiency of HVAC systems," but "the "signature' of each different problem can be discerned from the way in which each such problem affects the ***cycle times*** of a given HVAC system over time and relative to weather conditions and the performance of other HVAC systems in other houses." '497 Patent at 3:35-60. The patent further explains in the context of explaining its figures, including figure 8, that determining whether a system is "operating at normal efficiency" includes a measurement of efficiency in terms of ***time***—as one HVAC system can require "***significantly longer cycle times*** in order to try to maintain the same internal temperature" relative to its historic performance. *Id.* at 9:10-44.

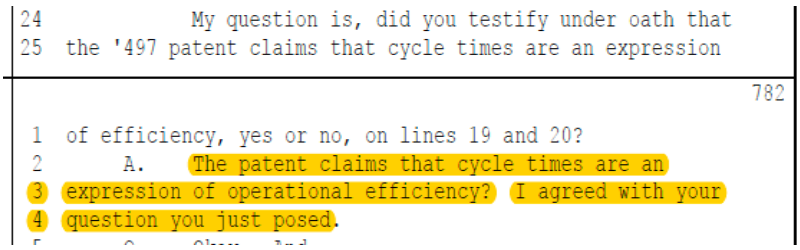
The evidence presented at the hearing now confirms EcoFactor's point. Respondents' own experts admitted that a POSITA would understand the term to also be met by "an HVAC system ***takes longer to change temperature***.

Q. All right. We can take that down for a second. Would you agree with me that an HVAC system that takes longer to change temperature is less efficient in terms of operational efficiency?
A. Again, you're talking about the same HVAC system at two different points in time?
Q. Yes.
A. Yes.

Hearing at 640:9-14.

[redacted]

This alone is dispositive. But there is more. During a detailed cross-examination, Respondents' own claim construction expert, Dr. Henze, admitted that this very intrinsic evidence reflects a preferred embodiment in which ***time***, ***not energy***, is the expression of operational efficiency:



24 My question is, did you testify under oath that
25 the '497 patent claims that cycle times are an expression

782

1 of efficiency, yes or no, on lines 19 and 20?
2 A. The patent claims that cycle times are an
3 expression of operational efficiency? I agreed with your
4 question you just posed.

Hearing Tr. 774:9-782:4. Respondents' construction excludes all this, as even Dr. Henze admitted. *Id*. Applying that construction will lead to error. Indeed, under black-letter Federal Circuit law, constructions that exclude embodiments are "***rarely, if ever, correct***." *SanDisk Corp. v. Memorex Prods*., 415 F.3d 1278, 1285-86 (Fed. Cir. 2005).

Extrinsic evidence further confirms this point. *See, e.g.,* CX-0542.0004 (Google web page entitled "Learn about what you'll see on your Nest thermostat," which states the "Time-to-Temperature estimate will get more accurate as your thermostat continues to learn about your home, your system's ***efficiency***, and how quickly your home warms up and cools down."); CX-0063C.0020 (Google technical document titled "A Brief Tour of HVAC Algorithms") [redacted]

For various results-driven reasons, Respondents seek to narrow the meaning of the term to exclude time and be limited to efficiency in terms of energy alone. Indeed, Respondents appear to be interpreting the term so narrowly as to forbid the use of "time" to understand energy required by an HVAC system, despite all of the evidence (and common sense) that a POSITA would understand that the longer an HVAC system runs, the more energy it uses. But "there are only two exceptions" in which claim terms are not given their "full ordinary and customary meaning: "1) when a patentee sets out a definition and acts as his own lexicographer, or 2) when the patentee disavows the full scope of a claim term[.]" *Thorner*, 669 F.3d at 1365. Here, Respondents cannot meet either exception. Their construction is wrong.

Compl. Br. at 12-15.

Respondents argue, in part:

EcoFactor's proposed construction is flawed because it removes operational efficiency from the context of the claims, which address operational efficiency "of [an/the] HVAC system." Respondents' and Staff's constructions both recognize this context: "energy required by the HVAC system to change inside temperature

[redacted]

by a given amount over a given time for a set of indoor and outdoor conditions;" (Respondents' proposed construction) and "energy required by the HVAC system to change inside temperature by a given amount" (Staff's proposed construction). This context is missing from EcoFactor's proposed construction.

This context hones the dispute between the parties for the ALJ. The true dispute is whether assessing "operational efficiency" of an HVAC system uses the "energy required" or whether, as proposed by EcoFactor, the "operational efficiency" of an HVAC system can be determined by "time" alone without any reference to energy. It cannot.

To a POSITA, "operational efficiency" in the context of HVAC systems. requires an assessment of the energy required for the HVAC system to perform an operation. As Vivint's expert Dr. James testified, "operational efficiency" is a well-understood concept in the context of HVAC systems. RX-0164C, James QA131. Dr. James testified that the American Society of Heating, Refrigeration, and Air Conditioning Engineers defines the efficiency estimate "SEER" (i.e., "Seasonal Energy Efficiency Ratio") as a "ratio of the total heat removed from the conditioned space to the total electrical input if the combined appliance operated exclusively in a space-cooling-only (COOL) mode. The quantity is expressed in units of Btu/Wh." RX-0164C, James QA134. Dr. James identified other industry examples of estimates for operational efficiency that account for energy: the Coefficient of Performance (COP) and the Energy Efficiency Ratio (EER). RX-0164C, James QA134. COP is measured by heat removed (or added) with respect to electrical energy input to a system (in kW or BTU/hr), while EER is a measure of efficiency that uses energy/hr (i.e., BTU/hr) for heat removed and W for power (electrical energy) input. *See id.* Other Respondent experts similarly testified that a person of ordinary skill in the art would understand "operational efficiency" to necessarily require evaluation of energy consumed. RX-0163C, Souri 9/2 QA ("In the context of heating or cooling, efficiency of an HVAC system relates to energy required by the HVAC system to establish and maintain a given temperature. . . . Simply looking at the time an HVAC system that takes to change the temperature by a given amount does not inform whether the HVAC system is more or less efficient."); RX-0156C, Henze QA71 ("The time to change indoor temperature by any amount for a set of one or more indoor or outdoor conditions, by itself, cannot be a value for the operational efficiency of the HVAC system. This is particularly true when the HVAC system is not properly matched to the structure it is conditioning.").

This unrefuted expert testimony can assist the ALJ in evaluating the intrinsic evidence found in the specification. The specification routinely discusses energy in the context of efficiency, including acknowledging that the "SEER" rating is a "theoretical efficiency of a central air conditioner [HVAC system]." '497 patent, at 3:36-37; *see also* '497 Patent at 2:40-42 (". . .leading the heating system to overheat the rest of the house and waste considerable energy"); 2:63-64 ("using contemporary techniques for energy efficiency such as high levels of insulation");

[redacted]

3:4-5 ("thermal mass significantly affects many parameters relating to energy efficiency"); 3:14-15 ("consumers can reduce costs by taking into account not just how much energy they use, but when they use it"); 3:43-44 (". . .these problems are likely to manifest themselves in the form of higher energy bills"); 10:25-28 ("Conventional thermostats. . . waste considerable energy"); 13:17-21 ("Additional temperature and/or humidity sensors may allow increased accuracy of the system, which can in turn increase user comfort or energy savings") (emphasis added).

When the specification references "time," it does so in reference to a span of time over which changes in efficiency will be evaluated—it never equates "time" by itself as being a measure of efficiency. *See* '497 patent at 1:22-23 ("communicating thermostats are combined with a computer network in order to evaluate changes in the operational efficiency of an HVAC system over time") (emphasis added); 9:34-38 (". . . correlating the drop in efficiency and the time interval over which it has occurred."). In that regard, the proposed constructions from the Staff and Respondents correctly focus the meaning of operational efficiency on "energy required by the HVAC system to change inside temperature by a given amount."

To fully capture the correct meaning of operational efficiency of an HVAC system, the Staff's and Respondents' proposed construction includes the additional language "over a given time for a set of indoor and outdoor conditions." This aspect of the proposed construction is necessary in light of the intrinsic and extrinsic evidence as well as the context in which "operational efficiency" is used in the claims. *See* RX-0163C, Souri 9/2 QA39. Operational efficiency of an HVAC system can only be assessed by looking at the amount of energy required over a given time. Without this, "energy required" is simply a measurement of energy not an evaluation of efficiency. Additionally, as the specification makes clear, operational efficiency cannot be assessed without consideration of the conditions in which the operations take place. For example, in discussing comparisons of efficiency, the specification states, "the server compares the HVAC system's efficiency, corrected for the relevant conditions, to its efficiency in the past." *See* '497 patent, at 11:58-60; *see also id.* 11:48-57 ("The server will also take into account that relative efficiency is not absolute, but will vary depending on conditions. For example, a house that has extensive south-facing windows is likely to experience significant solar gain. On sunny winter days, that home will appear more efficient than on cloudy winter days. That same house will appear more efficient at times of day and year when trees or overhangs shade those windows than it will when summer sun reaches those windows. Thus, the server will calculate efficiency under varying conditions."). EcoFactor recognizes and concedes this point because it too proposes a construction of operational efficiency that accounts for "indoor or outdoor conditions."

Resps. Br. at 18-21.

The Staff argues, in part:

[redacted]

> As stated by parties, the main dispute is whether assessing "operational efficiency" of an HVAC system uses the "energy required" or whether, as proposed by EcoFactor, the "operational efficiency" of an HVAC system can be determined by "time" alone without any reference to energy. *See* RPreHBr. at 22; CPreHBr. at 13. The Staff agrees with Respondents that it cannot.
>
> First, the claims and specification do not provide explicit guidance as to the meaning of "operational efficiency." . . .
>
> In addition to the extrinsic evidence set forth by Respondents that "operational efficiency" of an HVAC system can only be assessed by looking at the amount of energy required over a given time (*see* RPreHBr. at 12-13), a dictionary definition of "efficiency" is "accomplishment of or ability to accomplish a job with a minimum expenditure of *time and effort*," and a definition of "efficient" is "performing or functioning effectively with the least waste of *time and effort*." *See* Random House Webster Dictionary, 2nd Ed. (1997). This is consistent with Respondents' proposed construction that *energy* (*i.e.*, effort) over a *given time* should be included in the construction of "operational efficiency." Therefore, for these reasons and those set forth by Respondents, the ALJ should adopt the Respondents' and Staff's proposed construction of "operational efficiency."

Staff Br. at 15-16.

It is determined that the claim term "operational efficiency" is construed to mean "energy required by the HVAC system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions."

This interpretation is consistent with the specification of the '322 and '497 patents. For example, when the specification references "time," it does so in reference to a span of time over which changes in efficiency will be evaluated. JX-0001 ('497 patent) at col. 1, lns. 22-23 ("communicating thermostats are combined with a computer network in order to evaluate changes in the operational efficiency of an HVAC system over time"); col. 9, lns. 34-38 (". . . correlating the drop in efficiency and the time interval over which it has occurred.").

EcoFactor argues that "it is clear that operational efficiency of an HVAC system is determined in terms of cycle ***times***. As just one example, the patent explains that 'Many factors affect the efficiency of HVAC systems,' but 'the "signature" of each different problem can be

discerned from the way in which each such problem affects the ***cycle times*** of a given HVAC system over time and relative to weather conditions and the performance of other HVAC systems in other houses." Compl. Br. at 14 (quoting '497 patent at col. 3, lns. 35-60 (emphasis added)). Contrary to EcoFactor's assertion, the specification's reference to "cycle time" does not indicate that time alone can be a measure of operational efficiency. For instance, the specification explains that the longer cycle times of the HVAC system may be required when the outside temperature increases in order to maintain the same internal temperature. *See* JX-0001 ('497 patent) at col. 9, lns. 24-30. The specification explains that because the system is aware of the outside temperature, which is the cause of the longer cycle times, "those longer cycle times would not indicate the existence of any problems [in operational efficiency]." *Id*. at col. 9, lns. 26-29. Thus, because a longer cycle time can occur even though the efficiency of the system is operating normally (or has not changed), the cycle time references in the specification do not indicate that time alone is a measure of efficiency.

EcoFactor further argues that this proposed construction excludes a preferred embodiment, but this argument is unconvincing. EcoFactor cites the '497 patent at col. 9, lines 10-44, but this portion of the specification references a span of time over which changes in efficiency will be evaluated. *See* JX-0001 ('497 patent) at col. 9, lines 34-38 (". . . correlating the drop in efficiency and the time interval over which it has occurred."). While a longer cycle time can be indicative of lower operational efficiency due to clogged filter, refrigerant leak, etc., the patent does not equate this time itself with a measure of efficiency. *See id*.

Accordingly, the term "operational efficiency" is construed to mean "energy required by the HVAC system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions."

### 3. "measurements of outside temperatures" / "outside temperature measurements" / "outside temperatures" ('497 patent, claims 1, 2; '322 patent, claims 1, 2)

| EcoFactor's Proposed Construction | Respondents' Proposed Construction | Staff's Proposed Construction |
|---|---|---|
| "a measurement of the temperature outside (or external to) [the structure]" | "a measurement of the actual temperature at a location outside (or external to) [the structure]" | Same as EcoFactor's |

*See* Compl. Br. at 15-16; Resps. Br. at 21-22; Staff Br. at 17; Joint Claim Construction Chart, EDIS Doc. ID 704350, at 4.

The claim term "outside temperature measurements" appears in independent claim 1 of the '497 patent. JX-0001 ('497 patent) at col. 13, lns. 39-40. The claim term "outside temperatures" appears in dependent claim 2 of the '497 patent. *Id.* at col. 14, ln. 2. The claim term "measurements of outside temperatures" appears in independent claim 1 and dependent claim 2 of the '322 patent. JX-0002 ('322 patent) at col. 13, lns. 36-37, col. 13, ln. 51.

EcoFactor argues, in part:

> EcoFactor's construction of this phrase is consistent with its plain meaning. Indeed, "measurements of outside temperatures" is just repackaged as "a measurement of the temperature outside" the structure. These words need no further importation of elements—and the law does not allow for such importation, no matter the outcome one party seeks on infringement or validity or any other issue. This term needs no further construction.
>
> Staff's plain-meaning construction appears consistent with EcoFactor's plain-meaning construction. On the other hand, Respondents add the term "actual" to necessarily qualify and limit the actual word in the claim, which is "measurements." In this regard, Respondents' are narrowing the plain meaning of "measurements" to "**actual** measurements." Whatever Respondents mean by adding that qualifier, to narrow the term, it runs afoul of the law. That is because "there are only two exceptions" in which terms are not given their "full ordinary and customary meaning: "1) when a patentee sets out a definition and acts as his own lexicographer, or 2) when the patentee disavows the full scope of a claim term[.]" *Thorner*, 669 F.3d at 1365. Respondents cannot meet either exception. Without clear and unambiguous disclaimer or lexicography in the intrinsic record,

courts "do not import limitations into claims from examples or embodiments appearing only in a patent's written description." *JVW Enters. v. Interact Accessories, Inc.*, 424 F.3d 1324, 1335 (Fed. Cir. 2005). This is true "even when a specification describes very specific embodiments [] or even describes only a single embodiment." *Id*.

And here, Respondents' importation does not even appear from the intrinsic record. The intrinsic record demonstrates that Respondents' importation actually creates tension with the patent, which simply teaches—and claims in claim 2—receiving outside temperature data from weather information published on the Internet based on geographic areas such as by ZIP code. JX-0001 ('497 Patent) at 5:4-23. In other words, if the system receives digital outside temperature data from a weather database or the Internet, this must qualify as the claimed "outside temperature measurements" of the independent claims. Indeed, Respondents' own claim construction expert, Dr. Henze, admitted this point at the hearing:

Q. And if a system receives outside temperatures for geographic regions based on ZIP Codes from sources other than said HVAC system, it has to also satisfy the outside temperature measurements limitation of claim 1 then. Fair?
A. I believe so.

Hearing Tr. at 788:1-10. Respondents' construction fails.

Compl. Br. at 16-17.

Respondents argue, in part:

The parties agree that the terms **"**measurements of outside temperatures," "outside temperature measurements," and "outside temperatures" in the '322 and '497 claims all require a measurement of the temperature outside, or external to, the structure. The only dispute is whether the measurement must be of the actual temperature, as Respondents propose. The specifications of the Asserted Patents support Respondents' construction. The '497 and '322 patents explain that "outside temperature" affects subjective comfort. '497 Patent at 2:6-8; '322 Patent, at 2:6-8. As such, the '497 and '322 patents teach that the outside temperature measurements are used to calculate values for the operational efficiency of an HVAC system and the effective thermal mass. '497 Patent, at 3:62-5:3; 10:59-63; '322 Patent, at 3:62-5:3; 10:59-63. Dr. Henze testified that these computations rely on the *actual* temperature at a location outside the structure because the actual temperature is what would affect the operational efficiency and effective thermal mass. RX-0156C, Henze QA81. Accordingly, in the context of the Asserted Patents, the measurement of outside temperature is a measurement of the actual temperature at a location outside (or external to) [the structure]." *Id.,* Henze QA81.

Resps. Br. at 21-22.

The Staff argues, in part:

> All parties agree that these terms all require a measurement of the temperature outside, or external to, the structure. The only dispute is whether the measurement must be of the actual temperature, as Respondents propose. RPreHBr. at 25; CPreHBr. at 15.
>
> The Staff agrees with Respondents that the '497 and '322 patents explain that "outside temperature" affects subjective comfort, and that the outside temperature measurements are used to calculate values for the operational efficiency of an HVAC system and the effective thermal mass. RPreHBr. at 25. However, as pointed out by EcoFactor, the specification teaches receiving and logging outside temperature data from weather information published on the Internet based on geographic areas such as by ZIP code. CPreHBr. at 16; JX-1, at 5:12-18. The specification further teaches that this logged data (and other weather data) is used to calculate the effective thermal mass and operational efficiency. *See, e.g.*, JX-1 at 8:63:9:9; 11:8-19; 11:20-29. Although this logged outside temperature data is also an *actual* temperature measurement (at the time and location that it was measured) that is received by the system, the specification and claims do not require that the term "actual" be included in the construction. Therefore, for these reasons and those set forth by EcoFactor, the ALJ should adopt EcoFactor and the Staff's proposed construction.

Staff Br. at 17-18.

It is determined that the meaning of the claim term "measurements of outside temperatures" means "a measurement of the temperature outside (or external to) [the structure]." Respondents propose adding the term "actual", but the specification teaches multiple methods of determining the outside temperature, such as using temperature data from weather information published on the Internet based on geographic areas such as by ZIP code, and using this logged data (and other weather data) to calculate the effective thermal mass and operational efficiency. *See, e.g.*, JX-0001 ('497 patent) at col. 5, lns. 12-18, col. 8, ln. 63 – col. 9, ln. 9; col. 11, lns. 8-19; col. 11, lns. 20-29. Thus, respondents' construction is inconsistent with the intrinsic record, which simply teaches (and claims in claim 2) receiving outside temperature data from

Internet weather information. *See id.* at col. 5, lns. 4-23. Therefore, respondents have not demonstrated that their proposed construction of this claim limitation should be adopted.

**4. "programmable thermostat" ('497 and '322 patent, claim 5)**

| EcoFactor's Proposed Construction | Respondents' Proposed Construction | Staff's Proposed Construction |
|---|---|---|
| "thermostat that uses microprocessor-based circuitry to control the switch and operate based upon user-determined protocols for temperature vs. time" | "thermostat that uses microprocessor-based circuitry to control the switch and to store and operate based upon user determined protocols for temperature vs. time" | "thermostat that uses microprocessor-based circuitry to control the switch and operate based upon user determined protocols for temperature vs. time" |

*See* Compl. Br. at 17; Resps. Br. at 22-23; Staff Br. at 18; Joint Claim Construction Chart, EDIS Doc. ID 704350, at 4.

The claim term "programmable thermostat" appears in dependent claim 5 of the '497 patent. JX-0001 ('497 patent) at col. 14, lns. 10-11. The claim term "programmable thermostat" appears in dependent claim 5 of the '322 patent. JX-0002 ('322 patent) at col. 14, lns. 5-6.

EcoFactor argues, in part:

> For this term, EcoFactor and Staff fully agree on the plain meaning. Respondents largely agree, except for one key additional limitation: they also require the thermostat to ***store*** some unknown thing.
>
> Respondents' added limitation will lead to error. Though it is not clear where Respondents find their importation, what is clear is that the law of claim construction does not allow it. To the contrary, the Federal Circuit has made clear that courts should "not redefine words. Only the patentee can do that." *See Thorner*, 669 F.3d at 1366-67 (emphasis added). Indeed, even if the patent only taught one embodiment that involved an order and causation, that still would be legally insufficient to change the language of the claims. *Unwired Planet,* 829 F.3d at 1359 ("it is 'not enough that the only embodiments, or all of the embodiments, contain a particular limitation' to limit the claims beyond their plain meaning.")
>
> Respondents initially contended the inventors defined programmable thermostat when they wrote that exemplary prior art digital thermostats can use "microprocessor based circuitry to control the switch and to store and operate based on user-determined protocols for temperature vs. time." JX-0002 ('322 Patent) at

[redacted]

1:40-43. However, even Respondents' expert now acknowledges that the plain meaning is broader than Respondents'' proposed construction. *See, e.g.*, RX-0156C (Henze RWS) at Q/A 41 testifying that "[a] programmable thermostat is a thermostat that allows the user to create temperature setpoints for specific times, thereby 'programming' the thermostat with a schedule of temperatures and times.'"). And Respondents have offered no evidence that a person of skill in the art would read the description in the '322 patent as an express definition. Plainly it is not. Indeed, the section at issue refers to prior art devices, and not to "programmable thermostats" but rather to examples of "electronic digital thermostats [that] have become prevalent." JX-0002 ('322 Patent) at 1:38-43.

As the Federal Circuit has repeatedly held, "[i]t is not enough for a patentee to simply disclose a single embodiment or use a word in the same manner in all embodiments, the patentee must 'clearly express an intent' to redefine the term." *Thorner v. Sony Computer Entertainment America LLC,* 669 F.3d 1362, 1365 (Fed. Cir. 2012) ("To act as its own lexicographer, a patentee must '***clearly set forth*** a definition of the disputed claim term.'"). Respondents' construction fails.

Compl. Br. at 17-18.

Respondents argue, in part:

There are two disputes, (1) whether the thermostat that operates based upon user-determined protocols for temperature vs. time must also "store" those protocols as proposed by Respondents; and (2) whether the microprocessor-based circuitry controls "the switch" as proposed by Respondents and Staff, or "a switch" as proposed by EcoFactor.

Respondents' proposed construction is appropriate and fully supported by the intrinsic evidence that supports inclusion of the word "store" because the patentee, acting as a lexicographer, defined the term "programmable thermostat." A patentee acts as his own lexicographer when "the special definition of the term is clearly stated in the patent specification or file history." *See Vitronics,* 90 F.3d at 1582. In discussing modern "electronic digital thermostats," the specification states, "[t]hese thermostats use solid-state devices such as thermistors or thermal diodes to measure temperature, and microprocessor-based circuitry to control the switch **and to store** and operate based upon user-determined protocols for temperature vs. time." '497 Patent, at 1:37-42 (emphasis added); '322 Patent, at 1:37-42 (emphasis added). The specification is clearly referring to and defining a "programmable thermostat" because the very next sentence of the specification states, "[t]hese programmable thermostats generally offer . . ." '497 Patent at 1:43; '322 Patent, at 1:43. The patentee has clearly stated that the programmable thermostat is capable of storing protocols. The specification further states that the user can "set one series of commands per day." '497 Patent, at 1:48-49; '322 Patent, at 1:48-49. If a user can schedule a series of commands into the thermostat, then the thermostat must be able to store them. Moreover, the only reference to switch

is preceded by "the," not "a." *See* '497 Patent, at 1:40; '322 Patent, at 1:40 ("microprocessor bases circuitry to control **the switch** and to store and operate. . .") (emphasis added). Respondents' proposed constructions is based on this intrinsic evidence.

Resps. Br. at 22-23 (footnote omitted).

The Staff argues, in part:

The only dispute is whether the "programmable thermostat" should include the ability "to store," as Respondents propose. RPreHBr. at 25; CPreHBr. at 15.

The specification discloses that "thermostat 108 includes … a microprocessor 254, ***memory 256***, a display 258, a power source 260, a relay 262, which turns the HVAC system on and off in response to a signal from the microprocessor, and contacts by which the relay is connected to the wires that lead to the HVAC system." JX-1, at 7:40-48. This obviously implies that a programmable thermostat stores information, such as a temperature v. time schedule. However, the specification also discloses that the thermostat can be connected to a local computer or wireless network, so that the function of the thermostat can be done through a web browser:

> To allow the thermostat to communicate bi-directionally with the computer network, the thermostat also includes means 264 to connect the thermostat to a local computer or to a wireless network. …. The thermostat 250 may also 55 include controls 266 allowing users to change settings directly at the thermostat, but such controls are not necessary to allow the thermostat to function.
>
> ….
>
> As shown in FIG. 3, the website 200 will permit thermostat users to perform through the web browser substantially all of the programming functions traditionally performed directly at the physical thermostat, such as temperature set points, the time at which the thermostat should be at each set point, etc.

JX-1, at 7:49-58; 8:10-14.

This suggests that the functions of the thermostat can be programmed and stored externally from the physical thermostat. Therefore, the ALJ should adopt EcoFactor's and the Staff's proposed construction.

Staff Br. at 18-19.

It is determined that the term "programmable thermostat" is construed to mean

"thermostat that uses microprocessor-based circuitry to control the switch and operate based

upon user-determined protocols for temperature versus time." The intrinsic evidence demonstrates that the thermostat can be connected to a local computer or wireless network, so that the function of the thermostat can be done through a web browser. *See* JX-0001 ('497 patent) at col. 7, lns. 49-58 ("To allow the thermostat to communicate bi-directionally with the computer network, the thermostat also includes means 264 to connect the thermostat to a local computer or to a wireless network. …. The thermostat 250 may also 55 include controls 266 allowing users to change settings directly at the thermostat, but such controls are not necessary to allow the thermostat to function."); col. 8, lns. 10-14 ("As shown in FIG. 3, the website 200 will permit thermostat users to perform through the web browser substantially all of the programming functions traditionally performed directly at the physical thermostat, such as temperature set points, the time at which the thermostat should be at each set point, etc.").

The intrinsic evidence does not support respondents' proposed construction of "programmable thermostat." Respondents cite a section of the '497 patent referring to prior art devices. *See* Resps. Br. at 22-23 (citing JX-0001 ('497 patent) at col. 1, lns. 37-43). Contrary to respondents' argument, the claim language does not preclude the "programmable thermostat" from being stored externally from the physical thermostat.

**5. "status of the HVAC system is 'on'" / "status of the HVAC system is 'off'" ('497 patent, claim 1) and "status [of said HVAC system]" ('322 patent, claim 1)**

| Claim term | EcoFactor's Proposed Construction | Respondents' Proposed Construction | Staff's Proposed Construction |
|---|---|---|---|
| "status of said HVAC system" ('322 Patent, claim 1) | "Plain and ordinary meaning, an example of which is operational state of said HVAC system" | "operational state of the HVAC system, being either in an active state or an inactive state." | Plain and ordinary meaning, an example of which is: "operational state of said HVAC system" |

| | | | |
|---|---|---|---|
| "status of the HVAC system is 'on'" / "status of the HVAC system is 'off'" on" ('497 Patent, claim 1) | "the HVAC system is actively operating / the HVAC system is not actively operating" | "when the HVAC system is influencing (heating or cooling) the temperature inside the structure" / "when the HVAC system is not influencing (heating or cooling) the temperature inside the structure" | "when the HVAC system is actively operating" / "when the HVAC system is not actively operating" |

*See* Compl. Br. at 18-19; Resps. Br. at 23-24, 26-28; Staff Br. at 19; Joint Claim Construction Chart, EDIS Doc. ID 704350, at 4.

The claim terms "status of the HVAC system is 'on'" and "status of the HVAC system is 'off'" appear in independent claim 1 of the '497 patent. JX-0001 ('497 patent) at col. 13, lns. 44-48. The claim term "status of said HVAC system" appear in independent claim 1 of the '322 patent. JX-0002 ('322 patent) at col. 13, ln. 35.

EcoFactor argues, in part:

> The "claim construction inquiry ... begins and ends in all cases with the actual words of the claim." *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1324 (Fed. Cir. 2002). Indeed, "the claims themselves provide substantial guidance as to the meaning of [] terms." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005).
>
> In this next pair of overlapping disputes on overlapping claim language, EcoFactor and Staff appear to be in agreement, but Respondents diverge from the words of the claim.
>
> On the first dispute in the pair, "status of said HVAC system," there does not appear to be any real disagreement between the parties—or at least is it difficult to discern one. All sides agree that the "***operational state***" is the status of the system. The patent teaches exemplary embodiments in which the "status" or "operational state" information is received by a computer to indicate whether the HVAC system is likely "on" or active or "off" or inactive.
>
> The related phrase, status of the HVAC system is "on" or "status of the HVAC system is "off" exposes the true divergence of the parties' viewpoints. On this term, Respondents diverge from Staff and EcoFactor by replacing the simple and clear claim word "on" with their nine-word phrase "**influencing (heating or cooling) the temperature** inside the structure" and the claim word "off" with "**not**

**influencing (heating or cooling) the temperature** inside the structure." But there is no justification for redefining the clear claim language in this manner. And doing so injects more questions than it resolves.

Moreover, Respondents' proposal has no support from the intrinsic record. Indeed, it is inconsistent with that record. The patents teach exemplary embodiments involving receiving "status" data concerning whether the HVAC system is likely "**on**" or "**off**", including based on "the signals sent by the thermostats to their HVAC systems"—not determining that information by measuring whether it is "influencing (heating or cooling)" the temperature," whatever Respondents mean by that injected phrase. *See, e.g.*, JX-0001 ('497 Patent) at 5:3-30, Fig. 11.

Compl. Br. at 19.

Respondents argue, in part:

The parties agree that the "status [of the HVAC system]" refers to the "operational state of the HVAC system." Respondents, however, believe that the definition should further be clarified to indicate that, in the context of the '322 patent specification, the operational state refers to the HVAC system "being either in an active state or inactive state." The specification of the '322 patent only mentions the term "status of the HVAC system" twice, in the following passage: "calculating one or more rates of change in temperature at said first location for periods during which the *status of the HVAC system* is 'on'; calculating one or more rates of change in temperature at said first location for periods during which the *status of the HVAC system* is 'off.'" '322 patent, at 4:29–37. In other words, the only manner in which the specification of the '322 patent uses the term "status of the HVAC system" is to define when the status is "on" or "off." Thus, Respondents respectfully request that the ALJ construe "status [of the HVAC system" consistent with the '322 specification to mean "operational state of the HVAC system, being either in an active state or inactive state.

* * *

The parties dispute what it means for the status of the HVAC system to be 'on' or 'off.' EcoFactor and Staff propose that this simply refers to whether the HVAC system is or is not actively operating. But that construction only creates further ambiguity, and does not reflect how a person of ordinary skill in the art would understand these terms. In the context of the '497 patent, a person of ordinary skill in the art would understand that the status of the HVAC system being 'on' or 'off' refers to whether the HVAC system is working to influence (e.g. heat or cool) the temperature in a structure or location. RX-0156C, Henze QA90; RX-0163C, Souri 9/2 QA43. This is because there are many components in an HVAC system that may be active or inactive regardless of whether the system causing a structure to heat or cool. RX-0156C, Henze QA90; RX-0163C, Souri 9/2 QA43. For

[redacted]

instance, a fan may continue to run once the furnace is turned off, which might continue distributing heated air remaining in the ducts or might not. RX-0163C, Souri 9/2 QA43. Other HVAC components may also be active regardless of whether the home is being heated or cooled – e.g., a pilot light that is always on even when the main furnace flame is extinguished, or control circuitry that is on to monitor requests from the thermostat logic. *Id*. As such, to distinguish between periods when the status of HVAC *system* is "on" versus when the status is "off," a person of ordinary skill in the art would consider whether the HVAC system is influencing the temperature of the home. RX-0156C, Henze QA90; RX-0163C, Souri 9/2 QA43.

Respondents' construction is consistent with the teachings of the '497 patent. For instance, the '497 specification explains that, when considering thermal mass, the calculation involves an assessment of "the rate at which the inside temperature 306 changes in response to the changes in outside temperature." '497 Patent, at 8:42-45. Simply knowing whether one or more components are engaged or disengaged would not enable one to distinguish between when the structure is being actively conditioned by the HVAC *system* and when the structure's temperature is returning back towards the outside temperature. Rather, to calculate a thermal mass using rates of change for the period of time when inside temperature is changing in response to outside temperature, it is necessary to differentiate those periods when the HVAC system is not influencing the temperature inside the structure.

Indeed, EcoFactor's own statements during prosecution of a related patent support Respondents' proposed construction. During prosecution of U.S. Patent Application No. 12/183,949, EcoFactor distinguished a prior art reference called Rayburn, stating that it "only discusses a system that determined how much inside temperatures will change when the HVAC system is ***actively operating and influencing the temperature inside a structure***. That is, Rayburn only determines "on" slopes - the rate of change in temperature when the HVAC system is on." RX-0771 (File History-App. No. 12/183,949), at 56; RX-0156C, Henze QA90; RX-0163C, Souri 9/2 QA43; RDX-0009C-13. In other words, like Respondents, EcoFactor itself regarded "status of the HVAC system is 'on'" to mean that the HVAC system is "influencing the temperature inside a structure." RX-0156C, Henze QA90; RX-0163C, Souri 9/2 QA43; *see also Elkay Mfg. Co. v. Ebco Mfg. Co.*, 192 F.3d 973, 980 (Fed. Cir. 1999) ("When multiple patents derive from the same initial application, the prosecution history regarding a claim limitation in any patent that has issued applies with equal force to subsequently issued patents that contain the same claim limitation.").

Resps. Br. at 23-24, 26-28.

The Staff argues, in part:

The parties agree that the "status [of the HVAC system]" refers to the

[redacted]

> "operational state of the HVAC system." RPreHBr. at 27; CPreHBr. at 18. Respondents proposed construction of "status of the HVAC system" requires that the operation state of the HVAC system must be "either in an active state or an inactive state." The Staff disagrees.
>
> * * *
>
> Respondents' proposed construction of the "on" and "off" statuses of the HVAC system improperly imports limitations from the specifications into the claims. As stated by EcoFactor and noted above, the patents teach exemplary embodiments involving receiving "status" data concerning whether the HVAC system is likely "on" or "off", as well as "more economical settings," including based on the signals sent by the thermostats to their HVAC systems. CPreHBr. at 18-19; JX-1, at 8:15-18. Respondents argue that the during prosecution of a related patent, EcoFactor itself regarded "status of the HVAC system is 'on'" to mean that the HVAC system is "influencing the temperature inside a structure." *See* RPreHBr. at 31 (citing RX-0771 ('497 file history) at GOOG-ITC1185-00073546; RX-0156C (Henze) QA 90; RX-0163C (Souri 9/2) QA 43; RDX-0009C-13). However, even if true, EcoFactor distinguished the pending claims by arguing that the cited prior art (the "Rayburn" reference) did not disclose the "off" operating status, which was recited in the then pending claims. *See* RX-0771 at GOOG-ITC1185-00073541-43, 00073546. Therefore, in Staff's view, those remarks by EcoFactor did not disavow claim scope. *See Computer Docking Station Corp. v. Dell, Inc*., 519 F.3d 1366, 1379 (Fed. Cir. 2008). Therefore, ALJ should adopt EcoFactor and the Staff's proposed construction for these terms.

Staff Br. at 19-21.

It is determined that the term "status [of the HVAC system]" is construed to have its plain and ordinary meaning, an example of which is the operational state of the HVAC system. The claim language of claim 1 of the '497 patent recites the limitations "for periods during which the status of the HVAC system is 'on' and . . . for periods during which the status of the HVAC system is 'off'." JX-0001 ('497 patent) at col. 13, lns. 43-48. In view of this, respondents' proposed construction that the operational state must be "either in an active state or an inactive state" is redundant. Moreover, the specification further contemplates operational states in addition to "on" and "off." *See id.* at col. 8, lns. 15-18 ("Preferably the website will also allow users to accomplish more advanced tasks such as allow users to program in vacation settings

for times when the HVAC system may be turned off or run at more economical settings…"). Thus, the intrinsic record demonstrates that the term "status of the HVAC system" should be given its plain and ordinary meaning in both the '497 and '322 patents.

Respondents argue that "the specification of the '322 patent only mentions the term "status of the HVAC system" to define when the status is "on" or "off". *See* Resps. Br. at 23-24. The administrative law judge finds that respondents' proposed construction improperly imports limitations from the specifications into the claims. The patents teach exemplary embodiments involving receiving "status" data concerning whether the HVAC system is likely "on" or "off", as well as "more economical settings," including based on the signals sent by the thermostats to their HVAC systems. *See* JX-0001 ('497 patent) at col. 8, lns. 15-18. The meaning of these words is clear, and no further construction is needed.

**6. "one or more rates of change in temperature" ('497 patent, claim 1)**

| EcoFactor's Proposed Construction | Respondents' Proposed Construction | Staff's Proposed Construction |
|---|---|---|
| "the difference between two Temperature measurements over a particular span of time between the measurements" | the difference between two temperature measurements divided by a particular span of time between the measurements (i.e. $\Delta T/\Delta t$) | Plain and ordinary meaning, an example of which is: "the difference between two temperature measurements divided by a particular span of time between the measurements (i.e. $\Delta T/\Delta t$)" |

*See* Compl. Br. at 20; Resps. Br. at 24-25; Staff Br. at 21; Joint Claim Construction Chart, EDIS Doc. ID 704350, at 4.

The claim term "one or more rates of change in temperature" appear in independent claim 1 of the '497 patent. JX-0001 ('497 patent) at col. 13, lns. 46-47.

EcoFactor argues, in part:

[redacted]

On this term, EcoFactor and Staff appear to be in agreement. Respondents, on the other hand, replace simple and clear terms with specific and seemingly narrow importations. While the vast majority of the competing constructions appear to be essentially commensurate in scope, Respondents' construction also includes *another apparent definition within it*. In particular, using the known abbreviation, "i.e., which means, "that is," they replace the simple and clear claimed phrase "rate of change" with a definition *inside their construction*. And that definition appears to present a specific formula for determining a "rate of change": "(**i.e. delta T / delta *t***)."

Respondents' construction fails under controlling law. Under controlling law, Respondents' narrowing construction and importation of phrases and parentheticals not quoted from the patent specification fails. "There are only two exceptions" in which claim terms are not given their full ordinary and customary meaning: "1) when a patentee sets out a definition and acts as his own lexicographer, or 2) when the patentee disavows the full scope of a claim term either in the specification or during prosecution." *Thorner*, 669 F.3d at 1365. But Respondents point to no such disclaimer or lexicography.

Indeed, Respondents appear to concede that the term should be given its full ordinary and customary meaning. The problem for Respondents is: their definition within their construction is narrower than that ordinary and customary meaning. To illustrate this point, the Staff's construction provides a nice contrast showing why Respondents' construction is wrong. While Staff (and EcoFactor) agree that this formula can be one meaning of "rate of change," it is only an "example" of it—it does not define the outer scope of its plain meaning. Respondents' own witnesses will also confirm this is true. Because it is narrower than the plain meaning, Respondents' construction must be wrong. Without clear and unambiguous disclaimer or lexicography by the patentee, which Respondents do not even can claim here, courts "do not import limitations into claims from examples or embodiments appearing only in a patent's written description, even when a specification describes very specific embodiments of the invention or even describes only a single embodiment." *See JVW Enters.*, 424 F.3d at 1335.

If there were any doubt about whether Respondents' distorted "definition within a definition" construction is narrower than the plain meaning, the admissions heard during the hearing would eliminate that doubt. Witness after witness admitted under oath that the plain meaning of a rate of change ***would not require*** the specific mathematical formula that Respondents' proposal suggests is required here. For instance, Dr. Auslander conceded that the ***average*** time to traverse 1 degree in temperature is also a "rate of change:"

[redacted]

Q. The term rate of change, do you recall that term in the '497 patent, sir?
A. Yes, I do.
Q. And it's fair to say that average time to traverse 1 degree in temperature, is a rate of change; correct?
A. It is, if you're dealing with dense data.

Hearing Tr. at 902:3-9. Dr. Auslander was not alone in this concession. When asked, other experts, including Mr. Hagins, also admitted there are other ways of calculating the "rate of change" beyond the Respondents' "i.e." definition:

Q. Would you agree with me that there are certainly different ways to calculate rate of change, other than just change of temperature over change in time?
A. Yes, I would agree.

Hearing Tr. at 642:25-643:3. This is dispositive because, as he also admitted, this means Respondents' construction is ***narrower than the plain meaning*** of the term:

Q. Would you agree with me that change in temperature over change in time, as proposed by Respondents, is narrower than the full scope of the ways a person of ordinary skill in the art would understand that you can change -- calculate a change -- a rate of change of temperature?
A. Assuming that there are other ways of calculating rate of change, then by definition, it's narrower.

*Id.* at 643:13-21. This is also dispositive. *Thorner*, 669 F.3d at 1365.

But there is another reason why Respondents' construction would lead to error. The patent specification itself describes one embodiment in which division is not used to determine the likely "rate of change." In column 11, lines 8 through 20, the patent clearly states that one embodiment can include a calculation for a "likely rate of change for internal temperature in home X" where the server accomplishes this calculation not by using Respondents' specific "i.e." formula, but rather by "applying a basic ***algorithm that weighs each of the[] external variable*** for various characteristics of the home itself." Indeed, Respondents' expert. Dr. Henze, acknowledged this:

[redacted]

> Q. Sir, we agreed that the sentence refers to a basic algorithm that weighs each of these external variables. We agreed on that a moment ago, right? I read that correctly, right?
> A. Well, I mean, it's a very long sentence, Mr. Mirzaie. And we agreed that it discloses a way to compute the likely rate of change under all these conditions at a specific point in time.
> Q. Thank you.

Hearing Tr. at 790:14-792:25. The problem for Respondents is: this teaching appears to be in tension with—and excluded by—their construction. That would not be right, as constructions that exclude embodiments are "*rarely, if ever, correct*." *SanDisk*, 415 F.3d at 1285-86.

Compl. Br. at 20-22.

Respondents argue, in part:

> Respondents and Staff agree on the meaning of "one or more rates of change in temperature." While Staff gives their definition as an example of the plain meaning of the term to one of skill in the art, both Staff and Respondents agree on what that plain meaning is: "the difference between two temperature measurements divided by the span of time between the measurements (i.e., $\Delta T/\Delta t$)."
>
> The parties all agree that in the context of claim 1 of the '497 patent, "rates of change" refer to the change occurring between two measured quantities: "the difference between two temperature measurements." One of ordinary skill in the art would understand that rates of change of measured quantities are ratios of the difference between the measured quantities divided by the span of time between their measurements. As Dr. James testified, "[a] rate of change in engineering and mathematics is the difference of two measurements divided by (i.e., "over") the difference in time between those measurements. In other words,
>
> $$Rate\ of\ Change\ for\ \mathrm{A} = \frac{\mathrm{A}_2 - \mathrm{A}_1}{t_2 - t_1}$$
>
> where 'A' equals the measured quantity and 't' equals time." RX-0164C, James QA 84; *see also* RX-0163C, Souri 9/2 QA41; RX-0156C, Henze QA249-50. As mentioned previously, the parties agree that the measured quantity in claim 1 is temperature (in particular, temperature at said first location). Following the well accepted formula for determining a rate of change of a measured quantity the claim term "one or more rates of change in temperature" would mathematically read:

[redacted]

$$Rate\ of\ Change\ in\ Temperature\ = \frac{Temp_2 - Temp_1}{Time\ of\ Temp_2\ -\ Time\ of\ Temp_1}$$

In mathematics, this formula may be represented as "ΔT/Δt," as proposed in both the Staff's and Respondents' proposal. Respondents' and Staff's proposals accurately reflect the understanding of a person of ordinary skill in the art as well as the well-understood and generally accepted mathematical definitions for a rate of change.

EcoFactor's proposed construction is fundamentally flawed because it allows for a rate of change between two measurements to be calculated for a span of time that is unrelated to the times when each measurement is taken. As shown above, this is mathematically improper and inaccurate. EcoFactor further leaves open the door to argue that the difference between any two temperature measurements is a rate of change in temperature as long as those two temperature measurements are taken at different times. EcoFactor accomplishes this by using the generic phrase "over a particular span of time" in its construction. This phrasing allows the "span of time" to be any span of time rather than the actual span of time between the two temperature measurements. If, however, a "particular span of time" means "the span of time between the measurements," then EcoFactor's proposed construction becomes identical to the Staff and Respondents because, as Dr. James testified, in mathematics and engineering the word "over" means "divided by." *See* RX-0164C, James QA83-84.

Resps. Br. at 24-25.

The Staff argues, in part:

The Staff and Respondents agree on the construction of this term, and Staff gives the construction as an example of the term's plain and ordinary meaning. RPreHBr. at 28; CPreHBr. at 19.

Staff Br. at 19.

It is determined that the claim term "one or more rates of change in temperature" is construed to have its plain and ordinary meaning, an example of which is: "the difference between two temperature measurements divided by the span of time between the measurements". One of ordinary skill in the art would understand the rate of change of temperature to be the difference in two temperature measurements divided by the difference in time those two temperature measurements were taken. *See* RX-0164C (James RWS) at Q/A 83-84; RX-0163C

(Souri RWS) at Q/A 41. Nothing in the intrinsic record suggests a departure from this plain and ordinary meaning. EcoFactor's proposed construction is improper because it allows for a rate of change between two measurements to be calculated for a span of time that is unrelated to the times when each temperature measurement is taken.

**7. "one or more processors" / "said one or more processors" ('497 patent, claim 1; '322 patent claim 1)**

| Claim term | EcoFactor's Proposed Construction | Respondents' Proposed Construction | Staff's Proposed Construction |
|---|---|---|---|
| "one or more processors" / "said one or more processors" ('497 Patent, claims 1, 2; '322 Patent, claims 1 and 2) | No construction necessary | For '497 / '322 patent: "said one or more processors" means "the same one or more processors perform all of the associated functions in the claims." | No construction necessary |

*See* Compl. Br. at 22-23; Resps. Br. at 28-29; Staff Br. at 22; Joint Claim Construction Chart, EDIS Doc. ID 704350, at 4.

The claim term "one or more processors" appears in independent claim 1 of the '497 patent. JX-0001 ('497 patent) at col. 13, ln. 39. The claim term "one or more processors" also appears in independent claim 1 of the '322 patent. JX-0002 ('322 patent) at col. 13, ln. 36.

EcoFactor argues, in part:

> Claim construction "is not an obligatory exercise in redundancy." *U.S. Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1568 (Fed.Cir.1997). There is no need to construe these "processor" terms. A POSITA obviously would understand them.
>
> Staff and EcoFactor agree that these ordinary terms "one or more processors" or "remote processor" requires no construction. Even Respondents agree that a PHOSITA understands what "one or more processors" or "remote processor" mean, as their proposed constructions includes "one or more processors" or "remote processor" in them. There is no need to add Respondents' chosen words into a term that everyone agrees is readily understandable. *O2 Micro*

*Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008) ("courts are not (and should not be) required to construe every limitation present in a patent's asserted claims.").

Moreover, to the extent Respondents rely on some argument concerning antecedent basis, that still does not change the correct result here. The claims themselves are clear on what the antecedent basis. The '497 and '322 patents' claims recite "one or more processors" and thereafter recite "said one or more processors." There is no need to add Respondents' baggage to the clear language of the claims.

Compl. Br. at 21-23.

Respondents argue, in part:

The parties' dispute is whether the use of "said one or more processors" means that the same set of processors must be configured to perform all of the functional aspects of the claims associated with the processors. After the initial introduction of "one or more processors," the claims consistently refer to them as "said one or more processors." Use of the word "said" announces that terms following "said"—in this case "one or more processors"—reference a previously introduced element or term. *See Baldwin Graphic Sys., Inc. v. Siebert, Inc.,* 512 F.3d 1338, 1343 (Fed. Cir. 2008) (noting that claim terms using "said" are "anaphoric phrases, referring to the initial antecedent phrase."). In other words, each instance in which "said one or more processors" is used refers to the same "one or more processors." *See Wi-LAN, Inc. v. Apple Inc.,* 811 F.3d 455, 462 (Fed. Cir. 2016) ("Subsequent use of the definite articles 'the' or 'said' in a claim refers back to the same term recited earlier in the claim."). The "one or more processors" are defined in the claims by the functions they perform within the claim elements.

Take for example claim 1 of the '322 patent. In this claim, the same "one or more processors" must be capable of performing all associated functions in the claim. The "one or more processors" must: (1) "receive measurements of outside temperature" [element 1[b]]; (2) "compare[] said temperature measurements" [element 1[b]]; (3) "compare[] the inside temperature of said structure and the outside temperature over time" [element 1[b]]; (4) "compare[] an inside temperature recorded inside the first structure with an inside temperature of said first structure recorded at a different time" [element 1[d]]; **and** (5) "determine whether the operational efficiency of the HVAC system has decreased over time." [element 1[d]].

Resps. Br. at 28-29.

The Staff argues, in part:

The Staff agrees with EcoFactor that these terms do not need to be

> construed, and there is no need to add Respondents' chosen words into a term that everyone agrees is readily understandable. CPreHBr. at 20. Also, Respondents' proposed construction of "said remote processor" appears to simply restate an antecedent basis rule. RPreHBr. at 21. There is no need for such a construction because, as EcoFactor explains, the claims themselves are clear on what the antecedent basis is: the '497's and '322 patents' claims recite "one or more processors" then thereafter recite "said one or more processors." Claim 5 of the '753 patent recites "at least one remote processor," and thereafter claims 6 and 7—which depend from claim 5—recite "said remote processor." CPreHBr. at 20-21. Therefore, there is no need for the ALJ to construe these terms.

Staff Br. at 22.

As proposed by EcoFactor, it is determined that the claim terms "one or more processors" and "said one or more processors" are construed to have their plain and ordinary meaning. Respondents' proposed construction simply restates an antecedent basis rule. There is no need for such a construction because the claims themselves are clear on what the antecedent basis is: the '497 and '322 patents' claims recite "one or more processors" then thereafter recite "said one or more processors".

**8. "actual setpoint" ('371 patent, claim 9)**

| EcoFactor's Proposed Construction | Respondents' Proposed Construction | Staff's Proposed Construction |
|---|---|---|
| "an actual temperature setting for a thermostat to achieve or maintain" | "a temperature setting for a thermostat to achieve or maintain recorded at a thermostatic controller" | "a temperature setting for a thermostat to achieve or maintain recorded at a thermostat" |

*See* Compl. Br. at 24; Resps. Br. at 29; Staff Br. at 22-23; Joint Claim Construction Chart, EDIS Doc. ID 704350, at 4.

The claim term "actual setpoint" appears in independent claim 9 of the '371 patent. JX-0004 ('371 patent) at col. 9, lns. 14-15.

EcoFactor argues, in part:

> There is a "heavy presumption" that claim terms carry their "full ordinary

and customary meaning, unless [the accused infringer] can show the patentee expressly relinquished claim scope." *Epistar Corp. v. ITC*, 566 F.3d 1321, 1334 (Fed. Cir. 2009). Because that plain meaning "is the meaning that the term would have to a [POSITA] in question at the time of the invention," construing claims often "involves little more than the application of the widely accepted meaning of commonly understood words." *Phillips*, 415 F.3d at 1313-14.

EcoFactor's construction for this term is the one consistent with the full scope of its plain meaning. That meaning is "an actual temperature setting for a thermostat to achieve or maintain."

Respondents agree this must be part of the plain meaning of the term. In fact, elsewhere, the parties have ***stipulated*** to an agreed construction for the term "setpoint" alone, which is a "*temperature setting for a thermostat to achieve or maintain*." This phrase is found in the construction for all parties.

The difference from there is noticeable—and proves EcoFactor is right. EcoFactor qualifies the agreed definition of "setpoint" with the simple and straightforward term "actual," because the term in dispute here is "**actual** setpoint." Respondents go in a very different direction, by leaving out the word "actual" in their construction and, instead, seemingly equating it with the part of their construction that goes beyond the agreed meaning of setpoint: "recorded at a thermostatic controller." In other words, Respondents' position boils down to the obviously flawed contention that the plain meaning of "actual" is "recorded at a thermostatic controller." However, Respondents' additional requirement is not part of the plain meaning of the term "actual setpoint" itself and does not appear to bear a relationship to it.

Without clear and unambiguous disclaimer or lexicography by the patentee, courts "do not import limitations into claims from examples or embodiments appearing only in a patent's written description, even when a specification describes very specific embodiments of the invention or even describes only a single embodiment." *See, e.g., JVW Enters.*, 424 F.3d at 1335. Similarly, a statement during patent prosecution does not limit the claims unless the statement is a "clear and unambiguous disavowal of claim scope." *Omega Eng'g, Inc. v. Raytek Corp*., 334 F.3d 1314, 1325 (Fed. Cir. 2003). Respondents proposal to import limitations into the term "actual setpoint" fails as there is no such evidence that the term should be narrowed in the manner they propose, particularly in view of the surrounding claim language.

Further, even if some actual setpoints can be recorded at a thermostatic controller, there is no reason—under the plain meaning of the term or the intrinsic record, including the claims—for why "actual setpoint" must be construed to include this limitation in every instance. In any event, elsewhere in claim 9, there already is a separate requirement that the setpoint is recorded "with the controller," which EcoFactor will prove for both domestic industry and infringement. Indeed,

[redacted]

claim 9[c] reads "recording, with the thermostatic controller, actual setpoints of the heating ventilation and air conditioning system." JX-0004 ('371 patent) at claim 9.

Respondents' proposal fails for another reason. By eliminating the qualifier "actual" from the claim language, it creates confusion with other claimed setpoints." But even a cursory review of the claims themselves shows that this term serves the function of contrasting the disputed phrase with other claimed setpoints, such as "automated setpoints." Respondents' legally erroneous construction fails.

Compl. Br. at 24-26.

Respondents argue, in part:

The parties agree that an "actual setpoint" is a "temperature setting for a thermostat to achieve or maintain." The only dispute is whether the actual setpoint is the setpoint "recorded at the thermostat," as Staff and Respondents contend. The specification of the '371 patent supports Staff's and Respondents' constructions.

The only disclosure of "actual setpoints" in the'371 specification is in Fig. 7 and its accompanying description. '371 Patent at 5:66-6:43; RX-0156C, Henze QA207. There, the '371 patent describes that the actual setpoint is the setting "*recorded* for the thermostat." '371 Patent at 6:5-8 (emphasis added). This makes sense because a setpoint cannot be an "actual setpoint" for a thermostat until and unless it is recorded at a thermostatic controller so that it can be used for controlling the temperature settings. Furthermore, the flow chart of Fig. 7, as well as the language of the claims themselves, describes that the actual setpoints are compared against an automated setpoint. '371 Patent, at claims 1, 9, 17, Fig. 7, 6:3-19. As Dr. Henze testified, for this comparison to be performed, the actual setpoint must be recorded. Henze QA207. Thus, the claims and specification of the '371 patent support Staff's and Respondents' proposed constructions that the actual setpoint must be a temperature setting that is "recorded at a thermostatic controller."

Resps. Br. at 29.

The Staff argues, in part:

The parties agree that the term "setpoint" means "a temperature setting for a thermostat to achieve or maintain." *See* Joint Claim Construction Chart, EDIS Doc. ID 704350, at 2. EcoFactor's proposed construction, which merely inserts the term "actual" in front of the parties agreed upon construction of "setpoint," does nothing to differentiate the term "setpoint" from the disputed term "actual setpoint." The Staff's proposed construction, on the other hand, does and it is also consistent with the claim language and the specification.

Claim 9 of the '371 patent recites a "method for detecting manual changes to one or more setpoints for a thermostatic controller…, the one or more setpoints

> … being manually changeable, …, [and] ***recording, with the thermostatic controller, actual setpoints*** of the heating ventilation and air conditioning system." JX-4, at 8:24-37 (emphasis added). Claim 1 thus indicates that actual setpoints are temperature settings that are recorded "***with*** the thermostatic controller."

Staff Br. at 23-24 (footnote omitted).

The parties agree that the term "setpoint" means "a temperature setting for a thermostat to achieve or maintain." *See* Joint Claim Construction Chart (EDIS Doc. ID 704350) at 2.

It is determined that the meaning of the claim term "actual setpoint" is "a temperature setting for a thermostat to achieve or maintain recorded at a thermostat." The '371 patent discloses that the thermostat that may include several components, including controls that allow the user to change settings directly at the thermostat. *See* JX-0004 ('371 patent) at col. 4, lns. 36-40 ("The thermostat 108 may also include controls 268 allowing users to change settings directly at the thermostat, but such controls are not necessary to allow the thermostat to function"). Although the specification discloses that the thermostat can also be controlled through a web browser (including temperature setpoints), the "actual setpoints" are temperature settings input by the user at the thermostat, with/using the thermostatic controller, and these actual setpoints are used to detect manual changes to the scheduled setpoint data (that could have been input with the web browser). The specification discloses:

> FIG. 7 illustrates the currently preferred method for detecting the occurrence of a manual override event. In step 1002, the server retrieves the primary data points used to infer the occurrence of a manual override from one or more databases in overall database structure 300. The data should include each of the following: for the most recent point for which it can obtain such data (time0) the actual setpoint as recorded at the thermostat (A0); for the point immediately prior to time0, (time-1), the actual setpoint recorded for the thermostat (A-1); for time0 the setpoint as scheduled by server 106 according to the standard setpoint programming (S0), and for time0 the setpoint as scheduled by server 106 according to the standard setpoint programming (S-1).

*Id.* at col. 5, ln. 66 – col. 6, ln. 12; Figure 7 (step 1002, "Retrieve actual and scheduled setpoint data (current and immediately prior)").

Respondents' proposed construction requires recording the temperature settings "at the thermostatic controller." This is unpersuasive because it improperly equates the term "thermostatic controller" with the entire "thermostat", as further discussed below.

**9. "thermostatic controller" ('371 patent, claim 9)**

| EcoFactor's Proposed Construction | Respondents' Proposed Construction | Staff's Proposed Construction |
|---|---|---|
| "thermostat controller" | "thermostat" | "thermostat controller" |

*See* Compl. Br. at 23; Resps. Br. at 30-31; Staff Br. at 24; Joint Claim Construction Chart, EDIS Doc. ID 704350, at 4.

The claim term "thermostatic controller" appears in independent claim 9 of the '371 patent. JX-0004 ('371 patent) at col. 9, ln. 4.

EcoFactor argues, in part:

> The "claim construction inquiry ... begins and ends in all cases with the actual words of the claim." *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1324 (Fed. Cir. 2002). Indeed, "the claims themselves provide substantial guidance as to the meaning of [] terms." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005).
>
> On this dispute, all parties agree that the term "thermostatic" means that it must pertain to the thermostat. The problem is, Respondents again go rogue and create significant tension with the claim language itself—this time, by *eliminating* altogether the term "controller" from the claim language. But this invites error, because "interpretations that render some portion of the claim language superfluous are disfavored." *Power Mosfet Techs.*, 378 F.3d at 1410; *see also Merck & Co. v. Teva Pharm. USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Cir. 2005) ("A claim construction that gives meaning to all the terms of the claim is preferred over one that does not do so).
>
> Moreover, equating "thermostat" with "thermostatic controller" would *create tension with* the plain meaning and the intrinsic record's description of the term. The controller is not necessarily the exact same thing as a thermostat, and

[redacted]

vice versa.

This is confirmed by the intrinsic record. In the intrinsic record, Respondents' proposed construction of "thermostatic controller" as "thermostat" would exclude an embodiment of the invention, in which the thermostatic controls used are not in the thermostat, *but instead are available through the web browser*. *See, e.g.*, JX-0004 ('371 patent) at 4:6-40, 4:51-5:3. Applying Respondents' construction will lead to error, because constructions that exclude embodiments are "***rarely, if ever, correct***." *SanDisk*, 415 F.3d at 1285-86.

Compl. Br. at 23-24.

Respondents argue, in part:

A POSITA would interpret "thermostatic controller," as used in the claims of the '371 patent, to mean a "thermostat," as Google proposes. Google's proposed construction is supported by the specification, claims, and extrinsic evidence.

The specification supports Google's construction. *See, e.g.*,'371 patent, at 1:18-44, 3:53-4:5, 4:13-40, 6:33-41, 5:66-6:32, 8:1-9, 8:23-10:50, Figs. 2, 4. The specification does not describe or include the term "thermostatic controller" or "thermostat controller." *See id.* Instead, the '371 Patent regularly uses the term "thermostat." *See id.* Further, claim 9 of the '371 patent includes the step of "communicating the actual setpoints from the thermostatic controller to the at least one computer." '371 patent, cl. 9. The specification clarifies that a server, which is a computer, "retrieves the primary data points used to infer the occurrence of a manual override," which "should include . . . the actual setpoint as recorded ***at the thermostat***." *Id.* at 6:1-7 (emphasis added). The specification is therefore clear that the "thermostatic controller" of claim 1 is a thermostat.

EcoFactor's and the Staff's construction would not provide a POSITA with clarity as to the scope of the term "thermostatic controller." As previously noted, the term "thermostat controller" does not appear in the specification of the '371 patent. Further, as applied by EcoFactor, the term "thermostat controller" has no meaningful bounds. CX-0674C, Gomez QA333. Instead, according to EcoFactor, a thermostat controller "refers to the components that allow a user to adjust the temperature settings and control the thermostat . . . includ[ing] controllers on the thermostat and controllers connected over a network." *Id.* This includes "the dial turn, button press, and hall effect sensor, circuitry in the device for implementing a user's control decisions," as well as any cloud-based application. *Id.* EcoFactor's construction is therefore so broad as to render the term indefinite.

In view of all of the evidence on record, it is clear that a POSITA would understand that a "thermostatic controller" is a thermostat.

Resps. Br. at 30-31.

The Staff argues, in part:

> The parties agree that the "thermostatic controller" pertains to the thermostat, but Respondents argue that "thermostatic controller" is the entire thermostat. RPreHBr. at 34-35; CPreHBr. at 22.
>
> However, as pointed out by EcoFactor, the intrinsic record makes clear that the thermostat may include several components, including controls that allow the user to change settings directly at the thermostat. *See* JX-4, at 4:15-27 ("[Thermostat 108] includes a microprocessor 254, memory 256, a display 258, a power source 260, and at least one relay 262, which turns the HVAC system on and off in response to a signal from the microprocessor, and contacts by which the relay is connected to the wires that lead to the HVAC system. To allow the thermostat to communicate bi-directionally with the computer network, the thermostat also includes means 264 to connect the thermostat to a local computer or to a wired or wireless network"); *see also id*. at 4:36-40 ("The thermostat 250 may also include controls 268 allowing users to change settings directly at the thermostat, but such controls are not necessary to allow the thermostat to function."). The specification further discloses that the thermostat can be controlled through a web browser. JX-4, at 4:59-64 ("As shown in FIG. 3, the website 200 will permit thermostat users to perform through the web browser substantially all the programming functions traditionally performed directly at the thermostat, such as temperature set points, the time at which the thermostat should be at each set point, etc."); CPreHBr. at 22-23. Therefore, the ALJ should adopt the Staff's and EcoFactor's proposed construction."

Staff Br. at 24-25.

It is determined that the meaning of the claim term "thermostatic controller" is "thermostat controller." The thermostat may include several components, including controls that allow the user to change settings directly at the thermostat. *See* JX-0004 ('371 patent) at col. 4, lns. 15-27 ("[Thermostat 108] includes a microprocessor 254, memory 256, a display 258, a power source 260, and at least one relay 262, which turns the HVAC system on and off in response to a signal from the microprocessor, and contacts by which the relay is connected to the wires that lead to the HVAC system. To allow the thermostat to communicate bi-directionally with the computer network, the thermostat also includes means 264 to connect the thermostat to a local computer or to a wired or wireless network"); *id*. at col. 4, lns. 36-40 ("The thermostat

250 may also include controls 268 allowing users to change settings directly at the thermostat, but such controls are not necessary to allow the thermostat to function.").

Moreover, respondents' proposed construction of "thermostatic controller" as "thermostat" would exclude an exemplary embodiment in which the thermostatic controls used are not in the thermostat, but instead are available through the web browser. *See, e.g.*, *id.* at col. 4, lns. 6-40, col. 4, ln. 51 – col. 5, ln. 3. Respondents' proposed construction is not adopted.

## VI. The '497 Patent

### A. Overview of the '497 Patent

Asserted U.S. Patent No. 8,131,497 ("the '497 patent") is titled, "System and Method for Calculating the Thermal Mass of a Building." JX-0001 ('497 patent). The '497 patent issued on March 6, 2012, and the named inventors are John Douglas Steinberg and Scott Douglas Hublou. *Id.*

EcoFactor asserts independent claim 1 and dependent claims 2 and 5 of the '497 patent. These claims read as follows:

> 1. A system for calculating a value for the operational efficiency of a heating, ventilation, and air conditioning (HVAC) system comprising:
>
> at least one HVAC control system that receives temperature measurements from at least a first location conditioned by at least one HVAC system;
>
> one or more databases that store at least said temperatures measured at said first location over time; and
>
> one or more processors that receive outside temperature measurements from at least one source other than said HVAC system, wherein said one or more processors are configured to calculate one or more rates of change in temperature at said first location for periods during which the status of the HVAC system is "on" and wherein said one or more processors are further configured to calculate one or more rates of change in temperature at said first location for periods during

which the status of the HVAC system is "off", and to relate said calculated rates of change to said outside temperature measurements.

2. A system as in claim 1 in which said processors receive outside temperatures for geographic regions based on ZIP codes from sources other than said HVAC system.

5. A system as in claim 1 further comprising a programmable thermostat and said programmable thermostat is the sole source for current data regarding temperature inside said location conditioned by said HVAC system.

*Id.* at col. 13, ln. 31 – col. 14, ln. 3; col. 14, lns. 9-12.

EcoFactor relies on claims 1, 2, and 5 of the '497 patent to satisfy the technical prong of the domestic industry requirement.

**B. Infringement**

**1. Claim 1**

**a. Google Products**

EcoFactor asserts that the accused Google products infringe claim 1 of the '497 patent. Compl. Br. at 27-62.

**i. A system for calculating a value for the operational efficiency of a heating, ventilation, and air conditioning (HVAC) system comprising:**

The record evidence demonstrates that the accused Google products satisfy this limitation of asserted independent claim 1. *See* CX-0674C (Gomez) at Q/A 166-68.

EcoFactor argues, in part:

> The [redacted]. CX-0674C (Gomez DWS) Q/A 160-162. This time-to-temperature calculation will get more accurate as the thermostat learns the operational efficiency of the HVAC system. CX-0542 (Google's web page explaining "The Time-To-Temperature estimate will get more accurate as your thermostat continues to learn

about your home, **your system's efficiency**, and how quickly your home warms up and cools down.").

These are calculations of the operational efficiency of the user's HVAC system. Indeed, Dr. Henze admits that in the preferred embodiment of the '497 patent, Hearing Tr. 774:9-782:4. An HVAC system that takes longer to change temperature than it once did is less efficient in terms of its operational efficiency. Hearing Tr. 640:9-14 (Dr. Hagins)

* * *

The uses the CX-0674C (Gomez DWS) Q/A 160-168; CX-0061C (Burger Tr.) 140:22-146:15 , CX-0063C.0019-20 (A Brief Tour of HVAC Algorithms), CX-0104C.0005 (Sapphire Algorithms Overview) (Section 4.6 – ).

The CX-0104C.0005 (Sapphire Algorithms Overview) (Section 4.6 – ):

"The is a complex

* * *

. Trial Tr. 736:17-737:5 (Dr. Burger's cross-examination):

"**Q**. Thank you.

**A** .

**Q**.

The predicts the CX-0674C (Gomez DWS) Q/A 160-162. Thus, .

Google's documentation further confirms that CX-0063C.0020 ; CX-0542 (Google's web page explaining "The ***Time-To-Temperature estimate*** will get more accurate as your thermostat continues to learn about your home, ***your system's efficiency***, and how quickly your home warms up and cools down.") (CDX-0001C.64).

* * *

Google's sole non-infringement argument is based on Respondents' proposed construction for "operational efficiency," which requires "energy." Google argues that its products do not measure energy consumption, and thus do not infringe under Respondents' construction. Respondents' PHB at 118. However, Google's Products infringe even under this construction. CX-0104C.0005 Thus, even under Respondents' proposed construction, calculates "operational efficiency" in terms of "energy."

The At the hearing, Dr. Burger confirmed that Trial Tr. 736:17-737:5

[redacted]

Finally, the products would also infringe under EcoFactor's proposed construction, which includes "time or energy". Trial Tr. 736:17-737:5 [redacted] And Dr. Henze agreed at the hearing that EcoFactor's construction is more consistent with the preferred embodiment. Indeed, Dr. Henze admitted that in the preferred embodiment of the '497 patent, **HVAC cycle times** are used to measure the operational efficiency of the HVAC system. Hearing Tr. 774:9-782:4 (Dr. Henze's testimony regarding cycle times as the measure of efficiency):

> "Q. Okay. And I asked you on line 14: "And this is a description of the cycle times that it used to determine the efficiency of the HVAC system in a particular house at a particular point in time; is that fair? Can we agree on that at least?" And you finally answered: "The patent claims that cycle times are an expression of efficiency." Did I read that correctly?
>
> A. **So far, yeah. What you did, right**.
>
> …
>
> Q. My question is, did you testify under oath that the '497 patent claims that cycle times are an expression of efficiency, yes or no, on lines 19 and 20?
>
> A. **The patent claims that cycle times are an expression of operational efficiency? I agreed with your question you just posed**."

Hearing Tr. 781:4-12, 781:24-782:4.

Compl. Br. at 27-31.

Google argues, in part:

> EcoFactor only alleges literal infringement limitation [1pre]. There is no dispute that claim 1, as recited in the preamble, is directed to a system for "calculating a value for the operational efficiency of an [HVAC] system." '497 patent, cl. 1; RX-0156C, Henze QA45-46; RX-0001C, Auslander QA46; RX-0163C, Souri 9/2 QA36-37; Hearing Tr. vol. 1, 237:20-24, Nov. 16, 2020 (Gomez); Hearing Tr. vol. 4, 949:18-50:14, Nov. 19, 2020 (Palmer). Dr. Henze and Dr. Auslander testified that a POSITA would understand that the preamble of claim 1 is limiting and "breathes life into the claim by providing a purpose for the calculations recited in the rest of the claim." RX-0001C, Auslander QA69; RX-0156C, Henze QA64-65. A POSITA would understand that performing limitations [1a] through [1d] would result in calculating a value for the operational efficiency of an HVAC system, as recited by [1pre]. RX-0156C, Henze QA65; RX-0001C,

[redacted]

Auslander QA69. Without the preamble, a POSITA would not understand the purpose of limitations [1a] through [1d]. RX-0156C, Henze QA65; RX-0001C, Auslander QA69. As Dr. Henze testified, "[t]he final limitation does not explain how the result of the calculations that follow produce the claimed value for the operational efficiency of an HVAC, making the claim nonsensical." RX-0156C, Henze QA65. Mr. Gomez similarly testified that the rates of change calculated in limitation [1d] are used "to derive a value for the operational efficiency." Hearing Tr. vol. 1, 241:23-42:6, Nov. 16, 2020 (Gomez).

EcoFactor does not identify any value for the operational efficiency. *See* CX-0674C, Gomez QA167-68; RX-0156C, Henze QA66. Mr. Gomez's entire testimony regarding the preamble of claim 1 is embodied in two sentences, neither of which identify any value for operational efficiency. *See* CX-0674C, Gomez QA167-68. On cross-examination, Mr. Gomez agreed that he previously testified that the value for operational efficiency was any rate of change of inside temperature measurements. Hearing Tr. vol. 1, 241:12-22, Nov. 16, 2020 (Gomez). However, Mr. Gomez abandoned that position and testified that the claimed rates of change were not themselves values for operational efficiency, but "a way to derive a value for the operational efficiency." Hearing Tr. vol. 1, 240:17-42:6, Nov. 16, 2020 (Gomez). Specifically, Mr. Gomez testified that calculating the rates of change "is a very important aspect of figuring the operational efficiency," but he never identified any value for the operational efficiency of an HVAC system [redacted] in the Nest Thermostats. *See id.*; CX-0674C, Gomez QA168.

Clearly, Mr. Gomez could not find any such value because the Nest Thermostats do not "calculate a value for the operational efficiency of [an HVAC] system." RX-0156C, Henze QA66-69; RX-0157C, Burger QA33-36. Dr. Burger testified that the [redacted] RX-0157C, Burger QA36. Dr. Burger also testified that [redacted] RX-0157C, Burger QA34. Dr. Henze similarly testified that [redacted] RX-0156C, Henze QA68.

An inventor of the '497 patent was also unable to identify a specific value for the operational efficiency of an HVAC system that the EcoFactor Platform calculated. RX-0004C (Hublou Dep.) 213:9-15:1; RX-0156C, Henze QA241.

Resps. Br. at 146-48.

The Staff argues, in part:

[redacted]

The preamble of claim 1 discloses a system for "calculating a value for the operational efficiency" of an HVAC system. JX-1, claim 1. The Staff agrees with Google that the preamble of claim 1 of the '497 patent is limiting. RPreHBr. at 107. A person of ordinary skill would understand that performing limitations [1a] through [1d] would result in calculating a value for the operational efficiency of an HVAC system, as recited in the preamble, and without the preamble, a person of ordinary skill would not understand the purpose of limitations [1a] through [1d]. *See* RX-0156C (Henze) QA 65; RX-001C (Auslander) QA 69; Hearing Tr. 900:15-901:1-9 (Auslander).

The evidence shows that EcoFactor met its burden of demonstrating that the accused Google products satisfy the preamble. Mr. Gomez testified that the products [redacted] CX-0674C (Gomez) QA 160, 161. The evidence shows that the [redacted] The [redacted] uses the [redacted] to predict [redacted] The [redacted] CX-0674C (Gomez) QA 163; see also QA 162, 164 [redacted] The evidence shows that minimizing the [redacted] is [redacted] CX-0674C (Gomez) QA 166 (citing CX-0061C (Burger Tr.) at 140-145). The evidence shows that the [redacted]

[redacted]

[redacted]

The [redacted] that attempts [redacted]



CX-0674C (Gomez) QA 166.

In Staff's view, the above evidence satisfies the "calculating a value for the operational efficiency" limitation of the preamble, under either parties' proposed construction. *See* CX-0674C (Gomez) QA 167-168. Based on the evidence submitted, the optimization technique for determining an optimal *strategy* for running the HVAC system includes calculating a "cost function," which can be viewed as a *value* for "operational efficiency."

Google misinterprets "value of operational efficiency" as necessarily being a "physical, interpretable value" that is "an amount of energy used by the HVAC system," and to satisfy this limitation, "it is necessary to measure the gas or electricity consumed." RX-0156C (Henze) QA at 68; RPreHBr. at 108. As discussed above, the evidence shows that the [redacted] takes into account [redacted] *See* CX-0674C (Gomez) QA 166, 165,163; *see also* Hearing Tr. at 258:6-269:1 (Gomez); 325:23-348:3 (Gomez); 356:20-359:18 (Gomez).

Staff Br. at 27-30.

As an initial matter, the preamble of claim 1 of the '497 patent has been found to be limiting and "operational efficiency" has been construed to mean "energy required by the HVAC

system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions."

Regarding the preamble, Google argues that "the Nest Thermostats do not 'calculate a value for the operational efficiency of [an HVAC] system.'" Resps. Br. at 148 (quoting RX-0156C (Henze RWS) at Q/A 66-69). However, the evidence shows that CX-0674C (Gomez DWS) at Q/A 163, 162, 164 . The evidence shows that minimizing the *Id.* at Q/A 165 (quoting CX-0061C (Burger Dep.) at 140-45).

Google further argues that the Nest Thermostats do not infringe because these products are unable to measure the gas or electricity consumed. *See* Resps. Br. at 148 (citing RX-0156C (Henze RWS) at Q/A 68). However, the evidence shows that the ), and *See* CX-0674C (Gomez DWS) at Q/A 166, 165, 163; Gomez Tr. 258-269, 325-348, 356-359.

Even were "HVAC system" construed according to respondents' proposed construction, the accused Google products would still satisfy this claim limitation because the Nest thermostats function as a group of components working together to move heat or remove heat from the conditioned [structure/location].

[redacted]

Even were "operational efficiency" construed according to EcoFactor's proposed construction, the accused Google products would still satisfy this claim limitation because the [redacted] Dr. Burger testified that [redacted] Burger Tr. 736-737. Moreover, Dr. Henze [redacted]. Henze Tr. 774-782.

Accordingly, it is determined that the Google accused products satisfy this claim limitation.

**ii. at least one HVAC control system that receives temperature measurements from at least a first location conditioned by at least one HVAC system;**

Each of the accused Google products includes this feature of claim 1. *See* CX-0674C (Gomez DWS) at Q/A 170-73.

EcoFactor argues, in part:

> The Google Products include at least one HVAC control system. CX-0674C (Gomez DWS) Q. 73-75, 169-174; CX-0561C.0001 (Sapphire Algos Overview) [redacted]
>
> * * *
>
> In what quickly proved to be a trend of presenting one implausible non-infringement argument after another, Google argues there is no component in the Nest Thermostat that qualifies as an HVAC control system. Respondents' Prehearing Brief at 118. However, Mr. Gomez has clearly identified both hardware and software components of the Google Products that control the HVAC system. CX-0674C (Gomez DWS) Q. 169-174.
>
> The Google Products would clearly infringe even under Respondents' interpretations of this term: Dr. Henze admitted at the hearing that—in the context of the patent specification—***a thermostat would also qualify*** as an "HVAC control

[redacted]

system" because in certain embodiments, the patents describe the thermostat as the component in the system for measuring temperature:

Q. Sure. We agree that thermostat 108 in the patent is one embodiment of -- that is described as measuring temperature.
Do you recall that testimony?
A. Yes.
Q. And here an HVAC control system measures temperature inside the home, as you testified a moment ago, correct?
A. You read -- yeah, you read the patent.

Q. The HVAC control system that measures temperature at that location, correct?
A. Correct.

Hearing Tr. 782:21-787:10. The Google Products are thermostats. They clearly satisfy the plain meaning of "HVAC control system."

Google argues that the HVAC control system in the context of the '497 patent must be a **server**, not a thermostat. RX-0156C (Henze WS) Q. 73-74. But like the patents, [redacted] CX-0674C (Gomez DWS) Q/A 60; Hearing Tr. 270:8-13 (Mr. Gomez) [redacted], 271:9-272:8 (Mr. Gomez) ("the entire HVAC control system can exist in the device sitting on the wall or it can include functionality that is up in the cloud, so yes. I believe that you could have it either all in one component or you can have an integrated component cloud system, and that both would qualify as an HVAC control system.").

To the extent Respondents are proposing to exclude any "thermostat" from the construction of "HVAC control system," that would clearly be too limiting. Even Respondents' experts do not agree with Dr. Henze's proposed construction. For example, Vivint's expert, Dr. James, contends that the HVAC control system in the context of the '497 patent must be limited to the **thermostat itself**. RX-0164C (James WS) at Q44 ( [redacted]"); Q45 ("In my opinion, a person of ordinary skill in the art would understand that to be an HVAC control system, the control system must be able to control the operations of the HVAC system...The only component in Vivint's system that can send signals to the HVAC system to begin and end the heating or cooling cycle is the thermostat.").

The intrinsic record confirms that neither Dr. James nor Dr. Henze is correct in limiting an "HVAC control system" to a particular embodiment (either a thermostat, or a server). Rather, the HVAC control system can exist in a thermostat, in a server, or in multiple connected components that control the HVAC system over a network. JX-0001 ('497 patent) 1:17-21 ("This invention relates to the use of thermostatic HVAC controls that are connected to a computer network. More specifically, communicating thermostats are combined with a computer network to calculate the thermal mass of a structure"); Hearing Tr. 254:15-255:9; 270:8-13; 271:9-272:8 (Mr. Gomez explaining HVAC control systems can exist in device sitting on the wall, functionality in the cloud, or functionality in an integrated cloud-thermostat system). For example, the patent explains that users can control the HVAC system using the thermostat. JX-0001 ('497 patent) 7:40-57. However, such controls on the thermostat are "***not necessary***" for the system to function as intended. JX-0001 ('497 patent) 7:55-57. Users could also control the HVAC system through the web browser supported by the server. JX-0001 ('497 patent) 8:10-30. Thus, to a person of ordinary skill in the art, it is evident that an HVAC control system could exist entirely in a thermostat, entirely in the server, or some combination of the two.

* * *

At least one HVAC control system in the Google Products receives temperature measurements from at least a first location conditioned by at least one HVAC system. CX-0674C (Gomez DWS) Q/A 175-177, 180, 186-187, citing CPX-0002C CX-0061C (Burger Tr.) 25:2-22, 28:7-30:25 CX-0063C.0012 (A Brief Tour of HVAC Algorithms)

At the hearing, Dr. Burger testified under oath that the Nest Thermostat The CX-0063C.0012 / RX-0628C (A Brief Tour of HVAC Algorithms); CDX-0001C.51. When it is time to make a prediction, the Nest Thermostat takes into account the CX-0063C.0013 / RX-0628C; CDX-0001C.50.

Google does not dispute that the Nest Learning Thermostat (3rd Gen.) includes and the Nest Thermostat E includes Hearing Tr. 728:19-729:5 . Nonetheless, Google argues that its thermostats do not receive the claimed temperature measurements, because the sensors are receiving measurements from within the

[redacted]

thermostat itself, rather than from the space around the thermostat. Hearing Tr. 81:19-83:13. This is a distinction without a difference. The claim element requires "receiving temperature measurements from at least a first location conditioned by at least one HVAC system." Google cannot dispute that the Nest Thermostat is in a location conditioned by at least one HVAC system. Thus, even under Google's interpretation, the temperature measurements are from a first location (the Nest Thermostat) conditioned by the customer's HVAC system, which literally infringes.

Regardless, Google concedes that these temperature sensor measurements are used to estimate the temperature of the space surrounding the thermostat. RX-0157C (Burger) Q 48; Hearing Tr. 763:11-764:4 (Dr. Henze confirming the [redacted]"); Hearing Tr. 766:23-767:8 (Dr. Henze) [redacted] *see also* Hearing Tr. 729:6-730:17 (Dr. Burger confirming [redacted]). Specifically, a temperature compensation algorithm [redacted] CX-0674C Q. 187. This [redacted] CX-0674C (Gomez DWS) Q. 181-182. Indeed, the '497 patent expressly teaches the use of multiple sensors to receive a more accurate measurement of the inside temperature. JX-0001, 13:14-21. It is also clearly a measurement because it is in degrees Celsius and represents an average of the sensor measurements. Hearing Tr. 763:11-764:15.

* * *

Google's temperature sensors, and [redacted] also satisfy the claim language under the doctrine of equivalents. CX-0674C (Gomez DWS) Q/A 183. It performs substantially the same function (receiving temperature measurements from the temperature sensors in the customer's home), in substantially the same way (using temperature sensors in the home to receive temperature measurements and encoding them in a digital representation to represent the temperature information from the sensors, such as by combining measurements from multiple sensors into one reading to represent the temperature at a given time in the home, and receiving an inside measurement for that time with a processor) to achieve substantially the same result (receiving temperature measurements from the home over time).

Compl. Br. at 31-36.

Google argues, in part:

[redacted]

It is undisputed that the '497 patent contemplates at least two components—an "HVAC system," and an "HVAC control system." '497 patent, cl. 1; RX-0156C, Henze QA44, 46; RX-0001C, Auslander QA46-50; CX-0674C, Gomez QA103; RX-0163C, Souri 9/2 QA35; CX-0702C, Palmer QA19; *see also Becton, Dickinson & Co. v. Tyco Healthcare Grp.*, 616 F.3d 1249, 1254 (Fed. Cir. 2010) ("Where a claim lists elements separately, the clear implication of the claim language is that those elements are distinct components of the patented invention." (internal quotation marks and citations omitted)). Accordingly, to establish that the Nest Thermostats practice this claim limitation, EcoFactor must identify a component or components, apart from an HVAC system, that it contends is the claimed HVAC control system. *See Akzo Nobel Coatings, Inc.*, 811 F.3d at 1341. Despite numerous opportunities to clarify the record, Mr. Gomez failed to identify any component(s) that comprise or form the "HVAC control system" of the '497 and '322 patents, either in the patents themselves, or in the Nest Thermostats. Throughout his direct testimony, his cross-examination, and his redirect testimony, Mr. Gomez was unable to identify any component(s) that could be the claimed HVAC control system.

Mr. Gomez repeatedly testified that figure 2 was an embodiment of claim 1 of the '497 patent. Hearing Tr. vol. 1, 253:8-12, 256:23-57:4, Nov. 16, 2020 (Gomez). Accordingly, each element of claim 1 must appear in figure 2. *See id.* However, Mr. Gomez admitted that, during his deposition, he could not identify an HVAC control system in the embodiment disclosed by Figure 2 of the '497 patent. Hearing Tr. vol. 1, 253:17-56:19, Nov. 16, 2020 (Gomez). Despite being an expert in the field, Mr. Gomez blamed his inability to identify an HVAC control system in the patent on "some numbering issues" that "he can't resolve [] on a patent." *Id.* at 253:25-54:14.

Mr. Gomez's inability to identify an HVAC control system in the '497 patent stems from the fact the patent fails to disclose the metes and bounds of the claimed HVAC control system. *See* '497 patent, Fig. 1-13, 5:36-13:28; RX-0156C, Henze QA74; RX-0001C, Auslander QA48. When he was referred to the "Brief Description of the Drawings" and the "Detailed Description of the Preferred Embodiment," Mr. Gomez agreed that neither section disclosed an HVAC control system. Hearing Tr. vol. 1, 252:17-53:1, Nov. 16, 2020 (Gomez). At the Hearing, Mr. Gomez, for the first time, alleged that "HVAC control systems. [] could exist in multiple places, including the server, the computer, the controller, 108 [thermostat] or even 110 [gateway]." *Id.* at 254:20-53:3; *cf.* CX-0674C, Gomez QA21. Despite his new opinion that the HVAC control system could exist anywhere within the architecture of the claimed system, Mr. Gomez could not identify any HVAC control system in figure 2 or the embodiments in the specification of the '497 patent, stating only that "it's pretty clear from the rest of the specification what the HVAC control system is." Hearing Tr. vol. 1, 256:12-57:3, Nov. 16, 2020 (Gomez).

[redacted]

Mr. Gomez's new opinion that an HVAC control system could be found in a thermostat created a contradiction with EcoFactor's validity expert, Dr. Palmer. Noting that the components of an HVAC control system must be separate and distinct from an HVAC system, Mr. Gomez testified that the claimed HVAC system did not include a thermostat. Hearing Tr. vol. 1, 244:11-14, Nov. 16, 2020 (Gomez). However, Dr. Palmer contradicted this opinion and testified that the HVAC system "generally include[s]" a thermostat, as illustrated in figure 2 of the '497 patent. Hearing Tr. vol. 4, 962:2-13; 975:21-76:19, Nov. 19, 2020 (Palmer). If Dr. Palmer is correct that the claimed HVAC system includes a thermostat, then Mr. Gomez's opinion that the separate and distinct HVAC control system could be in a thermostat is wrong.

Mr. Gomez's inability to identify an HVAC control system in the '497 patent specification carries over into his inability to identify an HVAC control system in the Nest Thermostats. Although Mr. Gomez admitted that the "HVAC control system" was the same between the '322 and '497 patents, he identifies different configurations of the "HVAC control system" for each of the patents. *See* Hearing Tr. vol. 1, 252:8-16, Nov. 16, 2020 (Gomez); CX-0674C, Gomez QA103, 170-71. Mr. Gomez testified that "[t]he Google Products are an HVAC control system," and that "[t]he HVAC control system refers to the ***entire system*** that controls the customer's HVAC, including functionality with cloud support." CX-0674C, Gomez QA103, 170-71. Mr. Gomez struggled to explain what he meant by "entire system," and testified that "you could have it either all in one component or you can have an integrated component cloud system, and that would both qualify as an HVAC control system." Hearing Tr. vol. 1, 271:9-20, Nov. 16, 2020 (Gomez). Despite his obligation as an infringement expert to explain how "each limitation of the claim [is] present in the accused device," Mr. Gomez waived his hands and only testified that the HVAC control system was the entire accused product together with Google's cloud servers. *See Telemac Cellular Corp. v. Topp Telecom, Inc.*, 247 F.3d 1316, 1330 (Fed. Cir. 2001); Hearing Tr. vol. 1, 271:9-72:4 (Gomez).

Mr. Gomez's attempted identification of an HVAC control system that includes a thermostat is inconsistent with the claims and the specification and therefore cannot be correct. *See* RX-0156C, Henze QA74; RX-0001C, Auslander QA48; RX-0163C, Souri 9/2 QA36; *see also* '497 patent, cl. 3; '322 patent, cl. 5; '497 patent, at 8:21-30. As Dr. Auslander, Dr. Henze, and Dr. Souri all testified, according to the specification and claims of the '497 patent, the claimed "HVAC control system" must be a component other than a thermostat. RX-0156C, Henze QA74; RX-0001C, Auslander QA49; RX-0163C, Souri 9/2 QA50. As Dr. Henze testified:

> Claim 1 of both the '497 and the related '322 patent describe the HVAC control system as a component that "receives temperature measurements." Claim 3 of the '322 patent discloses that the HVAC control system may receive temperature measurements "from a programmable thermostat." Claim 3 of the '497 patent discloses that

[redacted]

> a programmable thermostat may "communicate[] with said HVAC control system using the Internet." Moreover, claim 5 of the '322 patent discloses that the "HVAC system includes a programmable thermostat." Based on the claims of the '497 and '322 patents, a PHOSITA would understand that an HVAC control system is a component separate and distinct from a thermostat.

RX-0156C, Henze QA74.

* * *

Limitation [1a] of the '497 patent requires that the "HVAC control system" receive temperature measurements of the location conditioned by an HVAC system. '497 patent, cl. 1; CX-0674C, Gomez QA175; RX-0156C, Henze QA74; RX-0001C, Auslander QA48. Mr. Gomez identifies the readings from sensors inside the thermostat as the claimed temperature measurements. CX-0674C, Gomez QA175. Mr. Gomez did not perform any analysis on, or even cite to any source code relating to, the sensor readings and their relationship, if any, to the ambient temperature of the structure. Hearing Tr. vol. 1, 236:6-37:12, 261:21-62:11, Nov. 16 , 2020 (Gomez); CX-0674C, Gomez QA107, 175. Rather, Mr. Gomez only relies on an incorrect interpretation of Dr. Burger's testimony regarding the [redacted]. CX-0674C, Gomez QA175. Dr. Burger clearly testified that [redacted] Hearing Tr. vol. 3, 747:20-48:2, Nov. 18, 2020 (Burger). Accordingly, Mr. Gomez failed to establish that any component within the Nest Thermostats receives temperature measurements "from at least a first ***location conditioned by*** at least one HVAC system," as required by the claims. *See* CX-0674C, Gomez QA175; RX-0156C, Henze QA73-74.

Although Mr. Gomez testified that the sensor readings are the claimed temperature measurements, he bases the rest of his infringement analysis on [redacted] *See* CX-0674C, Gomez QA177-180. The evidence shows that [redacted] are not temperature measurements, literally or under the doctrine of equivalents.

Mr. Gomez, Dr. Henze, and Dr. Burger all agree the Nest Thermostats use [redacted] CX-0674C, Gomez QA175; RX-0156C, Henze QA76-77; RX-0157C, Burger QA48-49; Hearing Tr. vol. 3, 746:25-2, Nov. 18, 2020 (Burger). In relying on Dr. Burger's deposition testimony, Mr. Gomez testified that [redacted] CX-0674C, Gomez QA175 (quoting CX-0061C (Burger Dep.) 25:10-22). Mr. Gomez then testified that the [redacted]

[redacted] *Id.* (quoting CX-0061C (Burger Dep.) 25:10-22); *see also* CX-0674C, Gomez QA177 (affirming that [redacted] quoting CX-0061C (Burger Dep.) 29:23-30:5). Mr. Gomez failed to establish that [redacted] are the claimed temperature measurements literally.

Mr. Gomez does not identify any evidence for and provides no explanation of the [redacted]. *See* CX-0674C, Gomez QA106-07, 182. During cross-examination, Mr. Gomez admitted that he did not cite to or otherwise reference the source code for the [redacted] in his testimony. Hearing Tr. vol. 1, 234:22-37:12, Nov. 16, 2020 (Gomez). Although Mr. Gomez claimed that he "did look at a fair amount of code that processed and received the indoor temperature measurements," he failed to discuss or cite any of the source code in his witness statement, and was unable to offer any opinion as to its operation. *Id.*; *see* CX-0674C, Gomez QA107.

The evidence shows that [redacted] Hearing Tr. vol. 3, 747:20-48:9, Nov. 18, 2020 (Burger); *id.* at 749:20-50:15. Dr. Burger, who is responsible for the development and maintenance of the [redacted], provided a detailed explanation of the algorithm. RX-0157C, Burger QA7-8, 48; CX-0061C (Burger Dep.) 110:25-11:6; Hearing Tr. vol. 3, 747:20-48:9, 749:20-50:15, Nov. 18, 2020 (Burger). Dr. Burger testified [redacted] Hearing Tr. vol. 3, 749:20-50:5, Nov. 18, 2020 (Burger) (emphasis added). When asked if the [redacted] "represent[s] an estimate of the inside temperature," Dr. Burger replied that [redacted] *Id.* at 750:6-15. Dr. Burger concluded that the [redacted] is the result of "months [of work] for every new thermostat." *Id.*

Mr. Gomez failed to establish that the [redacted] are equivalent to the claimed inside temperature measurements. Mr. Gomez's testimony is devoid of any function-way-result analysis on how the temperature estimates perform substantially the same function, in substantially the same way to achieve substantially the same result as temperature measurements. *See* CX-0674C, Gomez QA183. These conclusory allegations cannot establish infringement under the doctrine of equivalents. *Tex. Instruments, Inc. v. Cypress Semiconductor Corp.*, 90. F.3d 1558, 1567 (Fed. Cir. 1996).

The evidence shows that the [redacted] are not equivalent to the claimed inside temperature measurements. As Dr. Henze testified,

because and does not perform substantially the same function as a temperature measurement or provide substantially the same result. RX-0156C, Henze QA77. The is also not generated in substantially the same way as a temperature measurement. *Id.* The Nest Thermostats *Id.*; RX-0157C, Burger QA49; Hearing Tr. vol. 3 747:20-48:9, 749:20-50:15, Nov. 18, 2020 (Burger).

Resps. Br. at 148-55.

The Staff argues, in part:

The evidence shows that the accused Google products satisfy element 1[a]: "*at least one HVAC control system that receives temperature measurements from at least a first location conditioned by at least* one HVAC system." Staff Ex. 1; CX-0674C (Gomez) QA 169-183; Hearing Tr. at 269:6-274:3 (Gomez). Google's only non-infringement argument in its prehearing brief is that "Mr. Gomez fails to specify any component within the 'entire system' that receives the claimed [indoor] temperature measurements." RPreHBr. at 108. However, Mr. Gomez identified , for example, as I discussed earlier in the context of CX-0104C. And as I discussed earlier, and as is confirmed by the documents and testimony, customers use the Google Accused Products to control the HVAC system, both by changing temperature settings with the display and dial turn on the device and with the controllers on the network such as the Nest mobile app." CX-0674C (Gomez) QA 170 (emphasis added). The evidence further shows that the HVAC control system receives indoor temperature measurements:

> Each of the Google Products receives temperature measurements from the customer's home, which is conditioned by the customer's HVAC system. According to Mr. Burger's testimony in CX-0061C, 25:
>
> Burger Tr. 25.

[redacted]

CX-0674C (Gomez) QA 175; Hearing Tr. 762:5-17 (Henze); 763:11-22 (Henze); 233:22-237:19 (Gomez); 250:3-258:9 (Gomez).

Google argues that [redacted] on the accused devices do not measure the inside temperature, but rather approximate the inside temperature – [redacted] *See* Hearing Tr. 766:5-767:20 (Henze). However, to infringe, the claim element 1[a] requires only that a device "receives temperature measurements from at least a first location conditioned by at least one HVAC system." *See* Staff Ex. 1. The evidence shows that the Nest Thermostats are installed in customer's home (a first location conditioned by the HVAC system), and, as discussed above, [redacted] measure the inside temperature, and [redacted]). *See* Hearing Tr. 766:5-767:20 (Henze); CX-0674C (Gomez) QA 171, 173. In addition, if not literally satisfied, [redacted] is equivalent to the claimed temperature measurement at the first location (*i.e.*, indoors). *See* CX-0674C (Gomez) QA 183.

Staff Br. at 30-31.

The evidence adduced by EcoFactor shows that the accused Google products include at least one HVAC control system that receives temperature measurements from at least a first location conditioned by at least one HVAC system. *See* CX-0674C (Gomez) at Q/A 170-75. The claimed "at least one HVAC control system" corresponds to hardware and software for the Nest Learning Thermostat Third Generation or Nest Thermostat E that controls the customer's HVAC system. *See id.* at Q/A 171-72. Inasmuch as the Nest Thermostats include "HVAC Control" software that "decides when to turn on/off the HVAC and what stage or particular piece of equipment to use," CX-0063C.0017, and hardware and software for sending signals to the HVAC system, CX-0674C (Gomez DWS) at Q/A 70-73, 87-88, 103, 164, 170-73, the administrative law judge finds that the accused Google products satisfy the above-recited limitation.

[redacted]

Google argues that EcoFactor has failed to identify a component or components, apart from an HVAC system, that it contends is the claimed HVAC control system. However, Mr. Gomez identified both hardware and software components of the Google Products that control the HVAC system. *See id.* at Q/A 169-74.

Google further argues that Mr. Gomez failed to establish that any component within the Nest Thermostats receives temperature measurements "from at least a first location conditioned by at least one HVAC system," as required by the claims. However, EcoFactor adduced evidence showing that the Nest Thermostats are installed in customer's home (a first location conditioned by the HVAC system), [redacted] *See* Henze Tr. 766-767; CX-0674C (Gomez DWS) at Q/A 171, 173. In addition, if not literally satisfied, the [redacted] is equivalent to the claimed temperature measurement at the first location (*i.e.*, indoors). *See* CX-0674C (Gomez DWS) at Q/A 183. The accused Google products perform substantially the same function in substantially the same way to achieve the same result of receiving temperature measurements from the customer's home over time. *See id.* That is, the accused Google products receive the temperature measurements from the temperature sensors in the customer's home and encode them digitally as a temperature signal that represents the temperature information from the customer's home. *See id.* [redacted] is substantially the same as receiving a single temperature measurement from the customer's home. *See id.*

Even were "HVAC system" construed according to respondents' proposed construction, the accused Google products would still satisfy this claim limitation because the Nest thermostats function as a group of components working together to move heat or remove heat from the conditioned [structure/location].

Accordingly, it is determined that the accused Google products satisfy this claim limitation.

**iii. one or more databases that store at least said temperatures measured at said first location over time;**

The accused Google products include "one or more databases that store at least said temperatures measured at said first location over time." *See* CX-0674C (Gomez DWS) at Q/A 185-91.

EcoFactor argues, in part:

> The Google Products each meet claim element 1[b]. The processors in the head unit r . CX-0674C (Gomez DWS) Q/A 175-177 , 184-189 ( CX-0061C (Burger Tr.) 25:2-22 ), 29:5-30:25 "); CX-0063C.0011 (A Brief Tour of HVAC Algorithms), CX-0104C.0011 (Sapphire Algos Overview) (describing ), CX-0563C (Chicago Design Doc); CPX-0002C (Google source code, including ).
>
> The Google Products infringe literally by CX-0674C (Gomez DWS) Q/A 190-192. They also infringe under the doctrine of equivalents by performing substantially the same function ( in substantially the same way

[redacted]

[redacted] ) to achieve the same result [redacted] *Id.* Q/A 192.

* * *

Google has argued that the [redacted] is not a measurement, but an estimate. However, Google's [redacted] is still a temperature measurement, even if it is also an estimate. CX-0674C (Gomez DWS) Q181-182, 190-192 (Mr. Gomez has explained that the [redacted] ).

Dr. Henze's and Dr. Burger's testimony provide at least three reasons that fully support Mr. Gomez's opinion as to the buffered temperature. First, the [redacted] Hearing Tr. 766:23-767:8 (Dr. Henze); *see also* Hearing Tr. 729:6-730:17 (Dr. Burger confirming [redacted] represents the "ambient temperature" in the home). Second, it is in degrees Celsius. Third, it is based on an average of the device's sensor measurements. Hearing Tr. 763:11-764:15 (Dr. Henze) ( [redacted] ). This is literally a temperature measurement, even if the processors are [redacted] . CX-0674C (Gomez DWS) Q181-182, 190-192.

Finally, the intrinsic record confirms that Google's non-infringement argument cannot be correct. Indeed, Google's argument would exclude a preferred embodiment of the '497 patent. The specification of the '497 patent expressly recommends the use of multiple temperature sensors to receive a more accurate measurement of the inside temperature. JX-0001 ('497 patent), 13:14-21. Google's use of ten temperature sensors, instead of only one, follows the express teachings of the patent.

* * *

Regardless, Google also infringes under the doctrine of equivalents. CX-0674C (Gomez DWS) Q/A 183, 192. Google argues that [redacted] is substantially different from [redacted] Respondents' PHB 119. But [redacted]

[redacted] which is insubstantially different from using only one value. CX-0674C (Gomez DWS) Q/A 192.

Compl. Br. at 36-38.

Google argue, in part:

> EcoFactor asserts that the Nest Thermostats practice limitation [1b] both literally and under the doctrine of equivalents with respect to "said temperatures measured from at least a first location conditioned by at least one HVAC system." *See* CX-0674C, Gomez QA192.
>
> The evidence shows the Nest Thermostats do not store temperature measurements. CX-0674C, Gomez QA175; RX-0156C, Henze QA75, 78; RX-0157C, Burger QA48-49. As previously discussed with respect to limitation [1a], neither the [redacted] are the claimed inside temperature measurements, either literally or under the doctrine of equivalents. Furthermore, there is no evidence, and EcoFactor's expert does not allege, that the Nest Thermostats store the sensor readings. CX-0674C, Gomez QA175-77; RX-0156C, Henze QA76-77; RX-0157C, Burger QA48-49.

Resps. Br. at 155.

The Staff argues, in part:

> The evidence shows that the accused Google products satisfy element 1[b]: "*one or more databases that store at least said temperatures measured at said first location over time*." *See* Staff Ex. 1; CX-0674C (Gomez) QA 184-192; Hearing Tr. at 269:6-274:3 (Gomez); 348:4-20 (Gomez). Google's only argument in its prehearing brief is that the Nest Thermostats [redacted] PreHBr. at 109; RX-0157C (Burger) QA 48; RX-0156C (Henze) QA 76-77. Google also argues that [redacted] is also not equivalent to a temperature measurement. RPreHBr. at 109. For the same reasons discussed above with respect to element 1[a], the Staff disagrees.

Staff Br. at 31-32.

The evidence adduced by EcoFactor shows that the accused products include one or more databases that store at least said temperatures measured at said first location over time. *See* CX-0674C (Gomez DWS) at Q/A 185-91.

[redacted]

Google argues that neither [redacted] are the claimed inside temperature measurements, either literally or under the doctrine of equivalents, and that the Nest Thermostats [redacted]. *See* Resps. Br. at 155. However, the [redacted] *See* CX-0674C (Gomez DWS) at Q/A 175-77, 184-89. The Google Products infringe literally by [redacted]. *See id.* at Q/A 190-92.

The evidence adduced by EcoFactor shows that the Nest Thermostats' [redacted] *See id.* at Q/A 187; Henze Tr. 766-767. The [redacted] is literally a temperature measurement, even if it is [redacted]. In addition, if not literally satisfied, the [redacted], which is insubstantially different from using only one value. *See* CX-0674C (Gomez DWS) at Q/A 192. That is, the administrative law judge finds that the accused Google products perform substantially the same function in the same way to achieve the same result. In particular, the accused Google products [redacted] *See id.* The accused Google products [redacted]. *See id.*

[redacted]

Accordingly, it is determined that the accused products satisfy this claim limitation.

**iv. one or more processors that receive outside temperature measurements from at least one source other than said HVAC system;**

Each of the Google accused products includes this feature of claim 1. *See* CX-0674C (Gomez DWS) at Q/A 193-97, 199.

EcoFactor argues, in part:

> The Google Products each include one or more processors, including the System on Chip. CX-0674C (Gomez DWS) Q. 73, 170.
>
> * * *
>
> The Google Products [redacted] CX-0674C (Gomez DWS) Q/A 193-197, 199, citing CX-0063C.0012 (A Brief Tour of HVAC Algorithms) ("Each day, Nest observes and stores…outdoor temperatures from the [redacted] CX-0061C (Burger Tr.) 33:19-34:13; CX-0061C (Burger Tr.) 34:23-37:11; Hearing Tr. 355:16-356:9 [redacted]
>
> At the hearing, Dr. Burger confirmed under oath that the [redacted] Hearing Tr. 731:24-732:8 ([redacted]
>
> The source code also confirms this element is satisfied. CX-0674C (Gomez DWS) Q/A 197; Hearing Tr. 348:17-349:6 (Mr. Gomez reviewed the Nest source code that uses [redacted] Hearing Tr. 353:21-355:2 ([redacted] CPX-0002C; Hearing Tr. 733:25-734:7 (Dr. Burger testifying that [redacted]

[redacted]

* * *

Google argues non-infringement on the basis that the outside temperatures are "estimates," not "measurements." Even though Google u[redacted] of the user's home, Google argues that sometimes, the information[redacted] is not identical to information provided by Google Weather Service, indicating an estimate rather than a measurement. Respondents' PHB 119. To be clear, these temperatures are [redacted] hus, regardless if the values experience further processing or can be considered "estimates," the values are still measurements. CX-0674C (Gomez DWS) Q/A 198-199, citing CX-0061C (Burger Tr.) 34:23-37:11. Indeed, the outside temperature measurements are valid for particular time windows, which is [redacted] Hearing Tr. 352:18-353:13 (Mr. Gomez's opinion is that the Nest Thermostat features at issue receive outside temperature ***measurements***, because they are "in degrees C' and are updated "on a frequent enough basis so that they can be used as current measurements, not something in the future, not something in the past, but they need them [redacted]

Google's non-infringement argument is simply reading in claim limitations that do not exist. Moreover, it would exclude a preferred embodiment of the patent specification, as well as dependent claim 2. Dependent claim 2 requires the outside temperature measurements of claim 1 to be based on ZIP code. A measurement for the temperature in a geographic region such as ZIP code is surely an estimate in some sense. Yet, under Google's argument, even these outside temperature values would not qualify as "measurements."

**Doctrine of equivalents:** Regardless, there would also be infringement under the doctrine of equivalents, because the Google Products perform substantially the same function (receiving outside temperature measurements from a source other than the HVAC system) in substantially the same way (receiving outdoor temperature values from a weather service that were recorded and measured at a weather station in the customer's postal code) to achieve the same result (receiving the outdoor temperature at the customer's home over time). CX-0674C (Gomez DWS) Q. 200-201.

Compl. Br. at 38-41.

Google argues, in part:

[redacted]

EcoFactor asserts that the Nest Thermostats practice limitation [1c] both literally and under the doctrine of equivalents with respect to "outside temperature measurements." *See* CX-0674C, Gomez QA200.

Limitation [1c] requires that a processor receive "outside temperature measurements." '497 patent, cl. 1; RX-0156C, Henze QA79; CX-0674C, Gomez QA194. Although Mr. Gomez generically testified that "[e]ach of the Google Accused Products includes a processor," he failed to identify any such processor(s) that receives outside temperature measurements. CX-0674C, Gomez QA194.

The evidence shows that [redacted]. Hearing Tr. vol. 3, 771:14-24, Nov. 18, 2020 (Henze); RX-0156C, Henze QA79; RX-0157C, Burger QA43-44. As Dr. Henze testified, and as confirmed by Dr. Burger, [redacted] RX-0156C, Henze QA79-81; RX-0157C, Burger QA43; RX-0615 (Nest Learning Thermostat Installation Guide), at 9. Mr. Gomez did not examine, or provide any analysis, on how [redacted]. *See* CX-0674C, Gomez QA195-99.

Dr. Burger testified that the [redacted] RX-0157C, Burger QA43 (emphasis added). Dr. Henze similarly testified that [redacted] Hearing Tr. vol. 3, 771:14-24, Nov. 18, 2020 (Henze). Dr. Henze further demonstrated that the [redacted] Hearing Tr. vol. 3, 771:14-24, Nov. 18, 2020 (Henze); RX-0156C, Henze QA79; RX-0157C, Burger QA43-44. Dr. Henze gave a particular example of his analysis by testifying that when he "used Google Weather service to obtain the outside temperature in Boulder Colorado at 1:00am on July 1, 2020, [he] receive[s] a value of 64° F. However, when [he] requested the same information from [redacted] at the same time, [he] receive[s] a value of 61° F." RX-0156C, Henze QA79. This discrepancy could not occur unless [redacted]. *See* Hearing Tr. vol. 3, 771:14-24, Nov. 18, 2020 (Henze); RX-0156C, Henze QA79; RX-0157C, Burger QA43-44.

Mr. Gomez fails to show that the weather data provided [redacted] is equivalent to the claimed outside temperature measurements. Mr. Gomez does not provide any evidence or analysis as to what he alleges to be

equivalent to the claimed "outside temperature measurements" and only provides generalized assertions. *See* CX-0674C, Gomez QA200. Mr. Gomez also does not identify any component or function that performs substantially the same function, in substantially the same way, to achieve substantially the same result of "receiv[ing] outside temperature measurements." *Id.* Furthermore, because Mr. Gomez did not review or analyze any source code for [redacted] he cannot establish that they operate in substantially the same way as the claimed outside temperature measurements. Mr. Gomez's testimony, which merely parrots the claim language without explaining *how* or *why* the Nest Thermostats perform substantially the same function in substantially the same way with substantially the same results, cannot establish infringement under the doctrine of equivalents. *See Tex. Instruments, Inc.*, 90. F.3d at 1567.

The weather data provided by the Google Weather Service is also not equivalent to the claimed outside temperature measurements. Because the [redacted] *See* Hearing Tr. vol. 3, 771:14-24, Nov. 18, 2020 (Henze); RX-0156C, Henze QA79; RX-0157C, Burger QA43-44. Similarly, because [redacted] it does not operate in substantially the same way as receiving temperature measurements. *See* RX-0156C, Henze QA79; RX-0157C, Burger QA43-44. The Google Weather Service [redacted]. Hearing Tr. vol. 3, 771:14-24, Nov. 18, 2020 (Henze); RX-0156C, Henze QA79; RX-0157C, Burger QA43-44.

Resps. Br. at 156-58.

The Staff argues, in part:

The evidence shows that the accused Google products satisfy element 1[c]: "*one or more processors that receive outside temperature measurements from at least one source other than said HVAC system*." *See* Staff Ex. 1; CX-0674C (Gomez) QA 193-200, 119-120; Hearing Tr. at 269:6-274:3 (Gomez). According to Google, the Nest Thermostats [redacted] RPreHBr. at 109; RX-0156C (Henze) QA 79. Google argues that the temperatures from [redacted] "is not [an outside] temperature measurement," as required by the claim, but rather an estimate. *See* RX-0156C (Henze) QA 79; RX-0157C (Burger) QA 42; RPreHBr. at 109; Hearing Tr. 769:4-772:16 (Henze). The Staff disagrees.

Staff Br. at 32-33.

The construction of "outside temperature measurements" was discussed above; the claim term "outside temperature measurements" means "measurements of the temperature outside (or external to) [the structure]."

Under the adopted construction, the evidence adduced by EcoFactor shows that the Google accused products include one or more processors that receive measurements of the temperature outside (or external to) [the structure] from at least one source other than said HVAC system. *See* CX-0674C (Gomez DWS) at Q/A 193-97, 199.

Google argues that [redacted]. However, even if the measurements from the two services are [redacted] is still literally a temperature measurement—one that is likely more accurate than one of the two measurements. *See id.* at Q/A 199. Second, even if not a literal temperature measurement because [redacted], the temperature measurement that is communicated to the Nest Thermostat is equivalent to the claimed "outside temperature measurement." *See id.* at Q/A 200. The accused Google products include processors receiving outside temperature measurements from a weather service to achieve the same result of receiving the data for the outdoor temperature at the customer's home over time. *See id.*

Even were "HVAC system" construed according to respondents' proposed construction, the accused Google products would still satisfy this claim limitation because the Nest thermostats function as a group of components working together to move heat or remove heat from the conditioned [structure/location].

[redacted]

Even were "outside temperature measurements" construed according to respondents' proposed construction, the accused Google products would still satisfy this claim limitation because [redacted] *See id.* at Q/A 68, 200.

Accordingly, it is determined that the Google accused products satisfy this claim limitation.

**v. wherein said one or more processors are configured to calculate one or more rates of change in temperature at said first location for periods during which the status of the HVAC system is "on" and wherein said one or more processors are further configured to calculate one or more rates of change in temperature at said first location for periods during which the status of the HVAC system is "off", and to relate said calculated rates of change to said outside temperature measurements.**

Each of the Google accused products includes this feature of claim 1. *See* CX-0674C (Gomez DWS) at Q/A 202-19.

EcoFactor argues, in part:

> Mr. Gomez's analysis confirms this element is infringed under any proposed construction. CX-0674C (Gomez DWS) Q. 202-219. [redacted] CX-0674C (Gomez DWS) Q. 203-210. These processes learn "how quickly the home warms up and cools down," both for when the HVAC system is "on" and when it is "off." CX-0542 (Google's web page explaining "The Time-To-Temperature estimate will get more accurate as your thermostat continues to learn about your home, your system's efficiency, and how quickly your home warms up and cools down."). Calculating "how quickly the home warms up and cools down" meets every proposed construction of "rate of change."
>
> To build the model, the [redacted] CX-0674C (Gomez

DWS) Q. 203-210. To update the model, CX-0674C (Gomez DWS) 208-212. The CX-0674C (Gomez DWS) Q/A 212-219. It . *Id.* Google has never rebutted Mr. Gomez's theory as to building the model or updating the model, and limits its defenses to his theories regarding the model's prediction capability.

The is built using the inside temperatures, outside temperatures, and HVAC states stored in . CX-0674C (Gomez DWS) Q/A 204-206, 208, 210, 212-218; CX-0061C (Burger Tr.) 26:16-30:5 ), 45:1-46:25 ( ), 51:9-54:4 ( ), 61:5-62:9 (describing model equation X = AX + BU), 93:18-99:8 n), CX-0063C. (A Brief Tour of HVAC Algorithms), CX-0104C.0009 (Sapphire Algos Overview, discussing ).

The modeling calculates the rates of change divided into time steps of one minute. CX-0674C (Gomez DWS) Q. 208-209; CX-0061C (Burger Tr.) 48:9-49:7 s."); 49:25-50:1 (

Building the model . CX-0674C (Gomez DWS) Q/A 207. Th The CX-0674C (Gomez DWS) Q. 204-210; CX-0061C (Burger Tr.) 27:8-19 ( CX-0063C.0011-12 (also RX-0628C) (A Brief Tour of HVAC Algorithms) Hearing Tr. 335:1-17; CX-0063C.

[redacted]

The claimed "rates of change" are [redacted] Hearing Tr. 258:23-259:21 [redacted]; Hearing Tr. 330:12-13 [redacted]; Hearing Tr. 263:11-20 (Mr. Gomez testifying [redacted] Hearing Tr. 337:10-338:22 [redacted]

The [redacted]. CX-0674C (Gomez DWS) Q. 208. The [redacted] CX-0674C (Gomez DWS) Q. 208, citing CX-0061C (Burger Tr.) 23 [redacted] CX-0674C (Gomez DWS) Q. 212; CDX-0001C.55-58; Hearing Tr. 767:17-768:5 [redacted]

The Google Products use the [redacted] CX-0674C (Gomez DWS) Q/A 209-212, 217-218. CX-0063C / RX-0628C (A Brief Tour of HVAC Algorithms) (GOOG-ITC1185-00001746 at -1764) [redacted] The diagram in CX-0063C shows the [redacted]

Google's witnesses, including Dr. Henze, agree with Mr. Gomez that the Nest Thermostats [redacted] under any construction of the term. The following sentence is from ***Respondents'*** prehearing brief: "Instead, Mr. Gomez, Dr. Henze, and Dr. Burger all agree [redacted] Respondents' Prehearing Brief at 119.

* * *

[redacted]

Dr. Henze's admissions regarding a preferred embodiment of the '497 patent also show that the [redacted] Hearing Tr. 335:1-17 (Mr. Gomez testifying [redacted]); Hearing Tr. 263:11-20 (Mr. Gomez testifyin [redacted] – is consistent with one of the preferred embodiments in the '497 patent. JX-0001, 10:57-11:19. Dr. Henze confirmed this embodiment calculates the "likely rate of change" in internal temperature with an algorithm that weighs the impact of several variables, including outside temperature. Hearing Tr. 791:2-792:24 (Dr. Henze confirming that the patent specification discloses calculating a "likely rate of change for internal temperature at home X from a starting point of 70 degrees when the outside temperature is 85 degrees…" using a "basic algorithm that weighs the impact of external variables," such as outside temperature).

The algorithm in the specification can weigh these impacts because – [redacted] it uses outside temperatures over time, HVAC duty cycle on/off data over time, and temperature readings over time. JX-0001, 10:57-61 (outside temperatures), 10:63-67 (HVAC [redacted], 10:57-11:2 (inside temperatures).

* * *

Google's corporate representative, Dr. Burger, confirmed that each portion of this claim element is infringed during his testimony at the hearing.

**Configured to calculate one or more rates of change in temperature**: Dr. Burger confirmed [redacted] Hearing Tr. 734:23-735:14 (Dr. Burger testifying that [redacted]

The calculated [redacted] is depicted in Google's confidential technical documents, as confirmed at trial by Dr. Burger. Hearing Tr. 735:15-736:16 (Dr. Burger testifying that RX-0628C / CX-

(A Brief Tour of HVAC Algorithms), as excerpted in RDX.0006C.009, CX-0063C.0019 (also RX-0628C) (A Brief Tour of HVAC Algorithms), excerpted in RDX.0006C.009.

The calculated c literally meets each proposed construction for "rate of change." It is calculating the rise or fall in temperature measurements over the span of time between the measurements. This is the rise or fall in temperature measurements divided into 15-minute time intervals. CX-0674C (Gomez DWS) Q. 208.

**Configured to calculate one or more rates of change in temperature…for periods during which the status of the HVAC is "on" and "off":** Dr. Burger confirmed the ). Hearing Tr. 734:8-736:16 (Dr. Burger testifying about RDX.0006C.009. He confirmed that one action, is when the Nest is . Another action, is in response to the request for heat. The impact of each action on the temperature is evaluated over 15-minute intervals); RDX.0006C.0009, which contains an excerpt of CX-0063C.0019 (also RX-0628C) (A Brief Tour of HVAC Algorithms) which depicts for different HVAC control actions,

Dr. Burger's testimony establishes that the products infringe even under Respondents' interpretation of the "status of the HVAC system is 'on' / 'off'". Hearing Tr. 734:8-736:16 (Dr. Burger). This proves that when the HVAC is being requested to heat, it is , in contrast to when the HVAC is being requested to turn off.

Dr. Burger's testimony is consistent with Mr. Gomez's analysis as well. Hearing Tr. 327:4-327:24 (Mr. Gomez testified that ," and that the There ar CX-0674C (Gomez DWS) Q/A 205. This allows the to the home heats up and cools down when the status of the HVAC system is "on" as well as when it is "off." CX-0674C (Gomez DWS) Q/A 215-218.

[redacted]

**Relate (correlate) said calculated rates of change to said outside temperature measurements:** Finally, Dr. Burger also confirmed [redacted] Hearing Tr. 733:25-734:7 (Dr. Burger testifying that the [redacted].

Compl. Br. at 41-49.

Google argues, in part:

EcoFactor only alleges literal infringement of limitation [1d]. Limitation [1d] requires that the processors of limitation [1c] calculate rates of change in inside temperature measurements when the HVAC system is "on" and rates of change in inside temperature measurements when the HVAC system is "off." '497 patent, cl. 1; RX-0001C, Auslander QA81. The processors must then relate the calculated rates of change in inside temperature measurements to the outside temperature measurements. '497 patent, cl. 1; RX-0001C, Auslander QA81. Mr. Gomez again generically testified that "the Google Accused Products include one or more processors," but he failed to identify any such processor(s) that perform the claimed calculations. CX-0674C, Gomez QA203.

* * *

Mr. Gomez failed to identify any rate of change in the Nest Thermostats. Rather, Mr. Gomez alleged that a value, [redacted] CX-0674C, Gomez QA203, 212-13; Hearing Tr. vol. 1, 262:23-63:2, Nov. 16, 2020 (Gomez). Mr. Gomez admitted that he only pointed to [redacted] and no other component in the Nest Thermostats, as "representing a rate of change." Hearing Tr. vol. 1, 262:23-63:2, Nov. 16, 2020 (Gomez). The evidence shows that [redacted] does not represent any rates of change in inside temperature measurements. RX-0156C, Henze QA82.

First, Mr. Gomez admits [redacted] CX-0674C, Gomez QA214. Therefore, it is not possible, at a fundamental level, to derive a physical meaning from the values, such as a rate of change in temperature. RX-0628C (Brief Tour), at 12-13; RX-0156C, Henze QA83-84; RX-0157C, Burger QA34-35. As Dr. Burger testified, [redacted] RX-0157C, Burger QA34. In his witness statement, Mr. Gomez agreed with and adopted Dr. Burger's characterization and, quoting Dr. Burger, testified that [redacted], that it is

CX-0674C, Gomez QA214 (quoting CX-0061C (Burger Dep.) 97:24-98:3). On cross-examination, Mr. Gomez again referred to as a Hearing Tr. vol. 1, 258:13-22, Nov. 16, 2020 (Gomez).

At the Hearing, Mr. Gomez asserted, without any evidentiary support, that he believed "the contents of what's inside the black box are well-known." *Id.* at 258:13-22. When pressed on the contents of the , Mr. Gomez failed to explain what any values represented, and admitted, "it is difficult to figure out exactly what they're doing," but "[y]ou know it's in there." *Id.* at 260:12-61:3. According to Mr. Gomez, *Id.* at 261:21-62:1. However, Mr. Gomez admitted that he did not use any testing equipment or perform any analysis to understand the contents *Id.* at 262:2-11. Despite his obligation as an infringement expert to explain how "each limitation of the claim [is] present in the accused device," Mr. Gomez testified that he "didn't believe it was necessary to justify" his infringement allegations and, though "there's a fair amount of evidence do," he did not include any of it in his testimony. *See Telemac Cellular Corp.*, 247 F.3d at 1330; Hearing Tr. vol. 1, 262:12-22, Nov. 16, 2020 (Gomez).

On cross-examination, counsel for Google presented Mr. Gomez with evidence relating *Hearing Tr. vol. 1,* 265:23-67:1, Nov. 16, 2020 (Gomez). Although Mr. Gomez included, in a string cite, a function, . *See id.* at 266:4-67:1; CX-0674C, Gomez QA219. Hearing Tr. vol. 1, 267:16-19, 268:17-19, Nov. 16, 2020 (Gomez). Accordingly, Mr. Gomez's testimony demonstrates that does not include or otherwise "represent" any rates of change in inside temperature measurements.

Further, the evidence shows that cannot include or otherwise represent any rates of change in inside temperature measurements. Dr. Henze and Dr. Burger testified that RX-0156C, Henze QA82-83; RX-0157C, Burger QA33-35; RX-0628C (Brief Tour), at 12-13. Therefore, cannot represent a rate of change in inside temperature measurements. RX-0156C, Henze QA82; CX-0674C, Gomez QA213-15.

* * *

Failing to find a rate of change in inside temperature in Mr. Gomez created a new theory of infringement in which he alleged, with no evidentiary support, that a rate of change was "just inherent" and "part of" the .

Hearing Tr. vol. 1, 260:12-61:3, Nov. 16, 2020 (Gomez). The evidence shows that Mr. Gomez's spur-of-the-moment new theory is based on a faulty understanding of the operation of the Mr. Gomez incorrectly testified that the . *Id.* at 263:24-65:2. However, Google's source code, documents, witness testimony, and expert testimony establish that Mr. Gomez is incorrect and the does not use the as an input.

As described by Dr. Burger, the that uses RX-0157C, Burger QA33-34, 42; RX-0156C, Henze QA67, 82; RX-0628C (Brief Tour), at12-13; RX-0603C (E-mail from E. Burger Re ), at 2; RPX-0014C (Google Source Code), ll. 31-36. Google's documents further show that using the indoor temperature as an input "will definitely make the model unstable." RX-0603C (E-mail from E. Burger Re Thermal Model Parameters), at 2. Consequently, because the it cannot inherently calculate a rate of change in indoor temperature measurements, as required by the claim. RX-0156C, Henze QA85; RX-0157C, Burger QA46.

* * *

In its pre-hearing brief, EcoFactor also alleges that the PHB at 36-37. However, EcoFactor did not and cannot provide any evidence for these allegations. *See id.* On cross-examination, Mr. Gomez admitted that he only pointed as Hearing Tr. vol. 1, 262:23-63:2, Nov. 16, 2020 (Gomez). Accordingly EcoFactor's additional arguments are not supported by either Mr. Gomez's testimony or his witness statement. Further, there is no evidence supporting EcoFactor's additional theories, and EcoFactor does not identify any rates of change in any of the other terms of the equations . *See* PHB at 36-37.

Dr. Burger testified that the earing Tr. vol. 3, 747:3-14, Nov. 18, 2020 (Burger). Dr. Burger also testified that the does not . *Id.* at 748:10-22. In addition, as Dr. Palmer testified, using a model to predict a future temperature "does not necessarily include a rate of change calculation." Hearing Tr. vol. 4, 963:14-19, Nov. 19, 2020 (Palmer). Accordingly, the does not calculate any rates of change in inside temperature, as required by the claim.

[redacted]

* * *

The evidence shows that the Nest Thermostats also do not correlate any rates of change in indoor temperature measurements to outside temperature measurements under any proposed construction. RX-0156C, Henze QA82, 86-88. As explained by Dr. Henze and Dr. Burger, because the [redacted] cannot and does not correlate any rates of change in temperature to outdoor temperature measurements, or correlate any indoor temperature measurements to outdoor temperature measurements. RX-0156C, Henze QA88; RX-0157C, Burger QA45. When asked whether the [redacted] compares or correlates a buffered temperature estimate with [redacted] Dr. Burger clearly replied "No." RX-0157C, Burger QA45.

Therefore, EcoFactor failed to establish that the Nest Thermostats practice claim 1 of the '497 patent, either literally or under the doctrine of equivalents. RX-0156C, Henze QA91.

Resps. Br. at 158-63 (footnotes omitted).

The Staff argues, in part:

In its prehearing brief, Google asserted that (a) EcoFactor has not identified any processor that performs the claimed calculations, (b) the accused products do not calculate one or more rates of change, (c) the accused products [redacted] instead the [redacted]. RPreHBr. at 111.

**With respect to argument (a)**, the Staff disagrees for the same reasons discussed above for element 1[c].

**With respect to argument (b)**, the evidence shows:

- [redacted] CX-0674C (Gomez) QA 208.
- [redacted]

[redacted] *Id*.

- According to Mr. Burger, [redacted] *Id*. (citing CX-0061C (Burger Tr.) at 23.).
- In the source code, the [redacted]. *Id*. at QA 212.
- Eric Burger's testimony explains that [redacted]. *Id*. at QA 212.
- [redacted]. *Id*. at QA 213, 214.
- According to Mr. Burger, [redacted] *Id*. at QA 214 (citing CX-0061C (Burger Tr.) 98-99)).

Thus, the evidence shows that the [redacted] *See* Hearing Tr. at 258:6-269:1 (Gomez); 325:23-348:3 (Gomez). The "thermal mass" of a structure is defined in the '497 patent specification as "the speed with [which] the temperature inside a given building will change in response to changes in outside temperature and differences between inside and outside temperature." JX-1, at 9:1-5. The speed at which a building's inside temperature changes necessarily is a rate of change of temperature, *i.e*., deltaTemp/deltaTime.

[redacted]

> **With respect to argument (c)**, the claim does not require that the indoor temperature be an "input" to the model, as Google argues, but rather requires that the processor is configured to "***calculate*** one or more rates of change of [indoor] temperatures…" At any rate, for the same reasons discussed above with respect to the preamble, the [redacted] "***calculate*** one or more rates of change of [indoor temperature] (i.e., a first location)" for when the HVAC is "on" and "off." *See also* CX-0674C (Gomez) QA 203-219.
>
> **With respect to argument (d)**, because Google's argument (c) fails, its argument (d) falls as well. Further, the evidence further shows that the Nest Thermostats correlate the rates of change with outside temperature measurements. CX-0674C (Gomez) QA 210.

Staff Br. at 33-35.

The construction of "one or more rates of change in temperature" was discussed above; the claim term "one or more rates of change in temperature" is construed to have its plain and ordinary meaning, an example of which is: "the difference between two temperature measurements divided by the span of time between the measurements."

Under the adopted construction, EcoFactor has adduced evidence showing that the accused Google products satisfy limitation 1[d] of the '497 patent.

Google asserts that EcoFactor has not identified any processor that performs the claimed calculations. *See* Resps. Br. at 158. However, the accused Google products include a processor that calculates rates of change in inside temperatures [redacted] *See* CX-0674C (Gomez) at Q/A 203. In particular, Dr. Burger confirmed the model [redacted], and it also [redacted] Burger Tr. 734-736 (Dr. Burger testified [redacted]

[redacted]

[redacted]); RX-0628C (A Brief Tour of HVAC Algorithms) [redacted]

Google further asserts the accused products do not calculate one or more rates of change. *See* Resps. Br. at 159-61. However, EcoFactor adduced evidence showing that the [redacted] of the structure. *See* Gomez Tr. 258-269, 325-348. The "thermal mass" of a structure is defined in the '497 patent specification as "the speed with [which] the temperature inside a given building will change in response to changes in outside temperature and differences between inside and outside temperature." JX-0001 ('497 patent) at col. 9, lns. 1-5. The speed at which a building's inside temperature changes necessarily is a rate of change of temperature.

Google further asserts the accused products do not use [redacted] *See* Resps. Br. at 161-62. However, the claim does not require that the indoor temperature be an "input" to the model, as Google argues, but rather requires that the processor is configured to "calculate one or more rates of change of [indoor] temperatures…" For the same reasons discussed above with respect to the preamble, the evidence shows that the Nest Thermostats [redacted] "calculate one or more rates of change of [indoor temperature] (i.e., a first location)" for when the HVAC is "on" and "off." *See* CX-0674C (Gomez DWS) at Q/A 203-19.

[redacted]

Google further asserts that, because [redacted] cannot and does not correlate any rates of change in temperature to outdoor temperature measurements. *See* Resps. Br. at 163. However, the evidence shows that the Nest Thermostats correlate the rates of change with outside temperature measurements because the [redacted] CX-0674C (Gomez DWS) at Q/A 210.

Even were "HVAC system", "status of the HVAC system . . .", and "said one or more processors" construed according to respondents' proposed construction, the accused Google products would still satisfy this claim limitation because the Nest thermostats function as a group of components working together to move heat or remove heat from the conditioned [structure/location]. Dr. Burger confirmed [redacted] Burger Tr. 734-736. The accused Google products include a processor that calculates rates of change in inside temperatures with the [redacted]. *See* CX-0674C (Gomez) at Q/A 203.

Even were "outside temperature measurements" construed according to respondents' proposed construction, the accused Google products would still satisfy this claim limitation because the [redacted] *See id.* at Q/A 68.

Even were "one or more rates of change in temperature" construed according to EcoFactor's proposed construction, the accused Google products would still satisfy this claim limitation because the evidence shows that the Nest Thermostats ([redacted] "calculate one or more rates of change of [indoor temperature] (i.e., a first location)" for when the HVAC is "on" and "off." *See id.* at Q/A 203-19.

Accordingly, it is determined that the Google accused products satisfy this limitation.

* * *

It is therefore determined that the accused Google products infringe asserted independent claim 1 of the '497 patent.

**b. ecobee Products**

EcoFactor asserts that ecobee's accused products infringes claim 1 of the '497 patent. Compl. Br. at 62-99.

**i. A system for calculating a value for the operational efficiency of a heating, ventilation, and air conditioning (HVAC) system comprising:**

The record evidence demonstrates that ecobee's accused products do not satisfy this limitation of asserted independent claim 1. *See* RX-0163C (Souri RWS) at Q/A 46-49.

EcoFactor argues, in part:

> The preamble of claim 1 is not limiting. It does not provide antecedent basis for other portions of claim 1, nor does the preamble "give life, meaning, and vitality" to claim 1. *See Arctic Cat Inc. v. GEP Power Prod., Inc.*, 919 F.3d 1320, 1327 (Fed. Cir. 2019); *Acceleration Bay, LLC v. Activision Blizzard Inc.*, 908 F.3d 765, 770 (Fed. Cir. 2018). At the Hearing, ecobee's expert, Dr. Souri, confirmed that he "did not do any analysis or render any opinions as to whether the preamble of the claim is limiting or not." Hearing Tr. at 674:4-7. Because Dr. Souri merely assumed that the preamble is limiting, he acknowledged his non-infringement argument for the preamble of claim 1 "is only valid if the preamble is determined to be limiting." *Id.* at 673:16-24.

[redacted]

To the extent the preamble of claim 1 is deemed limiting, the ecobee Products meet this preamble, under any of the proposed constructions. *See* CX-0674C (Gomez DWS) Q/A 456-60. ecobee's [redacted] CX-0500C at ecobee00082732. [redacted] *Id*. This is because of the well understood relationship between HVAC runtime and energy consumption: an HVAC system does not consume energy when it is off, so reducing the runtime of an HVAC system results in a corresponding reduction in the energy consumed by the HVAC system.

As part of [redacted] Even if Respondents' improperly narrow proposed construction of "operational efficiency" were adopted, ecobee would still meet the preamble of claim 1 because [redacted] *See, e.g.*, Hearing Tr. at 638:25-640:6 (Respondent expert Mr. Hagins confirming that "[i]f temperature change is held equal, [] the amount of temperature change is a proxy for the amount of energy over time" and that "[i]f we have a proxy for the amount of energy over time, then the time necessary to cool the structure is indicative of a reduction in operational efficiency").

Compl. Br. at 62-63.

ecobee argues, in part:

EcoFactor has failed to establish that the ecobee Accused Products calculate, or in any way analyze, a value for the operational efficiency of the HVAC system. RX-0163C, Souri 9/2 QA46-49. Mr. Gomez contended that ecobee practices this limitation because various features in ecobee's thermostats [redacted] CX-0674C, Gomez QA458-460. But [redacted] RX-0163C, Souri 9/2 QA47; CX-0125C (Malchiondo) 26:25-27:5; RDX-0009C-15C (CX-0125C (Malchiondo) at 26:25-27:5, 28:3-14). [redacted] RX-

0163C, Souri 9/2 QA47; CX-0125C (Malchiondo) 26:25-27:5, 28:3-14, 128:8-21; CX-0146C (Cleaver) 84:9-13, 85:2-9, 149:21-151:1, 153:17-23; RDX-0009C-12C (CX-0125C (Malchiondo) 128:8-21); RDX-0009C-15C (CX-0125C (Malchiondo) 26:25-27:5, 28:3-14), RDX-0009C-16C (CX-0146C (Cleaver) 149:21-151:1).

It is thus not surprising that Mr. Gomez could not identify a single calculated "value" that would correspond to the operational efficiency of an HVAC system. RX-0163C, Souri 9/2 QA48-49. In fact, as explained below, Mr. Gomez failed to provide even a shred of evidence to support his assertion that any aspect of [redacted] practiced this limitation.

**No evidence That [redacted] Calculates A Value for Operational Efficiency of an HVAC System.** Mr. Gomez opined that ecobee calculates the claimed "value" for operational efficiency as part of a [redacted] CX-0674C, Gomez QA458. As an initial matter, there is no separate feature in ecobee's thermostats that corresponds to [redacted] RX-0163C, Souri 9/2 QA48, 60. As ecobee's witnesses explained, and as the evidence showed, [redacted] CX-0146C (Cleaver) 96:16-20, 96:25-97:7; CX-0125C (Malchiondo) 78:24-79:14; RX-0163C, Souri 9/2 QA48.

Regardless, Mr. Gomez provided no discussion (let alone evidence) of any actual functionality in the current ecobee products that he believed would correspond to [redacted] Nor did he identify any value for operational efficiency that is supposedly calculated by [redacted] RX-0163C, Souri 9/2 QA48, 49. That is because, as Mr. Gomez admitted at the hearing, he did not bother to perform any source code analysis as to [redacted] at all. *See* Hearing Tr. 298:17-299:7 (Gomez) ("Within the technology set by [redacted] no, we don't discuss the code"). Without analysis of the actual functionality, Mr. Gomez's unsupported opinions on this issue should be given no weight. *See, e.g. Rohm & Haas Co. v. Brotech Corp*., 127 F.3d 1089, 1092 (Fed. Cir. 1997) (affirming holding of no infringement because "[t]he patentee bore the burden of proving that the accused product or process satisfied each element of the claims" and "[Plaintiff] offered nothing more than its expert's general opinion.").

**No evidence That [redacted] Calculates A Value for Operational Efficiency of an HVAC System.** Mr. Gomez also opined that [redacted] would calculate a value for the operational efficiency of the HVAC system. CX-0674C, Gomez QA459. But Mr. Gomez, again, provided no analysis or evidence to support that opinion. Hearing Tr. 300:2-12 (Gomez). Specifically, while Mr. Gomez contended that [redacted] he identified no "value" that is actually calculated by [redacted] and, in fact, admitted at trial that he performed no review of the source code or the algorithm used by [redacted] Hearing Tr. 300:2-12 (Gomez).

Thus, just like his opinions on the record reflects that Mr. Gomez had no basis to opine that calculated a value for the operational efficiency of the HVAC system.

The only "value" that Mr. Gomez even referenced in his discussion of CX-0674C, Gomez QA459. But once again, Mr. Gomez conceded that he performed absolutely no analysis as to the "algorithm that … performs this calculation." Hearing Tr. 301:6-24 (Gomez). Nor did Mr. Gomez provide any evidence that would relate in any way to the operational efficiency of an HVAC system.

To the contrary, as Dr. Souri explained, RX-0163C; Souri 9/2 QA48; RDX-0009C-17 (CX-0669 (Savings from your ecobee ) at 0002). Thus, is clearly not a calculation of the operational efficiency of the HVAC system, under any proposed construction, because RX-0163C, Souri 9/2 QA48; *see also* Hearing Tr. 301:10-16 (Gomez).

**No evidence That Calculates A Value for Operational Efficiency of an HVAC System.** EcoFactor's reliance on ecobee's is similarly without merit. Mr. Gomez's opinion as to was based entirely on two sentences that he excerpted from CX-0500C . CX-0674C, Gomez QA460. As an initial matter, CX-0500C is an *unfinished draft*, as clearly evidenced by the numerous comments and highlights still present within the document. Notably, ecobee's Vice President of Software Development, Mr. Malchiondo, explained that RX-0163C, Souri 9/2 QA33; CX-0125C (Malchiondo Dep.) 128:8-21; RDX-0009C-12C (CX-0125C (Malchiondo Dep.) 128:8-21). EcoFactor presented no evidence showing that this draft reflected anything more than words on paper, and Mr. Gomez never analyzed the code to assess the issue with any indicia of reliability. Moreover, even putting aside Mr. Gomez's curious choice to rely on a document that he knew from the record was a draft that was referred to by a witness under oath as inaccurate, nothing in CX-0500C states, or even suggests, that calculates a "value" for the "operational efficiency of a heating, ventilation, an air conditioning (HVAC) system." Indeed, it is telling that, despite Mr. Gomez's review of for other claim limitations, he provided no analysis of how considers "efficiency," let alone how any method or algorithm in the code would purportedly calculate the claimed "value" for the operational efficiency of the HVAC system. RX-0163C, Souri 9/2 QA48, 49.

[redacted]

Because Mr. Gomez has failed to identify any calculated "value" for operational efficiency as required by claim 1 of the '497 patent, EcoFactor has not satisfied its burden to show that the ecobee Accused Products practice this limitation, under any of the proposed constructions.

Resps. Br. at 118-23 (footnotes omitted).

The Staff argues, in part:

As discussed above, the Staff agrees with Respondents that the preamble of claim 1 is limiting. To satisfy the preamble, the accused products must calculate a value for the "***energy required*** by the HVAC system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions." *See* Section III.C.2. The evidence does not show that the accused ecobee products satisfy the preamble. *See* RX-0163C (Souri 9/2) QA 46-49; Hearing Tr. at 673:16-675:12 (Souri).

Mr. Gomez points to three features of ecobee's products to satisfy the preamble, [redacted] CX-0674C (Gomez) QA 454-460. With respect to [redacted] Mr. Gomez is testified:

> [redacted] As shown on CDX-002C.059 (citing CX-0498C [redacted] at ecobee00068129; CX-0661 (ecobee Website) at ECOITC_0618687), ecobee's documents and website explain that [redacted]

CX-0674C (Gomez) QA 458.

With respect to [redacted] Mr. Gomez is testified:

> Yes. As another example, the [redacted] further show that the ecobee Accused Products meet the preamble, to the extent it is a limitation. As shown on CDX-0002C.060 (citing CX-0491C [redacted] at ecobee00001799; CX-0669C [redacted] at ECOITC_0618735), the [redacted]

[redacted]

CX-0674C (Gomez) QA 459.

With respect to [redacted] Mr. Gomez is testified:

Yes. Yet another example is ecobee's [redacted] feature, which [redacted] As shown on CDX-0002C.061 (citing CX-0500C at ecobee00082732), [redacted]

CX-0674C (Gomez) QA 460.

Although Mr. Gomez points to documents that indicate ecobee's accused product [redacted] his testimony fails to provide enough detail to establish that the accused products calculate a "value" for the "energy required by the HVAC system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions." Rather, his testimony above indicates that the [redacted] *See also* CX-0674C (Gomez) QA 495 ("As shown on CDX-0002C.095 (citing CX-0669C (Energy Savings) at ECOITC_0618735), ecobee's website explains, 'ecobee calculates energy savings by correlating how long your heating [redacted] RPreHBr. at 82 (citing RX-0163C (Souri 9/2) QA 47-49; CX-0125C, at 26:25-27:5, 28:3-14, 128:8-21; CX-0146C, at 84:9-13, 85:2-9, 149:21-151:1, 153:17-23; RDX-0009C-12C, 15C, 16C)); *see also* Hearing Tr. at 297:5- 305:24 (Gomez); 673:16-675:12 (Souri).

Staff Br. at 36-38.

As an initial matter, the preamble of claim 1 of the '497 patent has been found to be limiting and "operational efficiency" has been construed to mean "energy required by the HVAC

system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions."

Regarding the preamble, EcoFactor argues that ecobee's [redacted] *See* Compl. Br. at 62-63. It is argued that the ecobee accused products [redacted] *See id.*

EcoFactor relies on Mr. Gomez's opinion as to [redacted] which was based on two sentences that he excerpted from CX-0500C [redacted]. CX-0674C (Gomez RWS) at Q/A 460. However, ecobee's Vice President of Software Development, Mr. Malchiondo, explained that [redacted] RX-0163C (Souri RWS) at Q/A 33; CX-0125C (Malchiondo Dep.) 128:8-21. EcoFactor has not adduced evidence showing that this draft was actually implemented [redacted] and Mr. Gomez did not provide an analysis of the code to assess the issue with any indicia of reliability. Moreover, CX-0500C [redacted] does not state that [redacted] calculates a "value" for the "operational efficiency of a heating, ventilation, an air conditioning (HVAC) system." *See* RX-0163C (Souri RWS) at Q/A 48, 49.

Even were "HVAC system" construed according to respondents' proposed construction, the accused ecobee products would still not satisfy this claim limitation because [redacted]

[redacted]

does not calculate a value for the operational efficiency of a heating, ventilation, and air conditioning (HVAC) system.

If "operational efficiency" were construed according to EcoFactor's proposed construction, the ecobee thermostats would satisfy this claim limitation because ecobee's [redacted] CX-0500C [redacted] at ecobee00082732. Thus, ecobee's system [redacted]

Accordingly, it is determined that the ecobee accused products do not satisfy this claim limitation.

**ii. at least one HVAC control system that receives temperature measurements from at least a first location conditioned by at least one HVAC system;**

Each of the ecobee accused products includes this feature of claim 1. *See* CX-0674C (Gomez DWS) at Q/A 461-68.

EcoFactor argues, in part:

> The ecobee Products meet claim element 1[a], under any of the proposed constructions, because each ecobee Product includes an HVAC control system that receives inside temperature measurements. *See* CX-0674C (Gomez DWS) Q/A 461-68. It is undisputed that the ecobee thermostats receive inside temperature measurements, and Dr. Souri acknowledged at the Hearing that he "did not offer any opinion that the ecobee thermostat does not receive temperature measurements from a first location conditioned by the HVAC system." Hearing Tr. at 675:22-676:1. The only dispute over claim element 1[a] is whether the claimed HVAC control system must be outside the thermostat. *See id*. at 676:11-21 (Dr. Souri agreeing his only argument on this claim element is that "what Mr. Gomez pointed to is not an HVAC controller"). The evidence shows that ecobee literally infringes this claim element, but to the extent literal infringement is not found, the ecobee Products also infringe under the Doctrine of Equivalents.

[redacted]

* * *

Neither the claim language nor the specification imposes any limitation that the HVAC control system must be outside the thermostat. As acknowledged in Staff's pre-hearing brief, the '497 patent discloses:

> FIG. 4 shows a high-level block diagram of ***thermostat 108*** used as part of the subject invention. Thermostat 108 includes temperature sensing means 252, which may be a thermistor, thermal diode or other means commonly used in the design of electronic thermostats. It ***includes a microprocessor 254***, memory 256, a display 258, a power source 260, a relay 262, which ***turns the HVAC system on and off in response to a signal from the microprocessor***, and contacts by which the relay is connected to the wires that lead to the HVAC system.

JX-0001C ('497 Patent) at 7:40-48; *see also id*. at Fig. 4; Staff PreHB at 42 (quoting JX-0001C ('497 Patent) at 7:40-48). This disclosure further demonstrates that, while the claimed HVAC control system can be located outside the thermostat, there is no requirement that it must be. ecobee has indicated it may argue that claim 3 of the '497 patent mandates that the HVAC control system of claim 1 cannot be part of a thermostat. *See, e.g*., Respondents' PreHB at 83 (arguing that "the HVAC control system in the context of the '497 patent must be a server that is separate from the thermostat" and citing claim 3 among other sources (emphasis in original)). This argument is not legally or logically sound, nor does it establish any flaw in EcoFactor's infringement analysis for claim element 1[a].

If the ALJ agrees with EcoFactor and Staff that the claimed HVAC control system can be part of the thermostat, the ecobee Products clearly meet claim element 1[a]. ecobee has no argument to the contrary. Just as in the '497 patent specification, each ecobee3 lite and Vulcan thermostat [redacted] facts which are not in dispute. Each ecobee thermostat [redacted] CX-0639 (ecobee Website) at ECOITC_0618586; CX-0525C [redacted] at ecobee00329481; CX-0497C [redacted] at ecobee00065900. Mr. Malchiondo confirmed at his deposition that [redacted] CX-0125C (Malchiondo Tr.) at 66:13-67:9. Each ecobee thermostat can also [redacted] CX-0664 (ecobee Website) at ECOITC_0618714; CX-0662 (Remote Sensor) at ECOITC_0618817. For example, if a customer has an

[redacted]

ecobee thermostat in one room of their home and a SmartSensor in another room, ecobee [redacted] This is still an inside temperature measurement, particularly given the '497 patent's express teachings that the use of additional temperature sensors "may allow increased accuracy of the system, which can in turn increase user comfort or energy savings." JX-0001 ('497 Patent) at 13:14-21; see also CX-0674C (Gomez DWS) Q/A 467.

If the ALJ instead agrees with ecobee that the claimed HVAC control system "must be a server that is separate from the thermostat" (Respondents' PreHB at 83, emphasis in original), the ecobee Products still clearly meet claim element 1[a]. For example, each ecobee thermostat is WiFi-enabled and is able to communicate with ecobee's server side, which in turn communicates with ecobee's web portal, mobile app, and third-party services. Software on the server side, web portal, and mobile app can be used to control the ecobee thermostat. Mr. Malchiondo also confirmed at his deposition that [redacted] CX-0125C (Malchiondo Tr.) at 82:6-83:10. Thus, even if the claimed HVAC control system must be a server separate from the thermostat, the ecobee server meets this requirement and claim element 1[a].

Mr. Gomez's analysis of the ecobee source code, including the printouts of CPX-0003C, also confirmed that the ecobee Products meet this claim element, regardless of whether ecobee's argument about the location of the claimed "HVAC control system" is accepted. *See, e.g.*, CX-0674C (Gomez DWS) Q/A 467; Hearing Tr. at 366:10-367:23 (Mr. Gomez confirming he analyzed ecobee source code related to [redacted] and that this analysis supports his opinions that this claim element is met). For example, Mr. Gomez described how [redacted] *See* CX-0674C (Gomez DWS) Q/A 467.

* * *

To the extent the ALJ finds no literal infringement of claim element 1[a], the evidence has shown that the ecobee Products nonetheless meet this element under the Doctrine of Equivalents. *See, e.g.*, CX-0674C (Gomez DWS) Q/A 468. For example, Mr. Gomez testified that the ecobee Products each perform substantially the same function of providing software for controlling an HVAC system in the user's home and receiving inside temperature measurements of the home. The ecobee Products do so in substantially the same way by using signals that represent inside temperature measurements (e.g., from temperature sensors). And the ecobee Products do this to achieve the same result of receiving inside temperature measurements so that one or more processors can eventually compare temperatures over time.

[redacted]

Compls. Br. at 63-66.

ecobee argues, in part:

> EcoFactor failed to show that the ecobee Accused Products practice limitation 1[a] of the '497 patent. RX-0163C, Souri 9/2 QA50-51. Limitation 1[a] requires "at least one HVAC control system" that performs the claimed functions. Mr. Gomez opined that the ecobee thermostat itself is the HVAC control system. CX-0674C, Gomez QA463; *see also* Hearing Tr. 306:12-15 (Gomez). However, as Dr. Souri, Dr. Henze, and Dr. Auslander all explained, the HVAC control system in the context of the '497 patent must be a server that is *separate from* the thermostat. RX-0163C, Souri 9/2 QA36, 50-51; RX-0156C, Henze QA74; RX-0001C, Auslander QA47-49; RDX-0001C-008 (CX-0001('497 Patent) cl. 1, Fig. 2); CX-0001 ('497 patent) 8:21-30, cl. 3; CX-0002 ('322 patent) 8:21-30, cl. 3, cl. 5. This is because, according to the specification and claims of the '497 patent (as well as the related '322 patent), the thermostat is actually part of the "HVAC system," which is recited in the '497 claims as a separate and distinct element from the "HVAC control system." *Id.; see also Becton, Dickinson & Co. v. Tyco Healthcare Grp.*, 616 F.3d 1249, 1254 (Fed. Cir. 2010) ("Where a claim lists elements separately, the clear implication of the claim language is that those elements are distinct components of the patented invention." (internal quotation marks and citations omitted)).
>
> EcoFactor will try and confuse the issue by claiming that a thermostat can be generally understood as a device that can "control" HVAC equipment. But whether a thermostat can generically be viewed as a controller outside the context of the patent is not relevant. The question here is whether the thermostat is part of the "HVAC control system" that is specifically taught and claimed in the '497 patent. In this investigation, it is *not* because, in the context of the '497 patent claims, the thermostat is understood to be a separate component from the "HVAC control system." RX-0163C, Souri 9/2 QA36, 50-51; RX-0156C, Henze QA74; RX-0001C, Auslander QA47-49; Hearing Tr. 975:21-976:19 (Palmer); CX-0001 ('497 patent) 8:21-30, cl. 3; CX-0002 ('322 patent) 8:21-30, cl. 3, cl. 5. Indeed, EcoFactor's own expert, Dr. Palmer, acknowledged during cross-examination that, in the embodiment taught by the '497 patent, the thermostat "would *always* be … part of the HVAC system," and not the HVAC control system. Hearing Tr. 975:21-976:19 (Palmer) (emphasis added). As such, Mr. Gomez's assertion that the ecobee thermostat is the claimed "HVAC control system" is contradicted by Dr. Palmer, an EcoFactor expert, and otherwise has no support in the record.
>
> * * *
>
> Although Mr. Gomez provided an opinion as to limitation 1[a] under the doctrine of equivalents (CX-0674C, Gomez QA468), EcoFactor did not advance this argument in its pre-hearing brief and so has abandoned it. PHB at 39-40. EcoFactor is therefore estopped from raising this argument now. G.R. 7(c) ("Any

[redacted]

contentions not set forth in detail [in the prehearing statement and brief] . . . shall be deemed abandoned or withdrawn, except for contentions of which a party is not aware . . .."); *see also In the Matter of Certain Wearable Monitoring Devices, Sys., & Components Thereof Order No. 38: Granting-in-Part & Denying-in-Part Complainants' Motion in Limine No. 3*, USITC Inv. No. 337-TA-1190, WL 7054015 (Oct. 13, 2020) ("A party's contentions must be set forth in the pre-hearing brief with appropriate citations to the evidence . . . [b]y not including [the witness's] testimony concerning [two prior art references] in its pre-hearing brief, [respondents have] abandoned any contentions of invalidity based on such testimony") (citing the Ground Rules).

In any event, Mr. Gomez's testimony on the doctrine of equivalents falls short because he provided only conclusory assertions without any analysis to explain how a thermostat, which is a component *outside* of the "HVAC control system," could possibly be equivalent to an HVAC control system in the context of the '497 patent. CX-0674C, Gomez QA468; RX-0163C, Souri 9/2 QA51. The Federal Circuit has made clear that such conclusory assertions are wholly insufficient to support a finding of infringement under the doctrine of equivalents. *See Medtronic Inc. v. Bos. Sci. Corp*., 558 F. App'x 998, 1000 (Fed. Cir. 2014) ("conclusory statements are insufficient to support a verdict finding infringement under the doctrine of equivalents."). So too here.

Indeed, as the Federal Circuit has explained, evidence as to the doctrine of equivalents must be more than "[g]eneralized testimony as to the overall similarity between the claims and the accused infringer's product or process." *Tex. Instruments, Inc. v. Cypress Semiconductor Corp.*, 90 F.3d 1558, 1567 (Fed. Cir. 1996). Rather, the party asserting the doctrine of equivalents must offer "particularized testimony and linking argument as to the 'insubstantiality of the differences' between the claimed invention and the accused device or process., or with respect to the function, way, result test when such evidence is presented to support a finding of infringement under the doctrine of equivalents." *Id.* Mr. Gomez failed to provide any such testimony or argument, and so his opinions as the doctrine of equivalents should be given no weight.

Resps. Br. at 123-26.

The Staff argues, in part:

The evidence shows that the accused ecobee products satisfy element 1[a]: "*at least one HVAC control system that receives temperature measurements from at least a first location conditioned by at least one HVAC system*." Staff Ex. 1; CX-0674C (Gomez) QA 461-468. Ecobee argues that Mr. Gomez identifies the thermostat as the HVAC control system, and that the HVAC control system in the context of the '497 patent must be a server that is *separate from* the thermostat. *See* Hearing Tr. 677:7-15 (Souri); RPreHBr. at 83. The Staff disagrees. As disclosed in the '497 patent specification, the "thermostat 108 includes … a microprocessor

[redacted]

> 254, memory 256, a display 258, a power source 260, ***a relay 262, which turns the HVAC system on and off in response to a signal from the microprocessor***, and contacts by which the relay is connected to the wires that lead to the HVAC system." JX-1, at 7:40-48; 3:55-58 ("cycling of the HVAC system is controlled by the thermostat, those differences in cycle time would be reflected in the data sensed by the thermostat.") Thus, the "HVAC control system" may at least be a microprocessor within the thermostat that turns the HVAC system on and off (*i.e.*, run, don't run).
>
> Further, Dr. Souri testified at the hearing that during his deposition he considered the ecobee thermostat to be the control system in the context to the '322 patent (which would be the same for the '497 patent). *See* Hearing Tr. at 679:3-681:7 (Souri); CX-125C (Malchiodo Tr.) at 66:13-67:9. The evidence thus shows that ecobee's accused products satisfy element 1[a] of the '497 patent.

Staff Br. at 38-39.

The evidence adduced by EcoFactor shows that the accused ecobee products include at least one HVAC control system that receives temperature measurements from at least a first location conditioned by at least one HVAC system. *See* CX-0674C (Gomez) at Q/A 461-68. Each of the accused ecobee products includes an HVAC control system that receives inside temperature measurements. *See id*. EcoFactor adduced evidence showing that the ecobee thermostats receive inside temperature measurements, and Dr. Souri acknowledged at the hearing that he "did not offer any opinion that the ecobee thermostat does not receive temperature measurements from a first location conditioned by the HVAC system." Souri Tr. 675-676. ecobee argues that the HVAC control system in the context of the '497 patent must be a server that is separate from the thermostat. *See* Resps. Br. at 123-26. However, the '497 patent recites:

> FIG. 4 shows a high-level block diagram of thermostat 108 used as part of the subject invention. Thermostat 108 includes temperature sensing means 252, which may be a thermistor, thermal diode or other means commonly used in the design of electronic thermostats. It includes a microprocessor 254, memory 256, a display 258, a power source 260, a relay 262, which turns the HVAC system on and off in response to a signal from the microprocessor, and contacts by which the relay is

[redacted]

connected to the wires that lead to the HVAC system.

JX-0001C ('497 Patent) at col. 7, lines 40-48. Thus, the "HVAC control system" may be a microprocessor within the thermostat that turns the HVAC system on and off.

EcoFactor adduced evidence showing that each ecobee thermostat [redacted] CX-0639 (ecobee Website) at ECOITC_0618586; CX-0525C [redacted] at ecobee00329481; CX-0497C [redacted] at ecobee00065900. Mr. Malchiondo confirmed at his deposition that [redacted] CX-0125C (Malchiondo Dep.) at 66:13-67:9. Each ecobee thermostat can also [redacted] CX-0664 (ecobee Website) at ECOITC_0618714; CX-0662 (Remote Sensor) at ECOITC_0618817. In addition, if not literally satisfied, the buffered indoor temperature is equivalent to the claimed temperature measurement at the first location (*i.e.*, indoors). *See* CX-0674C (Gomez DWS) at Q/A 468. The administrative law judge finds that the accused ecobee products each perform substantially the same function in the same way to achieve the same result. In particular, the accused ecobee products provide software for controlling an HVAC system in the user's home and receiving temperature measurements from the home using signals that represent inside temperature measurements (e.g., from temperature sensors) to receive inside temperature measurements so that one or more processors may eventually compare temperatures over time. *See id.*

Even were "HVAC system" construed according to respondents' proposed construction, the accused ecobee products would still satisfy this claim limitation because the ecobee thermostat function as a group of components working together to move heat or remove heat from the conditioned [structure/location].

Accordingly, it is determined that the accused ecobee products satisfy this claim limitation.

**iii. one or more databases that store at least said temperatures measured at said first location over time;**

The ecobee accused products include "one or more databases that store at least said temperatures measured at said first location over time." CX-0674C (Gomez DWS) at Q/A 469-76. ecobee does not contest that the ecobee accused products satisfy this claim limitation. *See* Resps. Br. at 118-41.

**iv. one or more processors that receive outside temperature measurements from at least one source other than said HVAC system;**

The ecobee accused products do not satisfy this claim limitation. *See* RX-0163C (Souri RWS) at Q/A 52-55.

EcoFactor argues, in part:

> The ecobee Products meet claim element 1[c], under any of the proposed constructions. *See* CX-0674C (Gomez DWS) Q/A 477-87. There is no dispute that each ecobee Product [redacted] the only dispute is whether these values constitute outside temperature measurements. In other words, ecobee only argues failure of proof for this claim element. But ecobee offers zero evidence that what its documents, source code, and engineers all consistently refer to as outside temperatures are something other than outside temperature measurements.
>
> * * *
>
> The ecobee Products include [redacted]

[redacted]

[redacted] The claimed processor of element 1[c] can be mapped to either a processor inside the thermostat or a server-side processor. For purposes of ecobee's [redacted]

[redacted] *See, e.g.*, CX-0125C (Malchiondo Tr.) at 211:23-213:14, 70:3-13 (confirming that each ecobee thermostat includes [redacted] *See, e.g.*, CX-0500C [redacted] at ecobee00082732 [redacted] CX-0525C [redacted] at ecobee00329481 (describing [redacted]; CX-0497C [redacted] at ecobee00065900. [redacted]

Dr. Souri acknowledged at the Hearing that [redacted] Hearing Tr. at 681:23-682:18 (Dr. Souri [redacted] But he nonetheless argues EcoFactor has not proved that such data are measurements:

> Mr. Gomez, however, offer no evidence that the weather information [redacted] represents measurements of the outside temperature, rather than estimates or other processed data. Indeed, all of the documents and deposition testimony to which Mr. Gomez cites refer only generally to [redacted]

As such, Mr. Gomez fails to show the requirements of this claim element are satisfied by the accused ecobee products, under any construction.

RX-0163C (Souri RWS) Q/A 52.

* * *

*First*, ecobee The specification describes how "outside temperature and humidity data" are "widely available from various sources that publish detailed weather information based on geographic areas such as by ZIP code." JX-0001C ('497 Patent) at 5:13-18. In other words, the '497 patent specifically contemplates obtaining outside temperature values from third-party services that provide such information based on location information such as ZIP code.

CX-0125C (Malchiondo Tr.) at 70:3-13; *see also* CX-0498C at ecobee00068129 CX-0500C at ecobee00082732 ; CX-0525C at ecobee00329481 ( ); CX-0125C (Malchiondo Tr.) at 115:12-17 (confirming that

At his deposition, Mr. Malchiondo explicitly confirmed that CX-0125C (Malchiondo Tr.) at 125:2-25. This statement alone shows just how baseless ecobee's speculations really are. Mr. Malchiondo was ecobee's 30(b)(6) designee and has been the company's VP of Software

Development since it was founded. Yet even though he These arguments fly in the face of Mr. Malchiondo's testimony and are not credible.

Mr. Malchiondo's testimony is also consistent with Mr. Gomez's analysis of the ecobee source code, including the printouts of CPX-0003C. Mr. Gomez confirmed that *See* CX-0674C (Gomez DWS) Q/A 475; Hearing Tr. at 366:10-16, 368:11-369:6 (Mr. Gomez and that this analysis supports his opinions that this claim element is met). For example, Mr. Gomez described a source code function for the ecobee Products *See* CX-0674C (Gomez DWS) Q/A 428, 486. *Id. Mr.* Gomez explained that, Hearing Tr. at 368:21-369:6. ecobee's documents, source code, and 30(b)(6) testimony show that the ecobee Products

* * *

*Second*, ecobee's failure of proof argument is not credible because This was demonstrated at the Hearing with respect to an exemplary ecobee customer log from January 2020, an excerpt of which is shown below:

* * *

CX-0521C (Jan. 2020 Customer Log) at ecobee00329473 (native spreadsheet with certain rows and columns hidden for clarity); *see also* Hearing Tr. at 719:13-16 (Dr. Souri As shown in

[redacted]

Just as described in the '497 patent specification, ecobee [redacted] CX-0498C [redacted] at ecobee00068129. [redacted] This is not only reflected in the claims and specification of the '497 patent, it is also common sense. Without using a third-party provider of outside temperature measurements, each individual ecobee customer would need to have numerous temperature sensors strategically positioned outside their homes and somehow connected to the ecobee thermostat inside the home in order to provide a constant stream of outside temperature measurements to ecobee's algorithms. It would be unreasonable to suggest that this is the only way to practice the claims, given the claim language itself, the specification's disclosure of third-party weather services, and the prevalence and efficiency of using such services—as evidenced by the use of such providers by EcoFactor and every Respondent in this Investigation. A reasonable fact finder would understand that ecobee leverages data from [redacted] ecobee's suggestions otherwise are not credible.

* * *

*Third*, ecobee's failure of proof argument is not credible because it ignores how frequently ecobee [redacted] *See* CX-0514C [redacted] at ecobee00195484. This same document also explains that [redacted] *Id.* ecobee cannot [redacted] This is not a credible argument.

At the Hearing, ecobee made efforts to point out that, while its customer logs may suggest [redacted]

[redacted]

[redacted] This does not indicate, much less prove, that these outside temperature values are anything besides measurements. The fact remains that each ecobee thermostat [redacted] Such activities require power, consume bandwidth, and use computing resources. ecobee would presumably therefore collect data so frequently only if such data were sufficiently current and precise for its operations.

Mr. Gomez described an example of how the ecobee [redacted] which helps further show that what ecobee uses are outside temperature measurements:

[redacted]

CX-0674C (Gomez DWS) Q/A 484.

* * *

*Fourth*, it bears noting that despite its superior access to technical details about its products and third-party weather service partners, ecobee has not offered evidence showing that it does not receive outside temperature measurements. Of course, it is Complainant's burden to prove infringement by a preponderance of the evidence, and EcoFactor maintains that it has met that burden for the reasons described above. Nonetheless, it is telling that ecobee has repeated its specious failure of proof argument for months but not offered any supposedly exculpatory evidence. ecobee's reliance on mere speculation by its attorneys and expert—even in the face of ecobee documents and testimony explicitly stating —further demonstrates that ecobee's failure of proof argument for claim element 1[c] is simply not credible.

* * *

Furthermore, even if the ALJ were to accept ecobee's failure of proof argument and find no literal infringement of claim element 1[c], the ecobee Products nonetheless meet this element under the Doctrine of Equivalents. Each ecobee Product performs substantially the same ***function*** in substantially the same ***way*** to achieve the same ***result*** . CX-0674C (Gomez DWS) Q/A 487. As Mr. Gomez's opinions recognized, would be insubstantially different from obtaining measurements even under ecobee's apparently narrow definition of "measurement." The . *See, e.g.*, CX-0674C (Gomez DWS) Q/A 479-480, 482-484, 486. Of course, using more precise values of outside temperature (e.g., measurements) could allow for even greater precision, which is likely one reason why ecobee uses measurements of outside temperature.

[redacted]

Compl. Br. at 68-77 (footnote omitted).

ecobee argues, in part:

> The ecobee Accused Products [redacted] RX-0163C, Souri 9/2 QA52; CX-0674C, Gomez 8/19 QA479; Hearing Tr. 313:15-23 (Gomez). Thus, to establish infringement, EcoFactor had to prove that the ecobee Accused Products receive outside temperature *measurements* from the weather service, as opposed to other forms of weather data. Hearing. Tr. 313:6-14 (Gomez). EcoFactor did not come close to meeting that burden, however, because it has offered no evidence that the weather information received by the ecobee Accused Products includes measurements. RX-0163C, Souri 9/2 QA52-54.
>
> EcoFactor's failure of proof is clear from Mr. Gomez's own answers in his witness statement. When Mr. Gomez was asked to explain his belief that the "ecobee Accused Products receive outside temperature measurements, as opposed to only weather forecasts," he provided no analysis of the weather data actually received by ecobee. CX-0674C, Gomez 9/2 QA485. That is because, as Mr. Gomez admitted at the hearing, he never looked at the data that is provided by the weather service. Hearing Tr. 315:18-316:1 (Gomez). In fact, he did not even attempt to identify what weather service ecobee receives the weather data from. Hearing Tr. 321:7-10 (Gomez). Instead, Mr. Gomez simply made a lazy assumption that ecobee is receiving outside temperature measurements because, according to Gomez, ecobee [redacted] CX-0674C, Gomez QA485 (citing CX-0484C (2014 customer log)).
>
> [redacted] CX-0484C [redacted]. It never states, or even suggests, that what ecobee receives are outside temperature *measurements* as opposed to other forms of weather data. So Mr. Gomez is just guessing here, and his opinion is once again not reliable and should be afforded no weight.
>
> If anything, the data in CX-0484C [redacted] contradicts Mr. Gomez's unfounded assumptions. Although [redacted] Hearing Tr. 709:3-24; 710:16-711:23; 713:11-715:6 (Souri); *see also* CX-0125C (Malchiondo Tr.) 82:6-83:10; CX-0484C [redacted]. In fact, as Mr. Gomez conceded, [redacted] Hearing Tr. 318:9-320:9 (Gomez); CX-0484C (2014 Customer Log). Actual outside temperatures, however, [redacted] So there is no basis for Mr. Gomez's assumption that [redacted]

[redacted] To the contrary, as Dr. Souri explained at the hearing, [redacted] and not a measurement as required by the '497 patent. Hearing Tr. 718:20-719:7 (Souri).

Mr. Gomez's reliance on CX-0484C [redacted] is also flawed for another reason, in that CX-0484C [redacted] CX-0484C is a [redacted], which is two years before either of the ecobee Accused Products were even on the market. CX-0484C (2014 customer log); Hearing Tr. 317:4-19 (Gomez). To put a finer point on it, CX-0484C is [redacted] Mr. Gomez, however, provided no basis to suggest that the ecobee accused products today use the same weather service or receive the same type of weather today as non-accused products did in 2014, and so he had no basis to rely on [redacted] to support his conclusions.

Recognizing this flaw in Mr. Gomez's analysis, EcoFactor tried to fill in the gaps by questioning Dr. Souri [redacted] CX-0521C. Hearing Tr. 700:22-701:6 (Souri). EcoFactor should be precluded from relying on CX-0521C [redacted] because Mr. Gomez never relied on it in his witness statement, and EcoFactor never identified it in their pre-hearing brief. *See* G.R. 7(b) and (c). But in any event, CX-0521C [redacted] does not support EcoFactor's assertions. Just like CX-0484C [redacted], CX-0521C [redacted] shows that [redacted] Hearing Tr. 718:20-719:7 (Souri); CX-0521C (customer log). And there is no evidence showing that a [redacted]

Failing to offer any evidence as to what weather data is actually received by ecobee, Mr. Gomez also tried to contend that ecobee's [redacted] CX-0674C, Gomez QA483. But his testimony on this point mischaracterizes how the ecobee Accused Products function. RX-0163C, Souri 9/2 QA53. [redacted] RX-0163C, Souri 9/2 QA53; RPX-0001 (excerpts of ecobee source code). [redacted] RX-0163C, Souri 9/2 QA53.

If anything, the manner in which [redacted] shows that [redacted] As noted above, [redacted] RX-0163C, Souri 9/2 QA53. As such, to the extent

[redacted]

* * *

Mr. Gomez's opinion that ecobee would practice limitation 1[c] under the doctrine of equivalents is likewise without merit. As explained above, Mr. Gomez provided no explanation as to what kind of data is received [redacted] As such, he was also unable to identify what functionality in the ecobee products is supposedly equivalent to an "outside temperature measurement." CX-0674C, Gomez QA487; RX-0163C, Souri 9/2 QA55. Indeed, Mr. Gomez's opinion as to the doctrine of equivalents for limitation 1[c] merely parroted the claim language without any attempt to explain how or why the accused products would purportedly be equivalent. As a matter of law, such "conclusory statements are insufficient to support a verdict finding infringement under the doctrine of equivalents." *Medtronic Inc.*, 558 F. App'x at 1000; *see also Tex. Instruments,* 90 F.3d at 1567.

Moreover, to the extent EcoFactor is arguing that receiving other types of weather information that do not constitute measurements is equivalent to receiving an outside temperature measurement, that argument should be rejected out of hand because it impermissibly reads out the express limitation in the claims requiring that "outside temperature ***measurements***" be received. *See, e.g., PSN Illinois, LLC v. Ivoclar Vivadent, Inc.*, 525 F.3d 1159, 1167 (Fed. Cir. 2008) (explaining that there can be "no infringement under the doctrine of equivalents" if the "finding of infringement would read the . . . limitation out of the claim.").

Accordingly, there is no basis to find that the ecobee Accused Products practice element 1[c] of the '497 patent, either literally or under the doctrine of equivalents.

Resps. Br. at 126-30.

The Staff argues, in part:

The evidence does not show that the accused ecobee products satisfy element 1[c]: "*one or more processors that receive outside temperature measurements from at least one source other than said HVAC system*." JX-1, claim 1; RX-0163C (Souri) QA 52-55; CX-0674C (Gomez) QA 469-476. ecobee argues that the accused products [redacted] *See* RPreHBr. at 84. The Staff agrees.

[redacted]

The evidence shows that ecobee [redacted] CX-0674C (Gomez) QA 427, 482, 485, 486; CX-0484C (native); CX-0521C (native). However, the evidence shows that [redacted] *See* Hearing Tr. at 708:9-709:18 (Souri); 709:22-713:2 (Souri); 713:11-715:6 (Souri); 717:7-719:7 (Souri); CX-0525C; Hearing Tr. at 316:18-321:10 (Gomez). Mr. Gomez did not investigate [redacted] and Dr. Souri testified that [redacted] *See* Hearing Tr. at 686:10-17 (Souri); 717:7-719:7 (Souri); 313:6-316:1 (Gomez); 316:18-321:10 (Gomez).

Staff Br. at 39-40.

The construction of "outside temperature measurements" was discussed above; the claim term "outside temperature measurements" means "measurements of the temperature outside (or external to) [the structure]."

Under the adopted construction, the ecobee accused products do not include one or more processors that receive measurements of the temperature outside (or external to) [the structure] from at least one source other than said HVAC system. *See* RX-0163C (Souri RWS) at Q/A 52-55.

EcoFactor argues that ecobee obtains outside temperature data in the same manner the '497 patent discloses. *See* Compl. Br. at 68-77. However, Mr. Gomez provided no analysis of the weather data actually received by ecobee. *See* CX-0674C (Gomez DWS) at Q/A 485. Mr. Gomez testified that he did not examine the data that is provided [redacted], nor did he identify [redacted] data. Gomez Tr. 315-316, 321. Instead, Mr. Gomez assumed that ecobee is receiving outside temperature

measurements because it is alleged that ecobee maintains CX-0674C (Gomez DWS) at Q/A 485. Yet, CX-0484C

EcoFactor further argues that ecobee's failure of proof argument is not credible because the outside temperature values that ecobee receives and stores *See* Compl. Br. at 68-77. However, the evidence shows that Souri Tr. 709-715; CX-0125C (Malchiondo Dep.) 82:6-83:10; CX-0484C . Gomez Tr. 318-320; CX-0484C (2014 Customer Log). Actual outside temperatures, however, . So there is no basis for Mr. Gomez's assumption that To the contrary, as Dr. Souri explained at the hearing, and not a measurement as required by the '497 patent. Souri Tr. 718-719.

Mr. Gomez's reliance on CX-0484C is also flawed for another reason, in that CX-0484C is not CX-0484C is , which is two years before either of the accused ecobee products were even on the market. CX-0484C (2014 customer log); Gomez Tr. 317. Mr. Gomez provided no

[redacted]

basis to suggest that the accused ecobee products today use the same weather service or receive the same type of weather today as non-accused products did in 2014, and so he had no basis to rely on [redacted] to support his conclusions.

EcoFactor further argues that ecobee has not offered evidence showing that it does not receive outside temperature measurements. *See* Compl. Br. at 68-77. However, Mr. Gomez did not investigate [redacted] and Dr. Souri testified that [redacted] *See* Souri Tr. 686; 717-719; Gomez Tr. 313-321.

EcoFactor further argues that the accused ecobee products nevertheless satisfy this element under the doctrine of equivalents. *See* Compl. Br. at 76-77. EcoFactor argues that the accused ecobee products [redacted] *See id.* (citing CX-0674C (Gomez DWS) at Q/A 487). However, Mr. Gomez provided no explanation regarding the kind of data [redacted] *See* CX-0674C (Gomez DWS) at Q/A 487. Mr. Gomez did not identify what functionality in the ecobee products is supposedly equivalent to the "outside temperature measurement." *See id.*; RX-0163C (Souri RWS) at Q/A 55.

Even were "HVAC system" and "outside temperature measurements" construed according to respondents' proposed construction, the accused ecobee products would still not satisfy this claim limitation because the ecobee accused products do not include one or more

processors that receive measurements of the temperature outside (or external to) [the structure] from at least one source other than said HVAC system.

Accordingly, it is determined that the ecobee accused products do not satisfy this claim limitation.

**v. wherein said one or more processors are configured to calculate one or more rates of change in temperature at said first location for periods during which the status of the HVAC system is "on" and wherein said one or more processors are further configured to calculate one or more rates of change in temperature at said first location for periods during which the status of the HVAC system is "off", and to relate said calculated rates of change to said outside temperature measurements.**

The ecobee accused products do not satisfy this claim limitation. *See* RX-0163C (Souri DWS) at Q/A 56-57.

EcoFactor argues, in part:

> The ecobee Products meet claim element 1[d], under any of the proposed constructions. *See* CX-0674C (Gomez DWS) Q/A 488-97. ecobee has put forth essentially three non-infringement arguments for this claim element. Each of these arguments is based upon an improperly narrow interpretation of the claim language that is unsupported by intrinsic evidence and inconsistent with how one of ordinary skill in the art would understand the '497 patent. Because each of these arguments fails, literal infringement should be found. However, even if the ALJ concludes that claim element 1[d] is not met literally, the ecobee Products nonetheless infringe under the Doctrine of Equivalents.
>
> * * *
>
> The ecobee Products include [redacted] The claimed processor of element 1[d] can be mapped to either [redacted] it is most straightforward to focus on [redacted]
>
> Each ecobee3 lite and Vulcan thermostat [redacted]

[redacted]

[redacted]

ecobee's [redacted]

[redacted]

These facts establish that the ecobee Products meet claim element 1[d] and are reflected in Mr. Gomez's analysis of ecobee's 30(b)(6) testimony, documents, and source code, as well as in the cross-examination testimony of ecobee's expert, Dr. Souri.

For example, ecobee's [redacted]

[redacted]

[redacted]

CX-0514C [redacted] at ecobee00195484 [redacted] *see also* CX-0674C (Gomez DWS) Q/A 493. This corresponds to the claimed "***calculat[ing] rates of change***."

The same [redacted] CX-0514C [redacted] at ecobee00195484. [redacted] corresponds to the claimed "***relate said calculated rates of change to said outside temperature measurements***."

As summarized in Mr. Gomez's CDX-0002C.083 and .084 (reproduced below), Mr. Malchiondo's 30(b)(6) testimony further illustrates how [redacted] infringes claim element 1[d]. For example, Mr. Malchiondo explained that [redacted] CX-0125C (Malchiondo Tr.) at 123:11-124:21. [redacted] *Id.* *Mr.* Malchiondo also confirmed that this [redacted] *Id.*; *id.* at 187:6-188:18. [redacted]

* * *

Just as *See, e.g.*, CX-0674C (Gomez DWS) Q/A 494. ecobee does this by CX-0125C (Malchiondo Tr.) at 121:13-122:18. ecobee accounts for CDX-0002C.091:

* * *

CX-0674C (Gomez DWS) Q/A 494 (citing CX-0484C at ecobee00000077 (native with columns F-G and rows 1-5 hidden); CX-0125C (Malchiondo Tr.) at 121:13-122:18). The This corresponds to the claimed ***"off" rates of change*** recited in claim element 1[d].

Mr. Gomez's analysis of the ecobee source code, including the printouts of CPX-0003C, also confirmed that the ecobee Products meet this claim element. *See* CX-0674C (Gomez DWS) Q/A 496; Hearing Tr. at 366:10-16, 369:7-374:19 (Mr. Gomez confirming he analyzed ecobee source code related to and that this analysis supports his opinions that this claim element is met). For example, Mr. Gomez explained:

> For example, in the ecobee source code,

[redacted]

* * *

[redacted]

CX-0674C (Gomez DWS) Q/A 496 (citing portions of source code printouts CPX-0003C) (emphasis in original).

* * *

ecobee has advanced three non-infringement arguments for claim element 1[d]. All three are premised upon improperly narrow, litigation-driven interpretations of this claim element. These interpretations are objectively unreasonable and inconsistent with the claim language, the '497 patent specification, and even testimony by Respondents' own experts. All should be rejected.

* * *

ecobee's first argument is that it does not calculate rates of change in inside temperature. *See, e.g.*, Resps. PreHB at 85-86. ecobee acknowledges that [redacted] *Id.* at 85. But, according to ecobee, this is insufficient to meet claim element 1[d] because [redacted] But this is not what element 1[d] requires.

ecobee unquestionably [redacted] As Mr. Malchiondo explained, [redacted] CX-0125C (Malchiondo Tr.) at 123:11-124:21. Mr. Malchiondo agreed that [redacted] *Id.*; *id.* at 187:6-

[redacted]

188:18. Aware of this testimony by Mr. Malchiondo and similar statements in ecobee documents and source code, Dr. Souri attempted to explain this away at the Hearing as just a [redacted] rather than something that would meet element 1[d]:

* * *

In other words, there is no dispute that [redacted] But because ecobee contends [redacted] ecobee supposedly does not calculate a rate of change and therefore does not infringe.

Claim element 1[d] is not so limited. Another one of Respondents' experts, Mr. Hagins, was confronted at the Hearing with his prior testimony that the equation $\Delta T/\Delta t$ (found in Respondents' proposed construction for "rate of change") actually "tells you, the ***average*** rate of change of temperature over the period Delta T." Hearing Tr. at 641:18-642:11. Mr. Hagins also agreed that "change in temperature over change in time" is just one of "[m]any ways" to calculate a rate of change, such that Respondents' construction is "narrower than the full scope of the ways a person of ordinary skill in the art would understand that you can change -- calculate a change – a rate of change of temperature." Hearing Tr. at 642:18-643:21; *see also* Hearing Tr. at 902:3-9 (Respondents' invalidity expert, Dr. Auslander, agreeing that "average time to traverse 1 degree in temperature, is a rate of change" "if you're dealing with dense data"). In other words, while mathematically dividing a temp delta value by a time delta value may be one way to calculate a rate of change, the claimed rate of change [redacted]

* * *

ecobee's second non-infringement argument is equally flawed. ecobee argues that it does not relate calculated rates of change to outside temperature measurements because claim element 1[d] requires "correlat[ion] to a specific outside temperature" and [redacted] *See, e.g.*, Resps. PreHB at 87.

But ecobee ignores the fact that [redacted]

. As explained by Dr. Souri,

Hearing Tr. at 706:12-707:8.

As a simple example,

*See, e.g.*, CX-0125C (Malchiondo Tr.) at 175:7-176:16. Would ecobee agree that this "relate" limitation would be met if ecobee's

ecobee is again simply applying an improperly narrow, litigation-driven interpretation of the claim language. This argument should be rejected.

To be clear, Mr. Malchiondo explained at his deposition that

CX-0125C (Malchiondo Tr.) at 125:2-25; *see also* CX-0500C at ecobee00082732 (stating that

CX-0525C at ecobee00329481 (describing

); CX-0497C at ecobee00065900 (same); CX-0660 at ECOITC_0618681

; CX-0482 (ecobee Website) at ECOITC_0618806 ("Smart recovery lets your ecobee thermostat learn how your heating and cooling system works, taking into account weather and historical operating performance ….").

There is a good reason why ecobee

This is because, for example, a house heats up more slowly if it is very cold outside than if it is mild outside. As Mr. Malchiondo testified,

CX-0125C (Malchiondo Tr.) at 126:1-12. By

[redacted]

* * *

ecobee's third non-infringement argument is that the ecobee Products do not calculate rates of change when the HVAC system is off. *See* Resps. PreHB at 86-87. More specifically, ecobee argues that [redacted] *Id.* at 86. This interpretation and use of the term "influencing" is plainly intended to carve out [redacted] from the scope of the claims, despite there being no lexicography or disclaimer in the '497 patent or its prosecution history to support doing so. ecobee asks the ALJ to believe that what ecobee documents, 30(b)(6) testimony, and source code [redacted] specifically for purposes of deciding whether ecobee infringes the '497 patent. This argument should be rejected.

The evidence is overwhelming that ecobee consistently refers to [redacted]. For example, Mr. Malchiondo described [redacted]

* * *

CX-0674C (Gomez DWS) Q/A 494 (citing CX-0484C [redacted] at ecobee00000077 (native with columns F-G and rows 1-5 hidden); CX-0125C (Malchiondo Tr.) at 121:13-122:18). Mr. Malchiondo also explained that, as a result of [redacted] CX-0125C (Malchiondo Tr.) at 220:7-221:1.

As another example, ecobee's [redacted]

[redacted]

CX-0514C [redacted] at ecobee00195486-87; *see also* Hearing Tr. at 699:10-700:21 (Dr. Souri acknowledging these statements). This documentation further notes that [redacted] CX-0514C [redacted] at ecobee00195486-87. Mr. Malchiondo quantified this at his deposition by explaining that [redacted] CX-0125C (Malchiondo Tr.) at 220:7-221:1.

At the Hearing, Dr. Souri was also asked about an ecobee customer log from January 2020, an excerpt of which is shown below:

* * *

[redacted]

[redacted]

*See* CX-0521C [redacted] at ecobee00329473. According to ecobee, [redacted] for purposes of claim element 1[d], even though [redacted] *E.g.*, Hearing Tr. at 704:18-24 (Dr. Souri confirming his opinion that [redacted]

The following testimony by Dr. Souri is illustrative of ecobee's extreme position:

[redacted]

Hearing Tr. at 707:17-23.

At the Hearing, Dr. Souri was also asked about a demonstrative submitted with his witness statement (RDX-0009C-19C), which counsel for EcoFactor annotated during cross-examination and marked as CDX-0822C:

* * *

Even if the ALJ were to find no literal infringement of claim element 1[d], the ecobee Products nonetheless meet this element under the Doctrine of Equivalents. Each performs substantially the same function [redacted] in substantially the same way [redacted] to achieve the same result [redacted]. CX-0674C (Gomez DWS) Q/A 497. As detailed above, ecobee's non-infringement arguments for element 1[d] are all premised upon improperly narrow interpretations of the claim language. To the extent there is any difference between [redacted] there certainly is no substantial difference. Similarly, to the

[redacted]

extent there is any difference between [redacted] there is no substantial difference. And likewise, to the extent there is any difference between what Dr. Souri considers to be "off" and what ecobee's documents, 30(b)(6) testimony, and source code consider to be "off," there is no substantial difference. These are not significant technical differences impacting system operation; they are merely distinctions manufactured by ecobee in an effort to avoid infringement.

Compl. Br. at 77-94.

ecobee argues, in part:

Mr. Gomez contended that [redacted] CX-0674C, Gomez QA490, 496. But [redacted] RX-0163C, Souri 9/2 QA56-57; *see also* CX-0125C (Malchiondo) 185:12-24 (explaining that ecobee's [redacted]. Rather, as the evidence showed, [redacted] RX-0163C, Souri 9/2 QA57; RPX-0001C (ecobee source code). At [redacted] RX-0163C, Souri 9/2QA57; CX-0125C (Malchiondo) 185:12-24.

Under any party's construction, a rate of change must have units of temperature divided by time. Hearing Tr. 239:10-17 (Gomez) (describing a rate of change as "rise over time"); Hearing Tr. 963:20-22 (Palmer) (explaining a rate of change as having "units of temperature per unit of time"). As EcoFactor's own expert, Dr. Palmer, admitted, there are many ways to analyze temperature changes in a home without calculating such a rate of change. Hearing Tr. 963:17-19, 965:5-10, 964:19-22 (Palmer).

For instance, Dr Palmer admitted that the calculation of a rate is not necessary to predict a future temperature. Hearing Tr. 963:17-19 (Palmer). He admitted that detecting that a house takes longer to heat up does not necessarily involve a rate of change calculation. *Id.* at 965:5-10. He also admitted that simply tracking or recording temperature is not a rate of change. *Id.* at 964:19-22. Thus, Dr. Palmer's testimony suggests that the mere fact that ecobee [redacted] cannot alone establish infringement of the "rate of change" limitation. What matters is how the ecobee source code performs those functions, and whether the specific algorithms used in the code calculate a rate of change. EcoFactor has identified no such calculation. In fact, the evidence clearly shows that they do not. RX-0163C, Souri 9/2 QA57; RPX-0001C.

[redacted]

* * *

A second reason that EcoFactor's argument as to limitation 1[d] fails is because [redacted] RX-0163C, Souri 9/2 QA58; RPX-0001C (ecobee source code). To put a finer point on it, [redacted] RX-0163C, Souri 9/2 QA58; RPX-0001C (ecobee source code); RDX-0009C-19C (RPX-0001C (ecobee source code)). Thus, even under Mr. Gomez's incorrect analysis as to a "rate of change," the ecobee Accused Products do not calculate a rate of change when the "status of the HVAC system is 'off.'"

* * *

[redacted] – Mr. Gomez failed to identify any calculated rate of change that [redacted] RX-0163C, Souri 9/2 QA57-58. When Mr. Gomez was asked in his witness statement to provide a basis for his opinion that the [redacted] CX-0674C, Gomez QA494. Mr. Gomez merely pointed to [redacted] CX-0674C, Gomez QA494 (citing to CX-0484C [redacted]); *see also* PHB at 44-45 (relying on CX-0484C [redacted] for this limitation). [redacted] it provides no evidence that a separate rate is being calculated during that time and so provides no support for Mr. Gomez's opinion.

* * *

EcoFactor also failed to show that ecobee's [redacted] performs the last clause in limitation 1[d]. CX-0163C, Souri 9/2 QA59. The parties agree that the phrase "relate said calculated rates of change to said outside temperature measurements" in limitation 1[d] requires that the "calculated rates of change are correlated to said outside temperature measurements." Mr. Gomez contended that the claimed correlation occurs when [redacted] CX-0674C, Gomez QA492. But, as discussed above, [redacted] RX-0163C, Souri 9/2 QA52-55, 57-58. As such, there is no basis upon which EcoFactor can show the required correlation. RX-0163C, Souri 9/2 QA59.

[redacted]

* * *

EcoFactor also relied on the testimony of Mr. Gomez to try and argue infringement of limitation 1[d] under the doctrine of equivalents. PHB at 46. But once again, Mr. Gomez offered only a conclusory assertion on this issue. Indeed, Mr. Gomez did not even indicate which features or functions he contended were equivalent. CX-0674C, Gomez QA497; RX-0163C, Souri 9/2 QA61. As discussed above, element 1[d] includes numerous limitations, including that (i) there must be a calculation of "one or more rates of change in temperature at said first location," (ii) such calculations must be performed both for when the "status of the HVAC system is 'on'" and when the "status of the HVAC system is 'off' and (iii) then the calculated rates of change must be related to the outside temperature measurements. Mr. Gomez did not identify which of these limitations would be practiced under the doctrine of equivalents, nor did he identify which specific functionality in the ecobee Accused Products he is relying upon as purportedly being equivalent. RX-0163C, Souri 9/2 QA61. Thus, as a matter of law, his conclusory statements fail to support a finding of infringement. *See, e.g. Tex. Instruments,* 90 F.3d at 1567 (explaining that evidence of equivalency must be shown "on a limitation-by-limitation basis"); *Medtronic Inc.*, 558 F. App'x at 1000 ("conclusory statements are insufficient to support a verdict finding infringement under the doctrine of equivalents.").

Resps. Br. at 130-41 (footnote omitted).

The Staff argues, in part:

The evidence does not show that the accused ecobee products satisfy element 1[d]: "*wherein said one or more processors are configured to calculate one or more rates of change in temperature at said first location for periods during which the status of the HVAC system is 'on' and wherein said one or more processors are further configured to calculate one or more rates of change in temperature at said first location for periods during which the status of the HVAC system is 'off', and to relate said calculated rates of change to said outside temperature measurements*." Staff Ex. 1; CX-0674C (Gomez) QA 488-497; RX-0163C (Souri 9/2) QA 56-61. For example, although Mr. Gomez testified that ecobee's source code shows [redacted] *See* CX-0674C (Gomez) QA 496. Further, [redacted] 14-694:22 (Souri).

ecobee also argues that the system [redacted]

[redacted] RPreHBr. at 86 (citing RX-0163C (Souri 9/2) QA 58; RPX-0001C); Hearing Tr. 715:8-716:24 (Souri); 719:17-720:14 (Souri). However, Dr. Souri testified at the hearing that his opinion that the accused products [redacted] *See* Hearing Tr. at 696:2-24 (Souri); Section III.C.5, above. Thus, even though [redacted] *See* Hearing Tr. at 707:17-24 (Souri); 694:23-700:3 (Souri); 700:4-707:24 (Souri). In the Staff's view, this specific argument fails if the ALJ adopts either the Staff's or EcoFactor's proposed construction of "status of HVAC system is 'on' / "status of HVAC system is 'off.'" *See* Section III.C.5.

Therefore, the evidence does not show that EcoFactor has met its burden of establishing that ecobee's accused products satisfy claim 1 of the '497 patent.

Staff Br. at 40-41.

The construction of "one or more rates of change in temperature" was discussed above; the claim term "one or more rates of change in temperature" is construed to have its plain and ordinary meaning, an example of which is: "the difference between two temperature measurements divided by the span of time between the measurements."

Under the adopted construction, EcoFactor has not shown that the accused ecobee products satisfy limitation 1[d] of the '497 patent.

EcoFactor asserts that the ecobee thermostats [redacted] *See* Compl. Br. at 77-94. However, ecobee's [redacted] *See* RX-0163C (Souri DWS) at Q/A 56-57; CX-0125C (Malchiondo Dep.) at 185:12-24 (explaining

[redacted]

that ecobee's thermostats [redacted]). Rather, the evidence shows that [redacted] *See* RX-0163C (Souri DWS) at Q/A 57. A rate of change is not calculated during this process. *See* RX-0163C (Souri DWS) at Q/A 57; CX-0125C (Malchiondo Dep.) 185:12-24.

EcoFactor further contends that ecobee correlates the difference between the inside temperatures with the outside temperature at that time, as part of [redacted]. *See* Compl. Br. at 77-94. However, although Mr. Gomez testified that ecobee's source code shows that [redacted] *See* CX-0674C (Gomez) at Q/A 496. Further, [redacted] *See id.* at Q/A 494; RX-0163C (Souri RWS) at Q/A 57; Souri Tr. 688-694.

Moreover, even if the functions relied on by EcoFactor were interpreted as being the claimed rates of change and outside temperature measurements, the accused ecobee products still do not correlate the claimed rates of change to the outside temperature measurements. *See* RX-0163C (Souri RWS) at Q/A 59. That is because, as Dr. Souri explained, [redacted] *See id.* Inasmuch as [redacted]

[redacted] as required by claim 1. Souri Tr. 706-707; RX-0163C (Souri RWS) at Q/A 59. EcoFactor, therefore, has not shown that the ecobee Accused Products correlate a rate of change to an outside temperature measurement for the 'on' and 'off' periods.

EcoFactor further argues that the accused ecobee products satisfy this claim limitation under the doctrine of equivalents. *See* Compl. Br. at 94. EcoFactor argues the accused ecobee products calculate rates of change in temperature and relating those rates of change to outside temperature measurements [redacted] *See id.* (citing CX-0674C (Gomez DWS) at Q/A 497). However, Mr. Gomez does not indicate which features or functions he contends are equivalent. CX-0674C (Gomez DWS) at Q/A 497. Moreover, one of ordinary skill in the art would find that rate and time are two different types of calculations that are not equivalent. *See* RX-0163C (Souri DWS) at Q/A 61; Palmer Tr. 964, 965 (testifying that detecting that a house takes longer to heat up does not necessarily involve a rate of change calculation).

Even were "HVAC system", "status of the HVAC system . . .", and "said one or more processors" construed according to respondents' proposed construction, the accused ecobee products would still not satisfy this claim limitation because [redacted] does not calculate a value for the operational efficiency of a heating, ventilation, and air conditioning (HVAC) system.

Even were "one or more rates of change in temperature" construed according to EcoFactor's proposed construction, the accused ecobee products would still not satisfy this claim

[redacted]

limitation because [redacted] does not calculate a value for the operational efficiency of a heating, ventilation, and air conditioning (HVAC) system.

Accordingly, it is determined that the ecobee accused products do not satisfy this limitation.

* * *

It is therefore determined that the accused ecobee products do not infringe asserted independent claim 1 of the '497 patent.

**c. Vivint Products**

EcoFactor asserts that Vivint's accused products infringe claim 1 of the '497 patent. Compl. Br. at 99-129.

**i. A system for calculating a value for the operational efficiency of a heating, ventilation, and air conditioning (HVAC) system comprising:**

The record evidence demonstrates that Vivint's accused products do not satisfy this limitation of asserted independent claim 1. *See* RX-0164C (James RWS) at Q/A 133-34.

EcoFactor argues, in part:

> The preamble of JX-0001 ('497 patent) is not limiting. To the extent it is limiting, the Vivint Products each meet claim 1[pre] of CX-0001 ('497 patent) ("A system for calculating a value for the operational efficiency of a heating, ventilation, and air conditioning (HVAC) system, the system comprising"). CX-0675C (de la Iglesia) Q/A 172-193.

* * *

[redacted]

[redacted]

* * *

[redacted]

[redacted]

[redacted].

*      *      *

[redacted]:

[redacted]

*      *      *

[redacted]

[redacted]

[redacted] JX-0001, ’497 patent 9:10-155

[redacted]

40.

Further, an HVAC system that takes longer to change temperature than it once did is using more energy than it once did to achieve the same outcome, which is less efficient. [redacted]

Compl. Br. at 104-08.

Vivint argues, in part:

The record demonstrates that Vivint does not infringe the preamble of Claim 1 of the '497 Patent because Vivint does not and cannot calculate "operational efficiency of an HVAC system" as required by the claim. RX-0164C, James QA133-34. The record shows that Vivint does not "[redacted]

Mr. de la Iglesia's direct testimony contends that Vivint satisfies this element through the use of the source code file [redacted]. CX-0675C, de la Iglesia QA238. The record demonstrates, however, that Vivint does not [redacted] RX-0165C, Bunker QA191-92. The evidence also demonstrates that the [redacted] EcoFactor has no other evidence.

Resps. Br. at 219-20.

The Staff argues, in part:

[redacted]

> As discussed above, the Staff agrees that the preamble of claim 1 is limiting. To satisfy the preamble, the accused products must calculate a value for the "*energy required* by the HVAC system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions." *See* Section III.C.2. The evidence does not show that the preamble is met by the Vivint accused products.
>
> Mr. de la Iglesia testified that [redacted] of Vivint's accused products satisfies the preamble. *See* CX-0675C (de la Iglesia) QA 172-193. He testified that [redacted] " CX-0675C (de la Iglesia) QA 185, 187-189.
>
> * * *
>
> Accordingly, the evidence shows that the preamble is not satisfied, and Vivint's accused products do not calculate a value for the operational efficiency of the HVAC system.

Staff Br. at 42-43.

As an initial matter, the preamble of claim 1 of the '497 patent has been found to be limiting and "operational efficiency" has been construed to mean "energy required by the HVAC system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions."

Regarding the preamble, EcoFactor argues that Vivint's [redacted], and displays this to the user. *See* Compl. Br. at 104-08. It is argued that Vivint's [redacted] calculates the operational efficiency of the HVAC system. *See id.*

However, Vivint's expert, Dr. James, testified that EcoFactor's expert, Mr. de la Iglesia, misinterpreted [redacted]

[redacted]

[redacted]. *See* RX-0164C (James RWS) at Q/A 87-95, 142-46. Dr. James testified:

> Mr. de la Iglesia continues to misconstrue the [redacted].

*Id.* at Q/A 144.

EcoFactor argues that [redacted] *See* RX-0165C (Bunker DWS) at Q/A 191-96.

Moreover, the evidence shows that [redacted]" RX-0165C (Bunker DWS) at Q/A 151; CX-0254 (Bunker Dep.) at 100:5-6 ("THE WITNESS: Vivint has never had access to energy consumed."); RX-0164C (James RWS) at Q/A 134. Vivint also "has no software that [redacted] RX-0165C (Bunker DWS) at Q/A 196 ("[redacted]

[redacted]

[redacted]"); CX-0254C (Bunker Dep.) at 226:25-227:4; RX-0164C (James RWS) at Q/A 134.

Even were "HVAC system" construed according to respondents' proposed construction, the accused Vivint products would still not satisfy this claim limitation because Vivint's [redacted] does not calculate a value for the operational efficiency of a heating, ventilation, and air conditioning (HVAC) system.

If "operational efficiency" were construed according to EcoFactor's proposed construction, the accused Vivint products would satisfy this claim limitation because [redacted]

Accordingly, it is determined that the Vivint accused products do not satisfy this claim limitation.

**ii. at least one HVAC control system that receives temperature measurements from at least a first location conditioned by at least one HVAC system;**

Each of the Vivint accused products includes this feature of claim 1. *See* CX-0675C (de la Iglesia DWS) at Q/A 195-202.

EcoFactor argues, in part:

> The Vivint Products [redacted]
>
> * * *

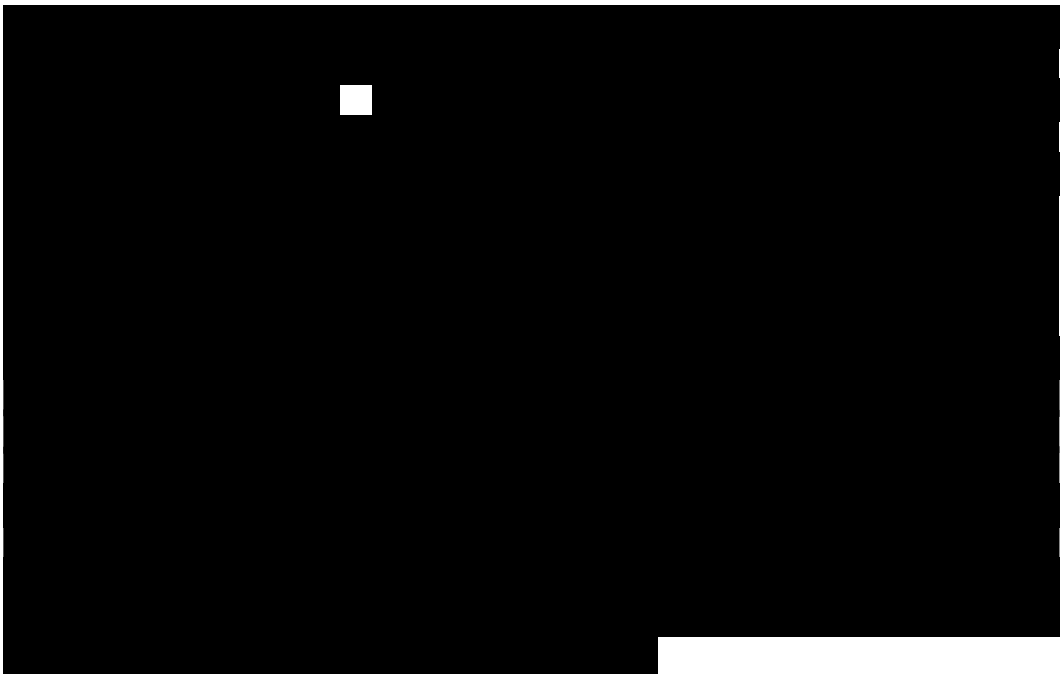
[redacted]

[redacted]

* * *

[redacted]

[redacted]

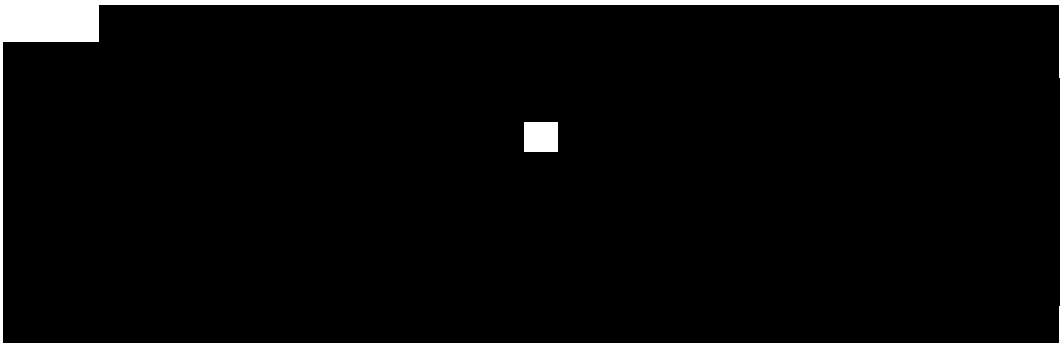


Compl. Br. at 108-12.

Vivint argues, in part:

> Claim Element 1[a] of the '497 Patent recites "at least one HVAC control system that receives temperature measurements from at least a first location conditioned by at least one HVAC system." [redacted]





[redacted]

* * *

The record demonstrates that "a person of ordinary skill in the art would understand that, to be an HVAC control system, the control system must be able to control the operations of the HVAC system." RX-0164C, James QA45. [redacted]

* * *

Dr. James explained:

[redacted]

[redacted]

* * *

The record also demonstrates that Vivint does not satisfy this element even if the Court were to accept Mr. de la Iglesia's broad view of the HVAC control system. [redacted]

[redacted]

[redacted]

* * *

Dr. James testified that inside the red box, "[redacted]." RX-0164C, James QA56. Dr. James explained:

> I reproduced the claim language of element 1[a] but I substituted the combination of components identified as the HVAC Control System by Mr. de la Iglesia for the claim term "HVAC control system." As this substitution shows, the claim language requires that this combination "receives temperature measurements from at least a first location conditioned by at least one HVAC system." Thus, because Mr. de la Iglesia opines that the claimed HVAC control system is the combination of Vivint components I just mentioned, it cannot satisfy the "receiving temperature measurements" limitation of claim element 1[a]. This is because Mr. de la Iglesia's "HVAC control system" combination includes the Vivint thermostat. [redacted]
>
> RX-0164C, James QA56.

Thus, the cumulative record demonstrates that because Mr. de la Iglesia has equated the claimed HVAC control system with the combination of three components listed above, even Complainant's manufactured HVAC control system cannot "receive" a temperature measurement because it makes the measurements itself. *Id.* Under Complainant's own theory, the record cannot support a finding that Vivint satisfies the claim element, "HVAC control system that receives temperature measurements from at least a first location conditioned by at least one HVAC system." *See, id.* at QA52-56.

Resps. Br. at 193-99.

The Staff argues, in part:

The evidence shows that the accused Vivint products satisfy element 1[a]: "*at least one HVAC control system that receives* temperature measurements from

[redacted]

at least a first location conditioned by at least one HVAC system." Staff Ex. 1; CX-0675C (de la Iglesia) QA 194-202. Mr. de la Iglesia testified that

> The Vivint Accused Products are a [redacted]

CX-0675C (de al Iglesia) QA 195. Mr. Bunker, whom Mr. de la Iglesia referenced here, testified during his deposition that [redacted]." CX-0254C (Bunker Tr.) at 131:12-22. Mr. de la Iglesia further testified:

> The Vivint Accused Products are [redacted] ….

CX-0675C (de la Iglesia) QA 196 (emphasis added).

> Additional testimony by Mr. Bunker establishes that the Vivint Accused Products [redacted]

[redacted]

*Id*. at QA 198 (emphasis added).

Vivint argues that the evidence shows that its thermostats only take temperature measurements, but that those measurements are [redacted] Hearing Tr. at 879:7-23 (James).

Staff Br. at 43-45.

The evidence adduced by EcoFactor shows that the accused Vivint products [redacted] *See id.*

Vivint argues that [redacted], and that the Vivint thermostats do not satisfy claim element 1[a] because the Vivint thermostats do not [redacted]. *See* Resps. Br. at 193-99.

[redacted]

However, Vivint's thermostats [redacted]. *See* CX-0675C (de la Iglesia DWS) at Q/A 196. The Vivint thermostats [redacted]. The current temperature measurement has a [redacted] and is in degrees Fahrenheit or Celsius. *See id.* at Q/A 197-98.

Even were "HVAC system" construed according to respondents' proposed construction, the accused Vivint products would still satisfy this claim limitation because Vivint's thermostats function as a [redacted].

Thus, the accused Vivint products include at least one HVAC control system that receives temperature measurements from at least a first location conditioned by at least one HVAC system.

Accordingly, it is determined that the accused Vivint products satisfy this claim limitation.

**iii. one or more databases that store at least said temperatures measured at said first location over time;**

The evidence shows that the accused Vivint products satisfy element 1[b]: "one or more databases that store at least said temperatures measured at said first location over time." CX-0675C (de la Iglesia) at Q/A 203-07. Vivint does not dispute that this element is satisfied. *See* Resps. Br. at 193-234.

[redacted]

**iv. one or more processors that receive outside temperature measurements from at least one source other than said HVAC system;**

The evidence does not show that the Vivint accused products include this feature of claim 1. *See* RX-0164C (James RWS) at Q/A 68-75.

EcoFactor argues, in part:

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

At the hearing, Vivint's expert, Dr. James, also confirmed that the [redacted]

[redacted]

[redacted]

[redacted]

[redacted]”

Finally, to the extent Vivint is arguing that the outdoor temperature [redacted]

[redacted]

Compl. Br. at 112-15.

Vivint argues:

> Claim element 1[c] of the ’497 Patent requires “one or more processors that receive outside temperature measurements from at least one source other than said HVAC system.” All proposed constructions for the “outside temperature measurements” require a ***measurement***. But there is no evidence on the record that could establish any component in Vivint’s system satisfies this claim element. In fact, the record demonstrates the opposite—the [redacted].”

* * *

[redacted]

[redacted]

[redacted]

[redacted]

la Iglesia QA187. But this alone does not satisfy Complainant's burden of preponderance of the evidence. To meet that burden, Complainant must show that it is more likely than not that the [redacted]. The record evidence actually shows that it is more likely than not that the opposite is true.

There is no dispute that a [redacted]

The actual evidence on the record establishes that the [redacted]

[redacted]

* * *

EcoFactor will, at best, point to its attempt to impeach Dr. James at the hearing with his deposition testimony that, [redacted]

Hearing Tr. 882:17-25 (Dr. James). Dr. James testimony is certainly not "evidence" that the value used [redacted] See Hearing Tr. 873:20-25 (Dr. James) ("Q. [redacted]

[redacted]

* * *

[redacted]

Mr. de la Iglesia also admitted that he has no basis to believe that [redacted]

[redacted]

[redacted]

* * *

Finally, even if the "weather data" [redacted]

[redacted]

Based on the record, Complainant failed to prove that it is more likely than not that [redacted]. The record actually shows the opposite—that it is more likely than not that [redacted]

Resps. Br. at 199-205.

The Staff argues, in part:

> The evidence does not show that the accused Vivint products satisfy element 1[c]: "*one or more processors that receive outside temperature measurements from at least one source other than said HVAC system*." Staff Ex. 1; CX-0675C (de la Iglesia) QA 208-211; RX-0164C (James) QA 68-75. The evidence shows that Vivint [redacted]

[redacted]

[redacted]." RX-0164C, James QA 75; *see also* RX-0165C (Bunker) QA 106-09; RPreHBr. at 139; RX-0164C (James) QA 70.

Further, even though Dr. James testified that Vivint [redacted] there is no testimony that the [redacted] are from *measurements*, as opposed to forecasts. *See* Hearing Tr. at 862:25-866:13 (James).

Therefore, EcoFactor has not met its burden of proof with respect to element 1[c].

Staff Br. at 45-46.

The construction of "outside temperature measurements" was discussed above; the claim term "outside temperature measurements" means "measurements of the temperature outside (or external to) [the structure]."

Under the adopted construction, the accused Vivint products do not include one or more processors that receive measurements of the temperature outside (or external to) [the structure] from at least one source other than said HVAC system. *See* RX-0164C (James RWS) at Q/A 68-75.

The evidence shows that Vivint [redacted] the Vivint Cloud. *See id.* at Q/A 70; CX-0254C (Bunker Dep.) at 177:17-19, 180:7-17 ("[redacted]"). EcoFactor has not adduced evidence showing [redacted],

[redacted] RX-0164C (James RWS) at Q/A 75.

Moreover, even if [redacted]", EcoFactor has not shown that it is a temperature for a "location outside" the structure. To the contrary, the record demonstrates that any "temperatures" [redacted] are "not for a 'location outside' the structure (that being the customer's home) [redacted] '[redacted]." *Id.* at Q/A 66. Mr. de la Iglesia testified that [redacted]." *See* de la Iglesia Tr. 389.

Even were "HVAC system" and "outside temperature measurements" construed according to respondents' proposed construction, the accused Vivint products would still not satisfy this claim limitation because the accused Vivint products do not include one or more

[redacted]

processors that receive measurements of the temperature outside (or external to) [the structure] from at least one source other than said HVAC system.

Accordingly, it is determined that the Vivint accused products do not satisfy this claim limitation.

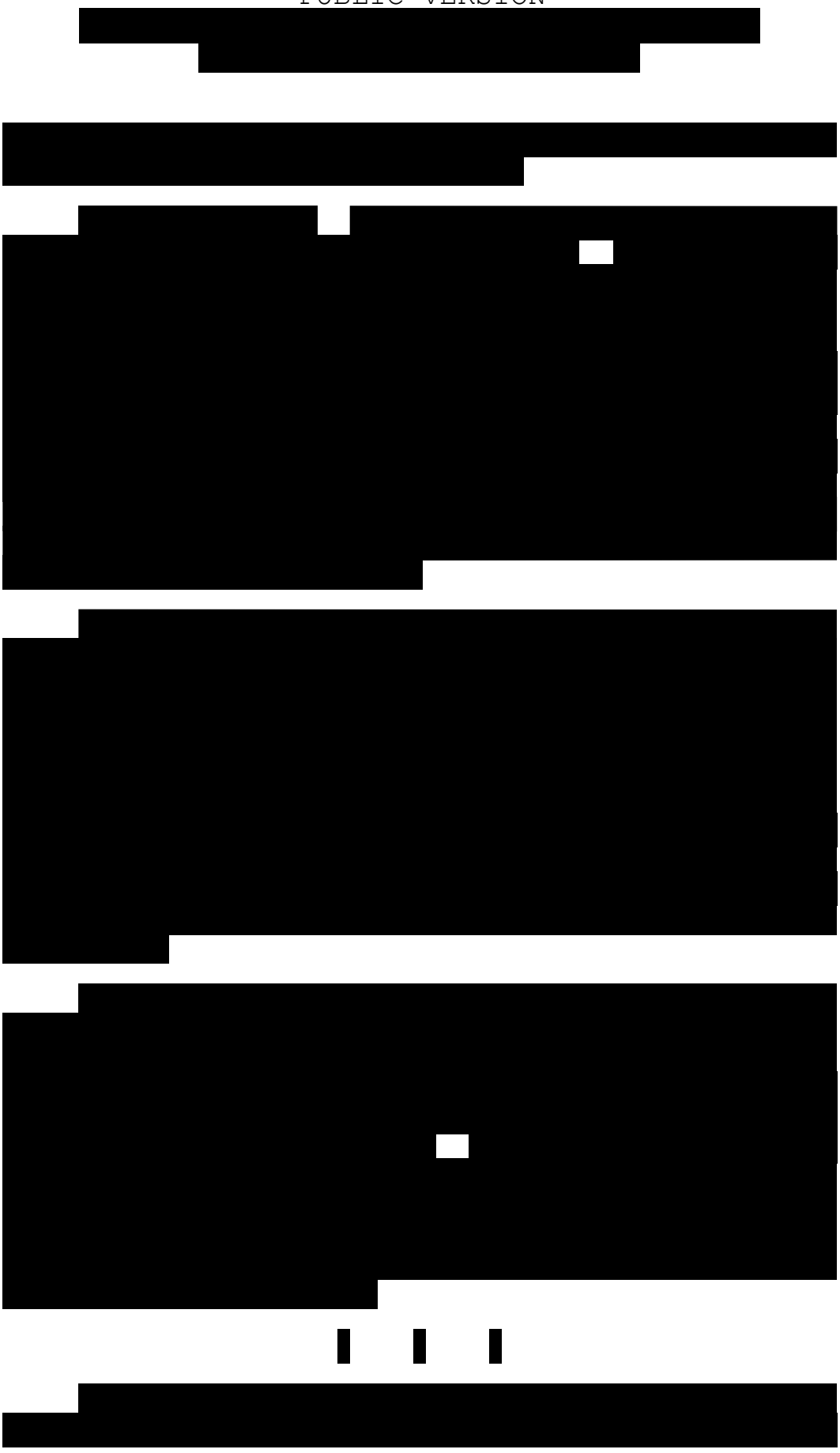
**v. wherein said one or more processors are configured to calculate one or more rates of change in temperature at said first location for periods during which the status of the HVAC system is "on" and wherein said one or more processors are further configured to calculate one or more rates of change in temperature at said first location for periods during which the status of the HVAC system is "off", and to relate said calculated rates of change to said outside temperature measurements.**

The evidence does not show that Vivint's accused products satisfy this claim element. *See* RX-0164C (James RWS) at Q/A 76-124.

EcoFactor argues, in part:

The Vivint Products each meet claim element 1[d]. The claimed "one or more processors" in the [redacted]

[redacted]



[redacted]

[redacted]

* * *

Vivint argues that the [redacted]

Vivint also argues that these [redacted]

[redacted]

[redacted]

.

Compl. Br. at 115-22.

Vivint argues, in part:

> Vivint does not meet the limitations of element 1[d] of Claim 1 of the '497 Patent for at least three reasons: [redacted]
>
> * * *
>
> The record demonstrates that Vivint's system "do[es] not [redacted]

[redacted]

proposed constructions for that term." RX-0164C, James QA78-84; RDX-0010C

[redacted]

[redacted]

[redacted]

* * *

In short, the record demonstrates that Vivint does not meet the "rate of change" limitation because [redacted]

Faced with the undisputed facts surrounding the [redacted] Complainant's expert improperly "created a new equation, and provided units for that new equation in order to make his conclusion come true." RDX-0164C, James QA101-05. Mr. de la Iglesia's demonstrative CDX-00005-11 reflects his new, manufactured equation:

* * *

The record demonstrates that Vivint does not satisfy the limitations of element 1[d] for a third reason—Vivint does not [redacted]

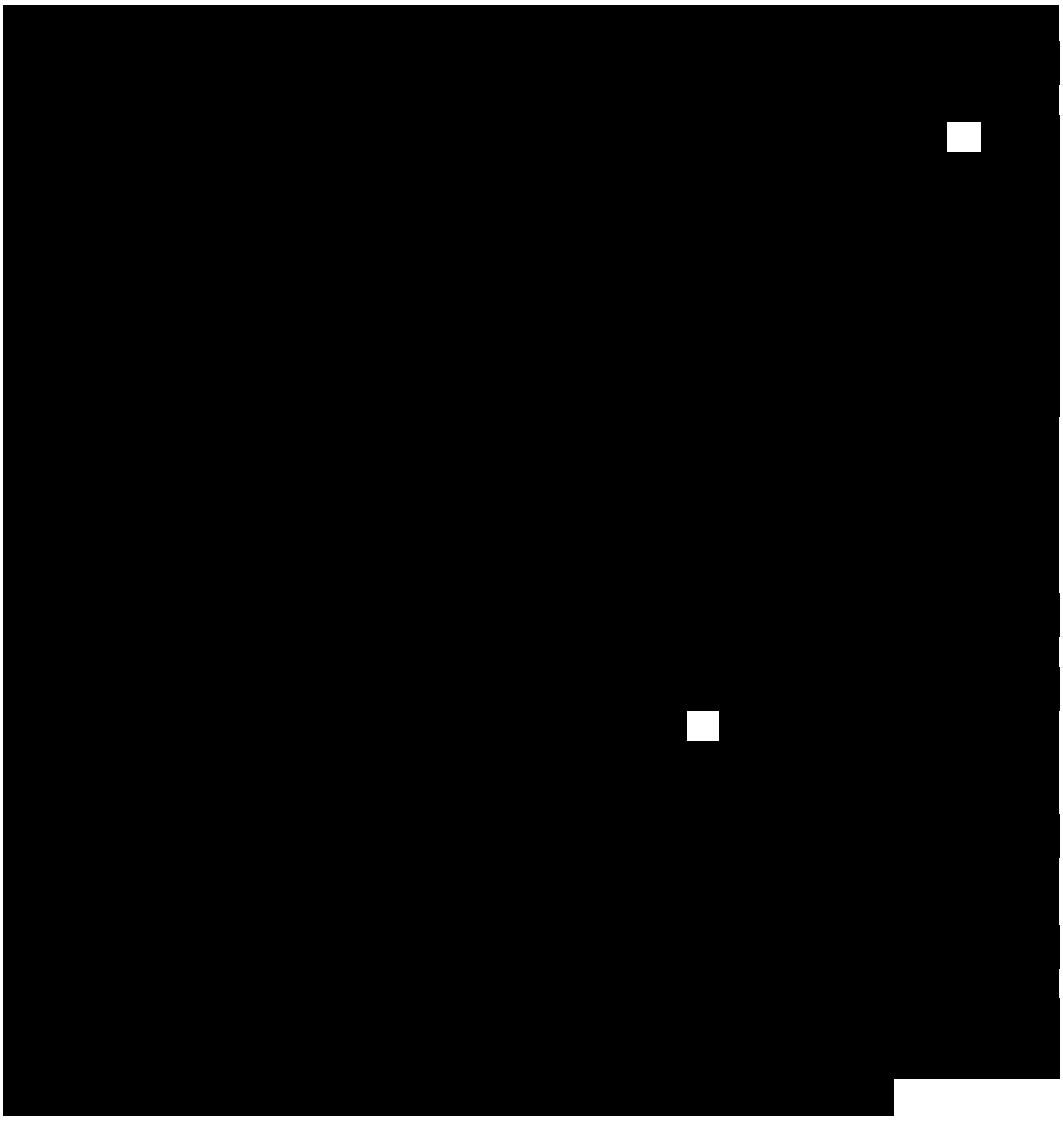
[redacted]

Resps. Br. at 206-19.

The Staff argues, in part:

[redacted]

[redacted]



Staff Br. at 46-48.

The construction of "one or more rates of change in temperature" was discussed above; the claim term "one or more rates of change in temperature" is construed to have its plain and ordinary meaning, an example of which is: "the difference between two temperature measurements divided by the span of time between the measurements."

Under the adopted construction, EcoFactor has not adduced evidence showing that the accused Vivint products satisfy limitation 1[d] of the '497 patent.

[redacted]

EcoFactor asserts that the [redacted]. However, the evidence shows that "Vivint's [redacted] RX-0164C (James RWS) at Q/A 96; RX-0165C (Bunker DWS) at Q/A 136-44; CX-0265C [redacted]. *See* RX-0164C (James RWS) at Q/A 84-100; CX-0265C; RX-0165C (Bunker DWS) at Q/A 98-103, 136-45.

Moreover, Vivint's accused products do not [redacted];

[redacted]

Accordingly, it is determined that the Vivint accused products do not satisfy this limitation.

* * *

It is therefore determined that the accused Vivint products do not infringe asserted independent claim 1 of the ’497 patent.

[redacted]

**2. Claim 2**

**a. Google Products**

**i. A system as in claim 1**

As discussed above, the accused Google products satisfy all limitations of independent claim 1.

**ii. in which said processors receive outside temperatures for geographic regions based on ZIP codes from sources other than said HVAC system.**

EcoFactor argues, in part:

> The Google Products each meet claim 2. CX-0674C (Gomez DWS) Q. 220-223. At the hearing, Dr. Burger confirmed under oath that the [redacted] Hearing Tr. 731:24-732:8 [redacted] Thus, the Google Products include the claimed "processors" that receive the claimed "outside temperatures" for the claimed "geographic regions based on ZIP codes" from the claimed "sources other than said HVAC system," which corresponds [redacted] CX-0674C (Gomez DWS) Q. 220-223.

Compl. Br. at 57-58.

Google argues, in part:

> Claim 2 of the '497 patent depends from claim 1. Because EcoFactor has not established that the Nest Thermostats practice claim 1 of the '497 patent, it necessarily cannot establish that the Nest Thermostats practice claim 2. RX-0156C, Henze QA92-94. "[L]ike claim 1, claim 2 requires that the claimed processor must receive measurements of outside temperature." RX-0156C, Henze QA94. As previously discussed, with respect to limitation [1c], the Nest Thermostats do not receive any measurements of outside temperatures. *Id.* Therefore, EcoFactor failed to establish that the Nest Thermostats practice claim 2 of the'497 patent, either literally or under the doctrine of equivalents. RX-0156C, Henze QA95.
>
> In addition, claim 2 of the '497 patent discloses that the processors receive outside temperatures "from sources other than said HVAC system." '497 patent, cl. 2. However, Mr. Gomez testified that the Nest Thermostats receive measurements

> of outside temperatures "from sources other than said ***HVAC control systems.***" CX-0674C, Gomez QA221 (emphasis added). Accordingly, Mr. Gomez's analysis is fundamentally flawed and cannot establish that the Nest Thermostats practice claim 2 of the '497 patent.

Resps. Br. at 163-64.

The Staff argues, in part:

> In its prehearing brief, Google incorporated its argument above that the Nest Thermostats do not receive outside temperature measurements, and therefore it does not practice the limitations of claim 2. RPreHBr. at 111-112. For the same reasons discussed above with respect to element 1[c], the evidence shows that the Nest Thermostats satisfy claim 2 of the '497 patent. *See also* CX-0674C (Gomez) QA 221-223; Hearing Tr. at 348:21-356:9 (Gomez).

Staff Br. at 35.

The evidence adduced by EcoFactor demonstrates that the accused Google products satisfy the additional claim 2 limitation "in which said processors receive outside temperatures for geographic regions based on ZIP codes from sources other than said HVAC system." *See* CX-0674C (Gomez DWS) at Q/A 220-23.

Google argues that the Nest Thermostats do not receive any measurements of outside temperatures. *See* Resps. Br. at 163-64. However, as Dr. Burger testified, [redacted] Burger Tr. 731-732. Thus, the Google Products include the claimed "processors" that receive the claimed "outside temperatures" for the claimed "geographic regions based on ZIP codes" from the claimed "sources other than said HVAC system." CX-0674C (Gomez DWS) at Q/A 220-23.

Even were "outside temperatures" construed according to respondents' proposed construction, the accused Google products would still satisfy this claim limitation because the

[redacted] in the Nest Thermostat [redacted]. *See* CX-0674C (Gomez) at Q/A 68.

* * *

It is therefore determined that the accused Google products infringe dependent claim 2 of the '497 patent.

**b. ecobee Products**

**i. A system as in claim 1**

As discussed above, the accused ecobee products do not satisfy all limitations of independent claim 1.

**ii. in which said processors receive outside temperatures for geographic regions based on ZIP codes from sources other than said HVAC system.**

EcoFactor argues, in part:

> The ecobee Products meet the additional limitations of dependent claim 2, under any of the proposed constructions. *See* CX-0674C (Gomez DWS) Q/A 498-502. As explained earlier with respect to claim element 1[c], [redacted] *See, e.g.*, CX-0146C (Cleaver Tr.) at 192:10-194:1 (ecobee [redacted]; CX-0516C [redacted] at ecobee00203967 (showing [redacted]; CX-0636 (Thermostat Registration) at ECOITC_0618837-38 (explaining that "[y]our location enables your devices to sync with local weather and timezone to enable smart features" and that "[s]etting an address allows your devices to work together, and use geographic data such as weather to help improve your device's performance"); CX-0634 (Weather Help) at ECOITC_0618572 ("Give your home a name and address. Your location enables

[redacted]

your devices to sync with local weather and timezone to enable smart features."). In summary, ecobee [redacted]

Mr. Gomez's analysis of the ecobee source code, including the printouts of CPX-0003C, also confirmed that the ecobee Products meet the additional limitations of claim 2. *See* CX-0674C (Gomez DWS) Q/A 502. For example, Mr. Gomez identified [redacted] *Id.* [redacted] *See id.* Consistent with its 30(b)(6) testimony, documents, and website, ecobee's source code shows that [redacted] CX-0674C (Gomez DWS) Q/A 502.

ecobee is expected to argue that [redacted] Respondents' PreHB at 89. It is unclear why ecobee believes this is a non-infringement argument. If we accept ecobee's argument at face value, [redacted] *Id.* ecobee's [redacted]

* * *

CDX-0002C.100 (excerpting and annotating CX-0516C [redacted] at ecobee00203967). In other words, ecobee acknowledges that [redacted] But yet ecobee inexplicably argues that [redacted] To be clear, claim 2 does not require the claimed processors to receive outside temperatures based exclusively or directly on ZIP codes. ecobee documents show that a [redacted] Thus, ecobee meets the additional limitations of claim 2.

Compl. Br. at 94-97.

[redacted]

ecobee argues, in part:

> EcoFactor has failed to show that the ecobee Accused Products "receive outside temperature measurements for geographic regions *based on ZIP codes*," as required by dependent claim 2. Mr. Gomez contended that the ecobee system [redacted] RX-1063C, Souri 9/2 QA64. Rather, as Dr. Souri explained, the evidence shows that it [redacted] *Id*. Accordingly, there is no infringement of claim 2 by ecobee.

Resps. Br. at 141.

The Staff argues, in part:

> Both claims 2 and 5 depend from claim 1. Because the evidence does not show that ecobee infringes claim 1, the evidence also does not show that it infringes claims 2 and 5. See also RX-0163C (Souri 9/2) QA 63-69.

Staff Br. at 42.

EcoFactor has not shown that the accused ecobee products satisfy this claim limitation.

EcoFactor argues that the ecobee system can [redacted] *See* Compl. Br. at 94-97. However, the ecobee code shows that [redacted] *See* RX-0163C (Souri RWS) at Q/A 64. Rather, as Dr. Souri explained, the evidence shows that [redacted] *See id.*

Even were "outside temperatures" construed according to respondents' proposed construction, the accused ecobee products would still not satisfy this claim limitation because the ecobee code shows [redacted] *See id.*

[redacted]

* * *

It is therefore determined that the accused ecobee products do not infringe asserted dependent claim 2 of the '497 patent.

**c. Vivint Products**

**i. A system as in claim 1**

As discussed above, the accused Vivint products do not satisfy all limitations of independent claim 1.

**ii. in which said processors receive outside temperatures for geographic regions based on ZIP codes from sources other than said HVAC system.**

EcoFactor argues, in part:

> The Vivint Products also meet claim 2, for the same reasons as element 1[c], because the [redacted]

Compl. Br. at 122.

Vivint argues, in part:

> The record demonstrates Vivint does not infringe dependent claim 2 for the same reasons that Vivint does not infringe Claim 1 of the '497 Patent.

Resps. Br. at 220.

The Staff argues, in part:

> Both claims 2 and 5 depend from claim 1. *See* Staff Ex. 1. Because the evidence does not show that Vivint infringes claim 1, the evidence also does not show that it infringes claims 2 and 5. *See* RX-0164C (James) QA 147-154.
>
> Further, with respect to the additional limitations of claim 2 (*see* Staff Ex. 1), as discussed above, although [redacted]

[redacted] *See* Hearing Tr. at 862:25-866:13 (James). Thus, EcoFactor has not met its burden of showing that the additional limitations of claim 2 are satisfied. *See also* RX-0164C (James) QA 147-159.

Staff Br. at 48 (footnote omitted).

EcoFactor has not shown that the accused Vivint products satisfy this claim limitation.

EcoFactor argues that the accused Vivint products include processors that [redacted] *See* Compl. Br. at 122. However, there is no testimony or evidence that the [redacted] *See* James Tr. 862-866.

Even were "outside temperatures" construed according to respondents' proposed construction, the accused Vivint products would still not satisfy this claim limitation because there is no testimony or evidence that the temperatures provided are from measurements, as opposed to forecasts. *See id.*

* * *

It is therefore determined that the accused Vivint products do not infringe asserted dependent claim 2 of the '497 patent.

**3. Claim 5**

**a. Google Products**

**i. A system as in claim 1**

As discussed above, the accused Google products satisfy all limitations of independent claim 1.

[redacted]

**ii. further comprising a programmable thermostat and said programmable thermostat is the sole source for current data regarding temperature inside said location conditioned by said HVAC system.**

EcoFactor argues, in part:

> The Google Products each meet claim 5. The Google Products further comprise the claimed "programmable thermostat" under any construction, because the Google Products are thermostats that are programmable with temperature settings. CX-0674C (Gomez DWS) Q/A 224-227, citing CX-0061C (Burger Tr.), CX-0072C (Chappelle Tr.), CX-0088C (Gleeson Tr.), CX-0613C (Revised Tstat Requirements for BGE utility) (confirming [redacted]).
>
> Further, the Google Products are the [redacted] CX-0674C (Gomez DWS) Q. 226-227. Further, they display one inside temperature measurement in the Nest app screen. CX-0674C (Gomez DWS) Q. 226-227.
>
> Google argues that the HVAC control system of claim 1 cannot be the same component as the programmable thermostat of claim 5. But the patent has no such limitation. The claimed HVAC control system can be embodied in a communicating thermostat. JX-0001 ('497 patent) 1:17-21 ("This invention relates to the use of thermostatic HVAC controls that are connected to a computer network. More specifically, communicating thermostats are combined with a computer network to calculate the thermal mass of a structure"); Hearing Tr. 254:15-255:9; 270:8-13; 271:9-272:8 (Mr. Gomez explaining HVAC control systems can exist in a device sitting on the wall, functionality in the cloud, or in an integrated thermostat-cloud system.

Compl. Br. at 58-59.

Google argues, in part:

> Claim 5 of the '497 patent depends from claim 1 and further requires a programmable thermostat, separate and apart from the HVAC control system, that is the ***sole*** source of indoor temperature measurements. '497 patent, cl. 5 (emphasis added); RX-0156C, Henze QA74, 98. Because, as previously explained, EcoFactor has not established that the Nest Thermostats practice claim 1 of the '497 patent, it necessarily cannot show that they practice claim 5. RX-0156C, Henze QA96-98. Contrary to the plain language of the claim, Mr. Gomez identifies the Nest

[redacted]

> Thermostats as both part of the claimed HVAC control system for claim 1 and as the programmable thermostat of claim 5. Hearing Tr. vol. 1, 271:9-72:4, Nov. 16, 2020 (Gomez); RX-0156C, Henze QA98. In his expansive interpretation, Mr. Gomez improperly conflates the HVAC control system of claim 1 with the programmable thermostat of claim 5. Hearing Tr. vol. 1, 271:9-72:4, Nov. 16, 2020 (Gomez); CX-0674C, Gomez QA170, 225. Accordingly, Mr. Gomez failed to identify a programmable thermostat that is separate and apart from the HVAC control system, as required by claim 5. Therefore, EcoFactor failed to establish that the Nest Thermostats practice claim 5 of the '497 patent, either literally or under the doctrine of equivalents. RX-0156C, Henze QA99.

Resps. Br. at 164-65.

The Staff argues, in part:

> In its prehearing brief, Google did not dispute that the Nest Thermostats are programmable thermostats, but argued that contrary to the plain language of the claim, EcoFactor improperly conflates the HVAC control system of claim 1 with the programmable thermostat of claim 5. RPreHBr. at 112; RX-0156C (Henze) QA 98; CX-0022 (Complaint Ex. 18), at 3. The Staff disagrees. Claim 5 adds to claim 1 by including a "programmable thermostat." Read with claim 1, claim 5 can be properly read such that the "HVAC control system" is a component of the programmable thermostat. The evidence thus demonstrates that the Nest Thermostats satisfy claim 5. *See* CX-0674C (Gomez) QA 155-158.

Staff Br. at 36.

The construction of "programmable thermostat" was discussed above; the claim term "programmable thermostat" means "thermostat that uses microprocessor-based circuitry to control the switch and operate based upon user-determined protocols for temperature vs. time."

Under the adopted construction, EcoFactor adduced evidence demonstrating that the accused Google products satisfy the additional claim 5 limitation "further comprising a programmable thermostat and said programmable thermostat is the sole source for current data regarding temperature inside said location conditioned by said HVAC system." *See* CX-0674C (Gomez DWS) at Q/A 224-27.

Google argues that Mr. Gomez failed to identify a programmable thermostat that is separate and apart from the HVAC control system, as required by claim 5. *See* Resps. Br. at 164-65. However, the claimed HVAC control system can be embodied in a communicating thermostat. JX-0001 ('497 patent) at col. 1, lns. 17-21 ("This invention relates to the use of thermostatic HVAC controls that are connected to a computer network. More specifically, communicating thermostats are combined with a computer network to calculate the thermal mass of a structure").

Even were "HVAC system" and "programmable thermostat" construed according to respondents' proposed construction, the accused Google products would still satisfy this claim limitation because the Nest thermostats function as a group of components working together to move heat or remove heat from the conditioned [structure/location], and include microprocessor-based circuitry to control the switch and operate based upon user-determined protocols for temperature vs. time. *See* CX-0674C (Gomez DWS) at Q/A 158.

* * *

It is therefore determined that the accused Google products infringe asserted dependent claim 5 of the '497 patent.

**b. ecobee Products**

**i. A system as in claim 1**

As discussed above, the accused ecobee products do not satisfy all limitations of independent claim 1.

**ii. in which said processors receive outside temperatures for geographic regions based on ZIP codes from sources other than said HVAC system.**

EcoFactor argues, in part:

[redacted]

The ecobee Products meet the additional limitations of dependent claim 5, under any of the proposed constructions. *See* CX-0674C (Gomez DWS) Q/A 503-06. The ecobee3 lite and Vulcan thermostats are programmable thermostats that store and operate based upon user-determined protocols for temperature vs. time, such as a schedule. *See, e.g.*, CX-0125C (Malchiondo Tr.) at 152:15-21, 95:25-96:4 (confirming that ecobee3 lite and Vulcan are "programmable thermostats" that users can program with, for example, scheduled setpoints). As explained earlier with respect to claim 1, each ecobee thermostat [redacted] *Id.* at 71:9-21; CX-0647C [redacted] at ECOITC_0618613, ECOITC_0618614 (referencing each thermostat's [redacted]. Thus, each ecobee Product comprises a programmable thermostat that provides current inside temperature data.

The ecobee Products also meet the "sole source" requirement of claim 5. While the ecobee thermostats can utilize inside temperature measurements from remote SmartSensors located in the user's home, this is entirely ***optional***. An ecobee3 lite or Vulcan customer is not required to use a SmartSensor for measuring indoor temperature, and the ecobee3 lite is not even sold with a SmartSensor. *See* CX-0674C (Gomez DWS) Q/A 465 ("[T]he SmartSensor is an optional accessory. The Vulcan product is sold in a bundle that comes with one SmartSensor, and the ecobee3 lite is not sold with any SmartSensor. Either product can be used without one."). If a user does not connect a SmartSensor to their ecobee thermostat's network, or if the customer chooses not to use a SmartSensor for temperature measurements (e.g., if they choose to use it only for room occupancy detection, which the SmartSensor also can perform), then the thermostat itself is the "sole source" for inside temperature measurements. Mr. Malchiondo confirmed exactly this:

* * *

CX-0125C (Malchiondo Tr.) at 71:9-21 (confirming ecobee customers are not required to use optional remote SmartSensors). Indeed, ecobee's Chief Hardware Architect confirmed that [redacted] CX-0113C (Metselaar Tr.) at 108:7-11.

As Mr. Malchiondo explained, an ecobee customer "can just use the ecobee thermostat" as the source for current inside temperature data. Accordingly, the ecobee Products meet the additional limitations of claim 5.

Compl. Br. at 97-98.

ecobee argues, in part:

EcoFactor also offers no evidence that the ecobee Accused Products "further compris[e] a programmable thermostat" that "is the sole source for current data regarding temperature inside said location conditioned by said HVAC

[redacted]

> system," as required by dependent claim 5. As previously discussed, Mr. Gomez contended that the ecobee thermostat constitutes the "HVAC control system" in claim 1. CX-0674C, Gomez QA463. But if the thermostat is the HVAC control system of claim 1, then the same thermostat cannot also be the programmable thermostat of claim 5. RX-0163C, Souri 9/2 QA67.
>
> Furthermore, the ecobee Accused Products are configured to be used with remote Smart Sensors (which are separate devices from the thermostat) that provide temperature information from other locations within a structure. RX-0163C, Souri 9/2 QA67. EcoFactor's own expert, Mr. Gomez, admitted that the ecobee Accused Products could only practice this limitation if a user does not connect the SmartSensOr. CX-0674C, Gomez QA505. However, EcoFactor failed to identify a single instance in which an ecobee Accused Product has been used without a Smart Sensor in the United States.
>
> The evidence also shows that the ecobee SmartThermostat with Voice Control is shipped with Smart Sensors included with the thermostat. RX-0163C, Souri 9/2 QA67. EcoFactor has offered no evidence or analysis as to why a customer would purchase a model of the ecobee smart thermostat that includes a SmartSensor and then opt to not use this SmartSensOr. *Id*. Accordingly, EcoFactor has failed to meet its burden to show that the ecobee Accused Products are used in a manner that would infringe claim 5 of the '497 patent.

Resps. Br. at 141-42.

The Staff argues, in part:

> Both claims 2 and 5 depend from claim 1. Because the evidence does not show that ecobee infringes claim 1, the evidence also does not show that it infringes claims 2 and 5. See also RX-0163C (Souri 9/2) QA 63-69.

Staff Br. at 42.

EcoFactor has not shown that the accused ecobee products satisfy this claim limitation.

EcoFactor argues that each ecobee thermostat comprises a programmable thermostat that provides current inside temperature data, and that the thermostat itself can act as the "sole source" for inside temperature measurements. *See* Compl. Br. at 94-97. However, the accused ecobee products are configured to be used with remote SmartSensors (which are separate devices from the thermostat) that provide temperature information from other locations within a structure. *See* RX-0163C (Souri RWS) at Q/A 67. Mr. Gomez testified that the accused ecobee

products could only practice this limitation if a user does not connect the SmartSensor. CX-0674C (Gomez DWS) at Q/A 505. EcoFactor failed to identify an instance in which an accused ecobee product has been used without a SmartSensor in the United States.

Even were "HVAC system" and "programmable thermostat" construed according to respondents' proposed construction, the accused ecobee products would still not satisfy this claim limitation because the accused ecobee products are configured to be used with remote SmartSensors (which are separate devices from the thermostat) that provide temperature information from other locations within a structure. *See* RX-0163C (Souri RWS) at Q/A 67.

* * *

It is therefore determined that the accused ecobee products do not infringe asserted dependent claim 5 of the '497 patent.

**c. Vivint Products**

**i. A system as in claim 1**

As discussed above, the accused Vivint products do not satisfy all limitations of independent claim 1.

**ii. in which said processors receive outside temperatures for geographic regions based on ZIP codes from sources other than said HVAC system.**

EcoFactor argues, in part:

The Vivint Products meet claim 5, because the Vivint CT100 and CT200 programmable thermostats are the .

Vivint hopes to avoid infringement of claim 5 because its thermostats are

[redacted]

[redacted]

Compl. Br. at 123.

Vivint argues, in part:

> For the same reasons that Vivint does not infringe claim 1 of the '497 Patent, Complainant has failed to prove by a preponderance of the evidence that Vivint infringes claim 5 of the '497 patent. In addition, the record demonstrates that Vivint does satisfy the "programmable thermostat" element of claim 5 under any parties' construction because Vivint's thermostats do not have "microprocessor-based circuitry to control the switch and operate based upon user determined protocols for temperature vs. time." RX-0164C, James QA157-68. Complainant has presented no evidence to the contrary. The sole basis for Complainant's accusations is Mr. de la Iglesia's *ipse dixit* testimony that fails to identify ***any*** evidence supporting his opinions. CX-0675C, de la Iglesia QA245; *cf.* RX-0164C, James QA158-59.
>
> Moreover, to the extent Respondents' proposed construction is adopted, the record demonstrates that the accused Vivint thermostats also do not [redacted] RX-0165C, Bunker QA29-31; *see also* RX-0164C, James QA155-56.

Resps. Br. at 220.

The Staff argues, in part:

> Both claims 2 and 5 depend from claim 1. *See* Staff Ex. 1. Because the

> evidence does not show that Vivint infringes claim 1, the evidence also does not show that it infringes claims 2 and 5. *See* RX-0164C (James) QA 147-154.

Staff Br. at 48 (footnote omitted).

EcoFactor has not shown that the accused Vivint products satisfy this claim limitation.

EcoFactor argues that the Vivint CT100 and CT200 programmable thermostats are the sole source of [redacted] *See* Compl. Br. at 123. However, Vivint's thermostats do not have "microprocessor-based circuitry to control the switch and operate based upon user determined protocols for temperature vs. time." RX-0164C (James RWS) at Q/A 157-58. Inasmuch as EcoFactor's evidence consists solely of Mr. de la Iglesia's testimony to that effect, *see* CX-0675C (de la Iglesia DWS) at Q/A 245, EcoFactor has not shown that the Vivint CT100 and CT200 are programmable thermostats.

Even were "HVAC system" and "programmable thermostat" construed according to respondents' proposed construction, the accused Vivint products would still not satisfy this claim limitation because EcoFactor has not shown that the Vivint CT100 and CT200 are programmable thermostats.

* * *

It is therefore determined that the accused Vivint products do not infringe asserted dependent claim 5 of the '497 patent.

### C. Domestic Industry (Technical Prong)

EcoFactor alleges that the EcoFactor Platform alone or in combination with the Simple Thermostat satisfies all limitations of claims 1, 2, and 5 of the '497 patent. Compl. Br. at 129.

[redacted]

**1. Claim 1**

**a. A system for calculating a value for the operational efficiency of a heating, ventilation, and air conditioning (HVAC) system comprising:**

The record evidence does not show that the EcoFactor DI products satisfy this limitation of asserted independent claim 1. *See* RX-0156C (Henze RWS) at Q/A 240-43.

EcoFactor argues, in part:

> To the extent it is limiting, the EcoFactor Platform, alone or in combination with the Simple Thermostat, meets the preamble of claim 1. As Mr. Gomez testified, the evidence demonstrates that the EcoFactor Platform includes a system for calculating a value for the operational efficiency of a heating, ventilation, and air conditioning (HVAC) system under any parties constructions under any of the proposed constructions because it uses the ramptimeDeltaSpLinearModel and, in the alternative, because it uses the HVAC Performance Monitoring severity metric (described in more detail below with regard to the preamble and element 1[d] of the '322 patent, which is incorporated herein by reference). CX-0674C (Gomez DWS) Q/A 581, 615. Dr. Henze's testimony regarding the ramptimeDeltaSpLinearModel, confirms that EcoFactor calculates a value for operational efficiency. Hearing Tr. at 803:22-804:4 ("[T]he EcoFactor Platform relies on a data-drive (or inverse) black box modeling approach that uses a linear regression model to describe, for example, ***the time to change indoor temperature by a certain amount as a function o findoor temperature and outdoor temperature***." (emphasis added).).
>
> The parties disagree as to the construction of "heating, ventilation, and air conditioning (HVAC) system." CX-0674C (Gomez DWS) Q/A 581. However, this dispute is not material to any live dispute between the parties as it relates to the EcoFactor DI Products. The EcoFactor Platform and the Simple Thermostat are each designed to be connected to HVAC equipment that moves heat into or out of a conditioned structure. CX-0674C (Gomez DWS) Q/A 581.
>
> The parties also disagree as to the construction of "operational efficiency of a heating, ventilation, and air conditioning (HVAC). System"—in particular the parties dispute whether a change in operational efficiency may occur when the time to change temperature changes or merely when the energy used to heat or cool the structure changes. Regardless of which disputed constructions are adopted, the EcoFactor (DI) Products meet them. CX-0674C (Gomez DWS) Q/A 581. The EcoFactor Platform uses the ramptimeDeltaSpLinearModel calculate times to reach a given temperature for a specific HVAC system given inside and outside temperature conditions. CPX-0001C (EcoFactor Code); CX-0674C (Gomez DWS) Q/A 581, 589-92, 615; Hearing Tr. 640:9-14 (Alarm.com expert Mr. Hagins

testifying that an HVAC system that runs longer has lost operational efficiency). This model is run for various purposes including, for example, to determine the time to precool a structure using the EcoFactor Platform. CX-0674C (Gomez DWS) Q/A 581, 589-92, 615; CPX-0001C (EcoFactor Code) at drPrediction.py. This is a time to reach a temperature, which meets EcoFactor's proposed construction. In addition, the runtime of an HVAC system is proxy for the energy necessary to cool a structure by a given amount, which meets all parties proposed constructions. CX-0674C (Gomez DWS) Q/A 581, 615; Hearing Tr. at 638:19-640:6 (Mr. Hagins testifying that a proxy for energy satisfies all constructions for opertational efficiency).

As another example, as part of EcoFactor's HVAC Performance Monitoring feature, the EcoFactor Platform a severity metric. CX-0674C (Gomez DWS) Q/A 581, 610-11; CPX-0001C (EcoFactor Code) at faultRunner.py ln. 173-440 ("getPerformanceSeverityModel1"). The severity metric is a proxy for both the time and energy necessary to heat or cool a space. CX-0674C (Gomez DWS) Q/A 581, 615; Hearing Tr. at 638:19-640:6. Using EcoFactor's HVAC performance monitoring analyzes the performance of the HVAC system to determine whether a fault exists and to analyze the severity of performance degradation. CX-0674C (Gomez DWS) Q/A 581, 615. Again, the HVAC Performance Monitoring feature is explained in more detail with regard to the '322 patent. That discussion is incorporated herein by reference.

Compl. Br. at 133-34.

Respondents argue, in part:

EcoFactor failed to establish that the EcoFactor Platform, with or without the Simple thermostat, practices claim 1 of the '497 patent. *See, e.g.*, RX-0156C, Henze QA236-39. The asserted claims of the '497 patent describe a system for "calculating the value for the operational efficiency of an [] (HVAC) system." *Id.* RX-0156C, Henze QA44-46.

Limitation [1pre] specifies that the system calculates "a value for the operational efficiency." '497 patent, cl. 1; RX-0156C, Henze QA240. However, EcoFactor fails to identify any such value. RX-0156C, Henze QA240. An inventor of the '497 patent was also unable to identify a specific value for the operational efficiency of an HVAC system that the EcoFactor Platform calculated. RX-0004C (Hublou Dep. Designations), 213:9-215:1 ("Hublou Dep."). During his deposition, EcoFactor's corporate witness, Glen Okita, was also unable to explain how EcoFactor's Platform, with or without a Simple Thermostat, calculates such a value. RX-0008C, Okita Dep. 244:2-10. Nor did Mr. Okita address the value for the operational efficiency in his testimony. Hearing Tr. 189:18-217:20. It was only after submitting its final contentions that EcoFactor advanced a new theory by identifying two values as possible values for operational efficiency, a "severity metric," and a "precooling length." CX-0674C, Gomez QA581. The '497 patent,

[redacted]

however, does not disclose either of these terms as values for operational efficiency. In addition, Dr. Henze's testimony outlines why neither of these new values satisfies any party's claim construction of "operational efficiency." RX-0156C, Henze QA241-43.

Dr. Henze testified that computation for the claimed "severity value" uses the equation "severity = durationHrs * max(avgTin - avgTout + 30, 0) / max(4 - deltaTin, 2)," which results in a quantity in units of hours, which is not a measurement for energy. Dr. Henze further testified that the calculation does not represent the "time to change inside temperature by any given amount for a set of one or more indoor or outdoor conditions." RX-0156C, Henze QA242; CPX-0001C (EF Source Code), at 15-16. Furthermore, the evidence shows that the claimed precooling length is an amount of time, which is not an amount of energy, as required by Respondents' construction. RX-0156C, Henze QA242-43; CPX-0001 (EF Source Code), at 15-16. Further, both Dr. Henze and Dr. Palmer testified that a POSITA would understand that a system calculates a value for "operational efficiency" based on historical data. RX-0156C, Henze QA243; CX-0702 (Palmer WS), QA21 ("Palmer QA"); '497 patent, at 8:62-9:44. Because the precooling length is an estimate of future behavior, it is not a *calculated* value for the operational efficiency of an HVAC system. RX-0156C, Henze QA243.

Resps. Br. at 36-37.

The Staff argues, in part:

The evidence does not show that the preamble is satisfied. Mr. Gomez testified that the DI product calculates a value of operational efficiency of the HVAC in two ways: (a) calculating time-to-temperature using a linear model, and (b) calculating a "severity metric" in the HVAC Performance Monitory feature. CX-0674C (Gomez) QA 615, 581.

> **The "time-to-temperature" method**: . . . Mr. Gomez testified that
>
> a person of ordinary skill in the art would recognize that these values are a rate of change under either party's constructions of the term since they represent the historical change in measured temperature over a known period of time. The time-to-temperature for historical temperature measurements provides the time period and the delta between the starting and ending temperature ***provides the rate of change in temperature***. ***Under these circumstances, the deltaTemparature represents a change in temperature divided by time in the units appropriate to calculate the time lenMin***.

CX-0674C (Gomez) QA 590. Mr. Gomez testified that the calculation of lenMin (time-to-temperature) is "an express calculation ***of the time*** necessary to change the

[redacted]

temperature of a structure by a given amount for a given set of indoor and outdoor conditions, which is also a ***proxy*** for the energy necessary." CX-0674C (Gomez) QA 615 (emphasis added).

However, the evidence shows that a calculated amount of time-to-temperature is not an amount of, or a representation of, energy, as required by Respondents' and Staff's construction. *See* RX-0156C (Henze) QA 243 (referring to time-to-temperature as "precooling length); RPreHBr. at 30. Furthermore, EcoFactor does not alleged that a calculated amount of time is equivalent, under the doctrine of equivalence, to energy.

**The "severity metric" method**: Mr. Gomez testified:

> This shows the equation for the severity metric as it is calculated in the EcoFactor Platform. If you look at line 354 you can see the following equations for ***severity metrics***:
>
> thisSeverity = durationHrs * max(avgTin-avgTout+30., 0.) / max(4.-deltaTin, 2.)
>
> peakSeverity = peakHrs * max(maxTin-maxTout+40., 0.) / max(11.-deltaTmax, 1.)\
>
> As you can see, the calculate [sic] involves both a comparison between indoor temperatures at different times, and a comparison indoor to outdoor temperature. For example avgTin corresponds to measured indoor temperatures. avgTout corresponds to outdoor measured temperatures. So the numerator of the equation for thisSeverity involves a ***comparison between inside and outside temperatures***. Likewise, the denominator involves deltaTin, which is calculated by comparing indoor temperatures at different times.

CX-0674C (Gomez) QA 610; *see also* QA 611.

Mr. Gomez testified that this "severity metric is ***a proxy for the amount of time or energy necessary*** to raise or lower the temperature in a building by given amount under certain conditions." As with time-to-temperature above, the evidence shows that the severity metric is *not* an amount of, or a representation of, energy, as required by Respondents' and Staff's construction. RX-0156C (Henze) QA 242.

Therefore, EcoFactor did not demonstrate that the DI product satisfies the preamble of claim 1.

Staff Br. at 111-13.

As an initial matter, the preamble of claim 1 of the '497 patent has been found to be limiting and "operational efficiency" has been construed to mean "energy required by the HVAC

system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions."

Regarding the preamble, EcoFactor argues that the EcoFactor Platform includes a system for calculating a value for the operational efficiency of a heating, ventilation, and air conditioning (HVAC) system because it uses the ramptimeDeltaSpLinearModel and, in the alternative, because it uses the HVAC Performance Monitoring severity metric. *See* Compl. Br. at 133-34.

Regarding the ramptimeDeltaSpLinearModel, Mr. Gomez testified that the time-to-temperature is calculated using a linear model that "is trained by looking at changes in internal temperature over time." CX-0674C (Gomez DWS) at Q/A 590. However, the evidence shows that a calculated amount of time-to-temperature is not an amount of, or a representation of, energy, as required by the construction of "operational efficiency." *See* RX-0156C (Henze RWS) at Q/A 243. Furthermore, EcoFactor does not allege that a calculated amount of time is equivalent, under the doctrine of equivalents, to energy. *See* Compl. Br. at 133-34.

Regarding the HVAC Performance Monitoring severity metric, Mr. Gomez testified that this "severity metric is a proxy for the amount of time or energy necessary to raise or lower the temperature in a building by given amount under certain conditions." CX-0674C (Gomez DWS) at Q/A 581. However, the evidence shows that the severity metric is not an amount of, or a representation of, energy, as required by the construction of "operational efficiency." *See* RX-0156C (Henze RWS) at Q/A 242.

Even were "HVAC system" construed according to respondents' proposed construction, the EcoFactor DI products would still not satisfy this claim limitation because neither ramptimeDeltaSpLinearModel nor the HVAC Performance Monitoring severity metric calculate

a value for the operational efficiency of a heating, ventilation, and air conditioning (HVAC) system.

If "operational efficiency" were construed according to EcoFactor's proposed construction, however, the EcoFactor DI products would satisfy this claim limitation because the EcoFactor Platform uses the ramptimeDeltaSpLinearModel to calculate the time it takes to reach a given temperature for a specific HVAC system given inside and outside temperature conditions. *See* CX-0674C (Gomez DWS) at Q/A 581, 589-92, 615.

Accordingly, it is determined that the EcoFactor DI products do not satisfy this claim limitation.

**b. at least one HVAC control system that receives temperature measurements from at least a first location conditioned by at least one HVAC system;**

The EcoFactor DI products include this feature of claim 1. *See* CX-0674C (Gomez DWS) at Q/A 582-84, 606-08.

EcoFactor argues, in part:

> The EcoFactor Platform alone, or in combination with the Simple Thermostat, meets claim element 1[a] under all proposed constructions. CX-0674C (Gomez DWS) Q/A 582-84, 606-08. For example, EcoFactor Platform includes a suite of features for controlling an HVAC system including, for example, Demand Response and Setpoint Optimization, which are used together or separately to provide setpoints for controlling an HVAC system. *Id.* at 569-74, 582-84, 609. These features and their algorithms (including the ramptimeDeltaSpLinearModel) make use of internal temperature measurements. *Id.* In order to perform these features, the EcoFactor Platform receives inside temperature measurements, stores them in databases, and provides them to servers for processing. *Id.* at Q/A 569-601; CX-0678C (Okita DWS) Q/A 42. In addition, the Simple Thermostat receives temperature measurements from an integrated sensor and provide these measurements to the EcoFactor Platform using a Wi-Fi connection and Wi-Fi chip. *See id.*; CX-0678C (Okita DWS) at Q/A 37-41 ("I have one on my wall at home."). Each of these components are part of a system for controlling an HVAC, and each receive internal temperature measurements. CX-0674C (Gomez DWS) Q/A 582-84; CX-0678C (Okita DWS) Q/A 42; CPX-0001C (EcoFactor Code) at

[redacted]

wifi_mcu_processing.c, wifi_mcu_processing.h, CollectorProcessorBolt.java, IoTEventsProcessorBolt.java, IoTEventProcessor.java, IoTEvent.java.

Once again, this is also confirmed by the testimony of Respondents' expert, Dr. Henze who testified that EcoFactor's predicts time to temperature "as a function of indoor temperature" and that it does so "for when the HVAC system is operating" and "when it is not operating." Hearing Tr. at 803:22-804:10 ("[T]he EcoFactor Platform relies on a data-drive (or inverse) black box modeling approach that uses a linear regression model to describe, for example, the time to change indoor temperature by a certain amount ***as a function of indoor temperature*** and outdoor temperature. . . . It does this analysis separately ***for when the HVAC system*** is operating, when it is not operation, and separately for different operating conditions." (emphasis added)).

Respondents contend that there is no evidence that the received values are internal temperature. However, Mr. Gomez and Mr. Okita have both provided testimony that internal temperatures are received and that they must be received for the EcoFactor Platform algorithms (including ramptimeDeltaSpLinearModel) to work as intended. CX-0674C (Gomez DWS) Q/A 582-84; CX-0678C (Okita DWS) Q/A 42.

Compl. Br. at 135-36.

Respondents argue, in part:

The evidence shows that EcoFactor failed to demonstrate that the EcoFactor Platform, with or without the Simple Thermostat, includes an "HVAC control system," as required by limitation [1a]. *Id.* Henze QA244. Mr. Gomez alleges that the Simple Thermostat is in the claimed HVAC control system. CX-0674C, Gomez QA582. However as Dr. Henze testified, a POSITA evaluating the EcoFactor Platform and reading the claims and specification of the '497 patent would understand that the HVAC control system cannot be the Simple Thermostat in EcoFactor's Platform, as EcoFactor claims. RX-0156C, Henze QA74, 244; RX-0001C (Auslander WS), QA47-49 ("Auslander QA"); '497 patent, at 8:21-30, cl. 3; '322 patent, at 8:21-30, cl.3, cl. 5.

Resps. Br. at 37-38.

The Staff argues that the evidence shows that this element is satisfied. *See* Staff Br. at 113.

The evidence adduced by EcoFactor shows that the EcoFactor DI products include at least one HVAC control system that receives temperature measurements from at least a first

location conditioned by at least one HVAC system. *See* CX-0674C (Gomez) at Q/A 582-84, 606-08. The EcoFactor Platform includes a suite of features for controlling an HVAC system including, for example, Demand Response and Setpoint Optimization, which are used together or separately to provide setpoints for controlling an HVAC system. *Id.* at 569-74, 582-84, 609. These features and their algorithms (including the ramptimeDeltaSpLinearModel) make use of internal temperature measurements. *Id.*

Respondents argue that one of ordinary skill in the art would understand that the HVAC control system cannot be the Simple Thermostat in EcoFactor's Platform. *See* Resps. Br. at 37-38 (citing RX-0156C (Henze RWS) at Q/A 74, 244). However, the Simple Thermostat receives temperature measurements from an integrated sensor and provide these measurements to the EcoFactor Platform using a Wi-Fi connection and Wi-Fi chip. *See* CX-0678C (Okita DWS) at Q/A 37-41. Each of these components is part of a system for controlling an HVAC, and each receives internal temperature measurements. *See* CX-0674C (Gomez DWS) at Q/A 582-84; CX-0678C (Okita DWS) at Q/A 42.

Even were "HVAC system" construed according to respondents' proposed construction, the EcoFactor DI products would still satisfy this claim limitation because the EcoFactor DI products function as a group of components working together to move heat or remove heat from the conditioned [structure/location].

Accordingly, it is determined that the EcoFactor DI products satisfy this claim limitation.

**c. one or more databases that store at least said temperatures measured at said first location over time;**

The EcoFactor DI products include "one or more databases that store at least said temperatures measured at said first location over time." *See* CX-0674C (Gomez DWS) at Q/A 582. Respondents does not contest that the EcoFactor DI products satisfy this claim limitation. *See* Resps. Br. at 36-40.

**d. one or more processors that receive outside temperature measurements from at least one source other than said HVAC system;**

The EcoFactor DI products include "one or more processors that receive outside temperature measurements from at least one source other than said HVAC system." CX-0674C (Gomez DWS) at Q/A 585-87.

EcoFactor argues, in part:

> The EcoFactor Platform alone, or in combination with the Simple Thermostat, meets element 1[c] under any party's construction. CX-0674C (Gomez DWS) Q/A 585-87. The EcoFactor platform obtains temperature measurements from a weather reporting service. *Id.* These measurements are received by the EcoFactor platform. *Id.* They are stored in EcoFactor's previously mentioned databases. *Id.* They are then received by each processor that uses outside temperature including, for example, the processors that perform the modeling referenced in the preamble of claim 1 of the '497 patent. *Id.*; Q/A 13; CX-0605C (Quant Overview); CPX-001C (EcoFactor Code) at \CurrentWeatherConsumer.java, ProvisionServiceImpl.java, CurrentWeatherConsumer.java, CurrentWeatherHandlerImpl.java, currentWeatherReport.xsd. In addition, outside temperature information is provided to connected thermostats such as the Simple Thermostat. CX-0674C (Gomez DWS) Q/A 585-87; CX-0678C (Okita DWS) Q/A 13.
>
> Once again, this is confirmed by Dr. Henze's testimony, who testified that EcoFactor's ramptimeDeltaSpLinearModel model uses outside temperature. Hearing Tr. at 803:22-804:10 ("[T]he EcoFactor Platform relies on a data-drive (or inverse) black box modeling approach that uses a linear regression model to describe, for example, the time to change indoor temperature by a certain amount ***as a function of*** indoor temperature and ***outdoor temperature***." (emphasis added)). Outside temperature is also used in other EcoFactor Platform features such as

[redacted]

HVAC Performance Monitoring, as explained in detail with regard to the '322 patent.

Compl. Br. at 136-37.

Respondents argue, in part:

> The evidence shows that EcoFactor failed to properly identify the claimed "one or more processors" as required by limitations [1c] and [1d]. RX-0156C, Henze QA245. Dr. Henze testified that a POSITA reading claim 1 of the '497 patent would understand that the term "*said* one or more processors" in limitation [1d] refers to the same "one or more processors" identified in limitation [1c]. *Id.* Henze QA246-47; '497 patent, cl. 1. However, Mr. Gomez identified different processors for limitation [1d] than for limitation [1c]. RX-0156C, Henze QA245-46; CX-0674C, Gomez QA587, 589. As to limitation [1c], Mr. Gomez only identified source code for the "platform" component of the EcoFactor software. RX-0156C, Henze QA247; CX-0674C, Gomez QA587. As to limitation [1d], Mr. Gomez identified the "quant" component of its source code. RX-0156C, Henze QA247; CX-0674C, Gomez QA589. However, the evidence shows that the processors of the "platform" component are not the same processors as the "quant" component. RX-0156C, Henze QA247; RX-0229C (EF-Trane Agmt.), at 261. Therefore, as Dr. Henze testified, the "quant" processors cannot be the "said one or more processors" of limitation [1d]. RX-0156C, Henze QA247.

Resps. Br. at 38.

The Staff argues, in part:

> The evidence shows that this element is satisfied. *See* CX-0674C (Gomez) QA 585. Mr. Gomez testified that the DI product includes a processor (the "Platform" server) that receives outside measurements from a weather service, and that information is then shared with several other processors. CX-0674C (Gomez) QA 585. Mr. Gomez testified that "each of these processors—including, for the avoidance of doubt the processors that use outside temperature information to perform the linear modeling I discuss below—receive outside temperature information, and so each individually or in combination with any other can be the claimed 'one or more' processors." *Id*. However, element 1[c] requires that the processor "receives outside temperature measurements ***from at least one source other than said HVAC system***." *See* Staff Ex. 1. Mr. Gomez testified that the processor that receives temperature measurements from a source other than the HVAC system (i.e., the weather service) is the "**Platform**" server. CX-0674C (Gomez) QA 587 ("SC001\Platform\platformServer\ services\src\main\ java\ com \ ecofactor\ consumers\handler\CurrentWeatherHandlerImpl.java obtains weather information including current weather readings.") The evidence shows that the other processors receive the outdoor temperature measurements *from sources*

[redacted]

> *within the DI product*, and thus those processors *do not* satisfy this limitation. *Id*. at 587 ("SC001\Platform\ pojo\src\main\java\com\ecofactor\common\ pojo\timeseries\ PartitionedWeatherRangeData.java writes outdoor temperature information into a database table as ef_weather_range_data_p."); *see also id*. at QA 585.

Staff Br. at 113-14.

The construction of "outside temperature measurements" was discussed above; the claim term "outside temperature measurements" means "measurements of the temperature outside (or external to) [the structure]."

Under the adopted construction, the evidence adduced by EcoFactor shows that the EcoFactor DI products include one or more processors that receive measurements of the temperature outside (or external to) [the structure] from at least one source other than said HVAC system. *See* CX-0674C (Gomez DWS) at Q/A 585.

Respondents argue that Mr. Gomez only identified source code for the "platform" component of the EcoFactor software. *See* Resps. Br. at 38. However, this does not demonstrate that the EcoFactor DI products do not satisfy claim 1[c]. Mr. Gomez testified that the "platform" server receives outside measurements from a weather service, and that information is then shared with several other processors. *See* CX-0674C (Gomez) at Q/A 585. Mr. Gomez testified that "[e]ach of these processors—including, for the avoidance of doubt the processors that use outside temperature information to perform the linear modeling I discuss below—receive outside temperature information, and so each individually or in combination with any other can be the claimed 'one or more' processors." *Id*.

Even were "HVAC system" construed according to respondents' proposed construction, the EcoFactor DI products would still satisfy this claim limitation because the EcoFactor DI

products function as a group of components working together to move heat or remove heat from the conditioned [structure/location].

Even were "outside temperature measurements" construed according to respondents' proposed construction, the EcoFactor DI products would still satisfy this claim limitation because the EcoFactor platform obtains temperature measurements from a weather reporting service. *See* CX-0674C (Gomez DWS) at Q/A 585-87.

Accordingly, it is determined that the EcoFactor DI products satisfy this claim limitation.

**e. wherein said one or more processors are configured to calculate one or more rates of change in temperature at said first location for periods during which the status of the HVAC system is "on" and wherein said one or more processors are further configured to calculate one or more rates of change in temperature at said first location for periods during which the status of the HVAC system is "off", and to relate said calculated rates of change to said outside temperature measurements.**

The record evidence does not show that the EcoFactor DI products satisfy this limitation of asserted independent claim 1. *See* RX-0156C (Henze RWS) at Q/A 246-56.

EcoFactor argues, in part:

> The EcoFactor Platform alone, or in combination with the Simple Thermostat, meets claim element 1[d] under any parties constructions. CX-0674C (Gomez DWS) Q/A 588-594. In particular, the ramptimeDeltaSpLinearModel, meets this element because as Mr. Gomez testified, it calculates rates of change in temperature, including historical and predicted rates of change, and relates those rates to outside temperature. *Id.* It does this both when the HVAC system is operating and when it is not operating. *Id.*
>
> This is further confirmed by the testimony of Respondents' expert, Dr. Henze, who testified that EcoFactor calculates "***the time to change indoor temperature*** by a certain amount," that it does so "a***s a function of . . . outdoor temperature***," and that it does so "***when the HVAC system is operating, when it is not operation, and separately for different operating conditions***." Hearing Tr. at 803:22-804:10 ("[T]he EcoFactor Platform relies on a data-drive (or inverse) black

box modeling approach that uses a linear regression model to describe, for example, the time to change indoor temperature by a certain amount as a function of indoor temperature and outdoor temperature. . . . It does this analysis separately for when the HVAC system is operating, when it is not operation, and separately for different operating conditions.").

As previously explained, the ramptimeDeltaSpLinearModel is a model that predicts the time to achieve a change in temperature based on known inside and outside weather conditions. The model is as follows:

$$lenMin = A * deltaTemp + B * avgOutsideTemp + C * startTemp$$

*Id.* (paraphrasing CPX-001C (EcoFactor Source Code) at, *e.g.*, ramptimePrecool.conf.py). The model is trained by correlating lenMin, deltaTemp, avgOutsideTemp, and startTemp to calculate unique values for coefficients A, B, and C for each connected thermostat each time the model is used. CX-0674C (Gomez DWS) Q/A 588-594. The coefficients A, B, and C are trained using historical values for deltaTemp, startTemp, avgOutsideTemp, and lenMin. *Id.* For training deltaTemp is a rate of change calculated by subtracted two internal temperatures over a known time interval denoted as lenMin. *Id.* avgOutsideTemp is value calculated using historical outside temperatures. *Id.* Once the algorithm is trained, it can be used to predict the time necessary to change temperature by a given amount with a given outdoor condition. *Id*.

EcoFactor calculates a rate of change by determining deltaTemp over the time interval lenMin. CX-0674C (Gomez DWS) Q/A 588-594. Respondents' experts agree that similar calculations meet all parties' constructions of rate of change. *Id.*; Hearing Tr. at 875:17-20 (Dr. James, Vivint's expert, agreeing that "[i]f I look at the delta temperature between two measurements, one hour apart, I will have calculated the rate of change of temperature per hour"); *see also* 642:25-643 (Mr. Hagins agreeing that there are many ways to calucate rate of change). The rate is correlated with outside temperature by training the model using historical outside temperatures and by applying the model using current outside temperatures. CX-0674C (Gomez DWS) Q/A 588-594.

As Mr. Gomez testified, the ramptimeDeltaSpLinearModel is used for both "on" and "off" HVAC statuses. CX-0674C (Gomez DWS) Q/A 588-594. This was further confirmed by Respondents' expert Dr. Henze. Hearing Tr. at 804:5-10 ("It does this analysis separately for when the HVAC system is operating, when it is not operating, and separately for different operating conditions."). For example, the code Quant/quant/modelFramework/conf/***ramptimeOff***.conf.py trains and runs the ramptimeDeltaSpLinearModel for cases where the status of the HVAC is "off." CX-0674C (Gomez DWS) Q/A 588-594; CPX-001C (EcoFactor Code) at ramptimeOff.conf.py. The file \Quant\quant\modelFramework\conf\ramptimePrecool.conf.py, for example trains and runs the ramptimeDeltaSpLinearModel for cases where the HVAC status is

[redacted]

on—such as Demand Response with precooling. Gomez DWS) Q/A 588-594; CPX-001C (EcoFactor Code) at ramptimePrecool.conf.py.

Compl. Br. at 137-39.

Respondents argue, in part:

> The evidence shows that EcoFactor failed to properly identify the claimed "one or more processors" as required by limitations [1c] and [1d]. RX-0156C, Henze QA245. Dr. Henze testified that a POSITA reading claim 1 of the '497 patent would understand that the term "*said* one or more processors" in limitation [1d] refers to the same "one or more processors" identified in limitation [1c]. *Id.* Henze QA246-47; '497 patent, cl. 1. However, Mr. Gomez identified different processors for limitation [1d] than for limitation [1c]. RX-0156C, Henze QA245-46; CX-0674C, Gomez QA587, 589. As to limitation [1c], Mr. Gomez only identified source code for the "platform" component of the EcoFactor software. RX-0156C, Henze QA247; CX-0674C, Gomez QA587. As to limitation [1d], Mr. Gomez identified the "quant" component of its source code. RX-0156C, Henze QA247; CX-0674C, Gomez QA589. However, the evidence shows that the processors of the "platform" component are not the same processors as the "quant" component. RX-0156C, Henze QA247; RX-0229C (EF-Trane Agmt.), at 261. Therefore, as Dr. Henze testified, the "quant" processors cannot be the "said one or more processors" of limitation [1d]. RX-0156C, Henze QA247.
>
> The evidence shows that EcoFactor failed to establish that the EcoFactor Platform, with or without the Simple Thermostat, calculates any "rates of change in temperature" or "relates said calculated rates of change to said outside temperature measurements" as required by limitation [1d]. RX-0156C, Henze QA246, 248. Mr. Gomez identified two terms, "deltaTemp" and "lenMin," in its linear model as the claimed "rates of change in temperature" (CX-0674C, Gomez QA590), but neither is a rate of change under any party's construction. RX-0156C, Henze QA248; CPX-0001C (EF Source Code), at 174-75. EcoFactor's experts agreed that, under any party's construction, a rate of change must have units of temperature *divided by* time. RX-0156C, Henze QA249-50; Hearing Tr. 239:10-17 (Gomez) (describing a rate of change as "rise over time"); Hearing Tr. 963:20-22 (Palmer) (describing a rate of change as having "units of temperature per unit of time"). According to EcoFactor's source code, the EcoFactor Platform calculates a length of time using the equation "**lenMin** = a + b1 * **deltaTemp** + b2 * avgOutsideTemp + b3 * startTemp." RX-0156C, Henze QA248; CPX-0001C (EF Source Code), at 175 (emphasis added). As Dr. Henze testified, although "deltaTemp" is in units of degrees Fahrenheit and "lenMin" is in units of time, neither the EcoFactor Platform nor the Simple Thermostat calculates a value resulting from dividing "deltaTemp" by "lenMin." RX-0156C, Henze QA249; CPX-0001C (EF Source Code), at 174-75.
>
> Expert testimony further established that a POSITA would understand that

[redacted]

> according to claim 1, limitation [1d] computes the claimed value for the "operational efficiency" of an HVAC system of [1pre] by "relat[ing] said calculated rates of change to said outside temperature measurements." RX-0156C, Henze QA254. However, Mr. Gomez did not claim that "lenMin" or "deltaTemp" are values for the "operational efficiency of an HVAC system." *Id.*; CX-0674C, Gomez QA581; RX-0008C, Okita Dep. 244:2-10. Therefore, the evidence shows that EcoFactor failed to establish that it practices claim 1 of the '497 patent. RX-0156C, Henze QA255.

Resps. Br. at 38-39.

The Staff argues, in part:

> The evidence does not show that this element is satisfied. CX-0674C (Gomez) QA 588; RX-0156C (Henze) QA 246-256. Respondents properly argue that a person of ordinary skill in the art reading claim 1 of the '497 patent would understand that the term "*said* one or more processors" in limitation [1d] refers to the same "one or more processors" identified in element [1c]. RPreHBr. at 31; RX-0156C (Henze) QA 246-47. However, Mr. Gomez testified that processor "quant" performs all the calculations of element 1[d], which is different from the processor "Platform" that receives the outdoor temperature measurements from the weather service. Therefore, the evidence does not show that this element is satisfied by the DI product. RX-0156C (Henze) QA 253-255.

Staff Br. at 114.

The construction of "one or more rates of change in temperature" was discussed above; the claim term "one or more rates of change in temperature" is construed to have its plain and ordinary meaning, an example of which is: "the difference between two temperature measurements divided by the span of time between the measurements."

Under the adopted construction, EcoFactor has not adduced evidence showing that the EcoFactor DI products satisfy limitation 1[d] of the '497 patent.

First, Mr. Gomez identified different processors for limitation [1d] than for limitation [1c]. *See* RX-0156C (Henze RWS) at Q/A 245-46; CX-0674C (Gomez DWS) at Q/A 587, 589. As to limitation [1c], Mr. Gomez only identified source code for the "platform" component of the EcoFactor software. RX-0156C (Henze RWS) at Q/A 247; CX-0674C (Gomez DWS) at

Q/A 587. As to limitation [1d], Mr. Gomez identified the "quant" component of its source code. RX-0156C (Henze RWS) at Q/A 247; CX-0674C (Gomez DWS) at Q/A 589. However, the evidence shows that the processors of the "platform" component are not the same processors as the "quant" component. RX-0156C (Henze RWS) at Q/A 247; RX-0229C (EF-Trane Agmt.) at 261. As Dr. Henze testified, the "quant" processors cannot be the "said one or more processors" of limitation [1d]. RX-0156C (Henze RWS) at Q/A 247. Therefore, the evidence does not show that this element is satisfied by the DI product. RX-0156C (Henze RWS) at Q/A 253-55.

Second, Mr. Gomez identified two terms, "deltaTemp" and "lenMin," in the linear model as the claimed "rates of change in temperature" (CX-0674C (Gomez DWS) at Q/A 590), but neither is a difference between two temperature measurements divided by the span of time between the measurements. *See* RX-0156C (Henze RWS) at Q/A 248. Dr. Henze testified that neither the EcoFactor Platform nor the Simple Thermostat calculates a value resulting from dividing "deltaTemp" by "lenMin." *See id*. at Q/A 249. Inasmuch as Mr. Gomez did not claim that "lenMin" or "deltaTemp" are values for the "operational efficiency of an HVAC system", the administrative law judge finds that EcoFactor has not shown that the EcoFactor DI products practice claim 1 of the '497 patent. *See id*. at Q/A 254-55.

Even were "HVAC system", "status of the HVAC system . . .", "one or more rates of change in temperature", and "said one or more processors" construed according to respondents' proposed construction, the accused ecobee products would still not satisfy this claim limitation because the processor "quant" performs all the calculations of element 1[d], which is different from the processor "Platform" that receives the outdoor temperature measurements from the weather service. *See* RX-0156C (Henze RWS) at Q/A 253-55.

If "one or more rates of change in temperature" were construed according to EcoFactor's proposed construction, the EcoFactor DI products would still not satisfy this claim limitation because neither the EcoFactor Platform nor the Simple Thermostat calculates a value resulting from dividing "deltaTemp" by "lenMin." *See id.* at Q/A 249.

* * *

It is therefore determined that the EcoFactor DI products do not practice independent claim 1 of the '497 patent.

**2. Claim 2**

**a. A system as in claim 1**

As discussed above, the EcoFactor DI products do not satisfy all limitations of independent claim 1.

**b. in which said processors receive outside temperatures for geographic regions based on ZIP codes from sources other than said HVAC system.**

EcoFactor argues, in part:

> The EcoFactor Platform alone, or in combination with the Simple Thermostat, includes a system as in claim 1 in which said processors that receive outside temperatures for geographic regions based on ZIP codes from sources other than said HVAC system. CX-0674C (Gomez DWS) Q/A 595-98. These outside temperature measurements are used by, for example, the ramptimeDeltaSpLinearModel and the HVAC Performance Monitoring feature. CX-0674C (Gomez DWS) Q/A 595-98; Hearing Tr. at 803:22-804:4. As Mr. Gomez testified, the EcoFactor Platform uses ZIP code to obtain weather information. *Id.* EcoFactor uses the ZIP code to obtain a city code corresponding to a weather station. *Id.* The EcoFactor platform then receives outside temperatures from that weather station based on the ZIP code of the HVAC system. CX-0674C (Gomez DWS) Q/A 596; CPX-001C (EcoFactor Code) at \CurrentWeatherConsumer.java, ProvisionServiceImpl.java, CurrentWeatherConsumer.java, CurrentWeatherHandlerImpl.java, currentWeatherReport.xsd.

Compl. Br. at 139-40.

Respondents argue, in part:

> The evidence shows that EcoFactor failed to establish that it practices claims 2 and 5 of the '497 patent. *Id.* Henze QA256-57. Claims 2 and 5 of the '497 patent depend from claim 1. Because EcoFactor did not establish that it practices claim 1 of the '497 patent, it necessarily did not show that it practices claims 2 and 5. *Id.* Henze QA257-60. In addition, as Dr. Henze testified, because Mr. Gomez identified the Simple Thermostat as the claimed HVAC control system for claim 1, (CX-0674C, Gomez QA582), the Simple Thermostat cannot also be the claimed thermostat of claim 5. RX-0156C, Henze QA258; CX-0674C, Gomez QA599.

Resps. Br. at 39-40.

The Staff argues, in part:

> For the same reasons, the evidence will not show that claims 2 and 5, which depend from claim 1, are satisfied. In addition, Mr. Gomez testified that the Simple Thermostat is required to meet the additional limitation of claims 2 and 5. *See* CX-0674C (Gomez) QA 596-600. Therefore, for this additional reason, the evidence does not show that the DI product, by itself, practices these claims. *See also* RX-0156C (Henze) QA 257-260.

Staff Br. at 114.

The evidence adduced by EcoFactor demonstrates that the EcoFactor DI products satisfy the additional claim 2 limitation "in which said processors receive outside temperatures for geographic regions based on ZIP codes from sources other than said HVAC system." *See* CX-0674C (Gomez DWS) at Q/A 595-98.

As Mr. Gomez testified, the EcoFactor Platform uses ZIP code to obtain weather information. *See id.* EcoFactor uses the ZIP code to obtain a city code corresponding to a weather station. *See id.* The EcoFactor platform then receives outside temperatures from that weather station based on the ZIP code of the HVAC system. *See id.* at Q/A 596.

Even were "outside temperature measurements" construed according to respondents' proposed construction, the EcoFactor DI products would still satisfy this claim limitation

because the EcoFactor platform obtains temperature measurements from a weather reporting service. *See id.* at Q/A 585-87.

* * *

It is therefore determined that the EcoFactor DI products do not practice dependent claim 2 of the '497 patent.

**3. Claim 5**

**a. A system as in claim 1**

As discussed above, the EcoFactor DI products do not satisfy all limitations of independent claim 1.

**b. further comprising a programmable thermostat and said programmable thermostat is the sole source for current data regarding temperature inside said location conditioned by said HVAC system.**

EcoFactor argues, in part:

> The EcoFactor Platform alone, or in combination with the Simple Thermostat, practices claim 5. The EcoFactor Platform is designed to operate on inside temperature data. CX-0674C (Gomez DWS) Q/A 599-601. The sole source of inside temperature information for the EcoFactor Platform can be a connected Simple Thermostat. *Id.* The thermostat agnostic features of the EcoFactor Platform that meet the elements of claim 1, such as Demand Response with precooling, are designed to analyze such received data. *Id.*; *see also* CX-0678C (Okita DWS) Q/A 42. Similarly, Setpoint Optimization is a core EcoFactor platform feature that works with EcoFactor's demand response, among other things, and provides modifications to a user schedule consisting of numerous setpoints. CX-0674C (Gomez DWS) Q/A 599-601. As another example, the Simple Thermostat includes an integrated temperature sensor that is the sole source of information regarding inside temperature within a structure. *Id.* The Simple Thermostat is a programmable thermostat that allows users to program schedules using EcoFator's application. *Id.* It too can be programmed by the EcoFactor cloud using, for example, Setpoint Optimization, precooling, Demand Response, and like features. *Id.* These meet the limitations of claim 5 under any of the parties constructions "HVAC system" and "programmable thermostat." *Id.*

Compl. Br. at 140.

Respondents argue, in part:

> The evidence shows that EcoFactor failed to establish that it practices claims 2 and 5 of the '497 patent. *Id.* Henze QA256-57. Claims 2 and 5 of the '497 patent depend from claim 1. Because EcoFactor did not establish that it practices claim 1 of the '497 patent, it necessarily did not show that it practices claims 2 and 5. *Id.* Henze QA257-60. In addition, as Dr. Henze testified, because Mr. Gomez identified the Simple Thermostat as the claimed HVAC control system for claim 1, (CX-0674C, Gomez QA582), the Simple Thermostat cannot also be the claimed thermostat of claim 5. RX-0156C, Henze QA258; CX-0674C, Gomez QA599.

Resps. Br. at 39-40.

The Staff argues, in part:

> For the same reasons, the evidence will not show that claims 2 and 5, which depend from claim 1, are satisfied. In addition, Mr. Gomez testified that the Simple Thermostat is required to meet the additional limitation of claims 2 and 5. *See* CX-0674C (Gomez) QA 596-600. Therefore, for this additional reason, the evidence does not show that the DI product, by itself, practices these claims. *See also* RX-0156C (Henze) QA 257-260.

Staff Br. at 114.

The construction of "programmable thermostat" was discussed above; the claim term "programmable thermostat" means "thermostat that uses microprocessor-based circuitry to control the switch and operate based upon user-determined protocols for temperature vs. time."

Under the adopted construction, EcoFactor adduced evidence demonstrating that the EcoFactor DI products satisfy the additional claim 5 limitation "further comprising a programmable thermostat and said programmable thermostat is the sole source for current data regarding temperature inside said location conditioned by said HVAC system." *See* CX-0674C (Gomez DWS) at Q/A 599-601.

The only source of inside temperature information for the EcoFactor Platform can be a connected Simple Thermostat. *Id.* The Simple Thermostat includes an integrated temperature

sensor that is the sole source of information regarding inside temperature within a structure. *Id.* The Simple Thermostat is a programmable thermostat that allows users to program schedules using EcoFactor's application. *Id*.

Even were "HVAC system" and "programmable thermostat" construed according to respondents' proposed construction, the EcoFactor DI products would still satisfy this claim limitation because the EcoFactor DI products function as a group of components working together to move heat or remove heat from the conditioned [structure/location], and the Simple Thermostat is a programmable thermostat that allows users to program schedules using EcoFactor's application. *See id*.

* * *

It is therefore determined that the EcoFactor DI products do not practice dependent claim 5 of the '497 patent.

## VII. The '322 Patent

### A. Overview of the '322 Patent

Asserted U.S. Patent No. 8,423,322 ("the '322 patent") is titled, "System and method for evaluating changes in the efficiency of an HVAC system." JX-0002 ('322 patent). The '322 patent issued on April 16, 2013, and the named inventors are John Douglas Steinberg and Scott Douglas Hublou. *Id.*

EcoFactor asserts independent claim 1 and dependent claims 2 and 5 of the '322 patent. These claims read as follows:

> 1. A system for evaluating changes in the operational efficiency of an HVAC system over time comprising:
>
> at least one HVAC control system associated with a first structure that receives temperature measurements from at least a first

structure conditioned by at least one HVAC system, and receives status of said HVAC system;

one or more processors that receive measurements of outside temperatures from at least one source other than said HVAC system and compare said temperature measurements from said first structure, wherein said one or more processors compares the inside temperature of said first structure and the outside temperature over time; and

one or more databases that store at least said temperature measurements obtained from said first structure over time,

wherein said one or more processors compares an inside temperature recorded inside the first structure with an inside temperature of said first structure recorded at a different time to determine whether the operational efficiency of the HVAC system has decreased over time.

2. A system as in claim 1 in which said processors receive measurements of outside temperatures for geographic regions such as ZIP codes from sources other than said HVAC control systems.

5. A system as in claim 1 in which said HVAC system includes a programmable thermostat and said programmable thermostat is the sole source for current data regarding temperature inside said first structure conditioned by said HVAC system.

*Id.* at col. 13, ln. 52 – col. 14, ln. 21; col. 14, lns. 55-59; col. 15, lns. 1-23; col. 15, ln. 30 – col. 16, ln. 20; col. 16, lns. 44-47.

EcoFactor relies on claims 1, 2 and 5 of the ’322 patent to satisfy the technical prong of the domestic industry requirement.

**B. Infringement**

**1. Claim 1**

**a. Google Products**

EcoFactor asserts that Google’s accused products infringe claim 1 of the ’322 patent. Compl. Br. at 154-84.

**i. A system for evaluating changes in the operational efficiency of an HVAC system over time comprising:**

The accused Google products satisfy this limitation. *See* CX-0674C (Gomez DWS) at Q/A 79-80.

EcoFactor argues, in part:

> The Google Products each meet the preamble of claim 1 of JX-0002 (the '322 patent), to the extent it is limiting. CX-079-85. The Google Products evaluate changes in the operational efficiency of the customer's HVAC system [redacted] CX-0674C (Gomez DWS) Q/A 79, citing CX-0657:
>
> > "Nest is testing a new thermostat feature that can help you look after your home. Your Nest thermostat can now help identify potential issues with your heating, ventilation and air conditioning (HVAC) systems. If a potential issue is detected, we'll send you an alert via email. If you are signed up to get the Nest Home Report, you'll be automatically enrolled to get these new HVAC alert emails.
> > …
> > "Sometimes, your HVAC system shows warning signs that it's having issues. For example, **if it takes longer than normal to cool your home, there might be a problem with your cooling system (AC).** If your Nest thermostat detects these unusual or unexpected patterns, we may send you an email alert. The alert email tells you what your thermostat noticed and which system (heating or cooling) may have been affected."
> > CX-0657 ("Google Nest is testing a new HVAC alerts feature" on Google's support web page for Google Nest).
>
> As Google's feature recognizes, an HVAC system that takes longer to change temperature than it once did has become less efficient in terms of its operational efficiency. Hearing Tr. 640:9-14 (Dr. Hagins) ("Q. Would you agree with me that an HVAC system that takes longer to change temperature is less efficient in terms of operational efficiency? A. Again, you're talking about the same HVAC system at two different points in time? Q. Yes. A. Yes.")
>
> Internally, the HVAC Alerts feature is known as the [redacted] CX-0674C (Gomez DWS) Q/A 80. The very name of the feature conveys the fact that it detects degradations in cooling performance, which is nearly identical to the disclosures of a preferred embodiment in the specification. *See* CX-0002 ('322 patent) 12:8-11 ("If the pattern of degradation matches the refrigerant leak paradigm, the server creates and transmits to the homeowner a message 1224

[redacted]

alerting the homeowner to the possible problem.").

Each and every day, the [redacted] CX-0674C (Gomez DWS) Q/A 79-85. [redacted] CX-0674C (Gomez DWS) Q. 85, 142-144. When the observed [redacted] CX-0674C (Gomez DWS) Q. 146-147; CX-0657 ("if it takes longer than normal to cool your home, there might be a problem with your cooling system (AC)").

* * *

Google's argument is that Mr. Gomez has failed to identify any computed values for the operational efficiency of an HVAC system. Respondents' PreHB at 123. However, Google's arguments ignore what Mr. Gomez has actually accused: [redacted]

After the model is trained, the model is used to [redacted] That [redacted] . [redacted] This is illustrated in CDX-0001C.35.

* * *

[redacted]

CX-0674C (Gomez WS) Q/A 142, 148.

Mr. Gomez analyzes the source code file, [redacted] CX-0674C (Gomez DWS) Q. 143. Dr. Burger has [redacted]

[redacted]

[redacted]. CX-0674C (Gomez DWS) Q. 142-144, 146-147; CX-0071C (Burger Tr.) 321:17-323:3, 316:9-318:4, 312:23-313:13 [redacted]

* * *

The Google Products infringe claim 1 under any construction of "operational efficiency." CX-0674C (Gomez DWS) Q/A 85:

> The [redacted] This meets each construction of evaluating changes in the operational efficiency of the HVAC system." CX-0674C (Gomez DWS) Q/A 85.

Google's [redacted] CX-0674C (Gomez DWS) Q. 148. This meets every proposed construction for "operational efficiency." CX-0674C (Gomez DWS) Q. 85, 149. Like Google's [redacted], in the Figure 8 embodiment, the claimed system evaluates changes in the operational efficiency of the HVAC system by monitoring HVAC cycle times to determine when the HVAC system runs for longer than normal. CX-0001 ('497 patent) 9:10-40 ("FIG. **8***a* shows a graph of outside temperature **402**, inside temperature **404** and HVAC cycle times **406** in House A for a specific 24-hour period on date X…on date X, the HVAC system in House A is presumed to be operating at normal efficiency…FIG. **8***b* shows a graph of outside temperature **408**, inside temperature **410**, and HVAC cycle times **412** in House A for the 24-hour period on date X+1. House A's HVAC system now requires significantly longer cycle times in order to try to maintain the same internal temperature.").

* * *

The [redacted]

[redacted]

[redacted]. CX-0674C (Gomez DWS) Q/A 136, 148-149. An HVAC system that takes longer to change temperature than it once did is less efficient in terms of its operational efficiency. Hearing Tr. 640:9-14 (Dr. Hagins) ("Q. Would you agree with me that an HVAC system that takes longer to change temperature is less efficient in terms of operational efficiency? A. Against, you're talking about the same HVAC system at two different points in time? Q. Yes. A. Yes.")

Google's witnesses have confirmed that [redacted] Dr. Henze confirmed at the hearing that in the preferred embodiment of the '497 patent, HVAC cycle times are used to measure the operational efficiency of the HVAC system. Hearing Tr. 774:9-782:4 (Dr. Henze's testimony regarding cycle times as the measure of efficiency):

> "Q. Okay. And I asked you on line 14: "And this is a description of the cycle times that it used to determine the efficiency of the HVAC system in a particular house at a particular point in time; is that fair? Can we agree on that at least?" And you finally answered: "The patent claims that cycle times are an expression of efficiency." Did I read that correctly?
>
> A. So far, yeah. What you did, right.
>
> …
>
> Q. My question is, did you testify under oath that the '497 patent claims that cycle times are an expression of efficiency, yes or no, on lines 19 and 20?
>
> A. **The patent claims that cycle times are an expression of operational efficiency? I agreed with your question you just posed**."

Hearing Tr. 781:4-12, 781:24-782:4.

Furthermore, Dr. Burger confirmed [redacted]

Compl. Br. at 155-59.

[redacted]

Google argues, in part:

EcoFactor only alleges literal infringement of limitation [1pre]. Limitation [1pre] requires that the claimed system "evaluate[] changes in the operational efficiency of an HVAC system over time." '322 patent, cl. 1. As Dr. Henze testified, a POSITA would understand that in order to "evaluate[] changes in the operational efficiency of an HVAC system over time," the system must compare at least two computed values for the operational efficiency of an HVAC system. RX-0156C, Henze QA106. However, Mr. Gomez did not identify any computed values for the operational efficiency of an HVAC system in [redacted] *Id.*; CX-0674C, Gomez QA79-85. As Dr. Henze testified, [redacted] RX-0156C, Henze QA106.

The [redacted] *Id.*; CX-0674C, Gomez QA79-85; RX-0157C, Burger QA69; CPX-0002C (Google Source Code), at GOOG-SC-ITC 1185-0391, ll. 109-119. Mr. Gomez does not identify any of the three terms as a value for the operational efficiency of an HVAC system, nor could he. *See* CX-0674C, Gomez QA85. Dr. Henze testified that none of the three terms is a value for the operational efficiency of an HVAC system. Dr. Henze also testified that [redacted] is neither an energy value, nor a 'time to change inside temperature by any given amount.'" RX-0156C, Henze QA107; CX-0674C, Gomez QA85, 125; CPX-0002C (Google Source Code), at GOOG-SC-ITC 1185-0391, ll. 109-119. As further explained by Dr. Henze, [redacted] RX-0156C, Henze QA108; CX-0674C, Gomez QA85, 125; RX-0157C, Burger QA63; CPX-0002C (Google Source Code), at GOOG-SC-ITC 1185-0391, ll. 109-119. Finally, Dr. Henze also testified that "the [redacted] is neither an energy value, nor a 'time to change inside temperature by any given amount.'" RX-0156C, Henze QA109; CX-0674C, Gomez QA85, 125; CPX-0002C (Google Source Code), at GOOG-SC-ITC 1185-0391, ll. 109-119. Mr. Gomez does not dispute Dr. Henze's analysis. *See* CX-0674C, Gomez QA79-85.

[redacted]

> Further, the evidence shows that [redacted] has no relationship to the [redacted] in the Nest Thermostats. RX-0157C, Burger QA66-68; CX-0061C (Burger Dep.) 73:13-17. Dr. Burger specifically testified in response to counsel for EcoFactor's questioning that the [redacted] CX-0061C (Burger Dep.) 73:13-20. Accordingly, even if Mr. Gomez had identified any value for the operational efficiency of an HVAC system in the [redacted], which he has not, the [redacted] would not use it or rely on it to determine a decrease in the operational efficiency of an HVAC system. *See id*.; RX-0156C, Henze QA106; CX-0674C, Gomez QA79-85; RX-0157C, Burger QA69; CPX-0002C (Google Source Code), at GOOG-SC-ITC 1185-0391, ll. 109-119.

Resps. Br. at 168-70 (footnote omitted).

The Staff argues, in part:

> The preamble of claim 1 discloses a system for "*evaluating changes in the operational efficiency of an HVAC system over time*." Staff Ex. 1. Although this phrase is not asserted by any party to be limiting, the term "operational efficiency" is recited further in element 1[d] (discussed below). For the reasons discussed above with respect to the preamble of claim 1 of the '497 patent, the evidence shows that the "operational efficiency" limitation is satisfied.

Staff Br. at 49.

As an initial matter, the preamble of claim 1 of the '322 patent has been found to be limiting and "operational efficiency" is construed to mean "energy required by the HVAC system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions."

Under the adopted construction, Google's accused products each meet the limitations of the preamble of claim 1. *See* CX-0674C (Gomez DWS) at Q/A 79-80. Google argues that Mr. Gomez did not identify any computed values for the operational efficiency of an HVAC system in the [redacted]. *See* Resps. Br. at 168-70. However, Mr. Gomez compared

[redacted]

[redacted]

[redacted] This is illustrated in CDX-0001C.35.

* * *

If the thermostat [redacted]

CX-0674C (Gomez DWS) at Q/A 142, 148.

Mr. Gomez analyzed the [redacted] *Id.* at Q/A 143. Dr. Burger confirmed that [redacted] *See id.* at Q/A 142-44, 146-47; CX-0071C (Burger Dep.) 321:17-323:3, 316:9-318:4. Dr. Burger also confirmed that [redacted] Burger Tr. 736-737. When the [redacted] *See* CX-0674C (Gomez DWS) Q/A 146-47; CX-0657 [redacted]

Even if EcoFactor's proposed construction for "operational efficiency" were adopted, EcoFactor adduced evidence showing that Google's accused products would satisfy this claim limitation. Dr. Burger testified that [redacted]

[redacted] Burger Tr. 736-737. Moreover, Dr. Henze testified that [redacted] Henze Tr. 774-782.

Even were "HVAC system" construed according to respondents' proposed construction, the accused Google products would still satisfy this claim limitation because the Nest thermostats function as a group of components working together to move heat or remove heat from the conditioned [structure/location].

**ii. at least one HVAC control system associated with a first structure that receives temperature measurements from at least a first structure conditioned by at least one HVAC system, and receives status of said HVAC system;**

Google's accused products satisfy this limitation. *See* CX-0674C (Gomez DWS) at Q/A 87-102.

EcoFactor argues, in part:

> The Google Products include at least one "HVAC Control System" that is "associated with a first structure" (i.e., associated with the customer's home). CX-0674C (Gomez DWS) Q/A 73-75, 87-90, 100-104. The Google Products include one or more processors, which corresponds to the [redacted] CX-0674C (Gomez DWS) Q/A 73-75, 87-90; CX-0061C (Burger Tr.) 49, 54-55. CX-0674C (Gomez DWS) Q/A 55-58, citing CX-0311C (Google's Resp. to EcoFactor's Request for Admission Nos. 3-4, 15-16, 27-30, 21-22), CX-0061C (Burger Tr.) 29:14-18. [redacted] CX-0674C (Gomez DWS) Q/A 171-172, citing CX-0072C (Chappelle Tr.) 130:02-141:21; CX-0061C (Burger Tr.) 54:13-55:8, 136:2-138:1, 162:7-164:21. The Google Products [redacted] CX-0674C (Gomez DWS) Q/A 58-61, citing CX-0072C (Chappelle Tr.) 188:23-195:11, 239:21-240:23; CX-0670C (GOOG-ITC1185-00038867-38889); CX-0674C (Gomez DWS) Q. 64, 89 [redacted]; CX-0088C (Gleeson Tr.) 304-306 [redacted]

[redacted]

The Google Products satisfy "at least one HVAC control system," even under Respondents' interpretation. Dr. Henze admitted at the hearing that outside the context of his non-infringement analysis, a thermostat would qualify as an HVAC control system. Hearing Tr. 794:22-795:2. The Google Products are clearly thermostats.

Dr. Henze has separately argued that the HVAC control system in the context of the '497 patent must be a server that is separate from the thermostat. RX-0156C (Henze WS) Q. 73-74. The Google Products would infringe under this interpretation as well. The Google Products can be controlled by the server in the cloud. CX-0674C (Gomez DWS) Q/A 60; Hearing Tr. 270:8-13 (Mr. Gomez) ("Q. And isn't it true that you opined that Google's cloud servers are also part of the HVAC control system? A. Well, they can be the HVAC – another HVAC control system. So, like we said, there can be one or more."), 271:9-272:8 (Mr. Gomez) ("the entire HVAC control system can exist in the device sitting on the wall or it can include functionality that is up in the cloud, so yes. I believe that you could have it either all in one component or you can have an integrated component cloud system, and that both would qualify as an HVAC control system.").

Further, the claim simply requires "at least one HVAC control system," without imposing a limit on their number or where they can be embodied. In light of the specification, a person of ordinary skill in the art would conclude that an HVAC control system can exist in a thermostat, in a server, or in multiple connected components that control the HVAC system over a network. CX-0001 ('497 patent) 1:17-21 ("This invention relates to the use of thermostatic HVAC controls that are connected to a computer network. More specifically, communicating thermostats are combined with a computer network to calculate the thermal mass of a structure"); Hearing Tr. 254:15-255:9; 270:8-13; 271:9-272:8 (Mr. Gomez explaining HVAC control systems can exist in device sitting on the wall, functionality in the cloud, or functionality in an integrated cloud-thermostat system.). For example, the patent explains that users can control the HVAC system using the thermostat. CX-0001 ('497 patent) 7:40-57. However, such controls on the thermostat are "not necessary". CX-0001 ('497 patent) 7:55-57. Users could also control the HVAC system through the web browser supported by the server. CX-0001 ('497 patent) 8:10-30. Thus, to a person of ordinary skill in the art, it is evident that an HVAC control system could exist entirely in a thermostat, entirely in the server, or some combination of the two. The patent clearly contemplates one embodiment with a system just like Google's, [redacted]

> In addition to using the system to allow **better signaling and control of the HVAC system**, which relies primarily on communication running from the server to the thermostat, the bi-directional communication will also **allow the thermostat 108 to regularly measure and send to the server information about the temperature in the building**. By comparing outside temperature,

[redacted]

> inside temperature, thermostat settings, cycling behavior of the HVAC system, and other variables, the system will be capable of numerous diagnostic and controlling functions beyond those of a standard thermostat.

JX-0001/JX-0002 ('497 / '322 patents) at 7:5-28, 8:21-30.

In sum, the Google Products include hardware and software for controlling HVAC equipment on the device, and they also have cloud features that [redacted] Thus, the entire system for controlling the customer's HVAC includes components on the device, as well as in the cloud. This clearly meets the claimed "***at least one*** HVAC control system." CX-0674C (Gomez DWS) Q. 102-105.

* * *

The "HVAC control system" receives temperature measurements in units of degrees Celsius from the customer's home, which is conditioned by an HVAC system. CX-0674C (Gomez DWS) Q/A 95-96, citing CX-0063C.0012 ("each day, [redacted]."), Q/A 91-94, citing CPX-0002C (Google source code); CX-0061C (Burger Tr.) 28:7-30:25. After receiving the [redacted]. Q/A 91-94, 106-111; RX-0157C-11 (Burger WS) Q/A 48-49.

Further, Google's backend servers [redacted]. CX-0674C (Gomez DWS) Q. 110.

On this point, Google argues that [redacted] Respondents' Prehearing Brief at 124. Importantly, Google does not dispute that the [redacted] Hearing Tr. 740:9-21 (Dr. Burger). Dr. Burger also confirmed that "[redacted] Hearing Tr. 740:9-21. And Dr. Burger even confirmed that [redacted] Hearing Tr. 740:9-21.

As with the '497 patent, this is literal infringement:

> [T]he use of multiple sensors to increase the accuracy of the

[redacted]

measurement does not change its character as a measurement. Nor does using a [redacted], what is received by the processors is still one measurement of the indoor temperature, in degrees Celsius.

CX-0674C (Gomez DWS) Q/A 107. Even Google concedes [redacted] RX-0157C (Burger WS) Q/A 48. Indeed, the '497 patent expressly teaches the use of multiple sensors to receive a more accurate measurement of the inside temperature. JX-0001 at 13:14-21.

Further, there is also infringement under the doctrine of equivalents, because the Google Products perform substantially the same function [redacted] and perform it in substantially the same way [redacted] to achieve substantially the same result (receiving temperature measurements from the home over time). CX-0674C (Gomez DWS) Q/A 106-111.

* * *

The Google Products include at least one HVAC control system that "receives the status of the HVAC system." Both the Nest Thermostats, and Google's backend system, receive the status of the HVAC system. [redacted] CX-0674C (Gomez DWS) Q/A 95-96, 96-99; CX-0063C.0020; CX-0071C (Burger Tr.) 343:11-14 [redacted]; CX-0061C (Burger Tr.) 75:7-20 [redacted]), CX-0061C (Burger Tr.) 76:16-78:24 ([redacted]

[redacted]

At the hearing, Dr. Burger confirmed that [redacted] Hearing Tr. 740:9-741:2. In the [redacted] CX-0674C (Gomez DWS) Q/A 98.

Google does not dispute any of these facts. But it argues that the claim language requires a component of the HVAC system to ***transmit*** its status to the HVAC control system, and thus excludes any embodiment where the HVAC status information is data for when the thermostat was requesting heating or cooling. Resps. PreHB at 125; CX-0674C (Gomez DWS) Q/A 112.

Contrary to Google's argument, the claim does not require receiving HVAC status ***from*** an HVAC system. CX-0002 ('322 patent), claim 1. Claim 1 only requires receiving status "***of*** said HVAC system," without limiting how the status of the HVAC system is received. Thus, the Google Products literally infringe, by [redacted]. CX-0674C (Gomez DWS) Q. 113; Q. 99, citing CPX-0002C (Google source code) [redacted] CX-0674C (Gomez DWS) Q/A 113.

Google's interpretation of the claim language must be incorrect because it would exclude a preferred embodiment in the patent specification, in which HVAC status is received by logging the control signals sent from the thermostat to the HVAC system. JX-0002 ('322 Patent) at 3:35-60 ("Because cycling of the HVAC system is controlled by the thermostat, differences in cycle time would be reflected in the data sensed by and **control signals generated by the thermostat**."; *id.* at

[redacted]

5:3-30 ("the server logs the **signals sent by the thermostats to their HVAC systems**."). Accordingly, the Google Products literally infringe claim 1[a] in the same manner described in the specification, in residential settings where HVAC equipment does not transmit its own state info.

**Doctrine of equivalents:** There would also be infringement under the doctrine of equivalents, because the Google Products perform substantially the same function [redacted] in substantially the same way [redacted] to achieve the same result (receiving the status of the HVAC system in the customer's home over time). CX-0674C (Gomez DWS) Q/A 114.

Google contends that [redacted] is not substantially the same as receiving status, because there is a possibility that the status information is not perfectly accurate. Respondents' Prehearing Brief at 125-126. But there is no claim requirement for the HVAC status information to be perfectly accurate. Even if there were, [redacted] is insubstantially different, for two reasons. First, in almost every case, the HVAC equipment will follow the command from the application of voltage to the wires to signal the equipment to turn on and off. CX-0674C (Gomez DWS) Q/A 113. Second, the [redacted] *Id*.

Compl. Br. at 159-65.

Google argues, in part:

EcoFactor alleges that the Nest Thermostats meet limitation [1a] both literally and under the doctrine of equivalents with respect to the "temperature measurements from at least a first structure" and the "status of said HVAC system." *See* CX-0674C, Gomez QA108, 111, 114. EcoFactor failed to establish that the Nest Thermostats contain an "HVAC control system," that they receive "temperature measurements from at least a first structure," or that they receive "status of said HVAC system."

* * *

It is undisputed that, like the '497 patent, the '322 patent contemplates an "HVAC control system" that is separate from an "HVAC system." '322 patent, cl. 1; RX-0156C, Henze QA44, 46; RX-0001C, Auslander QA46-50; CX-0674C,

Gomez QA103; RX-0163C, Souri 9/2 QA35; CX-0702C, Palmer QA19; *see also Becton, Dickinson & Co.*, 616 F.3d at 1254. As Mr. Gomez testified, because the '322 patent and '497 patent share a specification and "use[] the same words for sure," they refer to the same HVAC control system. Hearing Tr. vol. 1, 252:8-16, Nov. 16, 2020 (Gomez); *see Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1335 (Fed. Cir. 2003) ("[W]e presume, unless otherwise compelled, that the same claim term in the same patent or related patents carries the same construed meaning."). As previously discussed with respect to limitation [1a] of the '497 patent, the claims and the specification of the '497 patent and the '322 patent require that the HVAC control system is not a thermostat. RX-0156C, Henze QA74; RX-0001C, Auslander QA48; *see also* '497 patent, cl. 4; '322 patent, cl. 5; '322 patent, at 8:21-30.

As previously discussed with respect to limitation [1a] of the '497 patent, to establish that Google practices this claim limitation, EcoFactor must identify a component or components, apart from an HVAC system, that it contends is the claimed HVAC control system. *See Akzo Nobel Coatings, Inc.*, 811 F.3d at 1341. However, here too, Mr. Gomez fails to identify any component(s) that could be the claimed HVAC control system.

As previously discussed with respect to limitation [1a] of the '497 patent, after struggling to explain what he believed the claimed HVAC control system to be, and despite his obligation as an infringement expert to explain how "each limitation of the claim [is] present in the accused device," Mr. Gomez waived his hands and only testified that the HVAC control system was the entire accused product together with Google's cloud servers. *See Telemac Cellular Corp.*, 247 F.3d at 1330; Hearing Tr. vol. 1 271:9-72:4, Nov. 16, 2020 (Gomez); CX-0674C, Gomez QA87, 103. Once again, because Mr. Gomez's attempted identification of an HVAC control system includes a thermostat, his theory is inconsistent with the claims and specification and cannot be correct. *See* RX-0156C, Henze QA112; RX-0001C, Auslander QA48; *see also* '497 patent, cl. 3; '322 patent, cl. 5; '322 patent, at 8:21-30. Accordingly, Mr. Gomez failed to identify an HVAC control system in his infringement analysis.

* * *

Limitation [1a] of the '322 patent requires that the "HVAC control system" receive temperature measurements from at least the structure conditioned by an HVAC system. '322 patent, cl. 1; RX-0156C, Henze QA111.

As previously discussed with respect to limitation [1a] of the '497 patent, EcoFactor failed to demonstrate that the Nest Thermostats receive temperature measurements from a structure.

The evidence shows that the [redacted] does not receive inside temperature measurements from a structure. RX-0156C, Henze

QA113; RX-0157C, Burger QA69-71. Dr. Henze and Dr. Burger testified that the RX-0156C, Henze QA113; RX-0157C, Burger QA69-71. As previously discussed with respect to limitation [1a] of the '497 patent, a is not a temperature measurement, nor is it equivalent to a temperature measurement. RX-0156C, Henze QA113-115. Further, because a is not a temperature measurement, either literally or under the doctrine of equivalents, also cannot be a temperature measurement. *Id.*

* * *

Limitation [1a] further requires that the HVAC control system "receives status" of the HVAC system. '322 patent, cl. 1; RX-0156C, Henze QA111.

Neither the Nest Thermostats nor the receive the status of an HVAC system. RX-0156C, Henze QA116; RX-0157C, Burger QA40. There is no dispute that a POSITA would understand that for the HVAC control system to receive status, the status must originate from the HVAC system. RX-0156C, Henze QA116; CX-0702C, Palmer QA136, 143, 170. Hearing Tr. vol. 1, 269:24-70:3, Nov. 16, 2020 (Gomez). As Mr. Gomez testified, "you have to get it from somewhere." Hearing Tr. vol. 1, 269:24-70:3, Nov. 16, 2020 (Gomez). Dr. Palmer agreed with this assessment, and confirmed three times during his testimony that the claimed HVAC control system must receive status from a different component. CX-0702C, Palmer QA136 (arguing that components in a prior art reference do not anticipate the claimed HVAC control system because they "do not receive status or any other information ***from the HVAC system***" (emphasis added); *id.* at 143 (arguing that HVAC equipment does not provide status information); *id.* at 170 (arguing that a prior art reference does not disclose "receiving information <u>from</u> an HVAC system <u>to</u> an HVAC control system" (emphasis in original)). Mr. Gomez testified that the HVAC control system "is the ***entire system*** that controls the customer's HVAC, including functionality with cloud support," and the thermostat. *See* CX-0674C, Gomez QA103; Hearing Tr. vol. 1, 270:4-7, 271:9-72:4, Nov. 16, 2020 (Gomez); CX-0702C, Palmer QA136, 143, 170. Accordingly, another component, outside the thermostat, must be the source of the claimed HVAC status. *See* RX-0156C, Henze QA116; CX-0702C, Palmer QA136, 143, 170. Hearing Tr. vol. 1 269:24-70:3, Nov. 18, 2020 (Gomez). The only remaining component outside the "HVAC control system" defined by Mr. Gomez is the HVAC system. *See* RX-0156C, Henze QA116.

Mr. Gomez failed to identify any information provided by the HVAC system to the alleged HVAC control system. *See* CX-0674C, Gomez QA97-99; RX-0156C, Henze QA116. In a circular argument, Mr. Gomez testified that the thermostat is ***both*** the source of the claimed status, and the recipient of the status. *See* CX-0674C, Gomez QA97-99. More specifically, Mr. Gomez only identified source code for the which is part of the thermostat, as

[redacted] *See* CX-0674C, Gomez QA99; RX-0626C (Sapphire Algorithms Overview), at 1 (describing the Nest thermostat as [redacted]). Therefore, under Mr. Gomez's own interpretation, the Nest Thermostats do not ***receive*** the status of an HVAC system.

The evidence shows that neither the Nest Thermostats nor Google servers receive any status from the HVAC system. RX-0156C, Henze QA116; RX-0157C, Burger QA40. Dr. Burger testified that the Nest Thermostats, like conventional thermostats, [redacted] X-0157C, Burger QA39; RX-0609 (Nest Learning Thermostat Pro Installation & Configuration Guide), at 8. As shown by Dr. Henze through Google's documents and source code, [redacted], the Nest Thermostats do not send or receive any information from the HVAC system. RX-0156C, Henze QA116; RX-0157C, Burger QA39-41; RX-0609 (Nest Learning Thermostat Pro Installation & Configuration Guide), at 8; RPX-0012C (Google Source Code), ll. 334-358. Both Dr. Henze and Dr. Auslander identified other systems. where an HVAC system sent status to a thermostat. RX-0156C, Henze QA117-119; RX-0001C, Auslander QA181; Hearing vol. 4, 921:8-25, Nov. 19, 2020, (Auslander).Specifically, Dr. Auslander testified that, before 2007, commercial HVAC systems. "had been using this type of bidirectional communication for decades." Hearing Tr. vol. 4, 921:8-25, Nov. 19, 2020, (Auslander). Dr. Auslander further testified that, in 2004, Carrier Corporation had a patent "giving in great detail information about how to do -- to build a residential system with bidirectional communication." *Id.* Mr. Gomez identified no evidence that the Nest Thermostats were designed to include such bidirectional communication, or receive status of an HVAC system. *See* CX-0674C, Gomez QA99. Because the Nest Thermostats do not receive any signals or status from the HVAC system, it is necessarily the case that the [redacted] also does not receive status. RX-0156C, Henze QA116-121.

Mr. Gomez failed to establish that storing the last request to an HVAC system is equivalent to receiving status of an HVAC system. *See* CX-0674C, Gomez QA114. Mr. Gomez testified that the Nest Thermostats receive the status of the HVAC system by recording the amount of time that the HVAC is requested to run. CX-0674C, Gomez QA113. However, Mr. Gomez does not provide any analysis on how recording an amount of time is substantially the same function, performed in substantially the same way, to achieve substantially the same result as an HVAC control system "receiv[ing] status." *See* CX-0674C, Gomez QA114. Mr. Gomez's testimony therefore cannot establish infringement under the doctrine of equivalents. *Tex. Instruments, Inc.*, 90. F.3d at 1567.

The evidence shows that [redacted] is not substantially the same function as receiving status information from an HVAC system. RX-0156C, Henze QA124. Dr. Henze testified that "[i]nformation from the HVAC unit represents ground truth," whereas "retaining the last request does

[redacted]

not reflect the actual mode of the system." *Id.* The evidence shows that [redacted] is also not performed in substantially the same way as receiving status information from the HVAC system. RX-0156C, Henze QA125. Dr. Henze further testified that [redacted] *Id.* The evidence shows that [redacted] also does not achieve substantially the same result as receiving status information from the HVAC system. RX-0156C, Henze QA126. Dr. Henze testified that because [redacted] and the result of storing the last request or recording the amount of time the HVAC system is requested to run would be different from the status. *Id.*

Resps. Br. at 170-75.

The Staff argues, in part:

The evidence shows that [redacted] satisfies element 1[a]: "*at least one HVAC control system associated with a first structure that receives temperature measurements from at least a first structure conditioned by at least one HVAC system, and receives status of said HVAC system*." Staff Ex. 1. Google asserts that (a) EcoFactor fails to identify any component as the HVAC control system, (b) as discussed above with respect to the '497 patent, [redacted]. RPreHBr. at 114. For the same reasons discussed above with respect to elements 1[a] and 1[c] of the '497 patent, the Staff disagrees with Google's first two arguments ((a) and (b)). *See also* CX-0674C (Gomez) QA 86-94. The Staff further disagrees with Google's third argument, argument (c).

All parties proposed construction of the "status of said HVAC system" includes the "operational state of the said HVAC system." *See* CPreHBr. at 17; RPreHBr. at 16. Thus, claim 1 requires the HVAC control system to receive at least the operational state of the HVAC system.

Google asserts that the Nest Thermostats do not satisfy this limitation because the status information must originate from a component of the HVAC system and be transmitted to the HVAC control system. RPreHBr. at 115. Google argues that because the evidence shows that the Nest Thermostats, like all conventional thermostats, [redacted], the Nest Thermostats neither send nor receive any information from the HVAC system. RPreHBr. at 115 (citing RX-0157C (Burger) QA 39-41; RX-0609 (Nest Learning Thermostat Pro Installation & Configuration Guide), at 8; RPX-0012C (Google

Source Code), ll. 334-358).

In the Staff's view, Google imposes too many limitations on this element. The claim language requires only that the control system receive the "status of said HVAC system," not that it receive a status "signal" from the HVAC system or that the information must originate from a component of the HVAC system and be transmitted to the HVAC control system. Indeed, the '322 patent specification discloses that the thermostat includes a controller that "includes a relay 262, which turns the HVAC system on and off in response to a signal from the microprocessor" in the controller. JX-1 ('497 patent), at 7:44-47. The specification further discloses that "the server ***retrieves HVAC duty cycle data*** for home X. Such data may include target settings set by the thermostat in current and previous periods, ***the timing of switch-on and switch-off events*** and other data." JX-1, 10:63-64; 11:26-29; 12:30-34. This indicates, combined with the broad language of the claim, that retrieving or receiving the status of the HVAC system does not necessarily need to be a signal from the HVAC system transmitted to the controller, but can come from somewhere else and/or be derived from HVAC duty cycle information.

In this regard, the evidence shows that:

> The Google Products [redacted] This information is stored [redacted] This shows that the Google Products receive the status of the HVAC system over time. Mr. Burger's testimony for Google also confirms these facts. CX-0061C (Burger Tr.) 324-328, 343. And as I discussed earlier, the HVAC equipment will follow [redacted]. Finally, the Nest thermostats [redacted]. This is another example showing that the Google Products receive the status of the HVAC system.

CX-0674C (Gomez) QA 113, 114 (this term is also satisfied under the doctrine of equivalents).

Staff Br. at 49-51.

The construction of "status of said HVAC system" was discussed above; the claim term "status of said HVAC system" is construed to have its plain and ordinary meaning, an example of which is the operational state of the HVAC system."

Under the adopted construction, Google's accused products each meet the limitations of claim 1[a]. CX-0674C (Gomez DWS) at Q/A 87-102. Google argues that EcoFactor fails to identify any component as the HVAC control system. *See* Resps. Br. at 170-71. However, Google's accused products include one or more processors, which corresponds to the [redacted] in the accused Google products, as well as [redacted], and [redacted]. *See* CX-0674C (Gomez DWS) at Q/A 73-75, 87-90; CX-0061C (Burger Dep.) at 49, 54-55. Google's accused products are electrically connected to the furnace, A/C, or other HVAC equipment to control when the equipment turns on and off, *see* CX-0674C (Gomez DWS) at Q/A 171-72, and can be controlled with the device display and user interface, as well as with remote control through the Nest app, *see* CX-0674C (Gomez DWS) at Q/A 58-61 (citing CX-0072C (Chappelle Dep.) 188:23-195:11, 239:21-240:23; CX-0670C (GOOG-ITC1185-00038867-38889)).

Google further argues that [redacted] not a temperature measurement. *See* Resps. Br. at 171-72. However, the "HVAC control system" receives temperature measurements in units of degrees Celsius from the customer's home, which is conditioned by an HVAC system. *See* CX-0674C (Gomez DWS) at Q/A 95-96 (citing CX-0063C.0012 [redacted] Q/A 91-94 (citing CX-0061C (Burger Dep.) 28:7-30:25). [redacted]

[redacted]

*See* CX-0674C (Gomez DWS) at Q/A 91-94, 106-11; RX-0157C (Burger DWS) at Q/A 48-49.

Google further contends that neither the Nest Thermostats nor the [redacted] receive the status of the HVAC system. *See* Resps. Br. at 172-75. However, EcoFactor adduced evidence showing that both the Nest Thermostats, and Google's [redacted] receive the status of the HVAC system because they each [redacted] *See* CX-0674C (Gomez DWS) at Q/A 95-96, 96-99; CX-0063C.0020; CX-0071C (Burger Dep.) 75, 343 [redacted]

In addition, if not literally satisfied, [redacted] is equivalent to the claimed temperature measurement at the first location (*i.e.*, indoors). *See* CX-0674C (Gomez DWS) at Q/A 106-11. The accused Google products perform substantially the same function in substantially the same way to achieve the same result of receiving temperature measurements from the customer's home over time. *See id.* at Q/A 108. [redacted] is substantially the same as receiving temperature measurements from the customer's home. *See id.*

Even were "HVAC system" construed according to respondents' proposed construction, the accused Google products would still satisfy this claim limitation because the Nest

thermostats function as a group of components working together to move heat or remove heat from the conditioned [structure/location].

Even were "status of said HVAC system" construed according to respondents' proposed construction, the accused Google products would still satisfy this claim limitation because the Nest Thermostats, and Google's backend system, *See* CX-0674C (Gomez DWS) at Q/A 95-96, 96-99; CX-0071C (Burger Dep.) 343:11-14 CX-0061C (Burger Dep.) 75:7-20

Accordingly, it is determined that the accused Google products satisfy this claim limitation.

**iii. one or more processors that receive measurements of outside temperatures from at least one source other than said HVAC system and compare said temperature measurements from said first structure, wherein said one or more processors compares the inside temperature of said first structure and the outside temperature over time;**

Google's accused products satisfy this limitation. *See* CX-0674C (Gomez DWS) at Q/A 118-26.

EcoFactor argues, in part:

> The Google Products include one or more processors. The Nest Thermostats include the CX-0674C (Gomez DWS) Q/A 73, 170.

CX-0674C (Gomez DWS) Q/A 116-117.

* * *

These processors receive CX-0674C (Gomez DWS) Q/A 118-121, citing CX-0311 (Google's Responses to EcoFactor's Requests for Admission) CPX-0002C (Google source code including, *e.g.,* to

Further, these outside temperature measurements are . Hearing Tr. 740:9-741:2 (Dr. Burger confirming

Mr. Gomez's analysis confirms that Hearing Tr. 355:16-356:9 (According to Mr. Gomez, the Nest Thermostat features accused of infringement .); CX-0067C (Google document providing .

At the hearing, Dr. Burger confirmed under oath that the Nest Thermostats . Hearing Tr. 731:24-732:8 (Dr. Burger confirming that the Nest Thermostats ).

* * *

Google argues that the outside temperature values received by its processors are ***estimates,*** rather than ***measurements***. Google contends that the claim language excludes the function of

Mr. Gomez has explained that the Google Products do receive outside temperature measurements, even if they are also "estimates," because they are

temperature values in degrees Celsius and they are valid for a current time period. Hearing Tr. 352:18-353:13 (Mr. Gomez's opinion is that the Nest Thermostat features at issue receive outside temperature measurements, because they are "in degrees C' and are updated "on a frequent enough basis so that they can be used as **current measurements,** not something in the future, not something in the past, but they need them to be current for the time of day so that they can produce the right results to get to the right temperature

Google's attempt to distinguish "estimates" of outside temperature from "measurements" must be incorrect, because it would exclude a preferred embodiment of the patent specification. CX-0002 ('322 patent) 5:12-17 ("The server preferably also logs outside temperature and humidity data for the geographic locations for the buildings served by the connected HVAC systems. Such information is widely available from various sources that publish detailed weather information based on geographic areas such as by ZIP code."). Google's interpretation is also incompatible with dependent claim 2, which requires the outside temperatures of claim 1 to be based on ZIP code. A measurement for the temperature in a geographic region such as ZIP code is necessarily an estimate of the temperature in that region. Yet, under Google's argument, even these outside temperatures would not qualify as "measurements," even though they are precisely what the patent envisions as the correct form of outside temperature measurement to use. Thus, Google is simply wrong in the manner it is interpreting the claim.

* * *

Regardless, the doctrine of equivalents is also satisfied, because the Google Products perform substantially the same function in substantially the same way to achieve the same result (receiving the outdoor temperature at the customer's home over time). CX-0674C (Gomez DWS) Q/A 200-201.

* * *

The Google Products include one or more processors that compare the inside temperature measurements in the customer's home with the outside temperature measurements at the ZIP code of the customer's home over time. CX-0674C (Gomez DWS) Q/A 121-127 X-0674C (Gomez DWS) Q/A 125; CX-0061C (Burger Tr.) 190:10-20. . CX-0674C (Gomez DWS) Q/A 124.

[redacted]

At the hearing, Dr. Burger confirmed that the [redacted] Hearing Tr. 739:12-740:2 (Burger confirming [redacted]; *id.* 740:9-741:2 (Burger confirming [redacted]; *id.* 738:4-15 ("Q. Could we flip to slide 28 now. Now, Dr. Burger, you understand that my client is also accusing [redacted] of infringing the '322 patent, correct? A. I understand. Q. [redacted]

Google argues that [redacted] does not qualify as a temperature comparison over time. Respondents' Prehearing Brief at 126-127. But this clearly infringes the claim, [redacted] CX-0674C (Gomez DWS) Q/A 122, 125; CX-0674C (Gomez DWS) Q/A 82 (further confirming [redacted]).

Moreover, Mr. Gomez has confirmed that to a person of ordinary skill in the art, a measurement is still a measurement, whether it is viewed in isolation or in 15-minute averages with other measurements from the same time period. CX-0674C (Gomez DWS) Q/A 107-108 [redacted]. Further, the [redacted] CX-0002 ('322 patent) 9:1-40 (the server evaluates "**differences between inside and outside temperatures**" and does so for "**specific 24-hour period on date X**" as well as over several such 24-hour periods).

Compl. Br. at 166-70.

Google argues, in part:

EcoFactor only alleges literal infringement of limitation [1b]. Limitation [1b] requires that the claimed processors "receive measurements of outside temperatures." '322 patent, cl. 1; RX-0156C, Henze QA129. Although Mr. Gomez generically testified that "[t]he Google Accused Products includes one or more processors," he failed to identify any such processor that receives measurements of

[redacted]

outside temperature. CX-0674C, Gomez QA117. Mr. Gomez did not examine, or provide any analysis, on how [redacted]. *See* CX-0674C, Gomez QA119-20. As previously explained with respect to limitation [1c] of the '497 patent, the Nest Thermostats do not receive temperature measurements from [redacted]. Hearing Tr. vol. 3, 771:14-24, Nov. 18, 2020 (Henze); RX-0156C, Henze QA129; RX-0157C, Burger QA43-44.

Limitation [1b] further requires that the claimed processors compare the inside temperature and the outside temperature over time. '322 patent, cl. 1. Here, [redacted] RX-0156C, Henze QA130; RX-0157C, Burger QA69; CPX-0002C (Google Source Code), at GOOG-SC-ITC 1185-0391, ll. 109-119; CX-0674C, Gomez QA121. Dr. Henze testified that "an average of an estimated temperature is not a measurement of outside temperature." RX-0156C, Henze QA130. Further, Dr. Henze testified tha [redacted] "does not compare indoor and outdoor temperature samples or measurements." *Id.*

Resps. Br. at 175-76.

The Staff argues, in part:

The evidence shows that HVAC Alerts satisfies element 1[b]: "*one or more processors that receive measurements of outside temperatures from at least one source other than said HVAC system and compare said temperature measurements from said first structure, wherein said one or more processors compares the inside temperature of said first structure and the outside temperature over time*." Staff Ex. 1. Google contends that Mr. Gomez s](a) "fails to identify any processor … that receive[s] measurements of outside temperature measurements," because, as discussed above, [redacted] are not the claimed temperature measurements, and (b) [redacted] and does not perform any temperature comparisons. RPreHBr. at 116-117. The Staff disagrees.

***With respect to argument (a)***, the evidence shows that the accused products "include one or more processors. For example, the Nest Learning Thermostat (3rd Gen.) and Nest Thermostat E include multiple processors, [redacted] more processors that receive and analyze data from the thermostats. These processors all work together to receive, compare, and analyze temperature measurements over time." CX-0674C (Gomez) QA 117. The evidence also shows that the Nest Thermostats "receive outdoor temperature information" and, *e.g.,* that it may do so "via an internet connection," and that this information is [redacted]

[redacted]

CX-0674C (Gomez) QA 118-121.

***With respect to argument (b)***, the evidence shows the [redacted] CX-0674C (Gomez) QA 125. The evidence further shows that the [redacted] CX-0674C (Gomez) QA 125 (quoting CX-0061C (Burger Tr.) at 190:10-20). The evidence thus demonstrates that element 1[b] is satisfied. CX-0674C (Gomez) QA 116-128.

Staff Br. at 51-52.

The construction of "measurements of outside temperatures" was discussed above; the claim term "measurements of outside temperatures" means "measurements of the temperature outside (or external to) [the structure]."

Under the adopted construction, Google's accused products each meet the limitations of claim 1[b]. CX-0674C (Gomez DWS) at Q/A 117-27. Google argues that Mr. Gomez fails to identify any processor that receives measurements of outside temperature measurements. *See* Resps. Br. at 175-76. However, EcoFactor adduced evidence showing that the Google accused products include one or more processors. For example, the Nest Learning Thermostat (3rd Gen.) and Nest Thermostat E include multiple processors, including the [redacted]. ." CX-0674C (Gomez DWS) at Q/A 117. Google's [redacted]. *See id.* The evidence also shows that the Nest Thermostats "receive outdoor temperature information" and, *e.g.,* that it may do so "via an internet connection," and that this information is used by [redacted]. *See id.* at Q/A 118-21.

[redacted]

Google further argues that [redacted] and does not perform any temperature comparisons. *See* Resps. Br. at 175-76. However, EcoFactor adduced evidence showing that the [redacted] is [redacted] CX-0674C (Gomez DWS) at Q/A 125; CX-0061C (Burger Dep.) 190:10-20. This [redacted] meets the agreed construction for "compare," which is to analyze for one or more similarities or differences. CX-0674C (Gomez DWS) Q/A 124.

Moreover, Dr. Burger confirmed that [redacted] uses [redacted] the [redacted]. Burger Tr. 739-740 (Burger confirming [redacted]); *id.* at 740-741 (Burger confirming "[redacted]"). Moreover, the accused Google products receive outside temperature measurements from a weather service that were recorded and measured at a weather station in the customer's postal code) to receive the outdoor temperature at the customer's home over time. *See* CX-0674C (Gomez DWS) at Q/A 200-01.

Even were "measurements of outside temperatures" construed according to respondents' proposed construction, the accused Google products would still satisfy this claim limitation because [redacted] in the Nest Thermostat receives outside temperatures [redacted] *See* CX-0674C (Gomez) at Q/A 68.

Even were "HVAC system" and "said one or more processors" construed according to respondents' proposed construction, the accused Google products would still satisfy this claim limitation because the Nest thermostats function as a group of components working together to move heat or remove heat from the conditioned [structure/location]. EcoFactor adduced evidence showing that the Google accused products include processors that receive, compare, and analyze temperature measurements over time. CX-0674C (Gomez DWS) at Q/A 117.

Accordingly, it is determined that the accused Google products satisfy this claim limitation.

**iv. one or more databases that store at least said temperature measurements obtained from said first structure over time,**

Google's accused products satisfy this limitation. *See* CX-0674C (Gomez DWS) at Q/A 122-23, 128-34.

EcoFactor argues, in part:

> The Google Products include one or more databases that store the temperature measurements obtained from the customer's home ("said first structure") over time. CX-0674C (Gomez DWS) Q/A 122-123, 128-134. Inside temperature measurements and outside temperature measurements [redacted] CX-0674C (Gomez DWS) Q/A 123, 129-134, citing CPX-0002C (Google source code for [redacted]), CX-0061C (Burger Tr.) 73-75.
>
> Dr. Burger's testimony confirms [redacted]. CX-0061C (Burger Tr.) 73-75 ("[redacted]").
>
> As with the '497 patent, Mr. Gomez's analysis shows that [redacted] constitutes both literal infringement, as well

as infringement under the doctrine of equivalents. CX-0674C (Gomez DWS) Q/A 190-192 ("s); CX-0674C (Gomez DWS) Q/A 107-108 ( are still measurements, literally and under the doctrine of equivalents).

Compl. Br. at 170-71.

Google argues, in part:

> EcoFactor only alleges literal infringement of limitation [1c]. Limitation [1c] requires that the system store temperature measurements in a database. '322 patent, cl. 1; RX-0156C, Henze QA131. As previously discussed with respect to limitation [1a], as well as limitation [1b] of the '497 patent, neither are the claimed inside temperature measurements, either literally or under the doctrine of equivalents. Furthermore, as previously discussed with respect to limitation [1b] of the '497 patent, the Nest Thermostats do not store any temperature sensor readings. RX-0156C, Henze QA131, 76-77; RX-0157C, Burger QA48-49; Hearing Tr. vol. 3, 747:2048:9, 749:20-50:15, Nov. 18, 2020 (Burger);.

Resps. Br. at 176-77.

The Staff argues, in part:

> The evidence shows that HVAC Alerts satisfy element 1[c]: "*one or more databases that store at least said temperature measurements obtained from said first structure over time*." Staff Ex. 1. Google argues only that "because the Nest Thermostats do not store any temperature sensor data, they do not include databases that store 'at least said temperature measurements obtained from a first structure over time.'" RPreHBr. a t 117. However, as discussed above with respect to element 1[b] of the '497 patent, measurement is literally an indoor temperature measurement. And the evidence shows that . CX-0674C (Gomez) QA 130-134.

Staff Br. at 53.

[redacted]

Google's accused products each include one or more databases that store at least said temperature measurements obtained from said first structure over time. *See* CX-0674C (Gomez DWS) at Q/A 122-23, 128-34. Google argues that neither [redacted] are the claimed inside temperature measurements. *See* Resps. Br. at 176-77. However, EcoFactor adduced evidence that the [redacted] is an indoor temperature measurement, and that "the inside temperature measurements and outside temperature measurements [redacted]. For example, [redacted] CX-0674C (Gomez) at Q/A 130-34.

Furthermore, EcoFactor adduced evidence that inside temperature measurements and outside temperature measurements [redacted]. CX-0674C (Gomez DWS) at Q/A 123, 129-34. Dr. Burger testified that [redacted]. CX-0061C (Burger Dep.) at 73-75.

Moreover, the aggregation of measurements into [redacted] is substantially equivalent with respect to the database and achieves the same result of storing the data for the time periods to which it relates. *See* CX-0674C (Gomez DWS) at Q/A 190-92.

The administrative law judge thus finds that Google's accused products satisfy this claim limitation.

[redacted]

**v. wherein said one or more processors compares an inside temperature recorded inside the first structure with an inside temperature of said first structure recorded at a different time to determine whether the operational efficiency of the HVAC system has decreased over time.**

Google's accused products satisfy this limitation. *See* CX-0674C (Gomez DWS) at Q/A 137-49.

EcoFactor argues, in part:

> The Google Products infringe element 1[d]. CX-0674C (Gomez DWS) 137-149. Mr. Gomez analyzed the source code running on the claimed [redacted] CX-0674C (Gomez DWS) 79-85. The [redacted] and it even operates in a nearly identical manner to the disclosures of a preferred embodiment in the specification. *See* CX-0002 ('322 patent) 12:8-11 ("If the pattern of degradation matches the refrigerant leak paradigm, the server creates and transmits to the homeowner a message 1224 **alerting the homeowner to the possible problem**.").
>
> To be clear, Mr. Gomez's source code analysis is unrebutted by Google. Google's non-infringement expert, Dr. Gregor Henze, has provided no opinions disputing Mr. Gomez's analysis regarding the operation of the source code itself. Hearing Tr. 759:14-760:23, 761:20-762:4 (Dr. Henze cross-examination). Although Dr. Henze does not dispute Mr. Gomez's analysis regarding the source code, Google argues that Mr. Gomez has failed to identify the claimed processors. But Mr. Gomez has clearly identified both the Nest Thermostat processors that [redacted] CX-0674C (Gomez DWS) Q/A 116-117. Mr. Gomez also clearly analyzes the source code running on these processors throughout his analysis. CX-0674C (Gomez DWS) Q/A 75, 83, 90-93, 98-99, 118-126, 144-146
>
> * * *
>
> According to Mr. Gomez's analysis, [redacted] CX-0674C (Gomez DWS) Q/A 137-141. [redacted].

[redacted]

* * *

Next, after the model [redacted] CX-0674C (Gomez DWS) Q/A 142-149. To monitor for problems, it [redacted]. CX-0674C (Gomez DWS) Q/A 148. Then, [redacted]. CX-0674C (Gomez DWS) Q. 142 ("[redacted] This is illustrated in CDX-0001C.35."); CX-0061C (Burger Tr.) 321:17-323:3 ([redacted].

* * *

The first part of element 1[d] (which requires a comparison of two inside temperatures recorded at different times) corresponds to the [redacted]. CX-0674C (Gomez DWS) Q/A 137-139, citing CX-0061C (Burger Tr. 192-194) [redacted]

[redacted] This [redacted] meets the agreed construction of a "comparison," which includes an analysis of "differences" between two values.

* * *

The [redacted] is then used for the second part of element 1[d], to determine if the HVAC system's [redacted] CX-0674C (Gomez DWS) Q. 148. [redacted]

* * *

Google's [redacted] in the same manner as a preferred embodiment of the specification: [redacted] CX-0674C (Gomez DWS) Q. 148. This meets every proposed construction for "operational efficiency." CX-0674C (Gomez DWS) Q. 85, 149. Like Google's [redacted] in the Figure 8 embodiment, the claimed system [redacted] CX-0001 ('497 patent) 9:10-40 ("FIG. **8***a* shows a graph of outside temperature **402**, inside temperature **404** and HVAC cycle times **406** in House A for a specific 24-hour period on date X…on date X, the HVAC system in House A is presumed to be operating at **normal efficiency**…FIG. **8***b* shows a graph of outside temperature **408**, inside temperature **410**, and HVAC cycle times **412** in House A for the 24-hour period on date X+1. House A's **HVAC system now requires significantly longer cycle times in order to try to maintain the same internal temperature**.").

The [redacted] are efficiency calculations under any proposed construction, involving either "time" or "energy." The feature [redacted]. CX-0674C (Gomez DWS) Q/A 136, 148-149.

Google's witnesses have confirmed that [redacted] Dr. Henze confirmed at the hearing that in the preferred embodiment of the '497 patent, [redacted]

[redacted]

[redacted] Hearing Tr. 774:9-782:4 (Dr. Henze's testimony regarding [redacted]):

> "Q. Okay. And I asked you on line 14: "And this is a description of the [redacted]; is that fair? Can we agree on that at least?" And you finally answered: "The patent claims that cycle times are an expression of efficiency." Did I read that correctly?
>
> A. So far, yeah. What you did, right.
>
> …
>
> Q. My question is, did you testify under oath that the '497 patent claims that cycle times are an expression of efficiency, yes or no, on lines 19 and 20?
>
> A. **The patent claims that cycle times are an expression of operational efficiency? I agreed with your question you just posed**."

Hearing Tr. 781:4-12, 781:24-782:4.

Furthermore, Dr. Burger confirmed that the [redacted] Hearing Tr. 736:17-737:5 (Dr. Burger confirms that [redacted]).

Finally, it is important to note that Google's [redacted] CX-0674C (Gomez DWS) Q. 148-149. This matches the preferred embodiment, which also evaluates efficiency [redacted], and further satisfies the remainder of the proposed constructions for "operational efficiency" ("change inside temperature by a given amount" / "set of one or more indoor and outdoor conditions"). CX-0001 ('497 patent) 9:10-40

Compl. Br. at 171-76.

Google argues, in part:

> EcoFactor only alleges literal infringement of limitation [1d]. Limitation [1d] requires that one or more processors compare two different temperatures at

two different times "to determine whether the operational efficiency of an HVAC system has decreased over time." '322 patent, cl. 1; RX-0156C, Henze QA132. Mr. Gomez again generically testified that "[t]he Google Accused Products include one or more processors," but he failed to identify any such processor(s) that perform the claimed calculations. CX-0674C, Gomez QA126.

Further, as previously discussed with respect to limitation [1pre], the [redacted] does not calculate the operational efficiency of an HVAC system. Accordingly, [redacted] does not determine whether the operational efficiency has decreased over time, as required by the claim.

Mr. Gomez failed to demonstrate that any alleged comparison of two inside temperatures is used "to determine whether the operational efficiency of the HVAC system has decreased over time," as required by the claim. *See* CX-0674C, Gomez QA138-140. In contrast, Mr. Gomez only alleges that a decrease in operational efficiency is the result of a change in HVAC runtime, not a comparison of inside temperature measurements. *See* CX-0674C, Gomez QA142 [redacted]

As Dr. Henze testified, and as confirmed by the source code, [redacted] does not compare two different temperatures at two different times "to determine whether the operational efficiency of an HVAC system has decreased over time." RX-0156C, Henze QA133; RPX-0013C (Google Source Code), ll. 21-147; Hearing Tr. vol. 3, 795:20-24, Nov. 18, 2020 (Henze). Dr. Henze further testified that [redacted] does not include a temperature measurement comparison; rather, it [redacted] earing Tr. vol. 3, 795:20-24, Nov. 18, 2020 (Henze). Dr. Henze also testified that this temperature information is [redacted] and therefore does not "determine whether the operational efficiency of an HVAC system has decreased over time." *Id.* at 795:3-10; RX-0156C, Henze QA133.

Therefore, EcoFactor fails to establish that the Nest Thermostats practice claim 1 of the '322 patent, either literally or under the doctrine of equivalents. RX-0156C, Henze QA134.

Resps. Br. at 177-78.

The Staff argues, in part:

The evidence shows that [redacted] satisfy element 1[d]: "wherein said one or more processors compares an inside temperature recorded inside the first structure with an inside temperature of said first structure recorded at a different

[redacted]

time to determine whether the operational efficiency of the HVAC system has decreased over time." Staff Ex. 1. Google argues that (i) Mr. Gomez fails to identify any such processor(s) that perform the claimed calculations, and (ii) the [redacted] does not compare two different temperatures at two times "to determine whether the operational efficiency of an HVAC system has decreased over time." RPreHBr. at 117. For the reasons discussed above with respect to element 1[b], the Staff disagrees with Google's first argument.

With respect to Google's second argument, Mr. Henze testified that [redacted] also does not compare temperature measurements to determine whether the operational efficiency of an HVAC system has decreased over time. Instead, [redacted] makes the decision [redacted] based on a number of factors, including the [redacted]. This is confirmed by the source code [redacted] of RPX-00l3C." RX-0156C (Henze) QA 133.

Mr. Gomez, on the other hand, testified that the [redacted] CX-0674C (Gomez) QA 139, 140-141. According to Mr. Gomez, and based on the testimony of Mr. Burger (and source code), [redacted] CX-0674C (Gomez) QA 142, 143 (citing CX-071C (Burger Tr.) 321:17-323:3 [redacted] CDX-001C.37 and 37, CX-0674C (Gomez) QA 144-146 (source code).

The evidence further shows that the [redacted], as recited in element 1[d]. As testified by Mr. Burger:

[redacted]

CX-0674C (Gomez) QA 147 (quoting CX-0061C (Burger Tr.) 221-224), QA 146.

Thus, the evidence shows that the satisfies element 1[d], and, therefore, that the satisfy claim 1 of the '322 patent.

Staff Br. at 53-55.

Google's accused products each meet the limitations of claim 1[d]. *See* CX-0674C (Gomez DWS) at Q/A 137-49. The *See id.* at Q/A 136, 148-149. The first part of element 1[d] corresponds to the *See id.* at Q/A 137-39.

Google argues that Mr. Gomez fails to identify any such processor(s) that perform the claimed calculations. *See* Resps. Br. at 177. However, Mr. Gomez analyzed the source code *See* CX-0674C (Gomez DWS) at Q/A 79-85.

Google further argues that does not compare two different temperatures at two times to determine whether the operational efficiency of an HVAC system has decreased over time. *See* Resps. Br. at 177-78. However, Mr. Gomez testified that the

[redacted] CX-0674C (Gomez DWS) at Q/A 139, 140-41.

Furthermore, Dr. Burger confirmed that the [redacted]. *See* Burger Tr. 736-737. Hence, EcoFactor adduced evidence showing that Google's accused products would satisfy this claim limitation even if EcoFactor's proposed construction for "operational efficiency" were adopted.

Even were "HVAC system" and "said one or more processors" construed according to respondents' proposed construction, the accused Google products would still satisfy this claim limitation because the Nest thermostats function as a group of components working together to move heat or remove heat from the conditioned [structure/location]. Mr. Gomez analyzed the [redacted]. *See* CX-0674C (Gomez DWS) at Q/A 79-85.

The administrative law judge thus finds that Google's accused products satisfy this claim limitation.

* * *

It is therefore determined that the accused Google products infringe asserted independent claim 1 of the '322 patent.

**b. Alarm.com Products**

EcoFactor asserts that Alarm.com's accused products infringe claim 1 of the '322 patent. Compl. Br. at 184-209.

[redacted]

**i. A system for evaluating changes in the operational efficiency of an HVAC system over time comprising:**

The record evidence demonstrates that Alarm.com's accused products do not satisfy this limitation of asserted independent claim 1. *See* RX-0161C (Hagins RWS) at Q/A 73, 142.

EcoFactor argues, in part:

> To the extent it is limiting, the Alarm.com Products each meet element 1[a] of claim 1 of JX-0002 (the '322 patent). CX-0675C (de la Iglesia WS) Q/A 136-152; *see also id.* at Q/A 71-85. In particular, the Alarm.com T2000 and T3000 Smart Thermostat system evaluate changes in HVAC operational efficiency over time using Alarm.com's HVAC performance monitoring features HVAC Analytics and CFC/CFH. *Id.*; Hearing Tr. 420:12-421:19; RX-0159C (Hutz WS) Q/A 112-19, 147. When either of these features detect a decrease in HVAC operational efficiency, [redacted] Hearing Tr. at 626:13-627:8 (emphasis added). In addition, significant evidence confirms Mr. de la Iglesia's and Mr. Hutz's testimony.
>
> As to the portion of the claim relating to an HVAC system. There is no dispute that the T2000 and T3000 Smart Thermostat systems include thermostats, hubs and the Alarm.com backend, which control and provide analytics features for HVAC systems. CX-0675C (de la Iglesia WS) Q/A Q/A 22-38, 143-144; RX-0159C (Hutz WS) Q/A 19-23; RDX-0007C-10.
>
> Alarm.com disputes whether the Alarm.com Products meet the element of "evaluating changes in the operational efficiency" of an HVAC system for the same reasons they contend that element 1[d] is not met. EcoFactor incorporates its discussion of element 1[d] below.
>
> As Mr. de la Iglesia's analysis has shown, the [redacted] HVAC Analytics and call-for-heat are features of T2000 and T3000 smart thermostats implemented on the Alarm.com backend [redacted]

[redacted]

As both experts testified, these values are a proxy for both the energy and time used to heat or cool the system. E.g., CX-0675C (de la Iglesia WS) Q/A 74, 81; Hearing Tr. at 638:19-640:6. This is operational efficiency under either party's construction. *Id.*; [redacted]

Compl. Br. at 187-89.

Alarm.com argues, in part:

> HVAC Analytics does not "evaluat[e] changes in the *operational efficiency* of an HVAC system *over time*" or "determine whether the *operational efficiency* of the HVAC system has decreased *over time*". The broadest proposed construction (EcoFactor's) of the term "operational efficiency" requires: "energy or time to change inside temperature by any given amount for a set of one or more indoor or outdoor conditions." Ex. A at 2-3. EcoFactor has pointed to no evidence that HVAC Analytics computes either the energy or the time required by the HVAC system to change inside temperature by a given amount. Nor has EcoFactor

[redacted]

identified any aspect of HVAC Analytics that evaluates changes over time of operational efficiency or determines whether operational efficiency has decreased over time.

[redacted] Indeed, at the hearing, EcoFactor failed to challenge any of Alarm.com's witnesses on any of these subjects and failed to offer any rebuttal of these facts.

[redacted] As Mr. Hagins explained, however, the relevant question is what the source code actually does, not what it is named. RX-0161C, Hagins QA80. [redacted]

EcoFactor bases its case on Mr. de la Iglesia's unsubstantiated assertion that a POSITA "would understand" [redacted] But this contention is legally insufficient to prove literal infringement. "To establish literal infringement, every limitation set forth in a claim must be found in an accused product, ***exactly***." *Southwall Techs., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1575 (Fed. Cir. 1995) (emphasis added). [redacted]

[redacted] Claim 1 requires an evaluation of the energy or time to change a measured inside temperature by a given amount and a determination as to whether that energy or time increased (*i.e.*, operational efficiency decreased) from one point in time to another point in time. Determining whether operational efficiency is [redacted] does not meet the relevant claim limitations.

In an attempt to support EcoFactor's contention, Mr. de la Iglesia asserted [redacted].

Even if HVAC Analytics did evaluate operational efficiency, Mr. de la Iglesia does not dispute that HVAC Analytics does not (and cannot) evaluate changes in operational efficiency "over time", [redacted]

[redacted]

[redacted]

EcoFactor has failed to prove that HVAC Analytics evaluates changes in operational efficiency over time or determines whether operational efficiency has decreased over time.

Resps. Br. at 84-88 (footnotes omitted).

CFH/CFC does not "evaluate changes in the operational efficiency of an HVAC system over time" or "determine whether the operational efficiency of the HVAC system has decreased over time". The broadest proposed construction (EcoFactor's) of the term "operational efficiency" requires: "energy or time to change inside temperature by any given amount for a set of one or more indoor or outdoor conditions.". Ex. A at 2-3.

EcoFactor has pointed to no evidence that CFH/CFC calculates or evaluates the energy or the time required to change inside temperature by a given amount. Nor has EcoFactor identified any aspect of CFH/CFC that evaluates changes over time of operational efficiency or determines whether operational efficiency has decreased over time. Indeed, if CFH/CFC calculated or evaluated the energy or the time required by the HVAC system to change inside temperature by a given amount, one would expect Mr. de la Iglesia to have pointed to the Alarm.com source code where such a calculation or evaluation occurs. But Mr. de la Iglesia did not cite a single line of CFH/CFH source code. Hearing Tr. 432:1-4.

Rather than showing where the required calculations allegedly are performed, Mr. de la Iglesia offered two untenable theories. [redacted]

[redacted]

Second, Mr. de la Iglesia claimed that "[a] person of ordinary skill in the art would understand that [redacted]" indicates that operational efficiency has decreased. CX-0675C, de la Iglesia QA81. This is both conclusory and legally insufficient to prove literal infringement. *See Southwall Techs., Inc.*, 54 F.3d at 1575 ("To establish literal infringement, every limitation set forth in a claim must be found in an accused product, ***exactly***." (emphasis added)). [redacted]

CFH/CFC does not, in fact, perform the operational efficiency calculations required by claim 1 of the '322 patent. RX-0159C, Hutz QA169-175; RX-0161C, Hagins QA69, 141-146; RDX-0007C-59 (CPX-0004C (Alarm.com Source Code); CX-0225C (CFH/CFC high-level design)); RDX-0007C-77 (CPX-0004C (Alarm.com Source Code); CX-0225C (CFH/CFC high-level design)). [redacted] EcoFactor does not dispute how CFH/CFC works. Hearing Tr. 429:5-21 (de la Iglesia) (testifying that "all parties agree" on how the CFH/CFC algorithm works). At the hearing EcoFactor did not challenge Mr. Hutz's or Mr. Hagins's testimony regarding how CFH/CFC works and why it does not calculate or evaluate operational efficiency. Nor did EcoFactor offer any rebuttal. EcoFactor failed to prove infringement of the operational efficiency limitations.

Resps. Br. at 101-03.

The Staff argues, in part:

The evidence does not show that Alarm.com's accused products satisfy the preamble, which recites a system for "evaluating changes in the operational efficiency of an HVAC system over time." Staff Ex. 1. Mr. de la Iglesia testified that Alarm.com's HVAC Analytics and Call-for-Heat/Cool No-Heat/Cool ("CFH/CFC") calculate the "operational efficiency" of an HVAC system regardless of which parties' claim construction is adopted for "operational efficiency." CX-0675C (de la Iglesia) QA 140, 142. He testified that his opinion with respect to the

[redacted]

preamble of the '322 patent is based on his analysis regarding the preamble of the '497 patent (although that patent is no longer asserted against Alarm.com):

[redacted]

CX-0675C (de la Iglesia) QA 140, 141 (emphasis added). [redacted]

[redacted]

CX-0675C (de la Iglesia) QA 74 (emphasis added); s*ee also* QA 75-80, 140-142.

With respect to CFH/CFC, Mr. de la Iglesia testified:

[redacted]

*Id*. at QA 81; *see also* QA 82-85, 142.

However, consistent with Mr. de la Iglesia's testimony above, Mr. Hagins testified that:

[redacted]

[redacted]

RX-0161C (Hagins) QA 142 (emphasis added); *see also* QA 73, 75, 84.

In the Staff's view, Mr. Hagins' testimony sufficiently rebuts Mr. de la Iglesia's testimony; therefore, EcoFactor has not met its burden of showing that Alarm.com's accused products satisfy the preamble. *See* RX-0161C (Hagins) QA 141-146.

Staff Br. at 56-58.

As an initial matter, the preamble of claim 1 of the '322 patent has been found to be limiting and "operational efficiency" has been construed to mean "energy required by the HVAC system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions."

Regarding the preamble, EcoFactor argues that Alarm.com's T2000 and T3000 Smart Thermostat system evaluate changes in HVAC operational efficiency over time using Alarm.com's HVAC performance monitoring features HVAC Analytics and call-for-heat/cool no-heat/cool ("CFC/CFH"). *See* Compl. Br. at 187-89. [redacted] *See id.* (citing CX-0675C (de la Iglesia DWS) at Q/A 71-85).

[redacted]

*See* RX-0161C (Hagins RWS) at Q/A 142.

[redacted] is not an amount of energy or time. Claim 1 requires an evaluation of the energy or time to change a measured inside temperature by a given amount and a determination as to whether that energy or time increased (*i.e.*, operational efficiency decreased) from one point in time to another point in time. Determining whether operational efficiency is [redacted] does not meet the relevant claim limitations.

[redacted]

[redacted]

Even if EcoFactor's proposed construction for "operational efficiency" were adopted, EcoFactor has pointed to no evidence that HVAC Analytics or CFH/CFC computes either the energy or the time required by the HVAC system to change inside temperature by a given amount. [redacted]

Even were "HVAC system" construed according to respondents' proposed construction, the accused Alarm.com products would still not satisfy this claim limitation because EcoFactor has not shown that the accused Alarm.com products evaluate changes in the operational efficiency of the HVAC system.

Accordingly, it is determined that the Alarm.com accused products do not satisfy this claim limitation.

**ii. at least one HVAC control system associated with a first structure that receives temperature measurements from at least a first structure conditioned by at least one HVAC system, and receives status of said HVAC system;**

Each of the Alarm.com accused products includes this feature of claim 1. *See* CX-0675C (de la Iglesia DWS) at Q/A 143-44.

EcoFactor argues, in part:

> As Mr. de la Iglesia demonstrated in his testimony, the Alarm.com Products each meet element 1[a] of claim 1 of JX-0002 (the '322 patent). CX-0675C (de la Iglesia WS), Q/A 143-144. This is confirmed by the testimony of Respondents' 30(b)(6) witness, Mr. Hutz who testified that the Alarm.com Smart Thermostat systems [redacted] Substantial evidence confirms both points.
>
> First, as to the portion of the element that requires "at least one HVAC control system associated with a first structure that receives temperature measurements from at least a first structure conditioned by at least one HVAC system," the Alarm.com Products meet this element. CX-0675C (de la Iglesia WS), Q/A 143-144. As Mr. de la Iglesia explained, [redacted]

[redacted]

As to the element "receives status of said HVAC system," the Alarm.com Products meet this element. CX-0675C (de la Iglesia WS), Q/A 143-144. As previously explained, the T2000 and T3000 Smart Thermostats are connected to HVAC equipment. [redacted]

Alarm.com contends that its products do not receive status information because the received status information [redacted] Alarm.com's arguments are misplaced. The received HVAC status is still the status of the HVAC even if it may, on occasion, be inaccurate. And indeed it will generally be accurate. CX-0675C (de la Iglesia WS), Q/A 143-144; Hagins Tr. at 178-79; *see also id.* at 210. Mr. Hagis, Alarm.com's expert, also confirmed this in his testimony at trial:

> **Question:** Fair enough. Generally you would agree that if the HVAC system is working and operating normally and the wiring is operating normally, ***then the call-for-heat/call-for-cool status -- thermostat status will be the same as the HVAC status***, correct?
>
> **Answer:** That is true.

Hearing Tr. at 653:9-19. He further agreed that "within the meaning of the claims of the '322 patent, the status of a thermostat is part of the status of the HVAC

[redacted]

system" clarifying that it was a "partial status." *Id.* 654:11-655:16.

Further, this kind of information is contemplated by the patent specification and is generally considered HVAC status, [redacted] Hearing Tr. at 657:6-18 (Mr. Hagins testifying that he was not aware of ***any*** HVAC system where the HVAC itself transmitted status information at the time of the invention).

Compl. Br. at 189-92.

Alarm.com argues, in part:

The Alarm.com Backend does not receive the status of the HVAC system. The parties' constructions for "status of said HVAC system" are set forth in Exhibit A (*see* p. 5). The parties agree that the status of the HVAC system is the "operational state of said HVAC system".

The Alarm.com Backend does not receive the operational state of the HVAC system [redacted] None of this testimony was contradicted or otherwise challenged at the hearing. [redacted]

[redacted] EcoFactor failed to prove literal infringement of this limitation (and has not argued DOE infringement).

Resps. Br. at 99.

[redacted]

The Staff does not address this limitation. *See* Staff Br. at 56-59.

The construction of "status of said HVAC system" was discussed above; the claim term "status of said HVAC system" is construed to have its plain and ordinary meaning, an example of which is "the operational state of the HVAC system."

Under the adopted construction, Alarm.com's accused products each meet the limitations of claim 1[a]. CX-0675C (de la Iglesia DWS) at Q/A 143-44. Alarm.com argues that [redacted]

Even were "HVAC system" and "status of said HVAC system" construed according to respondents' proposed construction, the accused Alarm.com products would still satisfy this claim limitation because the T2000 and T3000 function as a group of components working together to move heat or remove heat from the conditioned [structure/location], and the T2000 and T3000 Smart Thermostats receive HVAC status indicating whether the HVAC system is "on" or "off."

The administrative law judge thus finds that Alarm.com's accused products satisfy this claim limitation.

**iii. one or more processors that receive measurements of outside temperatures from at least one source other than said HVAC system and compare said temperature measurements from said first structure, wherein said one or more processors compares the inside temperature of said first structure and the outside temperature over time;**

The Alarm.com accused products do not satisfy this claim limitation. *See* RX-0161C (Hagins RWS) at Q/A 89-96, 151-54.

EcoFactor argues, in part:

The Alarm.com Products each meet claim element 1[c]. As Mr. de la Iglesia testified, that Alarm.com receives a [redacted]

The evidence shows overwhelmingly that persons of ordinary skill in the art, including Alarm.com engineers understand and treat these values as outside temperature measurements. *See, e.g.*, CX-0675C (de la Iglesia WS), Q/A 91-106 (collecting citations); [redacted] As Mr. de la Iglesia has explained, a person of ordinary skill in the art would not focus on how these values are derived. Rather what matters is ***how they are used in the system***. CX-0675C (de la Iglesia WS), Q/A 93. Mr. de la Iglesia testified that all measurements, including all temperature measurements, "necessarily involve conclusions drawn from information." *Id.* "Ultimately, a measurement is considered a measurement because the methods used to obtain it are reliable for the purpose it was intended." *Id.*

As Mr. de la Iglesia further testified, "In the case of the Alarm.com products, an engineer would understand that Alarm.com uses the data [redacted]

[redacted]

In the face of the evidence, Alarm.com contends that the outside temperature values used by HVAC Analytics and CFC/CFH are not "outside temperature measurements" because [redacted]

*First, a*s Mr. de la Iglesia has explained, all measurements are, by their nature, extrapolations from data. The fact that the outside temperature measurements Alarm.com uses are [redacted]

*Second*, the outside temperature values are always used as current temperature values—***not forecasts***. [redacted]

[redacted]

[redacted]:

**Q.** A forecast is an estimate of future temperature, correct?

**A.** Correct.

. . .

[redacted]

[redacted]

[redacted]

* * *

[redacted]

As with literal infringement, EcoFactor's position under the doctrine of equivalents is supported by overwhelming evidence. [redacted]

[redacted]

[redacted]

[redacted]

Mr. de la Iglesia goes farther and provides an analysis and opinions regarding the "outside temperature measurements" using the function-way-result test. CX-0675C (de la Iglesia WS), Q/A 97. As explained above, the contested element is "outside temperature measurements." Mr. de la Iglesia testified that the function of "outside temperature measurements" is to "provid[e] a value for outdoor temperature" that the way is by "using weather data to determine the outdoor temperature" and that the result is "a value indicating the historical outdoor temperature" that can be used to me the element of the claims. *Id.* He further testified that the outside temperature values perform this function in this way to achieve this result. *Id.* The Federal Circuit has referred to this level of analysis as a "detailed application of the function-way-result test to the claim element and the allegedly equivalent feature of the accused product." *Brilliant Instruments, Inc. v. GuideTech, LLC*, 707 F.3d 1342, 1348 (Fed. Cir. 2013) (holding that expert testimony regarding function-way-result test was sufficient to defeat summary judgment as a matter of law).

[redacted]

[redacted]

[redacted]

To the contrary, Alarm's own witness testimony shows that Alarm's outdoor temperature values are, at most, insubstantially different than the claimed "outside temperature measurements." [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

CX-206C (Hutz Tr.) at 330:5-332:12.

In summary, every piece of credible evidence shows that Alarm uses its outside temperature values because they are so equivalent to outside temperature measurements.

* * *

The Alarm.com Products also each meet the portion of element 1[b] related to "compare said temperature measurements, wherein said one or more processors compares the inside temperature of said first structure and the outside temperature over time." CX-0675C (de la Iglesia WS), Q/A 145-148. The parties agree that the term "compare" means to analyze for one or more similarities or differences.

[redacted]

Compl. Br. at 192-200.

Alarm.com argues, in part:

> The Alarm.com Backend does not receive, and HVAC Analytics does not use, any measurements of outside temperature. It only receives forecasts.
>
> The parties agree that "measurements of outside temperature" requires "a measurement" of temperature outside the relevant structure. Ex. A at 3-4. This is consistent with the specification of the '322 patent which only describes the use of measurements, never forecasts, of the outside temperature. The specification describes a server that tracks data about an HVAC system over time, receives and tracks "outside temperatures" (a term that, when used in the patents, the parties and Staff agree means "measurements of outside temperatures"), and analyzes the collected data to calculate the operational efficiency of an HVAC system at various times. CX-0002 ('322 patent) at 8:26-9:44, 11:20-65 & Fig. 12. Because the claimed server knows the measured temperature outside the house, it may rule out the outside temperature as the cause for longer HVAC cycle times and determine that, instead, there may have been a "drop in efficiency" of the HVAC system. *Id.* at 9:10-44; *see also* RX-0161C, Hagins QA32; RDX-0007C-5 (CX-0001 ('497 patent)). If the server did not have access to actual measurements of outside temperature, it could not accurately make such assessments. RX-0161C, Hagins QA98. Mr. Hagins confirmed that the '322 patent *only* refers to outside temperature measurements—never forecasts. RX-0161C, Hagins QA96. And Mr. de la Iglesia admitted the same. Hearing Tr. 499:7-500:1 ("Q. Not only in the claim, in the patent as a whole, when it talks to outside temperatures, it's talking about measurements of outside temperatures; correct? That's correct, including in the text in column 5.").
>
> * * *
>
> The Alarm.com Backend does not receive measurements of outside temperature. [redacted]

[redacted]

A forecasted outside temperature is not a measurement of outside temperature. A measurement is a value obtained by direct observation using an instrument such as, in the case of measuring temperature, a temperature sensor. RX-0161C, Hagins QA94; *see also* RX-0745 (Oxford Definition of "measurement"). Neither EcoFactor nor Mr. de la Iglesia offered an alternative definition and did not contend that the word "measurement" should be interpreted according to anything other than its ordinary meaning. Hearing Tr. 387:8-15 (de la Iglesia); CX-0675C, de la Iglesia QA59. Mr. de la Iglesia also agreed that a forecast is "a statement of what is judged likely to happen in the future, especially in connection with a particular situation or the expected weather conditions" and offered no alternative definition. Hearing Tr. 390:24-391:3; 392:2-15. Forecasted outside temperatures and measurements of outside temperature, therefore, are different things. Because the Alarm.com Backend uses only forecasts, not measurements, it does not literally meet the outside temperature measurements limitations. *See Southwall Techs.*, 54 F.3d at 1575 (Fed. Cir. 1995) ("To establish literal infringement, every limitation set forth in a claim must be found in an accused product, exactly") (emphasis added); *see also* RX-0159C, Hutz QA130-135; RX-0161C, Hagins QA89-96, 151-154.

Mr. de la Iglesia attempted to argue that "a person of skill in the art would consider" the outside temperature values used by Alarm.com "measurements of outside temperature because of the context in which they are used". CX-0675C, de la Iglesia QA93. But he cited no support whatsoever for that assertion. *Id.*; Hearing Tr. 396:12-23 (de la Iglesia). The '322 patent's specification does not mention outside temperature forecasts or estimates—to the contrary, it explicitly refers to *measurements* of outside temperature. And as Mr. Hagins explained, forecasted temperature data is not transformed into measured temperature data simply because the data is used to make an estimate corresponding to a particular time. RX-0161C, Hagins QA96. EcoFactor failed to prove literal infringement.

[redacted]

* * *

Alarm.com's outside temperature forecasts are not equivalent to the measurements of outside temperature recited in claim 1.

*First*, equating forecasts and measurements in the context of claim 1 of the '322 patent would run afoul of the doctrine of claim vitiation. The doctrine of equivalents ("DOE") cannot support a finding of infringement based on an element in the accused product that is the antithesis of the literal claim limitation. *Planet Bingo, LLC v. GameTech Int'l, Inc.*, 472 F.3d 1338, 1345 (holding doctrine of equivalents could not be used to equate "before" and "after"); *Freedman Seating Co. v. American Seating Co.*, 420 F.3d 1350, 1361 (Fed. Cir. 2005) ("rotatably" not equivalent to "slidably"). "[F]or a patentee who has claimed an invention narrowly, there may not be infringement under the doctrine of equivalents in many cases . . . . If it were otherwise, then claims would be reduced to functional abstracts, devoid of any meaningful structural limitations on which the public could rely." *Sage Prods, Inc. v. Devon Indus., Inc.*, 126 F.3d 1420, 1424 (Fed. Cir. 1997). Outside temperature forecasts, [redacted] are the antithesis of outside temperature measurements. As explained above, a measurement is a value ascertained by direct observation of actual facts, while a forecast is merely a prediction about what ***might*** happen. Indeed, weather forecasts are notoriously unreliable, and a weather forecast often does not match the actual weather. To find that forecasts are equivalent to measurements in the context of the '322 patent would impermissibly write the word "measurements" out of the claims.

*Second*, EcoFactor's DOE theory is both legally insufficient and unsupported. Mr. de la Iglesia's analysis consists of a one-sentence, boilerplate restatement of the legal test as to the ***'497 patent***, which is no longer asserted against Alarm.com: "Alarm.com's use of forecast [redacted] is insubstantially different and performs the same function [redacted] in the same way [redacted] to achieve the same result [redacted]" CX-0675C, de la Iglesia QA97. Mr. de la Iglesia did not provide any DOE analysis specifically as to the '322 patent, and his '497 analysis of function, way, and result are inconsistent with the '322 patent. Neither the claims nor the specification calls for providing any old "value" for "historical outside temperature". They do not mention using forecasted temperatures. They only refer to "measurements" of outside temperature. Hearing Tr. 499:7-500:1 (de la Iglesia).

Moreover, EcoFactor's DOE theory must be supported with "an analysis of the role played by each element in the context of the specific patent claim", *Warner-Jenkinson Co. v. Hilton Davis Chem.*, 520 U.S. 17, 40 (1997), together with "particularized testimony" and "linking argument" as to how and why outside temperature forecasts would be equivalent to outside temperature measurements,

in the context of the asserted claims, *Texas Instruments Inc. v. Cypress Semiconductor Corp.*, 90 F.3d 1558, 1567 (Fed. Cir. 1996). Mr. de la Iglesia has not provided ***any*** analysis of the role played by measurements of outside temperature in the context of claim 1 of the '322 patent, let alone "particularized testimony" and "linking argument". *See* CX-0675C, de la Iglesia QA146.

Mr. de la Iglesia attempted to support his one-sentence DOE opinion with two additional points. First, he contended that outside temperature forecasts and outside temperature measurements [redacted] there is no factual dispute that the Alarm.com Backend only receives forecasts and not measurements. CX-0675C, de la Iglesia QA91. Indeed, Mr. de la Iglesia testified that *all* outside temperature information in the Alarm.com Backend "forecast data". Hearing Tr. 401:15-402:2; *see also* Hearing Tr. 400:13-22.

Second, Mr. de la Iglesia contended that forecasts and measurements are equivalent because [redacted] But this is not the relevant issue. The question under the DOE is not whether an element from the patent could be added to the accused product to make the accused product work more like the claimed system. The question, which Mr. de la Iglesia has not addressed at all, is whether the relevant element of the accused product is, in the context of the claims, substantially the same as the recited limitation, performing the same function, in the same way, with the same result. *See Warner-Jenkinson,* 520 U.S. at 40. In short, EcoFactor provided no cognizable evidence of infringement under the DOE.

Mr. Hagins, by contrast, testified that there are substantial differences between forecasted and measured outside temperatures, and analyzed the function, way, and result of measurements of outside temperature in the system of the '322 patent. RX-0161C, Hagins QA97-98, 155-162. The inherent unreliability of outside temperature forecasts [redacted] means that using outside temperature forecasts in the claimed system would produce false-positive and false-negative problem determinations. RX-0161C, Hagins QA155. Mr. Hagins's analysis, which determined that outside temperature forecasts in Alarm.com's HVAC Analytics are not equivalent to measurements of outside temperatures in the '322 patent, is summarized in the table below. RX-0161C, Hagins QA155-162.

| | **'322 Patent, Claim 1** | **HVAC Analytics** |
|---|---|---|
| **Function** | Provide actual temperatures outside the | [redacted] |

[redacted]

| | | |
|---|---|---|
| | structure so that one or more processors can compare them with inside temperature over time. | [redacted] |
| **Way** | Determined by measurement. | [redacted] |
| **Result** | Calculation of a value for operational efficiency that is adjusted for outdoor temperature conditions. | [redacted] |

EcoFactor did not challenge any part of Mr. Hagins's DOE analysis at the hearing, nor did it offer any evidence in rebuttal. Mr. Hagins's analysis thus stands uncontradicted. EcoFactor failed to prove infringement of the limitations requiring "measurements of outside temperatures".

* * *

HVAC Analytics does not compare inside and outside temperatures. RX-0161C, Hagins QA171-175. The parties agree that to "compare" means to "analyze to determine one or more similarities or differences between". CX-0060.0002 (Joint Claim Construction Chart).

Mr. de la Iglesia asserted that HVAC Analytics compares inside and outside temperatures "in a number of ways"—but without identifying even one instance of the Backend determining any similarities or differences. CX-0675C, de la Iglesia QA148. Moreover, if HVAC Analytics compared inside and outside temperatures over time, one would expect Mr. de la Iglesia to have pointed to source code where such a comparison occurs. He has not done so. EcoFactor thus has presented no substantive or credible proof of infringement as to this limitation.

In fact, the evidence shows that the Alarm.com Backend does not compare inside and outside temperatures. [redacted]

HVAC Analytics also does not compare inside and outside temperatures "over time". Mr. de la Iglesia agreed that in the context of the '322 patent, comparisons "over time" are done by comparing values corresponding to different points in time. Hearing Tr. 423:6-424:23 (de la Iglesia) ("Q. It gives another example of a 10% drop in efficiency over a time period of three months; right? A.

[redacted]

It does. Q. That reflects a determination that the HVAC system's efficiency dropped 10 percent as compared to a time three months before; right? A. That's correct, under the case where you're comparing one house to the same house. Over time, that would be one way to do it."); CX-0002 ('322 patent) at 9:22-38 (explaining that the system is able to determine that there has been a "drop in efficiency" on day X+1 as compared to day X), at 9:38-44 (the system may also detect "a 50% drop in efficiency in one day", "a further drop in efficiency the following day", or a "reduction of 10% over three months").

[redacted]

Thus, the Probability Function does not perform any comparison of inside and outside temperatures "over time". EcoFactor failed to prove infringement of this limitation.

Resps. Br. at 88-97 (footnotes omitted).

The Staff argues, in part:

The evidence does not show that Alarm.com's accused products satisfy element 1[c]: "one or more processors that **receive measurements of outside temperatures** from at least one source other than said HVAC system …" Staff Ex. 1; RX-0161C (Hagins) QA 89-112. The parties dispute the construction of the terms "measurements of outside temperatures" / "outside temperature measurements" / "outside temperatures" ('322 patent, claims 1, 2; ('497 patent, claims 1, 2). See Joint Claim Construction Chart, EDIS Doc. ID 704350, at 5. Although the dispute pertains to whether or not the measurement is of the "actual" temperature outside the structure, the parties agree that the outside temperature measurement limitation requires a "**measurement**" of the "temperature at a location outside (or external to) [the structure]" to be received, as opposed to some other form of outside temperature information. See Joint Claim Construction Chart, EDIS Doc. ID 704350, at 5. EcoFactor did not request any construction of the word "measurement" and does not contend that "measurement" should be interpreted according to anything other than the plain and ordinary meaning of the term. See Joint Claim Construction Chart, EDIS Doc. ID 704350, at 2-10; CPreHBr. at 11-30. The Staff agrees with Respondents that the plain and ordinary meaning of "measurement" is something that is measured -- in this case, outside temperature. RPreHBr. at 63.

[redacted]

*  *  *

EcoFactor's infringement allegations are directed at two software features that run on Alarm.com's back-end cloud computing platform (the "Alarm.com Backend"): Call-for-Heat, No Heat/Call-for-Cool, No Cool ("CFH/CFC") and HVAC Analytics. *See* CX-0675C (de la Iglesia) QA 140, 141, 63; RPreHBr. at 64.

EcoFactor contends that Alarm.com's accused products satisfy element 1[c] using ***temperature forecast*** information [redacted]

> The Accused Alarm.com Products meet this limitation. Under any parties' proposed constructions. The Alarm.com backend receives outside temperature information [redacted] ***in the form of a temperature forecast***. Alarm.com uses the temperature information [redacted]

CX-0675C (de la Iglesia) QA 91, 146. Consistent with Mr. de la Iglesia's testimony above, Alarm.com's expert, Mr. Hagins, testified:

> As I explained with respect to element 1c of the '497 patent, all parties agree that the patent claim terms "outside temperature measurements", "measurements of outside temperatures", and "outside temperatures" require "measurements" of the temperature outside the structure in question. Alarm.com does not receive any outside temperature measurements. I have reviewed the source code for the Accused Products and the backend, ***and confirmed that Alarm.com only receives daily high and low forecasted temperatures***. [redacted]

RX-0161C (Hagins) QA 153, 92.

> All parties' constructions require measurements of outside temperature. A measurement is a quantity ascertained by observation, using an instrument or device to actually measure a

[redacted]

value. Alarm.com does not receive or use any outside temperature measurements.

As I explained, and as noted on RDX-0007C-63, [redacted] Forecasts, which are predictions of what is expected to happen in the future, are by definition different than measurements. [redacted] For the reasons described with respect to element 1c of the '497 patent, ***no one of ordinary skill in the art would consider a forecast,*** [redacted] ***, to be the same thing as a measurement***.

*Id*. at QA 154, 93; s*ee also* RX-0159C (Hutz) QA 121.

Thus, the ***parties' experts agree*** that Alarm.com's Backend uses only outside *forecasted* temperature data, as opposed to outside temperature *measurements*. *See also* Hearing Tr. at 657:19-659:22 (Hagins). The evidence shows that a *forecasted* outdoor temperature (discussed further below) is not an outdoor temperature *measurement*. Therefore, EcoFactor did not demonstrate that Alarm.com literally infringes claim 1.

* * *

The evidence does not demonstrate infringement under the doctrine of equivalents. Mr. de la Iglesia testified:

If the ALJ finds that this element is not met literally, they should still find that it is met because in any event, this element is met under the doctrine of equivalents because Alarm.com's use of forecast [redacted] is insubstantially different and performs the same function [redacted] in the same way [redacted] to achieve the same result [redacted]

CX-0675C (de la Iglesia) QA 97, 146 (emphasis added). In support of his doctrine

[redacted]

of equivalents assessment, Mr. de la Iglesia testified, in reference to Mr. Hutz's deposition testimony:

[redacted]

First, in the Staff's view, Mr. de la Iglesia's testimony is legally insufficient. For instance, Mr. de la Iglesia's testimony does not explain why he believes that "historical outdoor temperature data" that is obtained from *forecasted* temperature data is the same as outdoor temperature *measurements*. Also, his testimony (based on Mr. Hutz's deposition) above that "engineers do not care how a *measurement* is derived so long as it is derived in a manner that provides an adequate *measurement* for the intended purpose" is premised on a "measurement," which is not how the temperature data is arrived at; it is arrived at from a *forecast*. Therefore, Mr. de la Iglesia's testimony is conclusory and does not provide "particularized testimony" or "linking argument" as to how or why outside temperature forecasts or estimates are equivalent to outside temperature measurements. *See Am. Calcar, Inc. v. Am. Honda Motor Co., Inc.*, 2007 WL 7757969, at *5-6 (S.D. Cal. July 10, 2007) (granting summary judgment of non-infringement under the doctrine of equivalents because "[c]onclusory and generalized statements, without detail of how or why" are insufficient, and the "recitation of the magic words 'function', 'way', and 'result' will not suffice"), *aff'd in relevant part*, 651 F.3d 1318, 1338-39 (Fed. Cir. 2011)); *see also* RX-0161C (Hagins) QA 155-169, 98-112.

Second, a temperature *forecast* is the antithesis of a temperature *measurement.* A ***measurement*** is a value ascertained by direct observation of

[redacted]

> actual facts. *See* Alarm.com's MSD of Non-Infringement, EDIS Doc. ID 721003, Exs. 5, 8, 10 (definitions of "forecast"). For example, the dimensions of a room are ***measured*** by using a tape measure. A ***forecast***, on the other hand, is a statement of what the forecaster considers likely to happen—*e.g.*, 'rain is expected this afternoon.' [redacted]
>
> Thus, the evidence shows that the use of outdoor forecasted temperatures in the accused products cannot infringe under doctrine of equivalents. To find otherwise would ignore the actual language of the claim ("measurement") and/or vitiate a claim element, which is improper. *See, e.g.*, *K-2 Corp. v. Salomon S.A.*, 191 F.3d 1356, 1367 (Fed. Cir. 1991); *Sage Prods., Inc. v. Devon Indus., Inc.*, 126 F.3d 1420, 1429-30 (Fed. Cir. 1997) (citing *Warner-Jenkinson*, 520 U.S. at 39 n.8).
>
> Therefore, the evidence does not show that Alarm.com's accused products infringe claim 1 of the '497 patent. *See* RX-0161C (Hagins) QA 65-138.

Staff Br. at 58-63 (footnote omitted).

As an initial matter, "measurements of outside temperatures" has been construed to mean "measurements of the temperature outside (or external to) [the structure]."

EcoFactor argues that all measurements are, by their nature, extrapolations from data, and so the outside temperature measurements derived from National Weather Service highs and lows are measurements. *See* Compl. Br. at 192-93 (citing CX-0675C (de la Iglesia DWS) at Q/A 91-106). However, the administrative law judge finds that a forecast is not a measurement. A measurement is a value obtained by direct observation using an instrument such as, in the case of measuring temperature, a temperature sensor. *See* RX-0161C (Hagins RWS) at Q/A 94; RX-0745 (Oxford Definition of "measurement"). Neither EcoFactor nor Mr. de la Iglesia offered an alternative definition and did not contend that the word "measurement" should be interpreted according to anything other than its ordinary meaning. de la Iglesia Tr. 387; CX-0675C (de la Iglesia DWS) at Q/A 59. Inasmuch as the Alarm.com Backend uses only forecasts, not measurements, it does not literally meet the "measurements of outside

[redacted]

temperatures" limitation. *See* RX-0159C (Hutz DWS) at QA130-35; RX-0161C (Hagins RWS) at Q/A 89-96, 151-54.

EcoFactor further argues that the outside temperature values are [redacted]

EcoFactor further argues that Alarm.com infringes under the doctrine of equivalents. However, outside temperature forecasts, [redacted], are the antithesis of outside temperature measurements. Indeed, weather forecasts are notoriously unreliable, and a weather forecast often does not match the actual weather. To find that forecasts are equivalent to measurements in the context of the '322 patent would impermissibly write the word "measurements" out of the claims.

Moreover, Mr. de la Iglesia testified as to the '497 patent: "Alarm.com's use of forecast and estimated outside temperature information is insubstantially different and performs the same function [redacted] in the same way ([redacted] to achieve the same result [redacted]." CX-0675C (de la Iglesia DWS) at Q/A 97. Mr. de la Iglesia, however, did not provide any analysis specifically as to the '322 patent, and his '497 analysis of function, way, and result are inconsistent with the '322 patent. Neither the claims nor the specification calls for providing any old "value" for "historical outside temperature". They do not mention using forecasted temperatures. They only refer to "measurements" of outside temperature. de la Iglesia Tr. 499-500.

EcoFactor further argues that outside temperature forecasts and outside temperature measurements are equivalent because Alarm.com's witnesses could provide no meaningful articulation of why a difference between [redacted] directly measured forecast would matter in the Alarm.com system. *See* Compl. Br. at 197-99. However, Mr. Hagins testified that there are substantial differences between forecasted and measured outside temperatures, and analyzed the function, way, and result of measurements of outside temperature in the system of the '322 patent. *See* RX-0161C (Hagins RWS) at Q/A 97-98, 155-62. The inherent unreliability of outside temperature forecasts [redacted] means that using outside temperature forecasts in the claimed system would produce false-positive and false-negative problem determinations. *See id.* at Q/A 155. EcoFactor has not established that this element of the Alarm.com system substantially performs the same function, in the same way, with the same result.

Even were "measurements of outside temperatures", "HVAC system" and "said one or more processors" construed according to respondents' proposed construction, the accused Alarm.com products would still not satisfy this claim limitation because the Alarm.com Backend uses only forecasts, not measurements, it does not literally meet the "measurements of outside temperatures" limitation. *See* RX-0159C (Hutz DWS) at QA130-35; RX-0161C (Hagins RWS) at Q/A 89-96, 151-54.

The administrative law judge thus finds that EcoFactor has not shown that the accused Alarm.com products satisfy this claim limitation.

**iv. one or more databases that store at least said temperature measurements obtained from said first structure over time,**

The evidence adduced by EcoFactor demonstrates that the accused Alarm.com products satisfy the limitation "one or more databases that store at least said temperature measurements obtained from said first structure over time." *See* CX-0675C (de la Iglesia DWS) at Q/A 70, 149. Alarm.com does not contest that the accused products satisfy this claim limitation. *See* Resps. Br. at 92-107.

**v. wherein said one or more processors compares an inside temperature recorded inside the first structure with an inside temperature of said first structure recorded at a different time to determine whether the operational efficiency of the HVAC system has decreased over time.**

The evidence does not show that Alarm.com's accused products satisfy this claim element. *See* RX-0161C (Hagins RWS) at Q/A 73, 142.

EcoFactor argues, in part:

> The Alarm.com Products each meet element 1[b] of claim 1 of JX-0002 (the '322 patent). CX-0675C (de la Iglesia WS), Q/A 62-70, 150-152. As previously explained, as explained above with regard to the preambles of claim 1 of the '322 patent, the Alarm.com Products implement features designed to "determine whether the operational efficiency of the HVAC system has decreased over time." '322 patent Claim 1. The discussion with regard to the preamble of '322 patent is incorporated herein by reference. [redacted]

[redacted]

[redacted]

[redacted]

HVAC Analytics and CFC/CFH both determine whether the energy or time to cool or heat the structure by a certain amount given known conditions has decreased. CX-0675C (de la Iglesia WS), Q/A 62-70, 71-85, 136-142, 150-152.

[redacted]

The Alarm Accused Products also calculate values for the "energy" and "time" necessary to cool a structure by a given amount for a given set of conditions. CX-0675C (de la Iglesia WS), Q/A 62-70, 71-85, 136-142, 150-152; CX-181C

[redacted]

[redacted]

The Alarm Accused Products "compare[] an inside temperature recorded inside the first structure with an inside temperature of said structure recorded at a different time." CX-0675C (de la Iglesia WS), Q/A 62-70, 71-85, 150-152. [redacted]

Compl. Br. at 201-04.

Alarm.com argues, in part:

HVAC Analytics does not compare inside temperatures recorded at different times to determine whether the operational efficiency of the HVAC system has decreased over time. For the reasons explained in Section V.A.4.b, HVAC Analytics does not and cannot determine whether the operational efficiency of the HVAC system has decreased over time. HVAC Analytics also does not meet

[redacted]

element 1d because it never compares inside temperature measurements recorded at different times.

[redacted] Nor did he identify any source code where such a comparison allegedly occurs. EcoFactor thus has failed to prove infringement of this limitation.

[redacted]

[redacted]

[redacted] His conclusions thus stand uncontradicted.

Resps. Br. at 97-98.

The Staff does not address this limitation. *See* Staff Br. at 56-59.

The construction of "operational efficiency" was discussed above; the claim term "operational efficiency" is construed to mean "energy required by the HVAC system to change

inside temperature by a given amount over a given time for a set of indoor and outdoor conditions."

As found above, regarding the preamble, the administrative law judge has found that EcoFactor has not shown that the accused Alarm.com products evaluate changes in the operational efficiency of the HVAC system. For the same reasons, EcoFactor has not shown that the accused Alarm.com products determine whether the operational efficiency of the HVAC system has decreased over time.

Moreover, EcoFactor has failed to prove that Alarm.com's HVAC Analytics meets the limitations of claim 1[d]. *See* RX-0161C (Hagins RWS) at Q/A 184-85. is a summary statistic where no two individual inside temperature measurements are compared to one another to see if they are similar or different. *See* RX-0161C (Hagins RWS) at 184-85.

Even if EcoFactor's proposed construction for "operational efficiency" were adopted, EcoFactor has pointed to no evidence that HVAC Analytics or CFH/CFC computes either the energy or the time required by the HVAC system to change inside temperature by a given amount.

[redacted]

Even were "HVAC system" and "said one or more processors" construed according to respondents' proposed construction, the accused Alarm.com products would still not satisfy this claim limitation because EcoFactor has not shown that the accused Alarm.com products determine whether the operational efficiency of the HVAC system has decreased over time.

The administrative law judge thus finds that Alarm.com's accused products do not satisfy this claim limitation.

* * *

It is therefore determined that the accused Alarm.com products do not infringe asserted independent claim 1 of the '322 patent.

**c. Vivint Products**

EcoFactor asserts that Vivint's accused products infringe claim 1 of the '322 patent. Compl. Br. at 184-209.

**i. A system for evaluating changes in the operational efficiency of an HVAC system over time comprising:**

The record evidence demonstrates that Vivint's accused products do not satisfy this limitation of asserted independent claim 1. *See* RX-0164C (James RWS) at Q/A 87-95, 142-46.

EcoFactor argues, in part:

> To the extent the preamble is limiting, the Vivint Products each meet claim 1[pre] of JX-0002 ('322 patent). The Vivint Products include a system for evaluating changes in the operational efficiency of the customer's HVAC system. CX-0675C.0044-0051, .0065 (de la Iglesia WS) Q/A 172-193, Q/A 251. The documents, testimony, and [redacted] also show infringement of JX-0002 ('322 patent). CX-0675C Q/A 251-252. *See* Section III.A.3 (Vivint '497 Patent Infringement), *supra*.

[redacted].

[redacted]

CX-0675C Q/A 191-193, 261-269. Changes over time in the values for the [redacted] indicate changes in the operational efficiency of the customer's HVAC system to change inside temperature by a given amount, under any proposed construction. CX-0675C (de la Iglesia) Q/A 251-253. This system meets any proposed construction of "operational efficiency," because it is a system for calculating values for the time and energy required by the HVAC system to achieve a target temperature under one or more indoor and outdoor conditions. *Id.* Q/A 191-193, 253. [redacted] RX-0165C (Bunker) Q/A 43.

* * *

Vivint implements the "[redacted]" described with regard to the '497 patent (*see* Section III.A.3.b)). [redacted] CX-0675C (de la Iglesia) Q/A 175-177.

[redacted]

[redacted]

Iglesia) Q/A 174, 187, citing CX-0265C (Vivint engineering document entitled [redacted]

For example, if it starts taking longer for the HVAC system to [redacted]

* * *

Vivint's technical documentation confirms that its [redacted]

[redacted]

* * *

These calculations satisfy "calculating a value for operational efficiency," including under Respondents' interpretations of this term. [redacted] This meets any proposed construction of "operational

[redacted]

[redacted] CX-0675C (de la Iglesia) Q/A 191-193.

Vivint's calculation [redacted] ).

[redacted] JX-0002 ('322 patent), 9:10-40.

Further, an HVAC system that takes longer to change temperature than it once did is using more energy than it once did to achieve the same outcome, which is less efficient. [redacted]

Compl. Br. at 209-13.

Vivint argues, in part: "Vivint: (1) [redacted]

The Staff argues, in part:

The preamble of claim 1 discloses a system for "*evaluating changes in the operational efficiency of an HVAC system over time*." Staff Ex. 1. Although this phrase is not asserted by any party to be limiting, the term "operational efficiency"

> is recited further in element 1[d] (discussed below). For the same reasons discussed above with respect to the preamble of claim 1 of the '497 patent, the evidence does not show that the term "operational efficiency" is satisfied. *See also* RX-0164C (James) QA 164, 182-191.

Staff Br. at 64.

As an initial matter, the preamble of claim 1 of the '322 patent has been found to be limiting and "operational efficiency" has been construed to mean "energy required by the HVAC system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions."

Regarding the preamble, EcoFactor argues that Vivint's [redacted] r. *See* Compl. Br. at 210-12. It is argued that Vivint's technical documentation confirms that [redacted] calculates the operational efficiency of the HVAC system. *See id.* at 212.

However, Vivint's expert, Dr. James, testified that EcoFactor's expert, Mr. de la Iglesia, misinterpreted [redacted]. RX-0164C (James RWS) at Q/A 87-95, 142-46. Dr. James testified:

> Mr. de la Iglesia continues to misconstrue the [redacted].

RX-0164C (James RWS) at Q/A 144.

Moreover, the evidence shows that "

.

If "operational efficiency" were construed according to EcoFactor's proposed construction, the accused Vivint products would satisfy this claim limitation because

*See* CX-0675C (de la Iglesia DWS) at Q/A 175-77. Thus, Vivint's system

.

Even were "HVAC system" construed according to respondents' proposed construction, the accused Vivint products would still not satisfy this claim limitation because EcoFactor has not shown that the accused Vivint products evaluate changes in the operational efficiency of the HVAC system.

Accordingly, it is determined that the Vivint accused products do not satisfy this claim limitation.

**ii. at least one HVAC control system associated with a first structure that receives temperature measurements from at least a first structure conditioned by at least one HVAC system, and receives status of said HVAC system;**

Each of the Vivint accused products includes this feature of claim 1. *See* CX-0675C (de la Iglesia DWS) at Q/A 254-60.

[redacted]

EcoFactor argues, in part:

The Vivint Products each meet claim element 1[a]. CX-0675C (de la Iglesia) 254-260. Much of element 1[a] is substantively the same as element 1[a] for the '497 patent, and the same arguments, reasoning, and evidence applies here. *See supra* Section III.A.3.b). However, this claim element also requires "receives status of said HVAC system."

The Vivint Products include at least one HVAC control system, such as [redacted]

Vivint admits that the claimed "HVAC control system" can correspond to [redacted] CX-0675C.0051 (de la Iglesia WS), Q/A 196-202.

**Receives status of said HVAC system:** [redacted]

[redacted]

[redacted]

Vivint argues that the claim should be interpreted to exclude a system that receives status of an HVAC system from a thermostat based on the control signals it generates. This argument is incorrect, as it would exclude the preferred embodiments of the specification. CX-0002 ('322 Patent), 3:35-60 ("Because cycling of the HVAC system is controlled by the thermostat, differences in cycle time would be reflected in the data sensed by and **control signals generated by the thermostat**."; JX-0002 ('322 Patent), 5:3-30 ("the server logs the **signals sent by the thermostats to their HVAC systems**."). Accordingly, the [redacted].

Vivint also argues that, if the HVAC control system includes the thermostat, then it cannot receive status from itself. However, the claim does not require receiving status ***from*** another component. It only requires receiving status ***of*** the HVAC system. There is no limitation excluding a thermostat that receives HVAC status based on the control signals it generates, which is exactly like the preferred embodiment.

Regardless, Vivint's thermostats are [redacted]

Compl. Br. at 213-16.

Vivint argues, in part:

Vivint . . . does not have an HVAC control system that "receives" temperature measurements (*see supra* '497 element 1[a], which is congruent with the first limitation of '322 patent element 1[a]). . . .

Element 1[a] of Claim 1 of the '322 Patent requires "at least one HVAC control system associated with a first structure that . . . receives status of said HVAC system." The record shows that Complainant cannot demonstrate by a preponderance of the evidence that any component in Vivint's system satisfies this claim element.

Complainant's own validity expert, Dr. Palmer, admits that in order to "receive[] status of said HVAC system, there must be bidirectional

[redacted]

communication—one-way commands from the HVAC control system to the HVAC system (but not vice versus) are not sufficient to satisfy the claim language." *See* CX-0702C, Palmer QA170 ("Q. Regarding your first point, why doesn't RX-0036 (Hildebrand) meet element 1[a]? A. It's because RX-0036 (Hildebrand) doesn't disclose "HVAC control system … receives status of said HVAC system" in element 1[a]. . . . [A]s shown in RX-0036 (Hildebrand) Figure 1, ***the communication arrow points from item 2 (the alleged "HVAC control system") to item 12 (the alleged "HVAC system"), but not in the other direction***. In other words, RX-0036 (Hildebrand) doesn't show receiving information (e.g., "status") from item 12 (the alleged "HVAC system") to item 2 (the alleged "HVAC control system") (emphasis added); *see also id*. at QA137 ("Bidirectionally communicating HVAC devices and controls were not, and are not, common or well known, and they are certainly not contemplated by Ehlers which communicates to the HVAC only using its unidirectional output stage.").

Given this admission, Complainant cannot demonstrate that element 1[a] is met because, [redacted]

[redacted]

[redacted]

provided no argument or opinions under the doctrine of equivalents.

Moreover, even if Complainant were correct that the "[redacted]".

Resps. Br. at 221-23.

The Staff argues, in part:

> The evidence shows that the accused Vivint products satisfy element 1[a]: "at least one HVAC control system associated with a first structure that receives temperature measurements from at least a first structure conditioned by at least one HVAC system, and receives status of said HVAC system." Staff Ex. 1; CX-0675C (de la Iglesia) QA 254-260. Vivint asserts that the [redacted]

Staff Br. at 64.

The construction of "status of said HVAC system" was discussed above; the claim term "status of said HVAC system" is construed to have its plain and ordinary meaning, an example of which is "the operational state of the HVAC system."

Under the adopted construction, the accused Vivint products include at least one HVAC control system associated with a first structure that receives temperature measurements from at

[redacted]

least a first structure conditioned by at least one HVAC system, and receives status of said HVAC system. *See* CX-0675C (de la Iglesia DWS) at Q/A 254-60. [redacted]

Thus, the accused Vivint products include at least one HVAC control system associated with a first structure that receives temperature measurements from at least a first structure conditioned by at least one HVAC system, and receives status of said HVAC system.

Even were "HVAC system" and "status of said HVAC system" construed according to respondents' proposed construction, the accused Vivint products would still satisfy this claim limitation because the accused Vivint products function as a group of components working together to move heat or remove heat from the conditioned [structure/location], and [redacted]. *See* CX-0675C (de la Iglesia DWS) at Q/A 258.

Accordingly, it is determined that the accused Vivint products satisfy this claim limitation.

[redacted]

**iii. one or more processors that receive measurements of outside temperatures from at least one source other than said HVAC system and compare said temperature measurements from said first structure, wherein said one or more processors compares the inside temperature of said first structure and the outside temperature over time;**

The evidence does not show that Vivint's accused products satisfy this claim element.

*See* RX-0164C (James RWS) at Q/A 68-75.

EcoFactor argues, in part:

> The Vivint Products each meet claim element 1[b]. CX-0675C (de la Iglesia) Q/A 261-262. First, for the same reasons as the '497 patent (*see supra* Section III.A.3.d)), the Vivint Products include "one or more processors" in the Vivint panels [redacted]

[redacted]

Compl. Br. at 216-17.

Vivint argues, in part:

> EcoFactor failed to show by a preponderance of the evidence that Vivint satisfies the limitation "compare[] said temperature measurements from said first structure" as required by element 1[b] of the '322 patent. *See*, *e.g.*, RX-0164C, James QA173-81. The record actually shows that Vivint's [redacted] e.

RX-0164C, James QAat 179 (emphasis added).

Moreover, the exhibit CX-0265C (Vivint Confluence document) from which Mr. de la Iglesia bases his opinions, [redacted]

[redacted]

*See* CX-0675, de la Iglesia *passim* (relying extensively on CX-0265C). Nor is there anything in the relevant Vivint Cloud source code that demonstrates otherwise. *See* CPX-0005C at VIVINT_SC_00116-117 ([redacted]

Complainant's only purported "evidence" is Mr. de la Iglesia's *ipse dixit* testimony that "[w[redacted] *Id.*

Complainant may otherwise attempt to point to one exchange from Mr. Bunker's two-day, ten-plus hour deposition that [redacted]:

[redacted]

Hearing Tr. 886:17-887:4 (Dr. James) (emphasis added).

Consistent with Dr. James' testimony, the record further demonstrates that [redacted]

Complainant cannot demonstrate by a preponderance of the evidence that this element is satisfied by Vivint's system. If anything, the record proves it is more likely than not that there is no comparison of an inside temperature at one time and an inside temperature at another time.

Resps. Br. at 224-26.

The Staff argues, in part:

For the same reasons discussed above with respect to element 1[c] of the '497 patent ("receive outside temperature measurements"), the evidence does not show that Vivint's accused products satisfy element 1[b]: "*one or more processors that receive measurements of outside temperatures from at least one source other than said HVAC system and compare said temperature measurements from said first structure, wherein said one or more processors compares the inside temperature of said first structure and the outside temperature over time*." *See also* RX-0164C (James) QA 170-181.

Staff Br. at 65.

[redacted]

The construction of "outside temperature measurements" was discussed above; the claim term "outside temperature measurements" means "measurements of the temperature outside (or external to) [the structure]."

Under the adopted construction, the Vivint accused products do not include one or more processors that receive measurements of the temperature outside (or external to) [the structure] from at least one source other than said HVAC system. *See* RX-0164C (James RWS) at Q/A 68-75.

The evidence shows that Vivint [redacted] The administrative law judge finds that EcoFactor has not adduced evidence showing that [redacted]. RX-0164C (James RWS) at Q/A 75; RX-0165C (Bunker DWS) at Q/A 106-09.

EcoFactor argues that the outdoor temperature measurements [redacted]. *See* Compl. Br. at 112-15. However, the evidence on the record establishes that the [redacted]

[redacted]

[redacted]

[redacted]." *See* de la Iglesia Tr. 389.

Even were "measurements of outside temperatures", "HVAC system" and "said one or more processors" construed according to respondents' proposed construction, the accused Vivint products would still not satisfy this claim limitation because EcoFactor has not adduced evidence showing that [redacted]. *See* RX-0164C (James RWS) at Q/A 75.

Accordingly, it is determined that the Vivint accused products do not satisfy this claim limitation.

**iv. one or more databases that store at least said temperature measurements obtained from said first structure over time,**

The evidence adduced by EcoFactor demonstrates that the accused Vivint products satisfy the limitation "one or more databases that store at least said temperature measurements

[redacted]

obtained from said first structure over time." *See* CX-0675C (de la Iglesia DWS) at Q/A 263, 264. Vivint does not contest that the accused products satisfy this claim limitation. *See* Resps. Br. at 220-31.

**v. wherein said one or more processors compares an inside temperature recorded inside the first structure with an inside temperature of said first structure recorded at a different time to determine whether the operational efficiency of the HVAC system has decreased over time.**

The evidence does not show that Vivint's accused products satisfy this claim element. *See* RX-0164C (James RWS) at Q/A 182-91.

EcoFactor argues, in part:

> The Vivint Products each meet claim element 1[d] under any proposed construction of "HVAC system" or "operational efficiency". CX-0675C (de la Iglesia) Q/A 266-269. The Vivint [redacted]

[redacted]

[redacted]. CX-0675C (de la Iglesia) Q/A 266-269.

Mr. de la Iglesia identified source code that confirms this analysis. CPX-0005C (Vivint source code). Q/A 268. Mr. de la Iglesia's testimony and other evidence showed infringement of claim 1 under any proposed construction of "HVAC system," "measurements of outside temperatures," "one or more processors," "status of the HVAC system is 'on' or 'off'", and "one or more rates of change." CX-0675C.0063, Q/A 241.

Compl. Br. at 217-19.

Vivint argues, in part:

Element 1[d] of Claim 1 of the '322 Patent recites one or more processors that "compares an inside temperature inside the first structure with an inside temperature of said first structure recorded at a different time to determine whether the operational efficiency of the HVAC system has decreased over time." For all the reasons given for element 1[b] above, Complainant failed to prove by a preponderance of the evidence that Vivint satisfies the limitations of element 1[d] because Vivint [redacted].

The record demonstrates that Vivint's system "[redacted] RX-0164C, James QA191. Mr. de la Iglesia attempts to sidestep this reality by offering several conclusory statements in his direct testimony. Each of these statements lack evidentiary support and are belied by the actual evidence on the record.

Mr. de la Iglesia first states that [redacted]

[redacted]

[redacted] But there is no evidence in the record to support Mr. de la Iglesia's contention.

The record instead demonstrates that Vivint's [redacted]

*Id.*

Mr. de la Iglesia next offers the conclusion that the Vivint system [redacted] But the record again contradicts Mr. de la Iglesia's opinion.

In Vivint's system, "[redacted] 54. As Mr. Bunker testified:

[redacted]

[redacted]

RX-0165C, Bunker QA155.

The record demonstrates that [redacted]

Also, as explained above, the record demonstrates that Vivint does not [redacted]"). This fact alone demonstrates Vivint's system does not satisfy this claim element.

Finally, the record evidences yet another reason why Vivint does not satisfy this element. In order to determine whether the [redacted]

[redacted]

[redacted] e, Complainant cannot demonstrate by a preponderance of the evidence that Vivint actually (or even could) determine whether [redacted].

> Complainant failed to demonstrate by a preponderance of the evidence that Vivint's systems. satisfies element 1[d] of the '322 patent. For these reasons and the others set out above, Complainant failed to prove by a preponderance of the evidence that Vivint infringes claim 1 of the '322 patent.

Resps. Br. at 227-31 (footnote omitted).

The Staff argues, in part:

> For the same reasons discussed above with respect to the preamble, the evidence does not show that Vivint's accused products "determine whether the ***operational efficiency*** of the HVAC system has decreased over time," as required by this element. *See also* RX-0164C (James) QA 182-191.

Staff Br. at 65.

The construction of "operational efficiency" was discussed above; the claim term "operational efficiency" is construed to mean "energy required by the HVAC system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions."

As found above, regarding the preamble, the administrative law judge has found that EcoFactor has not shown that the accused Vivint products evaluate changes in the operational efficiency of the HVAC system. For the same reasons, EcoFactor has not shown that the

accused Vivint determine whether the operational efficiency of the HVAC system has decreased over time.

EcoFactor asserts that the Vivint products

*See* RX-0164C (James RWS) at Q/A 96.

EcoFactor contends that

." RX-0164C (James RWS) at Q/A 189-91.

If "operational efficiency" were construed according to EcoFactor's proposed construction, the accused Vivint products would still not satisfy this claim limitation because EcoFactor has not shown that

. *See id.* at Q/A 181. Moreover, the record shows that the source code

. *See id.* at Q/A 96.

[redacted]

Even were "HVAC system" and "said one or more processors" construed according to respondents' proposed construction, the accused Alarm.com products would still not satisfy this claim limitation because EcoFactor has not shown that the accused Alarm.com products determine whether the operational efficiency of the HVAC system has decreased over time.

Accordingly, it is determined that the Vivint accused products do not satisfy this limitation.

**2. Claim 2**

**a. Google Products**

**i. A system as in claim 1**

As discussed above, the accused Google products satisfy all limitations of independent claim 1.

**ii. in which said processors receive measurements of outside temperatures for geographic regions such as ZIP codes from sources other than said HVAC control systems.**

EcoFactor argues, in part:

> The Google Products each meet claim 2. Consistent with element 1[c] above, the Google Products include the claimed "processors" that receive the claimed "outside temperatures" for the claimed "geographic regions based on ZIP codes" from the claimed "sources other than said HVAC system," which corresponds to the Google Products [redacted]. CX-0674C (Gomez DWS) 150-154, citing CPX-0002C (Google source code). At the hearing, Dr. Burger confirmed under oath that the [redacted] Hearing Tr. 731:24-732:8 (Dr. Burger confirming [redacted]

Compl. Br. at 176.

Google argues, in part:

[redacted]

> Claim 2 of the '322 patent depends from claim 1. Because EcoFactor has not established that the Nest Thermostats practice claim 1 of the '322 patent, it necessarily cannot establish that the Nest Thermostats practice claim 2. RX-0156C, Henze QA137. Claim 2 requires that the processor "must receive measurements of outside temperature." *Id.*; '322 patent, cl. 2. As previously discussed with respect to limitation [1b], the Nest Thermostats do not receive any measurements of outside temperature. RX-0156C, Henze QA137. Therefore, EcoFactor failed to establish that the Nest Thermostats practice claim 2 of the '322 patent, either literally or under the doctrine of equivalents. RX-0156C, Henze QA138.

Resps. Br. at 178.

The Staff argues, in part:

> In its prehearing brief, Google incorporated its argument above that the Nest Thermostat does not receive outside temperature measurements and, therefore, it does not practice the limitations of claim 2 of the '322 patent. RPreHBr. at 117. However, as discussed above with respect to element 1[c] of the '497 patent and element 1[b] of the '322 patent, the evidence shows that the Nest Thermostats do receive outside temperature measurements. Given that Google has not disputed EcoFactor's evidence with respect to the additional limitations of claim 2, the evidence shows that the Nest Thermostats satisfy claim 2 of the '322 patent. *See also* CX-0674C (Gomez) QA 150-154.

Staff Br. at 55.

The evidence adduced by EcoFactor demonstrates that the accused Google products satisfy the additional claim 2 limitation "in which said processors receive outside temperatures for geographic regions based on ZIP codes from sources other than said HVAC system." *See* CX-0674C (Gomez DWS) at Q/A 150-54.

Google argues that the Nest Thermostats do not receive any measurements of outside temperatures. *See* Resps. Br. at 178. However, Dr. Burger testified that the [redacted] Burger Tr. 731-732. Thus, the Google Products include the claimed "processors" that receive the claimed "outside temperatures" for the claimed "geographic regions

based on ZIP codes" from the claimed "sources other than said HVAC system." CX-0674C (Gomez DWS) at Q/A 150-54.

Even were "measurements of outside temperatures" construed according to respondents' proposed construction, the accused Google products would still satisfy this claim limitation because the [redacted]. *See* CX-0674C (Gomez) at Q/A 68.

* * *

It is therefore determined that the accused Google products infringe dependent claim 2 of the '322 patent.

**b. Alarm.com Products**

**i. A system as in claim 1**

As discussed above, the accused Alarm.com products do not satisfy all limitations of independent claim 1.

**ii. in which said processors receive measurements of outside temperatures for geographic regions such as ZIP codes from sources other than said HVAC control systems.**

EcoFactor argues, in part:

> The Alarm.com Products each meet element of claim 2 of JX-0002 ('322 patent) under any party's constructions of the term. CX-0675C (de la Iglesia WS), Q/A 153-155. [redacted]

Compl. Br. at 205.

Alarm.com argues, in part:

> Claims 2 and 5 of the '322 patent depend from claim 1. Alarm.com does not infringe claim 1 of the '322 patent and therefore cannot infringe claims 2 and 5.

Resps. Br. at 107.

The Staff argues, in part:

> Both claims 2 and 5 depend from claim 1. Because the evidence does not show that Alarm.com infringes claim 1, the evidence also does not show that it infringes claims 2 and 5 of the '322 patent. *See also* RX-0161C (Hagins) QA 195-204.

Staff Br. at 63.

As found above, the Alarm.com Backend uses only forecasts, not measurements; hence it does not literally meet the "measurements of outside temperatures" limitation. *See* RX-0159C (Hutz DWS) at QA130-35; RX-0161C (Hagins RWS) at Q/A 89-96, 151-54. The administrative law judge thus finds that EcoFactor has not shown that the accused Alarm.com products satisfy this claim limitation.

Even were "measurements of outside temperatures" construed according to respondents' proposed construction, the accused Alarm.com products would still not satisfy this claim limitation because the Alarm.com Backend uses only forecasts, not measurements. *See* RX-0159C (Hutz DWS) at QA130-35.

* * *

It is therefore determined that the accused Alarm.com products do not infringe asserted dependent claim 2 of the '322 patent.

[redacted]

**c. Vivint Products**

**i. A system as in claim 1**

As discussed above, the accused Vivint products do not satisfy all limitations of independent claim 1.

**ii. in which said processors receive measurements of outside temperatures for geographic regions such as ZIP codes from sources other than said HVAC control systems.**

EcoFactor argues, in part:

> The Vivint Products also meet claim 2, for the same reasons as the first portion of element 1[b], because the processors [redacted]." CX-0675C.0070 (de la Iglesia WS) Q/A 270, citing CX-0254C (Bunker Tr.) 177-178, CPX-0005C (Vivint source code).

Compl. Br. at 219.

Vivint argues, in part:

> Vivint . . . does not have one or more processors that [redacted], which is congruent with the first limitation of '322 element 1[b] and '322 claim 2).

Resps. Br. at 221.

The Staff argues, in part:

> Both claims 2 and 5 depend from claim 1. Because the evidence does not show that Vivint infringes claim 1, the evidence also does not show that it infringes claims 2 and 5. *See also* RX-0164C (James) QA 192-197.

Staff Br. at 65.

EcoFactor has not shown that the accused Vivint products satisfy this claim limitation.

EcoFactor argues that the accused Vivint products include processors that [redacted]

Compl. Br. at 219. However, EcoFactor has not adduced evidence showing that [redacted]

[redacted] *See* RX-0164C (James RWS) at Q/A 75; RX-0165C (Bunker DWS) at Q/A 106-09.

Even were "measurements of outside temperatures" construed according to respondents' proposed construction, the accused Vivint products would still not satisfy this claim limitation because EcoFactor has not adduced evidence showing that the [redacted]

* * *

It is therefore determined that the accused Vivint products do not infringe asserted dependent claim 2 of the '322 patent.

**3. Claim 5**

**a. Google Products**

**i. A system as in claim 1**

As discussed above, the accused Google products satisfy all limitations of independent claim 1.

**ii. in which said HVAC system includes a programmable thermostat and said programmable thermostat is the sole source for current data regarding temperature inside said first structure conditioned by said HVAC system.**

EcoFactor argues, in part:

> The Google Products each meet claim 5. The Google Products satisfy claim 5 under any construction, because the Google Products include thermostats that are programmable with temperature settings. CX-0674C (Gomez DWS) Q/A 156-157, citing CX-0061C (Burger Tr.), CX-0072C (Chappelle Tr.), CX-0088C (Gleeson Tr.), CX-0613C (Revised Tstat Requirements for BGE utility) (confirming Google

[redacted]

represents to utility companies that the Google Products are "Wi-Fi thermostats" that are "programmable"). The Google Products are [redacted] (*i.e.,* the "said location conditioned by said HVAC system"), because they are [redacted] and display one inside temperature measurement in the Nest app screen. *Id.* Q/A 157-158.

Google argues that the HVAC control system of claim 1 cannot be the same component as the programmable thermostat of claim 5. But the patent has no such limitation. The claimed HVAC control system can be embodied in a communicating thermostat, or remotely connected computers or servers. JX-0001 ('497 patent) 1:17-21 ("This invention relates to the use of thermostatic HVAC controls that are connected to a computer network. More specifically, communicating thermostats are combined with a computer network to calculate the thermal mass of a structure"); Hearing Tr. 254:15-255:9; 270:8-13; 271:9-272:8 (Mr. Gomez explaining HVAC control systems can exist in a device sitting on the wall, functionality in the cloud, or in an integrated thermostat-cloud system.). Even if the patent did have such a restriction, it would not change the outcome here. Mr. Gomez has explained that "at least one HVAC control system" also corresponds to the Google Cloud functionality for controlling the HVAC system, which would satisfy even Respondents' interpretations of the patent. Hearing Tr. 270:8-13 (Mr. Gomez) ("Q. And isn't it true that you opined [redacted] are also part of the HVAC control system? A. Well, they can be the HVAC – another HVAC control system. So, like we said, there can be one or more.").

Compl. Br. at 176-77.

Google argues, in part:

Claim 5 of the '322 patent depends from claim 1 and further requires a programmable thermostat that is part of the HVAC system, separate and apart from the HVAC control system, that is the ***sole*** source of indoor temperature measurements. '322 patent, cl. 5 (emphasis added); RX-0156C, Henze QA141. Because, as previously explained, EcoFactor has not established that the Nest Thermostats practice claim 1 of the '322 patent, it necessarily cannot show that they practice claim 5. RX-0156C, Henze QA141. Contrary to the plain language of the claim, Mr. Gomez identified the Nest Thermostats as both the claimed HVAC control system for claim 1 and the programmable thermostat of claim 5. RX-0156C, Henze QA141. In his expansive interpretation, Mr. Gomez improperly conflates the HVAC control system of claim 1 with the programmable thermostat of claim 5. Hearing Tr. vol. 1, 271:9-72:4, Nov. 16, 2020, (Gomez); CX-0674C, Gomez QA87. Accordingly, Mr. Gomez failed to identify a programmable thermostat that is both separate and apart from the HVAC control system and part of the HVAC system, as required by claim 5. Therefore, EcoFactor failed to

> establish that the Nest Thermostats practice claim 5 of the '322 patent, either literally or under the doctrine of equivalents. RX-0156C, Henze QA142.

Resps. Br. at 178-79.

The Staff argues, in part:

> Google does not dispute that the Nest Thermostats are programmable thermostats, but argues that contrary to the plain language of the claim, EcoFactor improperly conflates the HVAC control system of claim 1 with the programmable thermostat of claim 5. RPreHBr. at 118; RX-0156C (Henze) QA 141; CX-0022 (Complaint Ex. 17), at 3. The Staff disagrees. Claim 5 adds to claim 1 by including a "programmable thermostat." Read with claim 1, claim 5 can be properly read such that the "HVAC control system" is a component of the programmable thermostat. Thus, the evidence demonstrates that the Nest Thermostats satisfy claim 5. *See* CX-0674C (Gomez) QA 155-158.

Staff Br. at 55.

The construction of "programmable thermostat" was discussed above; the claim term "programmable thermostat" means "thermostat that uses microprocessor-based circuitry to control the switch and operate based upon user-determined protocols for temperature vs. time."

Under the adopted construction, EcoFactor adduced evidence demonstrating that the accused Google products satisfy the additional claim 5 limitation "in which said HVAC system includes a programmable thermostat and said programmable thermostat is the sole source for current data regarding temperature inside said first structure conditioned by said HVAC system." *See* CX-0674C (Gomez DWS) at Q/A 156-57.

Google argues that Mr. Gomez failed to identify a programmable thermostat that is separate and apart from the HVAC control system, as required by claim 5. *See* Resps. Br. at 178-79. However, the claimed HVAC control system can be embodied in a communicating thermostat. JX-0002 ('322 patent) at col. 1, lns. 17-21 ("This invention relates to the use of thermostatic HVAC controls that are connected to a computer network. More specifically,

communicating thermostats are combined with a computer network to calculate the thermal mass of a structure.").

Even were "HVAC system" and "programmable thermostat" construed according to respondents' proposed construction, the accused Google products would still satisfy this claim limitation because the Nest thermostats function as a group of components working together to move heat or remove heat from the conditioned [structure/location], and include microprocessor-based circuitry to control the switch and operate based upon user determined protocols for temperature vs. time. *See* CX-0674C (Gomez DWS) at Q/A 158.

* * *

It is therefore determined that the accused Google products infringe asserted dependent claim 5 of the '322 patent.

**b. Alarm.com Products**

**i. A system as in claim 1**

As discussed above, the accused Alarm.com products do not satisfy all limitations of independent claim 1.

**ii. in which said HVAC system includes a programmable thermostat and said programmable thermostat is the sole source for current data regarding temperature inside said first structure conditioned by said HVAC system.**

EcoFactor argues, in part:

> As Mr. de la Iglesia explained, the Alarm.com Products each meet element of claim 5 of JX-0002 ('322 patent). CX-0675C (de la Iglesia WS), Q/A 133-135, 153-155. The Alarm Accused Products comprise "a programmable thermostat and said programmable thermostat is the sole source for current data regarding temperature inside said location conditioned by said HVAC system" under either party's constructions. As a threshold matter, the parties appear to agree that a programmable thermostat is one that can apply a user schedule. [redacted]

[redacted]

Alarm.com contends it does not infringe under its own construction [redacted]

Likewise, the T2000 and T3000 may be the sole source of information regarding indoor temperature, for example, when they are not connected to remote sensors. [redacted]. Alarm.com contends that the T2000 and T3000 can also be used with multiple remote sensors. But this is immaterial. [redacted] In addition, it is black letter law that infringement some of the time is still infringement.

Compl. Br. at 205-06.

Alarm.com argues, in part:

First, Alarm.com does not meet the claim limitation that "said HVAC system includes a programmable thermostat". CX-0002 ('322 patent) cl. 5. [redacted]

[redacted]

[redacted].

> Second, the thermostats are not "the sole source of the current data regarding temperature inside" the structure. CX-0002 ('322 patent) cl. 5. "Sole" means "exclusive". RX-0746-2 (Merriam-Webster definition of "sole"). An ADC-T2000 or ADC-T3000 is never the exclusive source of inside temperature data in a house, because it is always possible to add a remote temperature sensor or second thermostat, which would supply additional indoor temperature data. RX-0161C, Hagins QA204; RX-0160C, Goodman QA13; RX-0159C, Hutz QA36.

Resps. Br. at 107-08.

The Staff argues, in part:

> Both claims 2 and 5 [redacted]pend from claim 1. Because the evidence does not show that Alarm.com infringes claim 1, the evidence also does not show that it infringes claims 2 and 5 of the '322 patent. *See also* RX-0161C (Hagins) QA 195-204.

Staff Br. at 63.

EcoFactor has not shown that the accused Alarm.com products satisfy this claim limitation.

[redacted]. However, the T2000 and T3000 are not programmable thermostats [redacted]

Even were "HVAC system" and "programmable thermostat" construed according to respondents' proposed construction, the accused Alarm.com products would still not satisfy this claim limitation because the T2000 and T3000 are not programmable thermostats.

[redacted]

* * *

It is therefore determined that the accused Alarm.com products do not infringe asserted dependent claim 5 of the '322 patent.

**c. Vivint Products**

**i. A system as in claim 1**

As discussed above, the accused Vivint products do not satisfy all limitations of independent claim 1.

**ii. in which said HVAC system includes a programmable thermostat and said programmable thermostat is the sole source for current data regarding temperature inside said first structure conditioned by said HVAC system.**

EcoFactor argues, in part:

> The Vivint Products meet claim 5, because the Vivint CT100 and CT200 [redacted]. *Id.* Q/A 273.

Compl. Br. at 219.

Vivint argues, in part:

> Vivint . . . does not include a "programmable thermostat" (*see supra* '497 claim [5] which is congruent with '322 claim 5).

Resps. Br. at 221.

The Staff argues, in part:

> Both claims 2 and 5 depend from claim 1. Because the evidence does not show that Vivint infringes claim 1, the evidence also does not show that it infringes claims 2 and 5. *See also* RX-0164C (James) QA 192-197.

[redacted]

Staff Br. at 65.

EcoFactor has not shown that the accused Vivint products satisfy this claim limitation.

EcoFactor argues that the Vivint CT100 and CT200 [redacted]

RX-0164C (James RWS) at Q/A 157-68. EcoFactor has not adduced evidence to the contrary. *See* CX-0675C (de la Iglesia DWS) at Q/A 245.

Even were "HVAC system" and "programmable thermostat" construed according to respondents' proposed construction, the accused Alarm.com products would still not satisfy this claim limitation because Vivint's thermostats are not programmable thermostats.

* * *

It is therefore determined that the accused Vivint products do not infringe asserted dependent claim 5 of the '322 patent.

### C. Domestic Industry (Technical Prong)

EcoFactor alleges that the EcoFactor Platform alone or in combination with the Simple Thermostat satisfies all limitations of claims 1, 2, and 5 of the '322 patent. Compl. Br. at 221.

#### 1. Claim 1

##### a. A system for evaluating changes in the operational efficiency of an HVAC system over time comprising:

The record evidence does not show that the EcoFactor DI products satisfy this limitation of asserted independent claim 1. *See* RX-0156C (Henze RWS) at Q/A 265-66.

EcoFactor argues, in part:

To the extent the preamble is limiting, the EcoFactor Platform alone, or in

[redacted]

combination with the Simple Thermostat, meets the preamble of claim 1 of JX-0002 (the '322 patent) for the same reasons expressed above with regard to the preamble of claim 1 of the '497 patent. CX-0674C (Gomez DWS) Q/A 603-608. EcoFactor incorporates by reference its prior discussion of that element. In particular, Mr. Gomez's analysis and other evidence proves EcoFactor's modeling evaluates changes in operational efficiency over time. *Id.* For example, EcoFactor's use of HVAC Performance Monitoring and the ramptimeDeltaSpLinearModel described above both involve evaluation of changes of operational efficiency of an HVAC system over time. *Id.* In HVAC Performance Monitoring, the EcoFactor Platform expressly calculates operational efficiency in the form of a severity metric. *Id.*; CPX-001C (EcoFactor Code) at faultRunner.py. This metric is compared to prior severity metrics in order to identify instances where operational efficiency has decreased. CX-0674C (Gomez DWS) Q/A 603-608. As Mr. Gomez explains, this severity metric is a proxy for the time or energy necessary to raise or lower the temperature in a structure for a given set of outside conditions. *Id.*

Likewise, the ramptimeDeltaSpLinearModel that is used by, among other things, EcoFactor's Demand Response with precooling is retrained in order to properly determine the time to reach the precooling temperature. CX-0674C (Gomez DWS) Q/A 603-608. This is done, for example, to account for deterioration of performance of the HVAC system. *Id.*; CPX-001C (EcoFactor Code) at drPrediction.py ln 14-290.

Compl. Br. at 223.

Respondents argue, in part:

The evidence shows that EcoFactor failed to establish that it practices claim 1 of the '322 Patent. RX-0156C, Henze QA261-64. As explained by Dr. Henze, the asserted claims of the '322 patent describe a system for "evaluating changes in operational efficiency of an HVAC system over time." *Id.* Henze QA44, 47-48; '322 patent, cl. 1. Dr. Henze's testimony established that a POSITA would understand that in order to evaluate changes in the operational efficiency of an HVAC system over time, the system must compute and compare values for the operational efficiency of an HVAC system. RX-0156C, Henze QA106. However, Mr. Gomez failed to identify any value for operational efficiency. *Id.* Henze QA265-66; CX-0674C, Gomez QA604-05. An inventor of the '497 patent was also unable to identify a specific value for the operational efficiency of an HVAC system that the EcoFactor Platform calculated. RX-0004C, Hublou Dep. 213:9-215:1. Further, EcoFactor's corporate representative was also unable to identify any computed value for the operational efficiency of an HVAC system in the EcoFactor Platform. RX-0156C, Henze QA266; RX-0008C, Okita Dep. 244:2-10.

Resps. Br. at 40.

The Staff argues, in part:

[redacted]

> EcoFactor contends that the DI product satisfies claims 1, 2, and 5 of the '322 patent. RPreHBr. at 103; CX-0674C (Gomez) QA 602-622. For the same reasons discussed above with respect to claim 1 of the '497 patent, the evidence does not show that the DI product satisfies the preamble (no operational efficiency) and element 1[d] (no "operational efficiency" and no "said one or more processors") of the '322 patent. *See also* RX-0156C (Henze) QA 261-267; 274.

Staff Br. at 115.

As an initial matter, the preamble of claim 1 of the '322 patent has been found to be limiting and "operational efficiency" has been construed to mean "energy required by the HVAC system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions."

Regarding the preamble, EcoFactor argues that the EcoFactor Platform includes a system for calculating a value for the operational efficiency of a heating, ventilation, and air conditioning (HVAC) system because it uses the ramptimeDeltaSpLinearModel and, in the alternative, because it uses the HVAC Performance Monitoring severity metric. *See* Compl. Br. at 223.

Regarding the ramptimeDeltaSpLinearModel, Mr. Gomez testified that the time-to-temperature is calculated using a linear model that "is trained by looking at changes in internal temperature over time." *Id*. at Q/A 590. However, the evidence shows that a calculated amount of time-to-temperature is not an amount of, or a representation of, energy, as required by the construction of "operational efficiency." *See* RX-0156C (Henze RWS) at Q/A 243. Furthermore, EcoFactor does not alleged that a calculated amount of time is equivalent, under the doctrine of equivalents, to energy.

Regarding the HVAC Performance Monitoring severity metric, Mr. Gomez testified that this "severity metric is a proxy for the amount of time or energy necessary to raise or lower the

temperature in a building by given amount under certain conditions." CX-0674C (Gomez DWS) at Q/A 581. However, the evidence shows that the severity metric is not an amount of, or a representation of, energy, as required by the construction of "operational efficiency." *See* RX-0156C (Henze RWS) at Q/A 242.

Even were "HVAC system" construed according to respondents' proposed construction, the EcoFactor DI products would still not satisfy this claim limitation because neither ramptimeDeltaSpLinearModel nor the HVAC Performance Monitoring severity metric calculate a value for the operational efficiency of a heating, ventilation, and air conditioning (HVAC) system.

If "operational efficiency" were construed according to EcoFactor's proposed construction, however, the EcoFactor DI products would satisfy this claim limitation because the EcoFactor Platform uses the ramptimeDeltaSpLinearModel to calculate the time it takes to reach a given temperature for a specific HVAC system given inside and outside temperature conditions. *See* CX-0674C (Gomez DWS) at Q/A 581, 589-92, 615.

Accordingly, it is determined that the EcoFactor DI products do not satisfy this claim limitation.

**b. at least one HVAC control system associated with a first structure that receives temperature measurements from at least a first structure conditioned by at least one HVAC system, and receives status of said HVAC system;**

The EcoFactor DI products include this feature of claim 1. *See* CX-0674C (Gomez DWS) at Q/A 582-84, 606-08.

EcoFactor argues, in part:

> The EcoFactor Platform alone, or in combination with the Simple

[redacted]

Thermostat, meets element 1[a] of claim 1 of JX-0002 (the '322 patent). CX-0674C (Gomez DWS) Q/A 606-608. As to the portion of the element that requires "at least one HVAC control system associated with a first structure that receives temperature measurements from at least a first structure conditioned by at least one HVAC system," the EcoFactor DI Product meets this element for the same reasons explained above with regard to element 1[a] of the '497 patent. *Id.* EcoFactor incorporates its prior discussion by reference as if fully set forth herein.

As to the element "receives status of said HVAC system," the EcoFactor Product meets this element. CX-0674C (Gomez DWS) Q/A 606-608. In particular, the EcoFactor Platform receives HVAC status including the operational state of the HVAC and whether it is active or inactive as part of communications from connected WiFi Thermostats. *Id.* EcoFactor's code refers to this as, among other things, "HvacState." *Id.*; CPX-001C (EcoFactor Code) at hvacInfo.py ("HvacState"). In addition, the Simple Thermostat receives HVAC state information by, for example, passing the information that will be relayed for the "HvacState" parameter to the Wi-Fi chip of the Simple Thermostat, which receives and then transmits the information. CX-0674C (Gomez DWS) Q/A 609-612; CPX-001C (EcoFactor Code) at wifi_init.c, cmd_processing.c ("hvacState"), aws_iot.h ("temperature", "hvacState"), hvacInfo.py ("HvacState").

This is further confirmed by the testimony of Respondents' expert, Mr. Henze who testified that the EcoFactor Platform uses its model responsive to HVAC state. Hearing Tr. at 803:22-804:10. In particular Mr. Henze testified that the EcoFactor Platform performs a time-to-temperature analysis "separately for when the HVAC system is operating, when it is not operation, and separately for different operating conditions." *Id.* ("[T]he EcoFactor Platform relies on a data-drive (or inverse) black box modeling approach that uses a linear regression model to describe, for example, the time to change indoor temperature by a certain amount as a function of indoor temperature and outdoor temperature. . . . It does this analysis separately for when the HVAC system is operating, when it is not operation, and separately for different operating conditions.

Compl. Br. at 223-24.

Respondents argue, in part:

The evidence shows that EcoFactor failed to establish that the EcoFactor Platform, with or without the Simple Thermostat, includes an HVAC control system as required by limitation [1a] of the '322 patent. RX-0156C, Henze QA267-68. Mr. Gomez improperly identified the Simple Thermostat as the claimed HVAC control system. *Id.* Henze QA267; CX-0674C, Gomez QA606. As previously explained, Dr. Henze testified that in the EcoFactor implementation, the claimed HVAC control system of the '497 patent and the '322 patent must be something other than a thermostat; the Simple Thermostat cannot be the claimed "HVAC control system." RX-0156C, Henze QA74, 111, 244, 268.

Resps. Br. at 40-41.

The Staff does not address this limitation. *See* Staff Br. at 115.

The evidence adduced by EcoFactor shows that the EcoFactor DI products include at least one HVAC control system associated with a first structure that receives temperature measurements from at least a first structure conditioned by at least one HVAC system, and receives status of said HVAC system. *See* CX-0674C (Gomez) at Q/A 606-08. The EcoFactor Platform includes a suite of features for controlling an HVAC system including, for example, Demand Response and Setpoint Optimization, which are used together or separately to provide setpoints for controlling an HVAC system. *Id.* at 569-74, 582-84, 609. These features and their algorithms (including the ramptimeDeltaSpLinearModel) make use of internal temperature measurements. *Id.*

Respondents argue that one of ordinary skill in the art would understand that the HVAC control system cannot be the Simple Thermostat in EcoFactor's Platform. *See* Resps. Br. at 40-41 (citing RX-0156C (Henze RWS) at Q/A 267-68). However, the Simple Thermostat receives temperature measurements from an integrated sensor and provide these measurements to the EcoFactor Platform using a Wi-Fi connection and Wi-Fi chip. *See* CX-0678C (Okita DWS) at Q/A 37-41. Each of these components is part of a system for controlling an HVAC, and each receives internal temperature measurements. *See* CX-0674C (Gomez DWS) at Q/A 609-12; CX-0678C (Okita DWS) at Q/A 42.

Even were "HVAC system" and "status of said HVAC system" construed according to respondents' proposed construction, the EcoFactor DI products would still satisfy this claim limitation because the EcoFactor DI products function as a group of components working together to move heat or remove heat from the conditioned [structure/location], and the

EcoFactor DI products receive HVAC status indicating whether the HVAC system is "on" or "off."

Accordingly, it is determined that the EcoFactor DI products satisfy this claim limitation.

**c. one or more processors that receive measurements of outside temperatures from at least one source other than said HVAC system and compare said temperature measurements from said first structure, wherein said one or more processors compares the inside temperature of said first structure and the outside temperature over time;**

The EcoFactor DI products include "one or more processors that receive measurements of outside temperatures from at least one source other than said HVAC system and compare said temperature measurements from said first structure, wherein said one or more processors compares the inside temperature of said first structure and the outside temperature over time." CX-0674C (Gomez DWS) Q/A 609-12.

EcoFactor argues, in part:

> The EcoFactor Platform alone, or in combination with the Simple Thermostat, meets element 1[b] of claim 1 of JX-0002 (the '322 patent). CX-0674C (Gomez DWS) Q/A 609-612. As to the portion of the element that requires "at least one HVAC control system associated with a first structure that receives temperature measurements from at least a first structure conditioned by at least one HVAC system," the EcoFactor DI Product meets this element for the same reasons explained above with regard to element 1[c] of the '497 patent. This discussion is incorporated herein by reference.
>
> The EcoFactor DI Product also meets the portion of element 1[b] related to "compare said temperature measurements, wherein said one or more processors compares the inside temperature of said first structure and the outside temperature over time." CX-0674C (Gomez DWS) Q/A 609-612. As explained above with regard to element 10[d] of the '497 patent, both HVAC Performance Monitoring and the ramptimeDeltaSpLinearModel use involve comparisons between inside and outside temperatures over time. CX-0674C (Gomez DWS) Q/A 609-612.
>
> For instance, the formula for calculating severity metric in HVAC Performance Monitoring includes the following two lines:

[redacted]

"thisSeverity = durationHrs * max(***avgTin-avgTout***+30., 0.) / max(4.-deltaTin, 2.)

peakSeverity = peakHrs * max(***maxTin-maxTout***+40., 0.) / max(11.-deltaTmax, 1.)."

CPX-001C (EcoFactor Code) at faultRuner.py ln 288-359 (parseHFP). As Mr. Gomez explains, both avgTin and maxTin represent inside temperatures while avgTout and maxTout represent outside temperatures. CX-0674C (Gomez DWS) Q/A 609-612. A person of skill in the art would understand that the term "avgTin - avgTout) and "maxTin - smaxTout" are comparions of inside to outside temperatures using subtraction. CX-0674C (Gomez DWS) Q/A 609-612.

Further, the ramptimeDeltaSpLinearModel compares inside to outside temperatures. As previously explained, the model is trained to identify coefficients A, B, and C in the following equation:

lenMin [time for temperature change] = ***A * deltaTemp + B* avgOutsideTemp*** + C* startTemp

CX-0674C (Gomez DWS) Q/A 591. The coefficients A and B indicate the relative impact of inside and outside temperature on the time to heat or cool a structure. *Id. The* parties agree that the term compare" means to analyze for one or more similarities or differences. CX-0674C (Gomez DWS) Q/A 124. By training ramptimeDeltaSpLinearModel to analyze and calculate the difference in relative impact of inside and outside temperatures of cooling time, the EcoFactor compares inside and outside temperatures within the meaning of the claims (i.e., calculates one difference—the relative impact on cooling time). *Id.* Q/A 591, 625.

All of these comparisons are over time since each is repeated over and over as part of the EcoFactor Platform's features. *Id*.

Compl. Br. at 225-26.

Respondents argue, in part:

The evidence shows that EcoFactor failed to properly identify the claimed "one or more processors" as required by limitations [1b] and [1d]. *Id.* Henze QA270. Limitation [1b] of the '322 patent references "one or more processors." Limitations [1b] and [1d] of the '322 patent further reference "said one or more processors." Dr. Henze testified that a POSITA would understand that the same "one or more processors" carry out all the claimed functionality of limitations [1b] and [1d]. RX-0156C, Henze QA270. However, Mr. Gomez identified two different groups of processors that allegedly satisfy these limitations. *Id.*; CX-0674C, Gomez QA609. As to limitation 1[b], Mr. Gomez only identified source code from the "platform" component of the EcoFactor software. RX-0156C, Henze

[redacted]

QA270; CX-0674C, Gomez QA609. But Mr. Gomez testified that source code from the "quant" component compares the measurements of inside and outside temperature, as required by limitations [1b] and [1d]. RX-0156C, Henze QA270; CX-0674C, Gomez QA609, 615. Dr. Henze testified that the "platform" and processors are different. RX-0156C, Henze QA247, 270; RX-0229C (EF-Trane Agmt.), at 261. Therefore, the "quant" processors cannot be the claimed "said one or more processors" of limitation [1d]. RX-0156C, Henze QA247, 270.

The evidence shows that EcoFactor failed to establish that the EcoFactor Platform, with or without the Simple Thermostat, "compares the inside temperature of said first structure and the outside temperature over time," as required by limitation [1b]. RX-0156C, Henze QA271. Mr. Gomez testified that a calculation of a severity metric compares measurements of inside temperatures with measurements of outside temperatures over time. CX-0674C, Gomez QA615. The evidence shows that the equation for the severity metric, "severity = durationHrs * max(avgTin - avgTout + 30, 0) / max(4 - deltaTin, 2)," includes a difference between an average inside temperature, "avgTin," and an average outside temperature, "avgTout." RX-0156C, Henze QA242, 272; CPX-0001C (EF Source Code), at 15-16. However, as Dr. Henze testified, because an average temperature is not a measurement, a difference between two average temperatures is not a comparison of two temperature measurements, as required by limitation [1b]. RX-0156C, Henze QA272.

Mr. Gomez also testified that the computation of a precool period length compares measurements of inside temperatures with measurements of outside temperatures over time. CX-0674C, Gomez QA615. According to EcoFactor's source code, this computation uses the equation "lenMin = a + b1 * deltaTemp + b2 * avgOutsideTemp + b3 * startTemp." RX-0156C, Henze QA273; CPX-0001C (EF Code), at 175. The evidence shows that when the EcoFactor software makes a prediction, it sets "deltaTemp" to 3°F, "avgOutsideTemp" to an average of the maximum outside temperature over a number of demand response days, and "startTemp" to an average mean inside temperature over a number of previous demand response days. RX-0156C, Henze QA273; CX-0531C (DR Overview); CPX-0001C (EF Source Code), at 04-07. As Dr. Henze testified, this equation does not include a comparison of inside and outside temperature measurements over time, as required by limitation [1b]. RX-0156C, Henze QA273.

Resps. Br. at 41-42.

The Staff does not address this limitation. *See* Staff Br. at 115.

The construction of "measurements of outside temperatures" was discussed above; the claim term "measurements of outside temperatures" means "measurements of the temperature outside (or external to) [the structure]."

Under the adopted construction, the evidence adduced by EcoFactor shows that the EcoFactor DI products include one or more processors that receive measurements of the temperature outside (or external to) [the structure] from at least one source other than said HVAC system. *See* CX-0674C (Gomez DWS) at Q/A 609-12.

Respondents argue that Mr. Gomez only identified source code for the "platform" component of the EcoFactor software. *See* Resps. Br. at 41. However, this does not demonstrate that the EcoFactor DI products do not satisfy claim 1[b]. Mr. Gomez testified that the "platform" server receives outside measurements from a weather service, and that information is then shared with several other processors. *See* CX-0674C (Gomez) at Q/A 585, 609. Mr. Gomez testified that "[e]ach of these processors—including, for the avoidance of doubt the processors that use outside temperature information to perform the linear modeling I discuss below—receive outside temperature information, and so each individually or in combination with any other can be the claimed 'one or more' processors." *Id*. at Q/A 585.

Respondents further argue that the EcoFactor Platform, with or without the Simple Thermostat, does not compare the inside temperature of said first structure and the outside temperature over time. *See* Resps. Br. at 41-42. However, the severity calculation involves a term of "avgTin – avgTout"—which is a comparison of inside temperatures and outside temperatures over the time period of the severity metric. *See* CX-0674C (Gomez DWS) at Q/A 609-11.

Even were "measurements of outside temperatures" construed according to respondents' proposed construction, the EcoFactor DI products would still satisfy this claim limitation because the "platform" server receives outside measurements from a weather service, and that

information is then shared with several other processors. *See* CX-0674C (Gomez) at Q/A 585, 609.

Even were "HVAC system" and "said one or more processors" construed according to respondents' proposed construction, the EcoFactor DI products would still satisfy this claim limitation because the EcoFactor DI products function as a group of components working together to move heat or remove heat from the conditioned [structure/location]. EcoFactor adduced evidence showing that the EcoFactor DI products include processors that receive, compare, and analyze temperature measurements over time. *See* CX-0674C (Gomez) at Q/A 585, 609.

Accordingly, it is determined that the EcoFactor DI products satisfy this claim limitation.

**d. one or more databases that store at least said temperature measurements obtained from said first structure over time,**

The EcoFactor DI products include "one or more databases that store at least said temperatures measured at said first location over time." CX-0674C (Gomez DWS) Q/A 613-14. Respondents does not contest that the EcoFactor DI products satisfy this claim limitation. *See* Resps. Br. at 40-43.

**e. wherein said one or more processors compares an inside temperature recorded inside the first structure with an inside temperature of said first structure recorded at a different time to determine whether the operational efficiency of the HVAC system has decreased over time.**

The record evidence does not show that the EcoFactor DI products satisfy this limitation of asserted independent claim 1. *See* RX-0156C (Henze RWS) at Q/A 274.

EcoFactor argues, in part:

> The EcoFactor Platform alone, or in combination with the Simple

[redacted]

Thermostat, meets element 1[b] of claim 1 of JX-0002 (the '322 patent). As Mr. Gomez explains, the EcoFactor Product implements at least two features designed to "determine whether the operational efficiency of the HVAC system has decreased over time"—HVAC Performance Monitoring, and the ramptimeDeltaSpLinearModel. CX-0674C (Gomez DWS) Q/A 615-17. In particular, as explained above, EcoFactor's HVAC Performance Monitoring feature involves the calculation of a severity metric that is used to determine whether operational efficiency has decreased indicating a performance degradation requiring maintenance as part of the HVAC Performance Monitoring feature. *Id.* In particular, the source code file \Quant\quant\faultDetector\faultRunner.py includes a function parseHPF that directly compares a current severity metric (thisSeverity) to a prior severity metric to determine whether operational efficiency has decreased. *Id.* Q/A 609-17; CPX-001C (EcoFactor Code) at faultRunner.py. The severity metric corresponds to the time and energy required to change the temperature by a given amount for a known set of outdoor conditions. *Id.*

In addition, EcoFactor re-trains its ramptimeDeltaSpLinearModel in order to detect changes in operational efficiency requiring increased durations for precooling. CX-0674C (Gomez DWS) Q/A 590-92. The increased duration is the time (and, for Demand Response, a proxy for energy) required to change the temperature by a given amount (in Demand Response, to the precooling temperature) for the known outdoor temperature. *Id.*

Both the severity metric parseHPF function (used for HVAC Performance Monitoring) and the delatSpLinearModel meet the element "wherein said one or more processors compares an inside temperature recorded inside the first structure with an inside temperature of said structure recorded at a different time." CX-0674C (Gomez DWS) Q/A 591-617. The parseHPF function calculates the severity metric using the ratio of the comparison of indoor to outdoor temperature (in the numerator) and indoor to indoor temperature in the denominator:

> thisSeverity = durationHrs * max(avgTin-avgTout+30., 0.) / max(4.-***deltaTin***, 2.)
>
> peakSeverity = peakHrs * max(maxTin-maxTout+40., 0.) / max(11.-***deltaTmax***, 1.)

CPX-001C (EcoFactor Code) at faultRuner.py ln 288-359 (parseHFP). As Mr. Gomez testifies, deltaTin and deltaTmax are comparisons of inside temperature at two different times (using subtraction).

Likewise, one input to the ramptimeDeltaSpLinearModel is another delta (i.e., comparison using subtraction) of two indoor temperatures: "lenMin ~ deltaTemp + avgOutsideTemp + startTemp." *E.g.*, CX-0674C (Gomez DWS) Q/A 591-617; CPX-001C (EcoFactor Code). As Mr. Gomez testified, deltaTemp is a comparison of two indoor temperatures at different times using subtraction. CX-

> 0674C (Gomez DWS) Q/A 591-617 CPX-001C (EcoFactor Code) at ramptimeDeltaSpLinearModel.

Compl. Br. at 226-28.

Respondents argue, in part:

> The evidence shows that EcoFactor failed to properly identify the claimed "one or more processors" as required by limitations [1b] and [1d]. *Id.* Henze QA270. Limitation [1b] of the '322 patent references "one or more processors." Limitations [1b] and [1d] of the '322 patent further reference "said one or more processors." Dr. Henze testified that a POSITA would understand that the same "one or more processors" carry out all the claimed functionality of limitations [1b] and [1d]. RX-0156C, Henze QA270. However, Mr. Gomez identified two different groups of processors that allegedly satisfy these limitations. *Id.*; CX-0674C, Gomez QA609. As to limitation 1[b], Mr. Gomez only identified source code from the "platform" component of the EcoFactor software. RX-0156C, Henze QA270; CX-0674C, Gomez QA609. But Mr. Gomez testified that source code from the "quant" component compares the measurements of inside and outside temperature, as required by limitations [1b] and [1d]. RX-0156C, Henze QA270; CX-0674C, Gomez QA609, 615. Dr. Henze testified that the "platform" and processors are different. RX-0156C, Henze QA247, 270; RX-0229C (EF-Trane Agmt.), at 261. Therefore, the "quant" processors cannot be the claimed "said one or more processors" of limitation [1d]. RX-0156C, Henze QA247, 270.

Resps. Br. at 41-43.

The Staff argues, in part:

> EcoFactor contends that the DI product satisfies claims 1, 2, and 5 of the '322 patent. RPreHBr. at 103; CX-0674C (Gomez) QA 602-622. For the same reasons discussed above with respect to claim 1 of the '497 patent, the evidence does not show that the DI product satisfies the preamble (no operational efficiency) and element 1[d] (no "operational efficiency" and no "said one or more processors") of the '322 patent. *See also* RX-0156C (Henze) QA 261-267; 274.

Staff Br. at 115.

EcoFactor has not adduced evidence showing that the EcoFactor DI products satisfy limitation 1[d] of the '322 patent.

First, Mr. Gomez identified different processors for limitation [1d] than for limitation [1b]. *See* RX-0156C (Henze RWS) at Q/A 270; CX-0674C (Gomez DWS) at Q/A 609, 615. As

to limitation [1b], Mr. Gomez only identified source code for the "platform" component of the EcoFactor software. *See* RX-0156C (Henze RWS) at Q/A 270; CX-0674C (Gomez DWS) at Q/A 609. As to limitation [1d], Mr. Gomez identified the "quant" component of its source code. *See* RX-0156C (Henze RWS) at Q/A 270; CX-0674C (Gomez DWS) at Q/A 615. However, the evidence shows that the processors of the "platform" component are not the same processors as the "quant" component. RX-0156C (Henze RWS) at Q/A 270; RX-0229C (EF-Trane Agmt.) at 261. As Dr. Henze testified, the "quant" processors cannot be the "said one or more processors" of limitation [1d]. RX-0156C (Henze RWS) at Q/A 270. Therefore, the evidence does not show that this element is satisfied by the EcoFactor DI products.

Second, EcoFactor failed to establish that the EcoFactor DI products compare two inside temperature measurements to determine whether the operational efficiency of an HVAC system has decreased over time. *See* RX-0156C (Henze RWS) at Q/A 274. Mr. Gomez testified that the severity metric includes the claimed comparisons of inside temperature measurements. *See* CX-0674C (Gomez DWS) at Q/A 615. However, Dr. Henze testified that the severity metric does not compare inside temperature measurements to determine whether the operational efficiency of an HVAC system has decreased over time. *See* RX-0156C (Henze RWS) at Q/A 274. Instead, the evidence shows that the EcoFactor source code compares two severity metrics to determine whether EcoFactor believes there is a fault with the HVAC system. *Id.* Mr. Gomez also testified that the precool period length computation determines whether the operational efficiency of an HVAC system has decreased over time. *See* CX-0674C (Gomez DWS) at Q/A 615. However, Dr. Henze testified that the precool period length computation only evaluates the latest model parameters to make a prediction of when to start precooling a space, and does not

determine whether the operational efficiency of an HVAC system has decreased over time. *See* RX-0156C (Henze RWS) at Q/A 274.

If "operational efficiency" were construed according to EcoFactor's proposed construction, the EcoFactor DI products would still not satisfy this claim limitation because EcoFactor failed to establish that the EcoFactor DI products compare two inside temperature measurements to determine whether the operational efficiency of an HVAC system has decreased over time. *See* RX-0156C (Henze RWS) at Q/A 274.

Even were "HVAC system" and "said one or more processors" construed according to respondents' proposed construction, the EcoFactor DI products would still not satisfy this claim limitation because EcoFactor has not shown that the EcoFactor DI products compare two inside temperature measurements to determine whether the operational efficiency of the HVAC system has decreased over time.

Accordingly, it is determined that the EcoFactor DI products do not satisfy this limitation.

* * *

It is therefore determined that the EcoFactor DI products do not practice independent claim 1 of the '322 patent.

**2. Claim 2**

**a. A system as in claim 1**

As discussed above, the EcoFactor DI products do not satisfy all limitations of independent claim 1.

[redacted]

**b. in which said processors receive measurements of outside temperatures for geographic regions such as ZIP codes from sources other than said HVAC control systems.**

EcoFactor argues, in part:

> The EcoFactor Platform alone, or in combination with the Simple Thermostat, meets element of claim 2 of JX-0002 (the '322 patent for the same reasons explained above with regard to claim 2 of the '497 patent. CX-0674C (Gomez DWS) Q/A 618-20. This discussion is incorporated herein by reference.

Compl. Br. at 228.

Respondents argue, in part:

> The evidence shows that EcoFactor failed to establish that it practices claims 2 and 5 of the '322 patent. *Id.* Henze QA276-80. Claim 2 of the '322 patent depends from claim 1. Because EcoFactor did not establish that it practices claim 1 of the '322 patent, it necessarily cannot show that it practices claims 2 and 5. *Id.* Henze QA277-78.

Resps. Br. at 43.

The Staff argues, in part:

> The evidence also does not show that dependent claims 2 and 5 are satisfied for at least the same reasons. RX-0156C (Henze) QA 277-280. In addition, as discussed above with respect to the '497 patent, Mr. Gomez testified that the Simple Thermostat is required to meet the additional limitation of claims 2 and 5 of the '322 patent. *See* CX-0674C (Gomez) QA 619-622. Therefore, for this additional reason, the evidence does not show that the DI product, by itself, practices these claims.

Staff Br. at 115.

The evidence adduced by EcoFactor demonstrates that the EcoFactor DI products satisfy the additional claim 2 limitation "in which said processors receive measurements of outside temperatures for geographic regions such as ZIP codes from sources other than said HVAC control systems." *See* CX-0674C (Gomez DWS) at Q/A 620.

[redacted]

As Mr. Gomez testified, the EcoFactor Platform uses ZIP code to obtain weather information. *See id.* at Q/A 596. EcoFactor uses the ZIP code to obtain a city code corresponding to a weather station. *See id.* The EcoFactor platform then receives outside temperatures from that weather station based on the ZIP code of the HVAC system. *See id*.

Even were "measurements of outside temperatures" construed according to respondents' proposed construction, the EcoFactor DI products would still satisfy this claim limitation because the "platform" server receives outside measurements from a weather service. *See* CX-0674C (Gomez) at Q/A 585, 609.

* * *

It is therefore determined that the EcoFactor DI products do not practice dependent claim 2 of the '322 patent.

**3. Claim 5**

**a. A system as in claim 1**

As discussed above, the EcoFactor DI products do not satisfy all limitations of independent claim 1.

**b. in which said HVAC system includes a programmable thermostat and said programmable thermostat is the sole source for current data regarding temperature inside said first structure conditioned by said HVAC system.**

EcoFactor argues, in part:

> The EcoFactor Platform alone, or in combination with the Simple Thermostat, meets claim 5 of the '322 patent for the same reasons explained above with regard to claim 5 of the '497 patent. CX-0674C (Gomez DWS) Q/A 621-22. This discussion is incorporated herein by reference.

Compl. Br. at 228.

Respondents argue, in part:

[redacted]

> The evidence shows that EcoFactor failed to establish that it practices claims 2 and 5 of the '322 patent. *Id.* Henze QA276-80. Claim 2 of the '322 patent depends from claim 1. Because EcoFactor did not establish that it practices claim 1 of the '322 patent, it necessarily cannot show that it practices claims 2 and 5. *Id.* Henze QA277-78. In addition, as Dr. Henze testified, because Mr. Gomez identified the Simple Thermostat as the claimed HVAC control system for claim 1, (CX-0674C, Gomez QA606), it cannot also be the claimed programmable thermostat of claim 5. RX-0156C, Henze QA278; CX-0674C, Gomez QA622. Therefore, EcoFactor failed to establish that it practices claim 5 of the '322 patent. RX-0156C, Henze QA280.

Resps. Br. at 43.

The Staff argues, in part:

> The evidence also does not show that dependent claims 2 and 5 are satisfied for at least the same reasons. RX-0156C (Henze) QA 277-280. In addition, as discussed above with respect to the '497 patent, Mr. Gomez testified that the Simple Thermostat is required to meet the additional limitation of claims 2 and 5 of the '322 patent. *See* CX-0674C (Gomez) QA 619-622. Therefore, for this additional reason, the evidence does not show that the DI product, by itself, practices these claims.

Staff Br. at 115.

The construction of "programmable thermostat" was discussed above; the claim term "programmable thermostat" means "thermostat that uses microprocessor-based circuitry to control the switch and operate based upon user-determined protocols for temperature vs. time."

Under the adopted construction, EcoFactor adduced evidence demonstrating that the EcoFactor DI products satisfy the additional claim 5 limitation "in which said HVAC system includes a programmable thermostat and said programmable thermostat is the sole source for current data regarding temperature inside said first structure conditioned by said HVAC system." *See* CX-0674C (Gomez DWS) at Q/A 621-22.

The sole source of inside temperature information for the EcoFactor Platform can be a connected Simple Thermostat. *See id.* at Q/A 599. The Simple Thermostat includes an

integrated temperature sensor that is the sole source of information regarding inside temperature within a structure. *See id.* The Simple Thermostat is a programmable thermostat that allows users to program schedules using EcoFactor's application. *See id*.

Even were "HVAC system" and "programmable thermostat" construed according to respondents' proposed construction, the EcoFactor DI products would still satisfy this claim limitation because the EcoFactor DI products function as a group of components working together to move heat or remove heat from the conditioned [structure/location], and the Simple Thermostat is a programmable thermostat that allows users to program schedules using EcoFactor's application. *See id*.

* * *

It is therefore determined that the EcoFactor DI products do not practice dependent claim 5 of the '322 patent.

## VIII. The '371 Patent

### A. Overview of the '371 Patent

Asserted U.S. Patent No. 10,018,371 ("the '371 patent") is titled, "System, method and apparatus for identifying manual inputs to and adaptive programming of a thermostat." JX-0004 ('371 patent). The '371 patent issued on July 10, 2018, and the named inventors are John Douglas Steinberg, Scott Douglas Hublou and Leo Cheung. *Id.*

EcoFactor asserts independent claim 9 of the '371 patent. This claim reads as follows:

> 9. A method for incorporating manual changes to one or more setpoints for a thermostatic controller, the method comprising:
>
> > providing a thermostatic controller operatively connected to a heating ventilation and air conditioning system, the one or more setpoints of the heating ventilation and air conditioning system being manually changeable;

[redacted]

> calculating scheduled programming of automated setpoints in the thermostatic controller based on the scheduled programming comprising at least a first automated setpoint at a first time and a second automated setpoint at a second time to control the heating ventilation and air conditioning system;
>
> recording, with the thermostatic controller, actual setpoints of the heating ventilation and air condition system;
>
> communicating the actual setpoints from the thermostatic controller to the at least one computer;
>
> comparing at least one of the actual setpoints at the first time for the thermostatic controller to the first automated setpoint for the thermostatic controller;
>
> detecting a manual change to the first automated setpoint by determining whether the at least one of the actual setpoints and the first automated setpoint are the same or different; and
>
> changing the operation of the heating ventilation and air conditioning system by changing the second automated setpoint at the second time based on at least one rule for the interpretation of the manual change.

*Id.* at col. 13, ln. 52 – col. 14, ln. 21; col. 14, lns. 55-59; col. 15, lns. 1-23; col. 15, ln. 30 – col. 16, ln. 20; col. 16, lns. 44-47.

EcoFactor relies on claim 9 of the ’371 patent to satisfy the technical prong of the domestic industry requirement.

### B. Infringement

EcoFactor contends that the accused Google products infringe independent claim 9 of the ’371 patent. *See* Compl. Br. at 238-40.

#### 1. A method for incorporating manual changes to one or more setpoints for a thermostatic controller, the method comprising:

Google’s accused products satisfy this limitation. CX-0674C (Gomez DWS) at Q/A 325-36.

EcoFactor argues, in part:

The Google Products each meet the preamble of claim 9 of CX-0004 (the '371 patent). The Google Products have smart scheduling features that incorporate a user's manual changes into automated scheduling. CX-0674C (Gomez DWS) Q/A 326-328.

**Auto-Schedule:** The Auto-Schedule feature incorporates the user's manual changes when calculating learned setpoints. CX-0674C (Gomez DWS) Q/A 326-327 (describing Auto-Schedule); CX-0063C.0002-9 (A Brief Tour of HVAC Algorithms) ( ); CX-0674C (Gomez DWS) Q/A 346 (describing Auto-Schedule); CX-0092 (How to improve energy savings with your Nest thermostat) ("Teach your Nest thermostat. The first week after being installed your thermostat will build a schedule by learning each time you walk in front of it or adjust the temperature. Your thermostat will never stop learning, so teach it good habits to help save energy.").

**Seasonal Savings**: The Seasonal Savings feature incorporates the user's manual changes when calculating Seasonal Savings setpoints. If a user makes a manual change to a temperature setpoint that was calculated by the Seasonal Savings algorithm, the Google Products learn from the manual change and make different adjustments going forward. CX-0674C (Gomez DWS) Q/A 334-335 (describing Seasonal Savings); CX-0655.0001 (Learn about Seasonal Savings) ("Seasonal Savings is an energy savings program that's available on your Google Nest thermostat in winter and summer. It's like a personal energy assistant, looking for ways to lower your bills, quietly working behind the scenes, and helping you stay comfortable too"); CX-0655.0003 ("If you don't like an adjustment Seasonal Savings has made, you have a few options. Change the temperature with the Nest app or Nest thermostat. Your Nest thermostat will learn from your adjustments and change its behavior. So if Seasonal Savings sets temperatures 2 degrees F (1.5 degrees C) lower, and you turn it up, then your Nest thermostat will know to make more subtle changes next week."); CX-0604C.0015 (Long Term Setpoint Trends) (CDX-0001.99); CDX-0001.10; CX-0674C Q. 328.

**Thermostatic Controller.** The Google Products infringe under any construction of "thermostatic controller," including Respondents' construction ("thermostat"). CX-0674C (Gomez DWS) Q. 332-340. That said, Respondents' proposed construction is too limiting. It would exclude one preferred embodiment of the invention, in which the thermostat in the residence does not include controls allowing users to program temperature settings because such controls are instead available to the user through a web browser. JX-0004 ('371 patent) 4:6-40, 4:51-67.

Regardless, the "thermostatic controller" of claim 9 corresponds to the controls on the Nest Thermostat itself, which satisfies Respondents' construction.

[redacted]

CX-0674C (Gomez DWS) Q. 332-333, 338-340. The Google Products incorporate the user's manual changes when they walk up to the device and turn the dial. Hearing Tr. 742:19-23 (Dr. Burger) ("[redacted] Hearing Tr. 742:24-743:22 (Dr. Burger confirming "Auto Schedule feature [redacted]

Further, the "thermostatic controller" of claim 9 corresponds to the controls on the Nest mobile app or web browser, which is consistent with a preferred embodiment. The Google Products incorporate the user's manual changes any time they [redacted]. CX-0674C (Gomez DWS) Q/A 332-333, 338-340, citing CX-0106C (Donhowe Tr.) 66-73 (testimony explaining that [redacted]); Hearing Tr. 742:24-743:22 (Dr. Burger confirming "Auto Schedule feature [redacted]."). The Google Products thus infringe whether users are using the controls on the thermostat or the controls in the Nest mobile app. CX-0674C (Gomez DWS) Q/A 332-333, 338-340, citing CX-0072C (Chappelle Tr.) 188:23-195:11, 239:21-240:23.

Compl. Br. at 240-42.

Google argues, in part:

To the extent that the preamble is limiting, limitation [9pre] req[redacted] that the system incorporate "manual changes." RX-0156C, Henze QA201; '371 patent, cl. 9. Mr. Gomez argues that the Nest Thermostats incorporate "manual changes" that result from user interactions with the thermostats, but does not explain how those changes are "incorporated" or into what they are incorporated. CX-0674C, Gomez QA332-35; RX-0156C, Henze QA201.

Resps. Br. at 180.

The Staff argues, in part:

The preamble recites "*[a] method for incorporating manual changes to one or more setpoints for a thermostatic controller*." Staff Ex. 1. To the extent the preamble is limiting, the evidence shows that Google's accused products satisfy the preamble. *See* CPreHBr. at 138-139; CX-0674C (Gomez) QA 325-336; Hearing Tr. at 360:15-365:1 (Gomez). Specifically, the evidence shows that

> a manual change to a setpoint may occur when a user adjusts the target temperature by, for example, walking up to a Nest Learning

[redacted]

> Thermostat Third Generation or Nest Thermostat E and turning the dial, or using the Nest mobile app to adjust the target temperature. A Nest Learning Thermostat (3rd Gen.) or Nest Thermostat E user can edit their temperature settings and setpoint schedule directly on the device. [redacted]. Donhowe Tr., 66-73.

CX-0674C (Gomez) QA 332 (emphasis added).

Staff Br. at 66.

The construction of "thermostatic controller" was discussed above; the claim term "thermostatic controller" is construed to mean "thermostat controller."

Under the adopted construction, Google's accused products each meet the limitations of the preamble of claim 9. CX-0674C (Gomez DWS) at Q/A 331-32. Google argues that Mr. Gomez does not explain how the manual changes are incorporated or into what they are incorporated. *See* Resps. Br. at 180. However, Mr. Gomez testified that the Auto-Schedule feature incorporates the user's manual changes when calculating learned setpoints. *See* CX-0674C (Gomez DWS) at Q/A 326-27, 346. Mr. Gomez also testified that the Seasonal Savings feature incorporates the user's manual changes because Google's accused products make adjustments going forward when calculating Seasonal Savings setpoints if a user makes a manual change to a temperature setpoint that was calculated by the Seasonal Savings algorithm. *See* CX-0674C (Gomez DWS) at Q/A 334-35. The administrative law judge thus finds that Google's accused products practice a method for incorporating manual changes to one or more setpoints for a thermostatic controller.

[redacted]

Even if Google's proposed construction for this claim limitation were adopted, EcoFactor adduced evidence showing that Google's accused products would nevertheless satisfy this claim limitation. The "thermostatic controller" of claim 9 corresponds to the controls on the Nest Thermostat itself, which satisfies Google's construction. *See* CX-0674C (Gomez DWS) at Q/A 332-33, 338-40. Google's accused products incorporate the user's manual changes when they turn the dial on the Nest Thermostat. Burger Tr. 742-743.

**2. providing a thermostatic controller operatively connected to a heating ventilation and air conditioning system, the one or more setpoints of the heating ventilation and air conditioning system being manually changeable;**

Google's accused products each satisfy the above-recited claim limitation. *See* CX-0674C (Gomez DWS) at Q/A 338-40.

EcoFactor argues, in part:

> The Google Products each meet claim 9[a] of JX-0004 (the '371 patent), regardless of what proposed claim construction is adopted. CX-0674C (Gomez DWS) Q/A 338-340. The Google Products include a thermostatic controller operatively connected to a customer's HVAC system. CX-0674C (Gomez DWS) Q/A 338-340, citing CX-0072C (Chappelle Tr. 188:23-196:25, 239:21-240:23). The Google Products include components that allow a user to adjust temperature settings and control the setpoint for the HVAC system. CX-0674C (Gomez DWS) 58-73, 338-340. Temperature settings can be changed using the dial turn, button press, and hall effect sensor on the device and the accompanying circuitry ("thermostatic controller"). Temperature settings can also be changed with the Nest mobile app ("thermostatic controller"). Each of these controllers is "operatively connected" to the customer's HVAC system. *Id.* The Google Products connect to the wires for controlling the HVAC system. *Id.* They are also operatively connected wirelessly to provide HVAC setpoint control through the Nest mobile app. *Id.*
>
> The Google Products infringe regardless of which claim construction of "thermostatic controller" is adopted, because they provide a controller located on the thermostat and controllers connected over the network, and both are operatively connected to the HVAC system. CX-0674C (Gomez DWS) Q/A 332-333, 338-340, citing CX-0072C (Chappelle Tr.) 188:23-195:11, 239:21-240:23; CX-0106C (Donhowe Tr.) 66-73 (testimony explaining that users can change temperature settings directly on the device or using the mobile or web apps); Hearing Tr.

[redacted]

742:24-743:22 (Dr. Burger confirming "Auto Schedule featur [redacted] .

Compl. Br. at 242-43.

Google argues, in part:

> Limitation [9a] requires "providing a thermostatic controller operatively connected" to an HVAC system. '371 patent, cl. 9; RX-0156C, Henze QA202. Mr. Gomez failed to identify the claimed "thermostatic controller" under Respondents' construction. CX-0674C, Gomez QA333, 338. Mr. Gomez also did not identify the claimed "thermostatic controller" under EcoFactor's construction. *Id.* Mr. Gomez points to no fewer than ***six*** different components within the thermostat, and on the network, as the alleged thermostatic controller. CX-0674C, Gomez QA333. Notwithstanding the confusion in Mr. Gomez's testimony, on cross-examination, Mr. Gomez agreed that, under his analysis, the claimed "thermostatic controller" includes the [redacted] of the Nest thermostats. Hearing Tr. vol. 1, 274:4-75:18, (Gomez); CX-0674C, Gomez QA333.
>
> Mr. Gomez did not explain how these components are "operatively connected" to an HVAC, as required by limitation [9a], or how they perform the other functions of a thermostatic controller to satisfy the requirements of claim 9. RX-0156C, Henze QA202; CX-0674C, Gomez QA338.

Resps. Br. at 180-81.

The Staff argues, in part:

> The evidence shows that Google's accused products satisfy element 9[a]: "providing a thermostatic controller operatively connected to a heating ventilation and air conditioning system, the one or more setpoints of the heating ventilation and air conditioning system being manually changeable." Staff Ex. 1; CX-0674C (Gomez) QA 337-340. Google argues that Mr. Gomez fails to identify the claimed "thermostatic controller," and does not explain how the different components of the thermostat are "operatively connected" to an HVAC, as required by limitation [9a], or how they perform the other functions of a thermostatic controller to satisfy the requirements of claim 9. RPreHBr. at 129. However, Mr. Gomez identified the thermostatic controller as "the components that allow a user to adjust the temperature settings and control the thermostat," including [redacted] X-0674C (Gomez) QA 333 (citing CX-0072C (Chappelle Tr.) 189-196, 239-240); see also Hearing Tr. 274:16-277:2 (Gomez); 360:15-365:1 (Gomez).

Staff Br. at 66-67 (footnote omitted).

The construction of "thermostatic controller" was discussed above; the claim term "thermostatic controller" is construed to mean "thermostat controller."

Under the adopted construction, Google's accused products each meet the limitations of claim 9[a]. *See* CX-0674C (Gomez DWS) at Q/A 338-40. Google's accused products include a thermostatic controller operatively connected to a customer's HVAC system. CX-0072C (Chappelle Dep. 188:23-196:25, 239:21-240:23). Google's accused products include components that allow a user to adjust temperature settings and control the setpoint for the HVAC system. *See* CX-0674C (Gomez DWS) 58-73, 338-340. Temperature settings can be changed using the dial turn, button press, and [redacted] on the device and the [redacted] which function as a thermostatic controller. *See id.*

Even if Google's proposed construction for this claim limitation were adopted, EcoFactor adduced evidence showing that Google's accused products would nevertheless satisfy this claim limitation. Google's accused products provide a [redacted]. *See* CX-0674C (Gomez DWS) Q/A 332-33, 338-40 (citing CX-0072C (Chappelle Dep.) 188:23-195:11, 239:21-240:23; CX-0106C (Donhowe Dep.) 66-73 (testimony explaining that users can [redacted])); Burger Tr. 742-743.

Even were "heating ventilation and air conditioning system" construed according to respondents' proposed construction, the accused Google products would still satisfy this claim limitation because the Nest thermostats function as a group of components working together to move heat or remove heat from the conditioned [structure/location].

[redacted]

**3. calculating scheduled programming of automated setpoints in the thermostatic controller based on the scheduled programming comprising at least a first automated setpoint at a first time and a second automated setpoint at a second time to control the heating ventilation and air conditioning system;**

Google's accused products each satisfy the above-recited claim limitation. *See* CX-0674C (Gomez DWS) at Q/A 341-51.

EcoFactor argues, in part:

The Google Products each meet claim 9[b] of JX-0004 (the '371 patent). CX-0674C (Gomez DWS) Q/A 341-351. The Google Products include a computer that calculates scheduled programming that includes automated setpoints, including at least a first and second automated setpoint. CX-0674C (Gomez DWS) Q/A 345-346, citing CX-0061C (Burger Tr. 263-265); CX-0104C (Sapphire Algos Overview, description of Auto-Schedule), CX-0063C.0005-0010; CX-0624C (Auto-Schedule Algo Audit); CDX-0001C.100-127; CX-0092 ("How to improve energy savings with your Nest thermostat"):

> "The first week after being installed your thermostat will build a schedule by learning each time you walk in front of it or adjust the temperature. Your thermostat will never stop learning, so teach it good habits to help save energy. Turn it down before you go to bed, or any time you would turn down a regular thermostat to save energy. Your Nest thermostat will remember these changes and adjust your schedule. You can see the results of teaching your Nest thermostat good habits in your Home Report."

Dr. Burger has confirmed that the Nest Thermostats' Auto-Schedule [redacted]. Hearing Tr. 742:1-742:18. Mr. Gomez confirmed this in the source code as well. CX-0674C (Gomez DWS) Q/A 344-349 ("In Google source code (CPX-0002C), [redacted].

* * *

Dr. Burger testified that the Auto-Schedule [redacted] Hearing Tr. 742:1-742:18 ("Q. And the thermostats, the Nest thermostats run an Auto Schedule algorithm that generates Auto Schedule setpoints, right? [redacted]

[redacted]

Dr. Burger also confirmed that the "Auto Schedule [redacted]. Hearing Tr. 742:24-743:22 (Dr. Burger):

"**A**. The Auto Schedule feature [redacted]

* * *

The patent specification defines automated setpoints as "algorithmic changes intended to reduce energy consumption, etc." CX-0004 ('371 patent), 6:12-16. Similarly, Auto Schedule calculates setpoints that are more "efficient" and "help save energy." CX-0063C.0005 [redacted]. CX-0655 ("Learn about Seasonal Savings. Seasonal Savings is an energy savings program that's available on your Google Nest thermostat in winter and summer. It's like a personal energy assistant, looking for ways to lower your bills, quietly working behind the scenes, and helping you stay comfortable too..... If you don't like an adjustment Seasonal Savings has made, you have a few options: Change the temperature with the Nest app or Nest thermostat. Your Nest thermostat will learn from your adjustments and change its behavior"); CX-0674C (Gomez DWS) Q. 346 (describing Auto-Schedule); CX-0092 (How to improve energy savings with your Nest thermostat) ("Teach your Nest thermostat. The first week after being installed your thermostat will build a schedule by learning each time you walk in front of it or adjust the temperature. Your thermostat will never stop learning, so teach it good habits to help save energy.")

* * *

The Auto-Schedule setpoints are [redacted] pursuant to the agreed construction for "automated setpoints," because they are [redacted] in the Google Products. CX-0674C (Gomez DWS) Q/A

70, 73, 344, 364; Hearing Tr. 742:1-742:18 (Dr. Burger confirming [redacted]).

* * *

Google argues that Mr. Gomez fails to identify a "computer," because under its interpretation of the '371 patent, the "computer" cannot be in the same device as the "thermostatic controller." Respondents' Prehearing Brief 140. Importantly, Dr. Burger has confirmed that the Nest Thermostats' Auto-Schedule [redacted]. Hearing Tr. 742:1-742:18. Mr. Gomez confirmed this in the source code as well. CX-0674C (Gomez DWS) Q/A 344-349. Thus, Google cannot dispute that the Nest Thermostats include a computer. Google is instead arguing that the plain and ordinary meaning of the term "computer" cannot apply [redacted].

This argument fails for at least two reasons. ***First,*** Google's "box-drawing" argument is irrelevant, given Mr. Gomez's infringement theories. Mr. Gomez asserts that the "computer" [redacted], whereas the "thermostatic controller" is the "dial turn button and hall sensor on the device and the accompanying circuitry." Hearing Tr. 362:10-23. Alternatively, the "thermostatic controller" is the Nest mobile application. Hearing Tr. 362:24-363:3. Either way, these are not the same component [redacted]

***Second,*** the intrinsic record confirms that Google is wrong. Google's argument would exclude from infringement any single device that includes both a "thermostatic controller" and a "computer." Such a construction would exclude a preferred embodiment, and thus cannot be correct. JX-0004 ('371 patent) 8:1-6 ("For example, much or even all of the work being accomplished by remote server **106** may also be done by thermostat **108** if the device has sufficient processing capabilities, memory, etc."). Moreover, Mr. Gomez's analysis confirms infringement under any proposed construction. *Id.* Q/A 351.

Compl. Br. at 243-47.

Google argues, in part:

Limitations [9b] through [9d] require: [b] "calculating . . . automated setpoints;" [c] "recording . . . actual setpoints;" and [d] "communicating the actual setpoints from the thermostatic controller to the at least one computer." '371 patent, cl. 9; RX-0156C, Henze QA203, 209-210. Mr. Gomez failed to establish that the Nest Thermostats include both the claimed computer and the claimed thermostatic controller, or that the Nest Thermostats include both the claimed actual setpoints and the claimed automated setpoints.

* * *

Mr. Gomez testified that the claimed thermostatic controller [redacted] the Nest Thermostats, and the claimed computer is also [redacted]. Hearing Tr. vol. 1, 274:4-76:19, Nov. 16, 2020 (Gomez); CX-0674C, Gomez QA333, 344, 349. However, as further discussed, limitations [9b] through [9d] require that the claimed computer and the claimed thermostatic controller are two separate components. Further, a component does not "communicate" with itself. Accordingly, Mr. Gomez's testimony cannot establish infringement.

As Dr. Henze and Dr. Palmer testified, and as Mr. Gomez agreed, a POSITA would understand that, under the agreed-upon construction for "automated setpoint," a computer must calculate the setpoints. RX-0156C, Henze QA204; CX-0702C, Palmer QA285; Hearing Tr. vol. 1, 275:19-76:2, Nov. 16, 2020 (Gomez). As Dr. Henze testified, because claim 9 requires that the thermostatic controller communicate the "actual setpoints" to the computer, a POSITA reading claim 9 of the '371 patent would understand that the claimed "at least one computer" and the "thermostatic controller" are two different components. RX-0156C, Henze QA205; *see also Becton, Dickinson & Co.*, 616 F.3d at 1254 ("Where a claim lists elements separately, the clear implication of the claim language is that those elements are distinct components of the patented invention." (internal quotation marks and citations omitted)).

* * *

On cross-examination, Mr. Gomez testified that "[a] setpoint is either an actual setpoint or an automated setpoint." Hearing Tr. vol. 1, 281:1-5, Nov. 16, 2020, (Gomez). Mr. Gomez makes clear in his testimony that it is his opinion that a setpoint is either an "actual setpoint," or an "automated setpoint," but cannot be both. However, Mr. Gomez's infringement analysis identifies the same setpoints as both "actual setpoints" and "automated setpoints." Accordingly, Mr. Gomez's analysis cannot establish infringement.

Mr. Gomez testified that the Nest Thermostats include "actual setpoints," which are the "actual setpoints executed by the thermostat." CX-0674C, Gomez QA353. Mr. Gomez testified that the setpoints that are "actually executed" are "the target temperature at a given time." CX-0674C, Gomez QA354. At the Hearing, Mr. Gomez testified that these setpoints represented "the temperature that would be executed." Hearing Tr. vol. 1, 280:21-23, Nov. 16, 2020, (Gomez). Under Mr. Gomez's analysis, the "actual setpoints" must therefore include all the setpoints present in a schedule on a thermostat. *See id.*

As previously noted, Mr. Gomez accuses temperature setpoints created by the "Auto Schedule" feature as being the required "automated setpoints." CX-0674C, Gomez QA343. However, Google's documents, source code, and witness testimony establish that, under Mr. Gomez's analysis, Auto-Schedule setpoints are actual setpoints because they are "actually executed" by the thermostat. Accordingly, the Auto-Schedule setpoints cannot also be automated setpoints.

[redacted]

As Dr. Henze testified, and as confirmed by Dr. Burger, the Nest Thermostats [redacted] RX-0156C, Henze QA208-209; RX-0157C, Burger QA75. Google's documentation establishes that [redacted] RX-0157C, Burger QA74; RX-0614 (How to Use Your Nest as a Traditional Thermostat), at 1; RX-0643C (Learn About Nest Temp. Schedules), at 6. Google's documents further establish that the Nest Thermostats will follow the schedule and "heat or cool to the scheduled temperature." *See, e.g.*, RX-0614 (How to Use Your Nest as a Traditional Thermostat), at 1-2; RX-0643C (Learn About Nest Temp. Schedules), at 7. As Dr. Henze testified, a POSITA would understand that all the setpoints in a schedule on the thermostat are "actual setpoints," and not "automated setpoints." RX-0156C, Henze QA208-209. Similarly, under Mr. Gomez's interpretation, any temperature setpoints in a schedule on the thermostat, regardless of their source, are "actual setpoints executed by the thermostat" and are therefore "actual setpoints."

Accordingly, Mr. Gomez's testimony is clear that he identifies the same setpoints as both automated and actual setpoints, which is inconsistent with the plain language of claim 9, and therefore cannot establish infringement. *Becton, Dickinson & Co.*, 616 F.3d at 1256 ("There can be no literal infringement where a claim requires two separate structures and one such structure is missing from an accused device.").

Resps. Br. at 181-85.

The Staff argues, in part:

The evidence shows that Google's accused products satisfy element 9[b]: "*calculating scheduled programming of automated setpoints in the thermostatic controller based on the scheduled programming comprising at least a first automated setpoint at a first time and a second automated setpoint at a second time to control the heating ventilation and air conditioning system*." Staff Ex. 1; CX-0674C (Gomez) QA 341-351; Hearing Tr. at 274:4-281:5 (Gomez); 360:15-365:1 (Gomez). Google argues that this limitation requires a computer that must be separate from the "thermostatic controller" of element 9[a], and thus Mr. Gomez's suggestion that they are the same component is inconsistent with the claim language. RPreHBr. at 130. The Staff disagrees. As discussed above, Mr. Gomez testified the thermostatic controller (the components that allow a user to adjust the temperature settings and control the thermostat," including "the dial turn, button press, and hall effect sensor, circuitry in the device for implementing a user's control decisions, and software including a hierarchy of different controllers of the HVAC") and the computer of element 9[b] are separate. CX-0674C (Gomez) QA 344.

Staff Br. at 67-68.

Google's accused products calculate scheduled programming of automated setpoints in the thermostatic controller based on the scheduled programming comprising at least a first automated setpoint at a first time and a second automated setpoint at a second time to control the heating ventilation and air conditioning system. Google's accused products include a computer that calculates scheduled programming that includes automated setpoints, including at least a first and second automated setpoint. *See* CX-0674C (Gomez DWS) at Q/A 345-46 (citing CX-0061C (Burger Dep. 263-65)); CX-0104C (Sapphire Algos Overview, description of Auto-Schedule), CX-0063C.0005-0010. As Mr. Gomez testified, the thermostatic controller (the components that allow a user to adjust the temperature settings and control the thermostat), and the computer of element 9[b] are separate. CX-0674C (Gomez) at Q/A 344.

Google contends Mr. Gomez's infringement analysis identifies [redacted] as both the claimed thermostatic controller and the claimed computer, which is contrary to the claim language. *See* Resps. Br. at 181-85. However, as Mr. Gomez testified, the "computer" is the [redacted]. Gomez Tr. 362-363. Google further argues Mr. Gomez identifies the same setpoints as both automated and actual setpoints, which is inconsistent with the plain language of claim 9. However, as Dr. Burger testified, [redacted] Burger Tr. 742.

It is therefore determined that Google's accused products satisfy the above-recited limitation.

[redacted]

**4. recording, with the thermostatic controller, actual setpoints of the heating ventilation and air condition system;**

Google's accused products each satisfy the above-recited claim limitation. *See* CX-0674C (Gomez DWS) at Q/A 354-57.

EcoFactor argues, in part:

> The Google Products each meet claim 9[c] of JX-0004 (the '371 patent). The Google Products record the actual set points executed for the HVAC system, which can differ from scheduled programming due to manual adjustments by the user on the device controls or through the Nest web or mobile apps. CX-0674C (Gomez DWS) Q/A 353-357. An "actual setpoint" is the "target temperature at a given time." CX-0674C (Gomez DWS) Q/A 354.
>
> Mr. Gomez analyzed the source code that describes [redacted] CX-0674C (Gomez DWS) Q/A 358:
>
> - "The source code [redacted]
> - Analyzing [redacted]
> - Analyzing [redacted] (GOOG-SC-ITC 1185-0014, -0135) [redacted]
>
> Dr. Burger has confirmed that the Google Products [redacted] Hearing Tr.

742:24-743:22 (Dr. Burger):

"**A**. The Auto Schedule feature

**Google's non-infringement argument.** Google argues that "all the setpoints in a schedule on the thermostat are 'actual setpoints,' and not 'automated setpoints.'" Respondents' Prehearing Brief at 140-141, referencing RX-0156C (Henze WS) QA 208-209. It is not clear why this argument would be relevant to non-infringement of element 9[c]. Dr. Henze contends that all of the setpoints recorded by the Google Products are actual setpoints. RX-0156C (Henze WS) QA 208-209. That literally infringes element 9[c].

Indeed, the Google Products . CX-0674C (Gomez DWS) Q/A 358

Q/A 378-380

Further, Google's documents expressly describe which may or may not differ from CX-0589C (Nest Seasonal Savings Impacts) or due to the auto-away feature based on occupancy detection of the Nest Learning Thermostat); CX-0582C (Seasonal Savings White Paper); CX-0623C (Seasonal Savings impacts)

The Google Products meet claim 9[c] under any proposed construction, because they record an actual temperature setting for a thermostat to achieve or

maintain with a thermostatic controller, including one located on the thermostat itself. CX-0674C (Gomez DWS) Q/A 359.

Compl. Br. at 247-49.

Google argues, in part:

> Mr. Gomez testified that the claimed thermostatic controller [redacted] in the Nest Thermostats, and the claimed computer is also the [redacted] Hearing Tr. vol. 1, 274:4-76:19, Nov. 16, 2020 (Gomez); CX-0674C, Gomez QA333, 344, 349. However, as further discussed, limitations [9b] through [9d] require that the claimed computer and the claimed thermostatic controller are two separate components. Further, a component does not "communicate" with itself. Accordingly, Mr. Gomez's testimony cannot establish infringement.
>
> As Dr. Henze and Dr. Palmer testified, and as Mr. Gomez agreed, a POSITA would understand that, under the agreed-upon construction for "automated setpoint," a computer must calculate the setpoints. RX-0156C, Henze QA204; CX-0702C, Palmer QA285; Hearing Tr. vol. 1, 275:19-76:2, Nov. 16, 2020 (Gomez). As Dr. Henze testified, because claim 9 requires that the thermostatic controller communicate the "actual setpoints" to the computer, a POSITA reading claim 9 of the '371 patent would understand that the claimed "at least one computer" and the "thermostatic controller" are two different components. RX-0156C, Henze QA205; *see also Becton, Dickinson & Co.*, 616 F.3d at 1254 ("Where a claim lists elements separately, the clear implication of the claim language is that those elements are distinct components of the patented invention." (internal quotation marks and citations omitted)).

Resps. Br. at 181-82.

The Staff argues, in part:

> The evidence shows that Google's accused products satisfy element 9[c]: "*recording, with the thermostatic controller, actual setpoints of the heating ventilation and air condition system*." Staff Ex. 1; CX-0674C (Gomez) QA 352-359; Hearing Tr. at 279:18-281:5 (Gomez); 360:15-365:1 (Gomez). Google argues that Mr. Gomez identifies some setpoints in the thermostat schedule as "actual setpoints," and other setpoints in the same schedule as "automated setpoints," which improperly combines two types of setpoints. RPreHBr. at 130. The Staff disagrees. Properly construed, the "actual setpoint" is "a temperature setting for a thermostat to achieve or maintain recorded at a thermostat" (or by the thermostatic controller). *See* Section III.C.8, above. The evidence shows that "an actual setpoint is recorded when a user adjusts the target temperature by, for example, [redacted] The actual setpoint is recorded with controllers on the thermostat and controllers connected

> over a network, including the iPhone mobile app, Android mobile app, web browser, or with local touch including the dial turn. CX-0674C (Gomez) QA 357; Hearing Tr. at 279:18-281:5 (Gomez).

Staff Br at 68.

The construction of "actual setpoint" was discussed above; the claim term "actual setpoint" is construed to mean "a temperature setting for a thermostat to achieve or maintain recorded at a thermostat." The claim term "thermostatic controller" is construed to mean "thermostat controller."

Under the adopted constructions, Google's accused products record, with the thermostat controller, [redacted] Google's accused products record the actual set points executed for the HVAC system, which [redacted]. *See* CX-0674C (Gomez DWS) Q/A 353-57.

Google argues that Mr. Gomez identifies some setpoints in the thermostat schedule as "actual setpoints," and other setpoints in the same schedule as "automated setpoints," which improperly combines two types of setpoints. *See* Resps. Br. at 181-82. However, EcoFactor adduced evidence showing that an actual setpoint is recorded when a user adjusts the target temperature by, for example, walking up to a Nest Learning Thermostat Third Generation or Nest Thermostat E and [redacted] The actual setpoint is recorded with controllers on the thermostat and controllers connected over a network, including the iPhone mobile app, Android mobile app, web browser, or with local touch including the dial turn. *See* CX-0674C (Gomez DWS) at Q/A 357; Gomez. Tr. 279-281.

Even if Google's proposed construction for this claim limitation were adopted, EcoFactor adduced evidence showing that Google's accused products would nevertheless satisfy this claim limitation. Google's documents expressly describe recording "actual setpoints," which may or may not differ from the automated setpoints calculated by the computer on the device. CX-0589C (Nest Seasonal Savings Impacts).

It is therefore determined that Google's accused products satisfy the above-recited limitation.

**5. communicating the actual setpoints from the thermostatic controller to the at least one computer;**

Google's accused products each satisfy the above-recited claim limitation. *See* CX-0674C (Gomez DWS) at Q/A 361-66.

EcoFactor argues, in part:

> The Google Products each meet claim 9[d] of JX-0004 (the '371 patent). CX-0674C (Gomez DWS) Q/A 361-366. The user's temperature changes on the Nest thermostat are communicated from the dial turn and accompanying circuitry to the [redacted]. CX-0674C (Gomez DWS) Q/A 362-366; CX-0655 (Seasonal Savings web page) ("If you don't like an adjustment Seasonal Savings has made, you have a few options: Change the temperature with the Nest app or Nest thermostat. Your Nest thermostat will learn from your adjustments and change its behavior. So if Seasonal Savings sets temperatures 2 F (1.5 C) lower, and you turn it up, then your Nest thermostat will know to make more subtle changes next week."); Hearing Tr. 362:10-23.
>
> Dr. Burger also confirmed that the "Auto Schedule [redacted] Hearing Tr. 742:19-23. This shows the manual inputs are recorded with the dial turn and then communicated to the computer that runs Auto Schedule. CX-0674C (Gomez DWS) Q/A 361-366.
>
> Google argues that the "thermostatic controller" cannot be part of the same device as the "computer." Respondents' Prehearing Brief at 141. But Google's argument would exclude from infringement any single device that includes both a "thermostatic controller" and a "computer." Such a construction would exclude a preferred embodiment, and thus cannot be correct. JX-0004 ('371 patent) 8:1-6 ("For example, much or even all of the work being accomplished by remote server

**106** may also be done by thermostat **108** if the device has sufficient processing capabilities, memory, etc.").

Regardless, the Google Products would infringe even under this strained, and incorrect, interpretation. The actual setpoint for a given time is recorded with the Nest mobile app ("thermostatic controller"). CX-0674C (Gomez DWS) Q/A 357; Hearing Tr. 362:24-363:3. [redacted] CX-0674C (Gomez DWS) Q/A 362-366. For example, the source code includes function "UpdateScheduleFromCloud (lines 209-232) to receive the currently [redacted] CX-0674C (Gomez DWS) Q/A 365. The Google Products thus meet claim 9[d] under any proposed construction. *Id.* Q/A 366.

Compl. Br. at 249-50.

Google argues, in part:

More specifically, claim 9 discloses that the thermostatic controller "communicate[s] the actual setpoints" to the computer. '371 patent, cl. 9; RX-0156C, Henze QA205. Dr. Henze testified that "[a] PHOSITA would understand that in order for the thermostatic controller to communicate information to the computer, they must be distinct components." RX-0156C, Henze QA205; *see Becton, Dickinson & Co.*, 616 F.3d at 1255 (a claim that disclosed that one component was "connected to" a second component required two separate components); Hearing Tr. vol. 4, 967:13-18, Nov. 19, 2020 (Palmer) (testifying that it is "reasonable" to infer that if a component is "transmitting" information to another component, the components are separate).

In his analysis, Mr. Gomez accuses temperature setpoints created by the "Auto Schedule" feature as being the required "automated setpoints." CX-0674C, Gomez QA343. According to Dr. Burger, and confirmed by Mr. Gomez, the "Auto Schedule" [redacted]. Hearing Tr. vol. 3, 742:5-15, Nov. 18 2020 (Burger); CDX-0061C (Burger Dep.) 264:11-19; Hearing Tr. vol. 1, 276:3-19, Nov. 16, 2020 (Gomez). Accordingly, Mr. Gomez testified that the claimed computer [redacted]. Hearing Tr. vol. 1, 276:3-19, Nov. 16, 2020 (Gomez); *see* CX-0674C, Gomez QA343-344; RX-0156C, Henze QA205.

Mr. Gomez's testimony makes it clear that his infringement analysis identifies the SoC as both the claimed thermostatic controller and the claimed computer, which is contrary to the claim language. Hearing Tr. vol. 1, 274:4-76:19, Nov. 16, 2020, (Gomez); CX-0674C, Gomez QA333, 344, 349. Google's documentation and witness testimony establish that there is [redacted]

[redacted]

[redacted] *See* CX-0061C (Burger Dep.) 31:20:5, 264:18-19; CX-0072C (Chappelle Dep.) 174:13-20; CX-0075C (Chappelle Exhibit 3), at 4 ([redacted] CX-0076C (Chappelle Exhibit 4), at 1 (same); CX-0085C (Chappelle Exhibit 13), at 2 [redacted] Accordingly, Mr. Gomez's testimony that the claimed thermostatic controller and the claimed computer are the same component in the Nest Thermostats is inconsistent with the plain language of claim 9, and therefore cannot establish infringement. *Becton, Dickinson & Co.*, 616 F.3d at 1256 ("There can be no literal infringement where a claim requires two separate structures and one such structure is missing from an accused device.").

Resps. Br. at 182-83.

The Staff argues, in part:

> The evidence shows that Google's accused products satisfy element 9[d]: "*communicating the actual setpoints from the thermostatic controller to the at least one computer*." Staff Ex. 1; CX-0674C (Gomez) QA 360-366; Hearing Tr. at 279:18-281:5 (Gomez); 360:15-365:1 (Gomez). Google argues that Mr. Gomez's analysis improperly conflates the claimed computer and the claimed thermostatic controller, as well as the claimed automated setpoints and actual setpoints. RPreHBr. aft 131. The Staff disagrees, for essentially the same reasons discussed above for elements 9[c] and 9[b].

Staff Br. at 68-69.

The construction of "actual setpoint" was discussed above; the claim term "actual setpoint" is construed to mean "a temperature setting for a thermostat to achieve or maintain recorded at a thermostat." The claim term "thermostatic controller" is construed to mean "thermostat controller."

Under the adopted constructions, Google's accused products communicate the temperature settings for a thermostat to achieve or maintain recorded at a thermostat from the thermostat controller to the at least one computer. The user's temperature changes on the Nest thermostat are communicated from [redacted] Google's accused products. CX-0674C (Gomez DWS) Q/A 362-366.

[redacted]

Google argues that Mr. Gomez identifies some setpoints in the thermostat schedule as "actual setpoints," and other setpoints in the same schedule as "automated setpoints," which improperly combines two types of setpoints. *See* Resps. Br. at 182-83. However, the actual setpoint for a given time may be recorded with the Nest mobile app. CX-0674C (Gomez DWS) at Q/A 357; Gomez Tr. 362-363. It is then communicated from the Nest mobile app to the computer in Google's accused products. CX-0674C (Gomez DWS) at Q/A 362-66.

Moreover, Dr. Burger testified that the "Auto Schedule [redacted] Burger Tr. 742. This shows the manual inputs are recorded with the dial turn and then communicated to the computer that runs Auto Schedule. CX-0674C (Gomez DWS) at Q/A 361-66.

Even if Google's proposed construction for "actual setpoint" and "thermostatic controller" were adopted, EcoFactor adduced evidence showing that Google's accused products would nevertheless satisfy this claim limitation. Google's documents expressly describe [redacted] CX-0589C (Nest Seasonal Savings Impacts). Google's accused products provide a controller located on the thermostat and controllers connected over the network, and both are operatively connected to the HVAC system. *See* CX-0674C (Gomez DWS) at Q/A 332-33, 338-40.

It is therefore determined that Google's accused products satisfy the above-recited limitation.

[redacted]

**6. comparing at least one of the actual setpoints at the first time for the thermostatic controller to the first automated setpoint for the thermostatic controller;**

Google's accused products each satisfy the above-recited claim limitation. *See* CX-0674C (Gomez DWS) at Q/A 368-75.

EcoFactor argues, in part:

> The Google Products each meet claim 9[e] of the '371 patent. The Google Products compare at least one actual setpoint to an automated setpoint scheduled for the same day and time. CX-0674C (Gomez DWS) Q/A 368-369, 370-375. This is the first step to determining if a user has made any changes to the setpoints calculated with Auto-Schedule or Seasonal Savings. *Id.*
>
> Google's only non-infringement argument asserts that Mr. Gomez has failed to identify any "automated setpoints" that are part of the comparison. Respondents' Prehearing Brief at 141. But the source code confirms that the [redacted] CX-0674C (Gomez DWS) Q/A 371-374, citing CPX-0002C (Google source code). For example, [redacted] CX-0674C (Gomez DWS) 372-374.
>
> - [redacted]
> - [redacted]

[redacted]

This comparison meets claim 9[d] under any proposed construction. CX-0674C (Gomez DWS) Q/A 375.

Dr. Burger confirmed that the Auto Schedule feature [redacted] earing Tr. 742:24-743:22 (Dr. Burger):

> "**A**. The Auto Schedule feature [redacted]
>
> The Google Products thus [redacted] As another example, if Seasonal Savings sets temperatures 2 degrees lower, and the user changes the actual setpoint to be warmer, then Seasonal Savings will learn to make more subtle adjustments in the future. CX-0655 (Seasonal Savings web page) ("If you don't like an adjustment Seasonal Savings has made, you have a few options: Change the temperature with the Nest app or Nest thermostat. Your Nest thermostat will learn from your adjustments and change its behavior. So if Seasonal Savings sets temperatures 2 F (1.5 C) lower, and you turn it up, then your Nest thermostat will know to make more subtle changes next week.").

Compl. Br. at 250-52.

Google argues, in part:

> Limitation [9e] requiring "comparing at least one of the actual setpoints" with "the first automated setpoint." '371 patent, cl. 9; RX-0156C, Henze QA213. As previously discussed, Mr. Gomez accused temperature setpoints that exist and are maintained by the thermostat of being both the claimed "actual setpoints," and the "automated setpoints," which is inconsistent with the language of claim 9. RX-0156C, Henze QA213; CX-0674C, Gomez QA368-369. Mr. Gomez did not identify any "automated setpoints" that are part of the comparison. CX-0674C,

[redacted]

Gomez QA373.

Mr. Gomez testified that the Nest Thermostats compare an actual setpoint with an automated setpoint when a user saves a new schedule to the thermostat. CX-0674C, Gomez QA373-374. However, under Mr. Gomez's interpretation, before a schedule is set on a thermostat, a user's schedule cannot contain any "actual setpoints" or "automated setpoints." As Mr. Gomez testified, an "actual setpoint" is a setpoint that is "actually executed," or "would be executed" by a thermostat. CX-0674C, Gomez QA354-355; Hearing Tr. vol. 1, 280:21-25, Nov. 16, 2020 (Gomez). However, until a user's schedule changes are stored on the thermostat, they cannot be executed by the thermostat. Dr. Burger testified that [redacted] RX-0157C, Burger QA79; *see* CX-0674C, Gomez QA374. Mr. Gomez similarly testified that the [redacted] CX-0674C, Gomez QA374 (emphasis added). In addition, because they are not created by a computer, the setpoints in a user's schedule also cannot be "automated setpoints." *See* RX-0157C, Burger QA79; CX-0674C, Gomez QA344.

Accordingly, under Mr. Gomez's analysis, before the new schedule is saved to the thermostat, it does not contain any "actual setpoints" or any "automated setpoints." *See* CX-0674C, Gomez QA344, 355, 374; RX-0157C, Burger QA79. Further, because [redacted] cannot contain either "actual setpoints" or "automated setpoints," [redacted] *ee* RX-0156C, Henze QA213. Therefore, the Nest thermostats do not perform the step of "comparing at least one of the actual setpoints" with "the first automated setpoint" as required by claim 9 of the '371 patent.

Resps. Br. at 185-86.

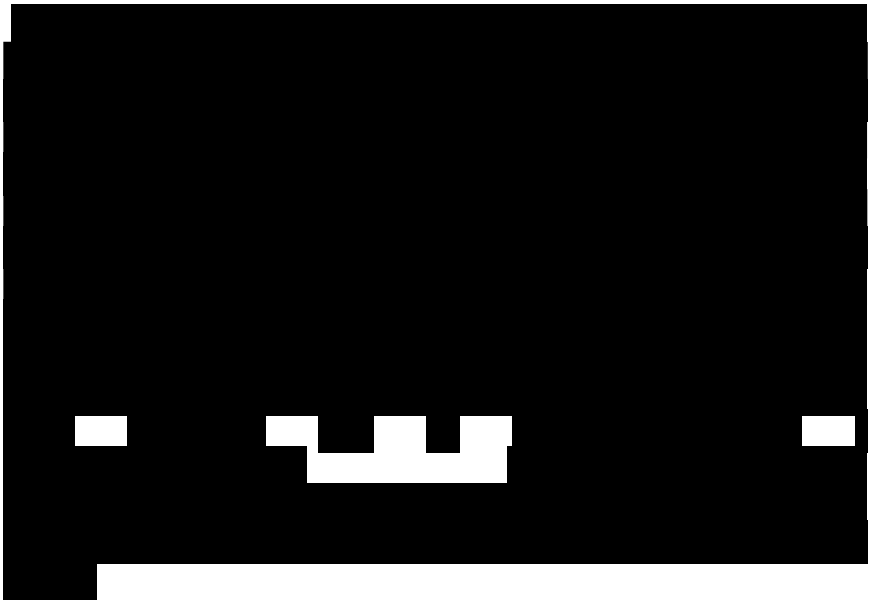
The Staff argues, in part:

The evidence shows that Google's accused products satisfy element 9[d]: "comparing at least one of the actual setpoints at the first time for the thermostatic controller to the first automated setpoint for the thermostatic controller." Staff Ex. 1; CX-0674C (Gomez) QA 367-375; Hearing Tr. at 279:18-281:5 (Gomez); 360:15-365:1 (Gomez). Google argues that Mr. Gomez improperly accuses temperature setpoints that exist and are maintained by the thermostat of being both the claimed "actual setpoints," and the "automated setpoints," and that he does not identify any "automated setpoints" that are part of the comparison. RPreHBr. at 131. However, it appears that Mr. Gomez identifies the user's manual temperature changes at the thermostat as "actual setpoints" (that are actually executed), which are compared against automated setpoints (or scheduled setpoints):

[redacted]

> If you don't like an adjustment Seasonal Savings has made, you have a few options: Change the temperature with the Nest app or Nest thermostat. Your Nest thermostat will learn from your adjustments and change its behavior.

CX-0674C (Gomez) QA 369.



CX-0674C (Gomez) QA 372; *see also* Hearing Tr. at 279:18-281:5 (Gomez).

Staff Br. at 69.

The construction of "actual setpoint" was discussed above; the claim term "actual setpoint" is construed to mean "a temperature setting for a thermostat to achieve or maintain recorded at a thermostat." The claim term "thermostatic controller" is construed to mean "thermostat controller."

Under the adopted constructions, Google's accused products compare at least one of the temperature settings for a thermostat to achieve or maintain recorded at a thermostat at the first time for the thermostat controller to the first automated setpoint for the thermostat controller. Google's accused products [redacted] CX-0674C (Gomez DWS) at Q/A 368-69, 370-75. This is

[redacted]

the first step to determining if a user has made any changes to the setpoints calculated with Auto-Schedule or Seasonal Savings. *See id*.

Google argues that Mr. Gomez identifies some setpoints in the thermostat schedule as "actual setpoints," and other setpoints in the same schedule as "automated setpoints," which improperly combines two types of setpoints. *See* Resps. Br. at 181-85. However, Mr. Gomez identifies the user's manual temperature changes at the thermostat as "actual setpoints" (that are actually executed), which are compared against automated setpoints (or scheduled setpoints). *See* CX-0674C (Gomez DWS) at Q/A 369, 372.

Moreover, Dr. Burger testified that the Auto Schedule feature [redacted] Burger Tr. 742.

Even if Google's proposed construction for "actual setpoint" and "thermostatic controller" were adopted, EcoFactor adduced evidence showing that Google's accused products would nevertheless satisfy this claim limitation. Google's documents expressly describe recording [redacted] which may or may not differ from [redacted] CX-0589C (Nest Seasonal Savings Impacts). Google's accused products provide a controller located on the thermostat and controllers connected over the network, and both are operatively connected to the HVAC system. *See* CX-0674C (Gomez DWS) at Q/A 332-33, 338-40.

It is therefore determined that the accused Google products satisfy the above-recited limitation.

[redacted]

**7. detecting a manual change to the first automated setpoint by determining whether the at least one of the actual setpoints and the first automated setpoint are the same or different;**

Google's accused products each satisfy the above-recited claim limitation. *See* CX-0674C (Gomez DWS) at Q/A 376-81.

EcoFactor argues, in part:

> The Google Products each meet claim 9[f] of JX-0004 (the '371 patent). CX-0674C (Gomez DWS) Q/A 376-381. The Google Products detect a manual change to an automated setpoint in the learned setpoint schedule. They accomplish this by [redacted]. CX-0674C (Gomez DWS) Q/A 377-381. [redacted]
>
> In [redacted] X-0674C (Gomez DWS) Q/A 380, citing CPX-0002C , GOOG-SC-ITC 1185-0135, line 1480.
>
> * * *
>
> The Auto Schedule feature detects if a user's inputs have resulted in manual changes to the learned setpoints in the existing learned schedule. According to Dr. Burger, it [redacted] Hearing Tr. 742:24-743:22 (Dr. Burger). [redacted]
>
> * * *
>
> Google argues that the Nest Thermostats do not detect a manual change to an automated setpoint by comparing setpoints, because they [redacted].

Respondents' Prehearing Brief 142.

Google is incorrect. The Nest Thermostats ***do not*** detect manual changes to the first automated setpoint based

The source code proves that Google is wrong. The source code . CX-0674C (Gomez DWS) Q/A 378-380.

CX-0674C (Gomez DWS) Q/A 380, citing CPX-0002C, GOOG-SC-ITC 1185-0135, line 1480.

Google's argument about detecting user inputs has nothing to do with the accused functionality for detecting manual changes to the learned schedule. Google argues that the It does not matter if one component or multiple components detect user inputs. All that matters is whether the Google Products run the accused software functions which detect manual changes to automated setpoints. Google's software for detecting manual inputs does not affect the operation of the accused software components, which still perform the claimed method step of detecting manual changes to the first automated setpoint under Mr. Gomez's analysis. This constitutes literal infringement as a matter of law – regardless of the existence of additional elements or features. "Infringement arises when all of the steps of a claim method are performed, whether or not the infringer also performs additional steps." *Smith & Nephew, Inc. v. Ethicon, Inc.,* 276 F.3d 1304, 1311 (Fed. Cir. 2011) (vacating summary judgment of non-infringement and noting that "[t]he signal that additional steps may be performed in carrying out a claimed method is the word 'comprising'")

In sum, does not detect whether this action resulted in any changes to automated setpoints. The Google Products ). CX-0674C (Gomez DWS) Q/A 378. On the other hand, if the For example, there would be no manual change if the user adds a setpoint on a day and

time where no automated setpoint previously existed, or changes the actual setpoint to be the ***same*** as one already scheduled as an automated setpoint.

* * *

Regardless, at most, Google's entire argument boils down to a theory about an "additional element" or "additional step," which does not defeat infringement. Google never disputes Mr. Gomez's analysis of the operation of the accused software components. Indeed, Mr. Gomez's source code analysis is unrebutted by Google. Google's non-infringement expert, Dr. Gregor Henze, has provided no opinions disputing Mr. Gomez's analysis regarding the operation of the source code itself. Hearing Tr. 759:14-760:23, 761:20-762:4 (Dr. Henze cross-examination).

Google does not dispute that its products always [redacted] RX-0157C (Burger WS) Q/A 82. Thus, Google's Products always infringe the claimed method steps, no matter what happens before or after that occurs. Indeed, Google cannot avoid the [redacted] CX-0674C (Gomez DWS) Q/A 380, citing CPX-0002C, GOOG-SC-ITC 1185-0135, line 1480.

As a result, it does not matter if the Google Products support additional software features for detecting user inputs. All that matters is that Google's products **do** use the infringing software features. Under controlling precedent, the asserted claims are literally infringed, because every requirement of the claim is included within the accused products and methods, and any facts showing that Google's Products also include other components or also perform other steps will not avoid infringement of claim 9, as it uses the open language "comprising." *Stiftung v. Renishaw PLC,* 945 F.2d 1173, 1178 (Fed. Cir. 1991).

The Google Products meet claim 9[f] under any proposed claim constructions. CX-0674C (Gomez DWS) Q/A 381.

Compl. Br. at 252-55.

Google argues, in part:

Limitation [9f] requires "detecting a manual change to the first automated setpoint by determining whether the at least one of the actual setpoints and the first automated setpoint are the same or different." '371 patent, cl. 9; RX-0156C, Henze QA214. The evidence shows that the Nest Thermostats do not detect a manual change by comparing setpoints. RX-0156C, Henze QA214. Instead, as Dr. Henze

testified, and confirmed by Dr. Burger and the source code, *Id.*; RX-0157C, Burger QA75-80; RPX-0018C (Google Source Code), ll. 59-53, 114-119. This RX-0156C, Henze QA214; RPX-0018C (Google Source Code), ll. 59-53, 114-119.

Mr. Gomez testified that a CX-0674C, Gomez QA378-380. However, Mr. Gomez testified that when he examined the source code at issue, he "didn't quite understand" how the code operated. *See* Hearing Tr. vol. 1, 279:8-15, Nov. 16, 2020 (Gomez). As Dr. Henze testified, Mr. Gomez's analysis is incorrect. RX-0156C, Henze QA217.

According to Dr. Henze and confirmed by Dr. Burger, the *Id.* RX-0157C, Burger QA76-77, 82-83. RX-0156C, Henze QA217; CPX-0002C (Google Source Code), at GOOG-SC-ITC 1185 0174-177, ll. 154-353. When the . RX-0156C, Henze QA217; CPX-0002C (Google Source Code), at GOOG-SC-ITC 1185 0174-177, ll. 154-353. Therefore, as Dr. Henze testified, and as Mr. Gomez agreed, the RX-0156C, Henze QA217; CX-0674C, Gomez QA374. Therefore, the RX-0156C, Henze QA217.

Resps. Br. at 186-87.

The Staff argues, in part:

The evidence shows that Google's accused products satisfy element 9[f]: "*detecting a manual change to the first automated setpoint by determining whether the at least one of the actual setpoints and the first automated setpoint are the same or different*." Staff Ex. 1; CX-0674C (Gomez) QA 376-381; Hearing Tr. at 279:18-281:5 (Gomez). Google argues that the accused products do not detect manual changes by comparing setpoints, but rather when the user makes a manual change to temperature settings, that action by itself and thus no comparison is needed or done in order to "detect" a manual change. RPreHBr. at 132. However, in addition to the above in element 9[e], Mr. Gomez testified:

[redacted]

*Id*. at QA 380 (emphasis added).

As one example, [redacted]

*Id*. at QA 374.

> Accordingly, the evidence shows that a current setpoint (or actual setpoint) is compared to an automated setpoint in the existing learned schedule, which is used to "detect[] a manual change to the first automated setpoint" (*i.e*., a change to the schedule), and after a manual change is detected, saving the scheduled changes.

Staff Br. at 70-71.

The construction of "actual setpoint" was discussed above; the claim term "actual setpoint" is construed to mean "a temperature setting for a thermostat to achieve or maintain recorded at a thermostat."

[redacted]

Under the adopted construction, Google's accused products detect a manual change to the first automated setpoint by determining whether the at least one of the temperature settings for a thermostat to achieve or maintain recorded at a thermostat and the first automated setpoint are the same or different. Google's accused products determine whether an actual setpoint and the first automated setpoint are the same or different. *See* CX-0674C (Gomez DWS) at Q/A 377-81. For example, [redacted] *See id.* at Q/A 379.

Google argues that the Nest Thermostats know [redacted] *See* Resps. Br. at 186-87. However, the evidence shows that a [redacted] *See* CX-0674C (Gomez DWS) at Q/A 374.

Moreover, Dr. Burger testified that the Auto Schedule feature [redacted] Burger Tr. 742-743.

Even if Google's proposed construction for "actual setpoint" were adopted, EcoFactor adduced evidence showing that Google's accused products would nevertheless satisfy this claim limitation. Google's documents expressly describe [redacted] which may or may not differ from the automated setpoints [redacted] CX-0589C (Nest Seasonal Savings Impacts).

[redacted]

It is therefore determined that the accused Google products satisfy the above-recited limitation.

**8. changing the operation of the heating ventilation and air conditioning system by changing the second automated setpoint at the second time based on at least one rule for the interpretation of the manual change.**

Google's accused products each satisfy the above-recited claim limitation. *See* CX-0674C (Gomez DWS) at Q/A 382-91.

EcoFactor argues, in part:

> The Google Products each meet claim 9[g] of JX-0004 (the '371 patent) under any proposed constructions. CX-0674C (Gomez DWS) Q/A 382-391. The Google Products [redacted]. CX-0674C (Gomez DWS) Q/A 383-384, citing CX-0624C (Auto-Schedule Algo Audit).
>
> **Auto-Schedule:** The Auto-Schedule feature incorporates the user's manual changes when calculating new learned setpoints. CX-0674C (Gomez DWS) Q. 326-327 (describing Auto-Schedule); CX-0063C.0002-9 (A Brief Tour of HVAC Algorithms) [redacted] CX-0674C (Gomez DWS) Q. 346 (describing Auto-Schedule); CX-0092 (How to improve energy savings with your Nest thermostat) ("Teach your Nest thermostat. The first week after being installed your thermostat will build a schedule by learning each time you walk in front of it or adjust the temperature. Your thermostat will never stop learning, so teach it good habits to help save energy.").
>
> According to Dr. Burger, the Auto Schedule feature [redacted] Hearing Tr. 742:24-743:22 (Dr. Burger). This information is [redacted] earing Tr. 742:24-743:22 (Dr. Burger):
>
> "**A**. The Auto Schedule feature [redacted]

[redacted]

The Google Products [redacted] CX-0674C (Gomez DWS) Q/A 384, citing CX-0624C (Auto-Schedule Algo Audit); CX-0655.0003-4. For example, with Auto-Schedule, the evidence has shown that the user's [redacted] *Id.* citing CX-0624C.0018 (Auto-Schedule Algo Audit).

In the source code, [redacted]. CX-0674C (Gomez DWS) Q/A 387-389. The [redacted] CX-0674C (Gomez DWS) Q/A 387-389. [redacted] CX-0674C (Gomez DWS) Q/A 387-389.

**Seasonal Savings**: The Seasonal Savings feature incorporates the user's manual changes when calculating Seasonal Savings setpoints. If a user makes a manual change to a temperature setpoint that was calculated by the Seasonal Savings algorithm, the Google Products learn from the manual change and make different adjustments going forward based [redacted] CX-0674C (Gomez DWS) Q. 334-335 (describing Seasonal Savings); CX-0655.0001 (Learn about Seasonal Savings) ("Seasonal Savings is an energy savings program that's available on your Google Nest thermostat in winter and summer. It's like a personal energy assistant, looking for ways to lower your bills, quietly working behind the scenes, and helping you stay comfortable too"); CX-0655.0003 ("If you don't like an adjustment Seasonal Savings has made, you have a few options. **Change the temperature with the Nest app or Nest thermostat**. **Your Nest thermostat will learn from your adjustments and change its behavior**. So if Seasonal Savings sets temperatures 2 degrees F (1.5 degrees C) lower, and you turn it up, then your Nest thermostat will know to **make more subtle changes next**

**week**."); CX-0604C.0015 (Long Term Setpoint Trends) (CDX-0001.99); CDX-0001.10; CX-0674C Q. 328.

Compl. Br. at 256-58.

Google argues, in part:

> Limitation [9g] requires "changing the operation" of the HVAC system "based on at least one rule for the interpretation of the manual change." '371 patent, cl. 9; RX-0156C, Henze QA218. As Dr. Henze explains, a POSITA would understand that the claimed computer determines and maintains the claimed "automated setpoints." RX-0156C, Henze QA218-219. Here, Mr. Gomez failed to identify setpoints that are maintained or calculated by a computer, improperly conflated the claimed computer with the thermostatic controller, and improperly conflated the claimed automated setpoints with the actual setpoints.CX-0674C, Gomez QA383-384.

Resps. Br. at 187-88.

The Staff argues, in part:

> The evidence shows that Google's accused products satisfy element 9[g]: "*changing the operation of the heating ventilation and air conditioning system by changing the second automated setpoint at the second time based on at least one rule for the interpretation of the manual change*." Staff Ex. 1; CX-0674C (Gomez) QA 382-391; Hearing Tr. at 279:18-281:5 (Gomez); 360:15-365:1 (Gomez). Google essentially repeats its arguments above that Mr. Gomez fails to identify setpoints that are maintained or calculated by a computer, improperly conflates the claimed computer with the thermostatic controller, and improperly conflates the claimed automated setpoints with the actual setpoints. RPreHBr. at 132-133. For the same reasons discussed above, the Staff disagrees.

Staff Br. at 71.

The administrative law judge finds that the accused Google products satisfy this limitation. The accused Google products [redacted]. *See* CX-0674C (Gomez DWS) at Q/A 383-84 (citing CX-0624C (Auto-Schedule Algo Audit)).

[redacted]

Google argues that Mr. Gomez failed to identify setpoints that are maintained or calculated by a computer, improperly conflated the claimed computer with the thermostatic controller, and improperly conflated the claimed automated setpoints with the actual setpoints. *See* Resps. Br. at 187-88. However, EcoFactor adduced evidence showing that the Auto-Schedule feature [redacted]. CX-0674C (Gomez DWS) at Q/A 326-27 (describing Auto-Schedule); CX-0063C (A Brief Tour of HVAC Algorithms) [redacted] CX-0674C (Gomez DWS) at Q/A 346 (describing Auto-Schedule); CX-0092 (How to improve energy savings with your Nest thermostat).

Moreover, Dr. Burger testified that the Auto Schedule [redacted] Burger Tr. 743. This information is [redacted] *Id.*

It is therefore determined that the accused Google products satisfy the above-recited limitation.

* * *

It is therefore determined that the accused Google products infringe asserted independent claim 9 of the '371 patent.

**C. Technical Prong**

EcoFactor contends the EcoFactor Platform alone, or in combination with the Simple Thermostat, practices claim 9 of the '371 patent. *See* Compl. Br. at 262.

**1. A method for incorporating manual changes to one or more setpoints for a thermostatic controller, the method comprising:**

The evidence adduced by EcoFactor demonstrates that the EcoFactor DI products satisfy the preamble. *See* CX-0674 (Gomez DWS) at Q/A 652. Respondents do not contest that the EcoFactor DI products satisfy this claim limitation. *See* Resps. Br. at 44-45.

**2. providing a thermostatic controller operatively connected to a heating ventilation and air conditioning system, the one or more setpoints of the heating ventilation and air conditioning system being manually changeable;**

The evidence adduced by EcoFactor demonstrates that the EcoFactor DI products satisfy this claim limitation. *See* CX-0674 (Gomez DWS) Q/A 653. Respondents do not contest that the EcoFactor DI products satisfy this claim limitation. *See* Resps. Br. at 44-45.

**3. calculating scheduled programming of automated setpoints in the thermostatic controller based on the scheduled programming comprising at least a first automated setpoint at a first time and a second automated setpoint at a second time to control the heating ventilation and air conditioning system;**

The evidence adduced by EcoFactor demonstrates that the EcoFactor DI products satisfy this claim limitation. *See* CX-0674 (Gomez DWS) Q/A 654. Respondents do not contest that the EcoFactor DI products satisfy this claim limitation. *See* Resps. Br. at 44-45.

**4. recording, with the thermostatic controller, actual setpoints of the heating ventilation and air condition system;**

The evidence adduced by EcoFactor demonstrates that the EcoFactor DI products satisfy this claim limitation. *See* CX-0674 (Gomez DWS) Q/A 655. Respondents do not contest that the EcoFactor DI products satisfy this claim limitation. *See* Resps. Br. at 44-45.

**5. communicating the actual setpoints from the thermostatic controller to the at least one computer;**

The EcoFactor DI products do not satisfy the above-recited claim limitation.

[redacted]

EcoFactor argues, in part:

> The EcoFactor Platform alone, or in combination with the Simple Thermostat, meets elements 9[c] and 9[d] of JX-0004 (the '371 patent). CX-0674 (Gomez DWS) Q/A 655-56; CX-0678 (Okita DWS) Q/A 26-36. The EcoFactor Platform receives standardized information from a connected Wi-Fi thermostat such as the Simple Thermostat. *Id.* Prior to transmission to the EcoFactor Platform backend, these setpoints are stored on the thermostat device so that, for example, they can be transmitted and/or used to control the HVAC system. *Id.* This information includes identification of the actual setpoint currently applied to the HVAC system. *Id.* As with other received information, the EcoFactor records the actual setpoints of the HVAC system in a database for use in feature such as Setpoint Optimization among others including, for example, to perform the steps below identifies for elements 9[e], 9[f], and 9[g]. *Id.*; *see also* CPX-001C at cmd_processing.c (Simple Thermostat reports include setpoints), aws_iot.h, aws_iot.c, aws_iot_mqtt_client_publish.c, CollectorProcessorBolt.java, IoTEventsProcessorBolt.java, IoTEvent.java.

Compl. Br. at 265.

Respondents argue, in part:

> The evidence shows that EcoFactor has failed to establish that it practices claim 9 of the '371 patent. RX-0156C, Henze QA304-07. As Dr. Henze testified, the asserted claims of the '371 patent describe a method for detecting a manual change to the setpoints on a "thermostatic controller" by using a server to compare the "actual setpoint" with an "automated setpoint" and changing the operation of the system based on "at least one rule for the interpretation of the manual change." *Id.* Henze QA44, 51-53.
>
> To establish that it practices the method of claim 9, EcoFactor must establish that it, or a party acting under its control, performed each step of the claimed method in the United States. *See Finjan, Inc. v. Secure Computing Corp.*, 626 F.3d 1197, 1205-06 (Fed. Cir. 2010). However, EcoFactor has provided no evidence—either in its prehearing brief or Mr. Gomez's witness statement—that it or its customers practice the method of claim 9 in the United States. *See* PHB at 153-56; CX-0674C, Gomez QA350-62. This is fatal to EcoFactor's claims under 35 U.S.C. § 271(a). *Finjan, Inc.*, 626 F.3d at 1205-06. Accordingly, EcoFactor cannot establish that it practices claim 9 of the '371 patent.

Resps. Br. at 44-45.

The Staff argues, in part:

> The evidence does not show that the DI product satisfies elements 9[c] and 9[d]. Mr. Gomez testified that the Simple Thermostat is required to satisfy each of

> these elements. *See* CX-0674C (Gomez) QA 655, 656. Given that the Simple Thermostat is not the DI product, the evidence does not show that the DI product, by itself, practices these elements. *See* CX-0674C (Gomez) QA 662.

Staff Br. at 116.

The construction of "actual setpoint" was discussed above; the claim term "actual setpoint" is construed to mean "a temperature setting for a thermostat to achieve or maintain recorded at a thermostat." The claim term "thermostatic controller" is construed to mean "thermostat controller."

Under the adopted constructions, the EcoFactor DI products do not communicate the temperature settings for a thermostat to achieve or maintain recorded at a thermostat from the thermostat controller to the at least one computer. Mr. Gomez's analysis for this claim limitation is to state that "[t]hese databases are accessed by the EcoFactor Platform servers, which are computers, for purposes of, for example performing setpoint optimization." CX-0674C (Gomez DWS) at Q/A 656. Yet, this analysis does not identify any "actual setpoints" that are communicated from a "thermostatic controller," as required by limitation [9d].

Moreover, Mr. Gomez's analysis only discloses two components, the EcoFactor Platform and databases. *See id.* Mr. Gomez testified that the EcoFactor Platform servers are the "at least one computer." *See id.* However, Mr. Gomez also testified that the EcoFactor Platform servers include the databases. *Id.* Hence, Mr. Gomez's testimony does not show that the EcoFactor DI products communicate the actual setpoints from the thermostatic controller to the at least one computer.

Even if Google's proposed construction for this claim limitation were adopted, the EcoFactor DI products do not satisfy this claim limitation. EcoFactor has not shown that the

EcoFactor DI products communicate the actual setpoints from the thermostatic controller to the at least one computer.

It is therefore determined that the EcoFactor DI products do not satisfy the above-recited limitation.

**6. comparing at least one of the actual setpoints at the first time for the thermostatic controller to the first automated setpoint for the thermostatic controller;**

The EcoFactor DI products do not satisfy the above-recited claim limitation. *See* RX-0156C (Henze DWS) at Q/A 308-09.

EcoFactor argues, in part:

> The EcoFactor Platform alone, or in combination with the Simple Thermostat, meets element 9[e] of JX-0004 (the '371 patent). CX-0674 (Gomez DWS) Q/A 657-58; CX-0678 (Okita DWS) Q/A 26-36. In particular, the evidence has shown that the EcoFactor Platform compares actual and automated setpoints in order to detect manual overrides that must be logged and used to update the next iteration of Setpoint Optimization microadjustments. *Id.*
>
> For example, the source code file AbstractManualOverrideService.java shows a comparison between automated and actual setpoints. CX-0674 (Gomez DWS) Q/A 657-58; CX-0678 (Okita DWS) Q/A 26-36; CPX-0001C (EcoFactor Code) at AbstractManualOverrideService.java. At line 323, for example, the function isSetpointWithinDrift includes a comparison of actual to automated setpoint:
>
> *delta = next.getHeatSetting().doubleValue() – prev.getHeatSetting().doubleValue();*
>
> CPX-0001C (EcoFactor Code) at AbstractManualOverrideService.java. As Mr. Gomez testifies, the value delta is a comparison between two setpoints by subtraction. CX-0674 (Gomez DWS) Q/A 657-58; CX-0678 (Okita DWS) Q/A 26-36. Next.getHeatSetting().doubleValue() is a value indicating the actual setpoint of the thermostatic controller. *Id.* Prev.getHeatSetting().doubleValue() is the automated setpoint. *Id.* The value "delta" is then used to determine whether a manual override has occurred, which will cause it to be logged to a database. CX-0674 (Gomez DWS) Q/A 657-58; CX-0678 (Okita DWS) Q/A 26-36; *see* CX-605C (Quant Overview); CPX-0001C (EcoFactor Code) at AbstractManualOverrideService.java., ReverseEngineeredManualEventsFilter.java. This is discussed further with regard to element 9[f], which is incorporated herein by reference.

[redacted]

Compl. Br. at 265-66.

Respondents argue, in part:

> EcoFactor failed to establish that the EcoFactor Platform, with or without the Simple Thermostat, compares "at least one of the actual setpoints at the first time for the thermostatic controller to the first automated setpoint for the thermostatic controller," as required by limitation [9e]. RX-0156C, Henze QA308. Mr. Gomez alleges that the "isSetPointWithinDrift" function of the file "AbstractManualOverrideService.java" compares an actual setpoint with an automated setpoint. *Id.*; CX-0674C, Gomez QA658. As Dr. Henze testified, limitation [9e] requires that the claimed "actual setpoint" and the claimed "automated setpoint" both be scheduled for the same "first time." '371 patent, cl. 1; RX-0156C, Henze QA203, 309. However, Mr. Gomez admits that the "isSetPointWithinDrift" function does not compare two setpoints for the same "first time" and instead "compares adjacent setpoints," which occur at two different times. RX-0156C, Henze QA309; CX-0674C, Gomez QA658.

Resps. Br. at 45.

The Staff argues, in part:

> The evidence does not show that this element is satisfied. This element requires "comparing at least ***one of the actual setpoints at the first time*** for the thermostatic controller to ***the first automated setpoint*** for the thermostatic controller." Staff Ex. 1. As set forth by element 9[b], the "first automated setpoint" is one that is calculated at the same "at the first time" of the "actual setpoint" of element 9[e]. *See* Staff Ex. 1.
>
> * * *
>
> In the Staff's view, Mr. Henze's testimony effectively and sufficiently rebuts Mr. Gomez's testimony. For this reason alone, EcoFactor has not shown that the DI products satisfies claim 9 of the '371 patent.

Staff Br. at 69.

The construction of "actual setpoint" was discussed above; the claim term "actual setpoint" is construed to mean "a temperature setting for a thermostat to achieve or maintain recorded at a thermostat." The claim term "thermostatic controller" is construed to mean "thermostat controller."

[redacted]

Under the adopted constructions, the EcoFactor products do not compare at least one of the temperature settings for a thermostat to achieve or maintain recorded at a thermostat at the first time for the thermostat controller to the first automated setpoint for the thermostat controller.

EcoFactor contends that the "isSetPointWithinDrift" function of the file "AbstractManualOverrideService.java" compares an actual setpoint with an automated setpoint. *See* Compl. Br. at 265-66. Limitation [9e] requires that the claimed "actual setpoint" and the claimed "automated setpoint" both be scheduled for the same "first time." '371 patent, cl. 1. However, Mr. Gomez testified that the "isSetPointWithinDrift" function does not compare two setpoints for the same "first time" and instead "compares adjacent setpoints," which occur at two different times. *See* CX-0674C (Gomez DWS) at Q/A 657-58.

Mr. Gomez testified that the EcoFactor product compares adjacent setpoints, as follows:

> The EcoFactor Platform compares actual and automated setpoints in order to detect manual overrides. An exemplary code file that does this is AbstractManualOverrideService.java, which can be found at Platform\commonsvc\src\main\java\com\ecofactor\commonsvc\service\impl\AbstractManualOverrideService.java. This information is obtained for a variety of features including Setpoint Optimization.

*Id.* at Q/A 657.

> Yes, in AbstractManualOverrideService.java, which can be found at Platform\commonsvc\src\main\java\com\ecofactor\commonsvc\service\impl\AbstractManualOverrideService.java, there is a function defined starting on line 323 called "isSetpointWithinDrift." This function compares adjacent setpoints including setpoints that involve a first automatic setpoint and second manual setpoint. An example of the relevant code is:
>
> > delta = next.getHeatSetting().doubleValue() – prev.getHeatSeetting(). doubleVlaue();
>
> The absolute value of delta is returned by the function and used as a check to determine whether a manual setpoint change has occurred. This information is obtained for a variety of features including Setpoint Optimization.

*Id. at* Q/A 658.

With respect to the function called "isSetpointWithinDrift," Mr. Henze testified:

> According to EcoFactor, this function "compares adjacent setpoints." Instead of comparing two setpoints, automated and actual, scheduled to occur at the same time, EcoFactor instead compares one setpoint occurring at one time and a second set point from the same list occurring at a different time. As we previously discussed, comparing two setpoints from the same list would not satisfy this claim limitation.

RX-0156C (Henze) at Q/A 309; *see also id.* at Q/A 308.

The administrative law judge finds that EcoFactor has not shown that the EcoFactor DI products compare at least one of the actual setpoints at the first time for the thermostatic controller to the first automated setpoint for the thermostatic controller because "isSetpointWithinDrift" compares adjacent setpoints. Mr. Gomez did not establish the "time" associated with the comparison. *See* CX-0674C (Gomez DWS) at Q/A 657-58. Mr. Henze testified that the EcoFactor DI products compare one setpoint occurring at one time and a second set point from the same list occurring at a different time. *See* RX-0156C (Henze RWS) at Q/A 309.

Even if Google's proposed construction for "actual setpoint" and "thermostatic controller" were adopted, EcoFactor has not shown that the EcoFactor DI products compare at least one of the actual setpoints at the first time for the thermostatic controller to the first automated setpoint for the thermostatic controller.

It is therefore determined that the EcoFactor DI products do not satisfy the above-recited limitation.

**7. detecting a manual change to the first automated setpoint by determining whether the at least one of the actual setpoints and the first automated setpoint are the same or different;**

The evidence adduced by EcoFactor demonstrates that the EcoFactor DI products satisfy this claim limitation. *See* CX-0674 (Gomez DWS) Q/A 659. Respondents do not contest that the EcoFactor DI products satisfy this claim limitation. *See* Resps. Br. at 44-45.

**8. changing the operation of the heating ventilation and air conditioning system by changing the second automated setpoint at the second time based on at least one rule for the interpretation of the manual change.**

The evidence adduced by EcoFactor demonstrates that the EcoFactor DI products satisfy this claim limitation. *See* CX-0674 (Gomez DWS) at Q/A 660. Respondents do not contest that the EcoFactor DI products satisfy this claim limitation. *See* Resps. Br. at 44-45.

* * *

It is therefore determined that the EcoFactor DI products do not practice independent claim 9 of the '371 patent.

## IX. Indirect Infringement

Both the Commission and the Federal Circuit have recognized the Commission's authority to block importation of goods found to directly infringe post-importation as a result of the seller's inducement, or to be contributorily infringing, as well as to block subsequent post-importation sale of directly-infringing goods that incorporate those contributorily-infringing products. *See Suprema, Inc. v. Int'l Trade Comm'n*, 796 F.3d 1338, 1347-49, 1352 (Fed. Cir. 2015) (en banc). In *Suprema*, the Federal Circuit discussed importation and post-importation activities:

> For contributory infringement, as for inducement, direct infringement is necessary and will typically take place later than the accused indirect infringer's act. *See Aro Mfg. Co. v. Convertible Top Replacement Co.*, 365 U.S. 336, 341, 81

[redacted]

> S.Ct. 599, 5 L.Ed.2d 592 (1961). The panel recognized that Section 337 could fairly reach contributory infringement. *See, e.g., Suprema*, 742 F.3d at 1361, n. 4. As that recognition confirms, Section 337's present-tense language is readily susceptible to being read as satisfied by the indirect infringer's own acts, ***including importation that is part of inducement or contribution***. *See National Presto Indus., Inc. v. West Bend Co.*, 76 F.3d 1185, 1194-96 (Fed.Cir.1996) (inducing act must occur after patent issues to support inducement liability; not enough that induced act occurs after issuance); *Standard Oil Co. v. Nippon Shokubai Kagaku Kogyo Co., Ltd.*, 754 F.2d 345, 348 (Fed.Cir.1985) ("[L]iability [arises] as of the time the [inducing] acts were committed, not at some future date determined by the acts of others.") (emphasis omitted).

*Suprema*, 796 F.3d at 1347 (emphasis added).

The Federal Circuit concluded: "We hold that the Commission's interpretation that the phrase 'articles that infringe' covers goods that were used by an importer to directly infringe post-importation as a result of the seller's inducement is reasonable." *Id.* at 1352-1353. Thus, it is clear that the Commission has the authority to block importation of goods found to be directly infringing post-importation as a result of the seller's inducement or on the basis of contributory infringement.

Regarding inducement, the Commission has found that Section 337 requires importation of articles, proof of direct infringement, and proof of inducement. *See Certain Digital Video Receivers and Hardware and Software Components Thereof*, Inv. No. 337-TA-1001, Comm'n Op. at 21 (Nov. 21, 2017). A party is liable for contributory infringement if he "offers to sell or sells within the United States or imports into the United States … a material or apparatus for use in practicing a patented process, constituting a material part of the invention, 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 'non-infringing use." *See Certain Network Devices, Related Software and Components Thereof (I)*, Inv. No. 337-TA-944, Comm'n Op. at 21-22 (June 23, 2016). In addition, the complainant must show that the accused

infringer knew that the component was patented and infringing and that the respondent's components have no substantial non-infringing uses. *See id.*

### A. Google Products

#### 1. Inducement

EcoFactor argues that Google affirmatively encourages the use of the accused Google products in their ordinary and customary manner by customers, and they are designed and intended to infringe the asserted claims in their normal operation. *See* Compl. Br. at 60 (citing CX-0674C (Gomez DWS) at Q/A 558-59). It is argued that the accused Google products are installed in the normal and customary manner by connecting to the switches for the HVAC equipment and by connecting to the Internet to allow for remote control with mobile devices and for receiving outside temperature measurements from a weather service. *See id.*

Google argues, in part:

> The evidence shows that Google does not indirectly infringe the Asserted Patents. RX-0156C, Henze QA221-223. As previously discussed, the Nest Thermostats are not capable of infringing the Asserted Patents. RX-0156C, Henze QA224. Because there can be no direct infringement, there necessarily is no indirect infringement. Further, because EcoFactor has not identified any evidence that Google was aware that it allegedly infringes the Asserted Patents, or that it was aware of the Asserted Patents before the Investigation, EcoFactor cannot establish that Google indirectly infringes the Asserted Patents. *Id.*; CX-0674C, Gomez QA557.

Resps. Br. at 188.

The Staff argues, in part:

> With respect to Google (in which the evidence shows that their accused products satisfy the asserted claims of the '497, '322 and '371 patents), the evidence shows that it performs affirmative acts that induce and encourage actions which may be attributable to the customer that constitute direct infringement. CPreHBr. at 171. The evidence shows that Google affirmatively encourages the use of its products in their ordinary and customary manner by customers, and its products are designed and intended to practice the asserted claims in their normal operation. To use the advertised features of the thermostats (including "smart" features at issue

> here), the devices will be installed in the normal and customary manner by connecting to the switches for the HVAC equipment and by connecting to the Internet to allow for remote control with mobile devices. CPreHBr. at 172-173; CX-0675C (de la Iglesia) QA 158-162, 278-283; CX-0674C (Gomez) QA 56-60, 61-71, 73-75.
>
> For instance, the evidence shows that Google [redacted]; encourages customers to participate in and enroll in Rush Hour Rewards and Seasonal Savings to receive the benefits from these energy savings features; encourages customers to use its Auto-Schedule and other smart scheduling technologies, including by changing temperature settings as desired so as to allow the products to learn from the user's manual changes, and that without doing as Google recommends and creating a Nest account and connecting its products to the Internet and to Google's backend network, customers cannot obtain the benefits advertised for the products, such as the Nest app, the HVAC Alerts functionality, the Rush Hour Rewards and Seasonal Savings energy savings features, the Early-On feature, or the Auto-Schedule feature. CPreHBr. at 172; CX-0674C (Gomez) QA 69.

Staff Br. at 74-75.

As discussed above, when the accused Google products are connected to Google's backend systems and operated in their intended manner, the accused Google products infringe the asserted claims of the '497, '322, and '371 patents. The administrative law judge further finds that Google had knowledge of the asserted patents at least as of the filing of this investigation. *See* CX-0674C (Gomez DWS) at Q/A 556-57. Google induces infringement of the '497 patent by encouraging customers [redacted]. Google induces infringement of the '322 patent by encouraging customers to use the [redacted]. *See, e.g.*, *id.* at Q/A 79-82. Customers cannot obtain the benefits Google advertises for the accused products, such as the Nest app and the HVAC Alerts functionality, without [redacted]

[redacted] and connecting the accused products to the Internet and to Google's backend network. *See id.* at Q/A 69.

The accused Google products are designed and intended to be used in a way that infringes the asserted claims in their normal operation. *See id.* at Q/A 558-59. When the accused Google products are installed in the normal and customary manner, they connect to the switches for the HVAC equipment and to the Internet to allow for remote control with mobile devices. *See id.* at Q/A 56-60, 61-71, 73-75, 338-40, 353-59. As found above, the accused Google products infringe in this configuration. *See* above at V.B., VI.B., VII.B.

Regarding the '371 patent, the administrative law judge further finds that Google encourages customers to use the accused Auto-Schedule feature and to use and participate in Seasonal Savings to receive the benefits from these energy savings features. Google encourages customers to use both Auto-Schedule and Seasonal Savings in an infringing manner, including by changing temperature settings as desired so as to allow the products to learn from the user's changes. Customers cannot obtain the benefits advertised for the Seasonal Savings energy savings features without using the accused Auto-Schedule feature. *See* CX-0674C (Gomez DWS) at Q/A 69; 334-35.

Inasmuch as the accused Google products are combined with the Google Cloud into an infringing system upon importation, and Google designs and intends for the accused Google products to infringe the asserted patents when the accused Google products are used in their normal operation, the administrative law judge finds that Google induces infringement of the asserted claims. *See Suprema*, 796 F.3d at 1347.

**2. Contributory Infringement**

EcoFactor argues, in part:

> **Contributory Infringement.** Google also contributorily infringes. The Google Products form a material part of the invention, are not staple articles suitable for substantial non-infringing use, but are instead specifically designed for use in infringement of the asserted claims, with features that infringe in the ordinary and customary use. CX-0674C (Gomez DWS) Q/A 560-562. The Nest Thermostats are not staple articles, but are specialized learning thermostats. CX-0674C (Gomez DWS) Q/A 335. Although it is possible to disable the Early-On feature, "infringement is not avoided merely because a non-infringing mode of operation is possible." *z4 Techs., Inc. v. Microsoft Corp*., 507 F.3d 1340, 1350 (Fed. Cir. 2007). And under *Fujitsu Ltd. v. Netgear Inc.,* 620 F.3d 1321, 1330-31 (Fed. Cir. 2010), the relevant question regarding substantial non-infringing use is not whether a user can turn off the features, but rather, whether there is infringement when the feature is used as intended with the Nest Thermostats. Mr. Gomez's analysis shows that *Fujitsu* is satisfied here.

Compl. Br. at 59-60.

> **Contributory.** Google also contributorily infringes. The Google Products are not staple articles suitable for substantial non-infringing use, but are instead specifically designed for use in infringement of the asserted claims, with features that infringe in the ordinary and customary use and that form a material part of the invention, which requires particular data to be received, stored, and analyzed in order to evaluate changes in the operational efficiency of an HVAC system. CX-0674C (Gomez DWS) Q/A 560-562. The Nest Thermostats are not staple articles, but are specialized learning thermostats. CX-0674C (Gomez DWS) Q/A 335. And under *Fujitsu Ltd. v. Netgear Inc.,* 620 F.3d 1321, 1330-31 (Fed. Cir. 2010), the relevant question regarding substantial non-infringing use is not whether a user can [redacted], but rather, whether there is infringement when the feature is used as intended with the Nest Thermostats. Mr. Gomez's analysis shows that *Fujitsu* is satisfied here. CX-0674C (Gomez DWS) Q/A 346 (CX-0092 provides "Teach your Nest thermostat. The first week after being installed your thermostat will build a schedule by learning each time you walk in front of it or adjust the temperature. Your thermostat will never stop learning, so teach it good habits to help save energy.").

Compl. Br. at 183-84.

> **Contributory Infringement.** Google also contributorily infringes. The Google Products are not staple articles suitable for substantial non-infringing use, but are instead specifically designed for use in infringement of the asserted claims, with features that infringe in the ordinary and customary use. CX-0674C (Gomez DWS) Q/A 560-562. The Nest Thermostats are not staple articles, but are specialized learning thermostats. CX-0674C (Gomez DWS) Q/A 335. Although it is possible to disable the Auto-Schedule feature or to fail to participate in Seasonal Savings, "infringement is not avoided merely because a non-infringing mode of

operation is possible." *z4 Techs., Inc. v. Microsoft Corp*., 507 F.3d 1340, 1350 (Fed. Cir. 2007). And under *Fujitsu,* 620 F.3d at 1330-31, the relevant question regarding substantial non-infringing use is not whether a user can turn off the Auto-Schedule or Seasonal Savings feature, but rather, whether there is infringement when the feature is used as intended with the Nest Thermostats. Mr. Gomez's analysis shows that *Fujitsu* is satisfied here. CX-0674C (Gomez DWS) Q/A 346 (CX-0092 provides "Teach your Nest thermostat. The first week after being installed your thermostat will build a schedule by learning each time you walk in front of it or adjust the temperature. Your thermostat will never stop learning, so teach it good habits to help save energy.").

Compl. Br. at 259-61.

Google argues, in part:

The evidence shows that Google does not indirectly infringe the Asserted Patents. RX-0156C, Henze QA221-223. As previously discussed, the Nest Thermostats are not capable of infringing the Asserted Patents. RX-0156C, Henze QA224. Because there can be no direct infringement, there necessarily is no indirect infringement. Further, because EcoFactor has not identified any evidence that Google was aware that it allegedly infringes the Asserted Patents, or that it was aware of the Asserted Patents before the Investigation, EcoFactor cannot establish that Google indirectly infringes the Asserted Patents. *Id.*; CX-0674C, Gomez QA557.

In addition, the evidence shows that the Nest Thermostats have substantial non-infringing uses. RX-0156C, Henze QA224. For one thing, the Nest Thermostats have myriad uses that have nothing to do with the asserted patents. For example, the evidence will show that the Nest Thermostats include a [redacted] *Id.*; RX-0157C, Burger QA50-51; RX-0626C (Sapphire Algorithms Overview), at 4; RX-0628C (Brief Tour), at 18. [redacted]. RX-0157C, Burger QA52. Because EcoFactor accuses the [redacted] in its infringement allegations for the '497 patent, use of the [redacted] constitutes a substantial non-infringing use. *See* CX-0674C, Gomez QA160. Furthermore, the Nest Thermostats are able to operate without a network connection. Under these circumstances, the Nest Thermostats could not meet at least limitation [1c] of the '497 patent. Therefore, use of the Nest Thermostats without a network connection constitute a substantial non-infringing use.

The evidence shows, and Mr. Gomez admits, that the Nest Thermostats do not necessarily use the cooling degradation feature. RX-0156C, Henze QA224; RX-0157C, Burger QA65, 73; CX-0674C, Gomez QA69. Because EcoFactor

> accuses [redacted] in its infringement allegations for the '322 patent, use of the Nest thermostat without enrolling in these features constitutes a substantial non-infringing use. *See* CX-0674C, Gomez QA77.
>
> The evidence will show that the Nest Thermostats do not necessarily use the Auto Schedule feature. RX-0614 (How to Use Nest as a Traditional Thermostat), at 1. More specifically, users are able to turn off the Auto Schedule feature. *Id.* Because EcoFactor accuses the Auto Schedule feature as part of its infringement allegations for the '371 patent, use of the Nest Thermostats without the Auto Schedule feature constitutes a substantial non-infringing use. *See* CX-0674C, Gomez QA326-327.

Resps. Br. at 188-89.

The Staff argues that Google contributorily infringes the '497 and '371 patents, but does not contributorily infringe the '322 patent because the accused Google products have a substantial non-infringing use. *See* Staff Br. at 74-77.

With respect to the '497 patent, Google argues that the Nest Thermostats include a [redacted] thus constituting a substantial non-infringing use. *See* Resps. Br. at 188-89 (citing RX-0157C (Burger DWS) at Q/A 50-51; RX-0626C (Sapphire Algorithms Overview) at 4; RX-0628C (Brief Tour) at 18). However, Mr. Burger testified that the [redacted] RX-0157C (Burger DWS) at Q/A 51. This demonstrates that this so-called alternative is a temporary stop gap measure [redacted], and, therefore, is not a substantial non-infringing use. *See Vita-Mix Corp. v. Basic Holding, Inc.*, 581 F.3d 1317, 1328-29 (Fed. Cir. 2009) ("[N]on-infringing uses are substantial when they are not unusual, far-fetched, illusory, impractical, occasional, aberrant, or experimental."). Therefore, the administrative law judge finds that Google contributorily infringes the '497 patent.

Regarding the '322 patent, the administrative law judge finds that the accused Google products do not contributorily infringe because the Nest Thermostats do not necessarily use the [redacted] or the Rush Hour Rewards feature. *See* RX-0156C (Henze RWS) at Q/A 224; RX-0157C (Burger DWS) at Q/A 65, 73. Inasmuch as the use of the Nest Thermostat without enrolling in these features constitutes a substantial non-infringing use, the administrative law judge finds that Google does not contributorily infringe the '322 patent.

Regarding the '371 patent, Google argues the Nest Thermostats do not necessarily use the Auto Schedule Feature. Resps. Br. at 189. Here, Google relies on documentation that explains how a user can use the Nest Thermostat as a traditional programmable thermostat. *See id.* (citing RX-0614C at 1). However, this document explains that if this feature is turned off, "your thermostat will stop learning from your future adjustment." RX-0614C at 1. Thus, the document explains that the intended "smart" benefits of the thermostat would not be achieved if the Auto Feature is turned off. This does not indicate a substantial non-infringing use. *See i4i Limited Partnership et al. v. Microsoft Corp*., 598 F.3d 831, 851( Fed. Cir. 2010). Therefore, the administrative law judge finds that Google contributorily infringes the '371 patent.

**B. ecobee Products**

EcoFactor argues, in part:

> To the extent that ecobee does not literally infringe each asserted claim, ecobee is nonetheless liable for inducement and contributory infringement. ecobee may contend that it does not directly infringe the system claims of the '497 patent because its products are not yet installed in the customer's home and controlling HVAC operation at the time of importation. But the ecobee Products are used in their intended manner after importation to directly infringe, both in their ordinary and customary use as designed, as well as at the inducement of ecobee. *Suprema, Inc. v. Int'l. Trade Comm'n.*, 796 F.3d 1338, 1344-45 (Fed. Cir. 2015).
>
> With respect to inducement, ecobee had knowledge of the '497 patent at least as of the filing of this Investigation, if not earlier, and knew of EcoFactor even

[redacted]

before that time. CX-0674C (Gomez DWS) Q/A 556-557. ecobee performs affirmative acts that induce and encourage customer actions that constitute direct infringement. ecobee affirmatively encourages the use of the ecobee Products in their ordinary and customary manner by customers, which includes the [redacted] ecobee's products, including these features, are designed and intended to infringe the asserted claims in their normal operation. To make full use of an ecobee thermostat's capabilities and advertised features, the device will be installed by connecting it to switches for HVAC equipment and by connecting it to the Internet to allow for remote control with mobile devices, acquisition of outside temperature data from third-party weather services, and other beneficial features. CX-0674C (Gomez DWS) Q/A 394-401. ecobee even encourages the use of the specific features at issue here, such as Smart Recovery. For example, ecobee promotes the Smart Recovery feature on its website, including the beneficial use of current outside temperature data with Smart Recovery. *E.g.*, CX-0660 (Smart Recovery) at ECOITC_0618681; CX-0482 (ecobee Website) at ECOITC_0618806.

ecobee is also liable under a theory of contributory infringement. As Mr. Gomez explained, the ecobee Products are not staple articles suitable for substantial non-infringing use, but are instead specifically designed for use in infringement of the asserted claims, with features that infringe in the ordinary and customary use [redacted]

Compl. Br. at 98-99.

ecobee argues, in part:

EcoFactor has asserted that ecobee indirectly infringes by inducing or contributing to the infringement of the '497 patent. But ecobee is not liable for induced or contributory infringement for numerous reasons. First, both induced and contributory infringement require evidence of direct infringement by another. *See AIDS Healthcare Found., Inc. v. Gilead Scis., Inc.,* 890 F.3d 986, 992 (Fed. Cir.), cert. denied, 139 S. Ct. 415, 202 L. Ed. 2d 314 (2018) ("Liability for induced infringement requires that some other entity is directly infringing the patent."); *Fujitsu Ltd. v. Netgear Inc.*, 620 F.3d 1321, 1326 (Fed. Cir. 2010) ("To establish contributory infringement, the patent owner must show …that there is direct infringement …"). However, EcoFactor has provided no such evidence of direct infringement, for the reasons discussed above. As such, EcoFactor has failed to establish induced or contributory infringement as a matter of law. RX-0163C, Souri 9/2 QA130.

Second, indirect infringement requires "knowledge that the induced acts constitute patent infringement." *Glob.-Tech Appliances, Inc. v. SEB S.A.*, 563 U.S. 754, 766 (2011) ("we now hold that induced infringement under § 271(b) requires

knowledge that the induced acts constitute patent infringement."); *see also Commil USA, LLC v. Cisco Sys., Inc.*, 575 U.S. 632 (2015). EcoFactor, however, offered no evidence that ecobee was aware of the asserted patent prior to this Investigation. And since the filing of this Investigation, ecobee has steadfastly maintained a reasonable, good-faith belief that the ecobee Accused Products do not practice any valid claim of the asserted patent. As such, EcoFactor has failed to establish that ecobee knowingly induced or contributed to infringement by others. RX-0163C, Souri 9/2 QA131.

Third, contributory infringement applies only when a party sells a component of a patented combination "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 non-infringing use." *Golden Blount, Inc. v. Robert H. Peterson Co.*, 365 F.3d 1054, 1061 (Fed. Cir. 2004) (quoting 35 U.S.C. § 271(c) (2000)). However, the ecobee Accused Products are clearly suitable for substantial non-infringing use. For instance, as noted above, EcoFactor's infringement theory requires that a user has connected the ecobee Accused Products to the internet. The evidence shows, however, that [redacted] RX-0163C, Souri 9/2 QA29, 69, 129, 132; RDX-0009C-11C; CX-0125C (Malchiondo) 176:17-177:12.

Resps. Br. at 142-43.

The Staff argues that ecobee does not induce infringement because EcoFactor has not shown that the accused ecobee products infringe the asserted patent by inducement or contributory infringement, and that ecobee has not shown a substantial non-infringing use. *See* Staff Br. at 74.

ecobee argues that EcoFactor has not adduced evidence that ecobee was aware of the asserted patent prior to this investigation. However, with respect to "knowledge of the asserted patent" requirement, the Commission has held that service of a section 337 complaint provides knowledge of the asserted patent. *See Beverage Brewing*, Inv. No. 337-TA-929, Comm'n Op., at 19. Therefore, the complaint satisfies the "knowledge of the patent requirement" for induced infringement.

[redacted]

Nevertheless, as found above, there is no direct infringement because EcoFactor has not shown that ecobee's accused products satisfy all the limitations of the asserted claims of the '497 patent. The administrative law judge therefore finds that ecobee does not infringe by inducement or contributory infringement.

Regarding substantial non-infringing use, Mr. Souri testified that [redacted] RX-0163C (Souri RWS) at Q/A 69, 129, 132. Thus, the evidence shows that [redacted] However, as the accused ecobee products are designed and marketed as smart thermostats, the administrative law judge finds that this is not a substantial non-infringing use. *See i4i Limited Partnership et al. v. Microsoft Corp.*, 598 F.3d 831, 851 (Fed. Cir. 2010). Inasmuch as the relevant question regarding substantial non-infringing use is not whether a user can turn off the features, but rather whether there is infringement when the feature is used as intended, *see Fujitsu*, 620 F.3d at 1330-31, Mr. Gomez's analysis shows that there is no substantial non-infringing use here.

### C. Vivint Products

EcoFactor argues, in part:

> Vivint also would infringe indirectly as a consequence of its users installing the products and using them in the normal and ordinary configuration, as intended and affirmatively encouraged by Vivint. CX-0675C (de la Iglesia) Q/A 274-283. The asserted system is formed, at the very least, when the user installs the Vivint Products in the normal and customary manner, which includes a connection to the Vivint backend. CX-0675C (de la Iglesia) 274-275. Vivint has known of the asserted patents at least since the beginning of this investigation. Yet Vivint continues to promote and instruct users to use the Vivint Products in their ordinary, everyday way, in a manner that results in infringement. [redacted]

[redacted] RX-0165C (Bunker) Q/A 43. Vivint thus induces and affirmatively encourages the acts that result in formation of the infringing systems at issue here.

The elements of contributory infringement are also satisfied. Vivint's thermostats and panels form a material part of the invention, are not staple articles, and have no substantial non-infringing uses. CX-0675C (de la Iglesia) Q/A 283. They are [redacted], because the test concerns whether they infringe in at least one mode of operation. *Fujitsu Ltd. v. Netgear Inc.,* 620 F.3d 1321, 1330-31 (Fed. Cir. 2010), the relevant question is not whether a user can turn off the infringing features, but rather, when the accused feature is used, is the product infringing. *See also i4i Ltd. v. Microsoft Corp.,* 598 F.3d at 849. Here, therefore, it is irrelevant that a user can theoretically use the Vivint thermostat as a generic thermostat, without any of its "smart" features, because the user fails to connect it to the Vivint panel as intended. To the contrary, the question is whether the Vivint Imported Products infringe when operating as intended – and clearly, they do, according to Mr. de la Iglesia's theories and other evidence.

Compl. Br. at 124-25.

Vivint infringes the asserted claims indirectly, to the extent it does not literally infringe each asserted claim directly. CX-0675C (de la Iglesia) Q/A 274-283. The asserted system is formed, at the very least, when the user installs the Vivint Products in the normal and customary manner, which includes a connection to the Vivint backend. CX-0675C (de la Iglesia) 274-275. Vivint has known of the asserted patents at least since the beginning of this investigation. Yet Vivint continues to promote and instruct users to use the Vivint Products in their ordinary, everyday way, in a manner that results in infringement. [redacted]. RX-0165C (Bunker) Q/A 43.

Vivint's thermostats and panels form a material part of the invention, are not staple articles, and have no substantial non-infringing uses. CX-0675C (de la Iglesia) Q/A 283. They are [redacted]

[redacted] because the test concerns whether they infringe in at least one mode of operation. *Fujitsu Ltd. v. Netgear Inc.,* 620 F.3d 1321, 1330-31 (Fed. Cir. 2010), the relevant question is not whether a user can turn off the infringing features, but rather, when the accused feature is used, is the product infringing. *See also i4i Ltd. v. Microsoft Corp.,* 598 F.3d at 849. Here, therefore, it is irrelevant that a user can theoretically use the Vivint thermostat as a generic thermostat, without any of its "smart" features, because the user fails to connect it to the Vivint panel as intended. To the contrary, the question is whether the Vivint Imported Products infringe when operating as intended – and clearly, they do, according to Mr. de la Iglesia's theories and other evidence.

Compl. Br. at 220-21.

Vivint argues, in part:

The record lacks any evidence that could support a finding that Vivint indirectly infringes either the '497 patent or the '322 patent. Indirect infringement requires an underlying act of direct infringement. See *Limelight Networks, Inc. v. Akamai Techs., Inc.*, 572 U.S. 915, 920-21 (2014) (inducement of infringement); *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 365 U.S. 336, 341 (1961) (contributory infringement). The record demonstrates Vivint's system does not directly infringe for the reasons stated above. The record also demonstrates that Complainant has failed to present any evidence identifying a direct infringer other than Vivint. *See* CX-0675C, de la Iglesia QA274-83.

A finding of induced infringement under 35 U.S.C. § 271(b) further requires that EcoFactor show that Vivint induced the allegedly infringing acts and knew that the acts constituted infringement. *See Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.*, 843 F.3d 1315, 1332 (Fed. Cir. 2016). A finding of contributory infringement under 35 U.S.C. § 271(c) further requires that EcoFactor show that the Vivint Accused Products constitute a material part of the claimed inventions of the '497 and '322 Patents, were especially made or adapted for such infringement, and are not a staple article or commodity of commerce suitable for non-infringing use.

Mr. de la Iglesia contends that Vivint's thermostats and panels are "[redacted]" CX-0675C, de la Iglesia QA279. [redacted]. RX-0165C, Bunker QA23. [redacted] *Id.* at QA24 ("Q. [redacted]

[redacted]

[redacted]

Likewise, the accused panel products are not designed specifically to work with any particular HVAC system or thermostat. RX-0165C, Bunker QA34-37 [redacted] *Id.* at QA63-65 ("The panels are not designed to specifically operate with Smart Comfort. . . The panels were not designed to [redacted]"); *see also* RX-0164C, James QA201. As such, there is no basis in the record to support the contention that the thermostats are "specifically designed" to operate with the Vivint Cloud system Complainant accuses of infringement.

The record also demonstrates that the accused thermostats, the CT-100 and CT-200, "are capable of functioning with an HVAC system and sending commands to an HVAC system even when disconnected from a Vivint panel or internet connection to the accused Vivint cloud system." RX-0164C, James QA203; *see also* RX-0165C, Bunker QA37 ("The thermostat [redacted]ols the HVAC system even if it is disconnected from the panel. The thermostat does not need any other device or software to control the HVAC system."). The record demonstrates that only if a customer affirmatively installs the Vivint Smart Home App will they be able to receive [redacted]." RX-0165C, Bunker QA56. In addition, the Vivint panels are used in Vivint Smart Homes with only security systems. (i.e., homes without Vivint thermostats or access to the accused aspects of the Vivint Cloud). RX-0164C, James QA203; *see also* RX-0165C, Bunker QA4-5. Finally, the record demonstrates that Vivint's cloud-based system can be used with non-accused third-party thermostats, in Vivint Smart Homes without a panel, or without "Smart Comfort" and without the Smart Home App. RX-0164C, James QA203. As such, the record is devoid of evidence that could support a finding of contributory or induced infringement by Vivint.

Resps. Br. at 231-34.

The Staff argues that Vivint does not induce infringement because EcoFactor has not shown that the accused Vivint products infringe the asserted patent, and that Vivint's products have substantial non-infringing uses. *See* Staff Br. at 74, 79.

Vivint argues that EcoFactor has not adduced evidence that Vivint was aware of the asserted patent prior to this investigation. However, with respect to "knowledge of the asserted patent" requirement, the Commission has held that service of a section 337 complaint provides knowledge of the asserted patent. *See Beverage Brewing*, Inv. No. 337-TA-929, Comm'n Op., at 19. Therefore, the complaint satisfies the "knowledge of the patent requirement" for induced infringement.

However, as found above, there is no direct infringement because EcoFactor has not shown that Vivint's accused products satisfy all the limitations of the asserted claims of the '497 and '322 patents. The administrative law judge therefore finds that Vivint does not infringe by inducement or contributory infringement.

The administrative law judge further finds that the accused Vivint products are capable of a substantial non-infringing use. The administrative law judge finds that third parties [redacted]. The accused panel products are not designed specifically to work with an HVAC system or thermostat, and are not specially designed to operate with the accused cloud software. *See* RX-0165C (Bunker DWS) at Q/A 23-24. The CT-100 and CT-200 are capable of functioning with an HVAC system and sending commands to an HVAC system even when disconnected from a Vivint panel or internet connection to the accused Vivint cloud system. *See id.* at 34-37. Only if a customer affirmatively installs the Vivint Smart Home App will one be able to receive [redacted] *See id.* at 56. The Vivint panels may be used in Vivint Smart Homes with security systems that lack HVAC functionality. *See* RX-0164C (James RWS) at Q/A 201, 203. Moreover, Vivint's cloud-based system can be used with non-accused third-party thermostats, Vivint Smart Homes without panels, or without "Smart Comfort" or the Smart Home App. *See id.*

[redacted]

**D. Alarm.com Products**

EcoFactor argues, in part:

> Further, Alarm.com is liable for indirect infringement under theories of induced and contributory infringement for infringement that occurs after the T2000 and T3000 Smart Thermostats are imported and connected to the smart thermostat system including the Alarm.com backend. *Suprema, Inc. v. Int'l. Trade Comm'n.*, 796 F.3d 1338, 1344-45 (Fed. Cir. 2015).
>
> Inducement generally requires a finding of knowledge of the asserted patents and an affirmative inducing act that evidences the intent to encourage the acts constituting patent infringement. Alarm.com had knowledge of the '322 patent at least as of the filing of this Investigation. CX-0675C (de la Iglesia WS) Q/A 158-162. As explained above, this was confirmed by Alarm.com's 30(b)(6) witness who testified that he reviewed the '322 patent and understood that it was directed to detecting problems with HVAC systems—just like the feature HVAC Analytics and CFC/CFH. Hearing Tr. 623:24-624:25. Alarm instructs intends that its users use the HVAC Analytics and CFC/CFH features. CX-0675C (de la Iglesia WS) Q/A 158-162, 279-283. It provides instructions and presentations to users, it performed pilot tests with its users, and it continues to support these features for its users. *Id.* [redacted]
>
> Alarm.com also infringes under contributory infringement. To establish contributory infringement, EcoFactor has shown "1) that there is direct infringement, 2) that the accused infringer had knowledge of the patent, 3) that the component has no substantial noninfringing uses, and 4) that the component is a material part of the invention." *Fujitsu,* 620 F.3d at 1326. Direct infringement by HVAC Analytics and CFC/CFH is discussed above as is knowledge of the '322 patent. Further, the Alarm.com T2000 and T3000 Smart Thermostats are not staple goods but are smart thermostats designed to function in a smart thermostat. CX-0675C (de la Iglesia WS) Q/A 158-162. As explained above, HVAC Analytics and CFC/CFH are discrete features of the T2000 and T3000 Smart Thermostats that have no non-infringing use. *Id.* Thus the T2000 and T3000 Smart Thermostats infringe contributorily as components of an infringing smart thermostat system. *Fujitsu,* 620 F.3d at 1330-31 (holding that the question for contributory infringement is whether a "separate and distinct" feature has a non-infringing use—not whether the product as a whole does).

Compl. Br. at 208-09.

Alarm.com argues, in part:

> As explained above, EcoFactor failed to prove any act of direct

[redacted]

infringement. Therefore, EcoFactor's indirect infringement claims must also fail. *See Dynacore Holdings Corp. v. U.S. Philips Corp.*, 363 F.3d 1263, 1277 (Fed. Cir. 2004).

Additionally, EcoFactor failed to prove indirect infringement because there is no evidence in the record that Alarm.com had the requisite knowledge to either induce or contribute to the infringement of others. Inducement "requires knowledge that the induced acts ***constitute patent infringement***". *Global-Tech Appliances, Inc. v. SEB S.A.*, 563 U.S. 754, 766 (2011) (emphasis added). Similarly, contributory infringement requires that "the alleged contributory infringer knew that the combination for which his component was especially designed was both ***patented and infringing***". *Koninklijke Philips N.V. v. Zoll Med. Corp.*, 656 F. App'x 504, 523 (Fed. Cir. 2016) (emphasis added).

EcoFactor adduced no evidence that Alarm.com had any knowledge that it infringed the '322 patent, either before or after EcoFactor filed its Complaint in this Investigation. To the contrary, the testimony of Mr. Hutz (who explained how the accused software systems. work, *see* RX-0159C, Hutz QA91-108, 167-75) and Mr. Hagins (who concluded that Alarm.com does not infringe the '322 patent after a thorough review of the evidence, *see* RX-0161C, Hagins QA139-204), demonstrates a reasonable basis to believe that Alarm.com was ***not*** infringing the '322 patent. As such, EcoFactor's claims of contributory and induced infringement must fail.

* * *

Alarm.com cannot have contributorily infringed because the Alarm.com Accused Products have substantial non-infringing uses. As an initial matter, EcoFactor has waived any argument that the Alarm.com Accused Products are not staple articles or lack substantial non-infringing uses, because it made no such arguments in its prehearing brief or statement.

* * *

EcoFactor elicited no testimony on either direct or cross-examination that refutes, or even addresses, this evidence. EcoFactor may wish to rely on Mr. de la Iglesia, but his testimony states that the Alarm.com Accused Products "have non infringing use." CX-0675C, de la Iglesia QA162. That testimony supports Alarm.com's position.

* * *

EcoFactor also failed to prove that the Alarm.com Accused Products are "especially made or especially adapted" for use in an infringing combination. *See* 35 U.S.C. § 271(c). Mr. Goodman, who runs the company that engineered and developed the Alarm.com Accused Products, testified that the Alarm.com Products

[redacted]

were not especially made or adapted for use with the accused Backend functionalities. RX-0160C, Goodman QA62, 65-66, 73, 76, 77. [redacted] This testimony was unchallenged at the hearing and uncontroverted by any evidence EcoFactor submitted.

Resps. Br. at 109-15.

The Staff argues that Alarm.com does not induce infringement because EcoFactor has not shown that the accused Alarm.com products infringe the asserted patent, and that Alarm.com's products have substantial non-infringing uses. *See* Staff Br. at 74, 78.

Alarm.com argues that EcoFactor has not adduced evidence that Alarm.com was aware of the asserted patent prior to this investigation. However, with respect to "knowledge of the asserted patent" requirement, the Commission has held that service of a section 337 complaint provides knowledge of the asserted patent. *See Beverage Brewing*, Inv. No. 337-TA-929, Comm'n Op., at 19. Therefore, the complaint satisfies the "knowledge of the patent requirement" for induced infringement.

Nevertheless, as found above, there is no direct infringement because EcoFactor has not shown that Alarm.com's accused products satisfy all the limitations of the asserted claims of the '322 patent. The administrative law judge therefore finds that Alarm.com does not infringe by inducement or contributory infringement.

The administrative law judge further finds that the accused Alarm.com's products are capable of a substantial non-infringing use. With respect to Alarm.com, the evidence shows that Alarm.com and Building 36 do not sell Alarm.com's accused products to end users, rather each company sells Alarm.com's accused products to their respective network of independent dealers, who sell the thermostats (along with other products and Alarm.com interactive services) to end

users. *See* RX-0159C (Hutz DWS) at Q/A 37-40. None of the customers that bought their ADC-T2000 or ADC-T3000 through an Alarm.com security dealer rather than a Building 36 dealer have access to HVAC Analytics or CFH/CFC. *See id.* at 109-10, 161-62; RX-0160C (Goodman DWS) at Q/A 58-59, 69-70. The thermostats were not specifically engineered to work with HVAC Analytics or CFH/CFC. *See* RX-0160C (Goodman DWS) at 65-66, 73, 76-77; RX-0161C (Hagins RWS) at Q/A 208.

## X. Invalidity

### A. Validity Under 35 U.S.C. § 101

#### 1. The '497 and '322 Patents

##### a. *Alice* Step One

Respondents argue, in part:

> The asserted claims of the '497 patent are directed to nothing more than the abstract idea of using temperature measurements to calculate the efficiency of an HVAC system. Hearing Tr. 237:20-24 (Gomez); Hearing Tr. 949:18-950:14 (Palmer). Even EcoFactor does not dispute that the claims of the '497 patent are directed to ordinary human activity: storing and comparing temperature measurements. Compl. ¶ 40. EcoFactor's own expert Mr. Gomez even confirmed that all of the limitations of the asserted claims of the '497 patent could be done with pen and paper because they merely require (1) reading temperatures from a thermometer, (2) starting and stopping a stopwatch while the HVAC is on and off, and (3) applying "high school algebra" to calculate the rates of change. Hearing Tr. 238:8-242:21 (Gomez).
>
> Moreover, as Mr. Gomez and EcoFactor's validity expert Dr. Palmer testified, the claims of the '497 patent do not involve "improving the efficiency of an HVAC system," nor do they require or involve "the management or changes to the management of the HVAC system," "the shifting of the on-and-off time of the HVAC system," or any "modifications or operational changes to the HVAC system." Hearing Tr. 237:25-238:7 (Gomez); Hearing Tr. 960:3-961:7 (Palmer).
>
> The prosecution history for the '497 patent confirms that it claims performing an abstract idea on a generic computer system. To overcome a § 101 rejection in which the Examiner characterized the claims as "abstract" (*see* CX-0005 ('497 FH) at 355-56)[], EcoFactor argued that performing the claims on a conventional processor was sufficient to be patent-eligible. Because this claim was

prosecuted before *Alice*, the Examiner allowed the claims. But the Supreme Court in *Alice* held "the mere recitation of a generic computer cannot transform a patent-ineligible abstract idea into a patent-eligible invention." *Alice Corp. v. CLS Bank Int'l*, 573 U.S. 208, 223 (2014).

* * *

The asserted claims of the '322 patent are directed to the abstract idea of using temperature measurements to evaluate changes in the efficiency of an HVAC system. Hearing Tr. 268:22-269:1 (Gomez); Hearing Tr. 951:13-16 (Palmer). Specifically, as Dr. Palmer conceded, the asserted claims of the '322 patent merely "involve ways of collecting and analyzing data about the operational efficiency of HVAC systems . . ." Hearing Tr. 959:6–10 (Palmer). As explained above in relation to Section 112, neither the specification nor the claims explain how to evaluate changes in operational efficiency, nor do they limit such an evaluation to a particular technical environment. Supra, §VI.A-B. The asserted claims provide no meaningful limitations to preclude a person from using a pen and paper to record temperature measurements inside and outside a building and compare them to determine whether the operational efficiency of the HVAC system has decreased over time. As further admitted by Dr. Palmer, the claims of the '322 patent do not require any changes to the management of the HVAC system, any shifting of the on-and-off times of the HVAC system, or any operational changes to the HVAC system. Hearing Tr. 960:3-961:7 (Palmer). Moreover, the claims are directed toward routine information retrieval and analysis, and do not disclose any improvement in how the claimed generic processors perform those standard functions. *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1354 (Fed. Cir. 2016).

Resps. Br. at 248-50.

EcoFactor argues that the claims of the'497 and '322 patents are not directed to abstract ideas, but rather to technical improvements in HVAC systems. *See* Compl. Br. at 276-78.

The Staff argues, in part:

The evidence does not show that the asserted claims of the '497 and '322 patents are patent ineligible under 35 U.S.C § 101.

* * *

**First step:** Claim 1 of the '497 and '322 patents are directed to calculating and/or evaluating changes in the operational efficiency of an HVAC system. *See* Staff Ex. 1 (preamble and elements 1[d] of each patent). The specifications disclose calculating the operational efficiency of an HVAC system by calculating the "***effective thermal mass"*** of the structure, even though that term is not recited in

> the claims. *See* JX-1, at 8:31-9:9. The specification further makes clear that this claimed system and method is a significant departure and improvement over the existing electronic thermostat and HVAC control system.

Staff Br. at 79-80.

The administrative law judge finds that respondents have not shown that the asserted claims of the of the ’497 and ’322 patents are directed to an abstract idea, devoid of a concrete or tangible application. Rather, these claims are directed to technical improvements in HVAC systems. *See Alice Corp., v. CLS Bank Int’l*, 573 U.S. 208, 223 (2014) (“[T]he claims in [*Diamond v. Diehr*, 450 U.S. 175, 188 (1981)] were patent eligible because they improved an existing technological process, not because they were implemented on a computer.”).

Respondents argue that the asserted claims of the ’497 patent are directed to nothing more than the abstract idea of using temperature measurements to calculate the efficiency of an HVAC system, and that the asserted claims of the ’322 patent are directed to the abstract idea of using temperature measurements to evaluate changes in the efficiency of an HVAC system. *See* Resps. Br. at 248-50. However, the claimed electronic HVAC control system of the ’497 patent is configured with a database for storing inside temperature measurements and processors to determine rates of change of those measurements when the HVAC status is “off” and “on”, and correlating those rates of change to outside temperature measurements received from a source other than the HVAC. Moreover, the claimed electronic HVAC control system of the ’322 patent is configured to determine a decrease in operational energy efficiency over time by using one or more computer processors that are configured to receive electronic measurements of outside temperatures from a non-HVAC system, compare inside temperature with outside temperature over time, and compare a plurality of stored historical inside temperature measurements obtained from an electronic database.

[redacted]

These claims are expressly directed to technical improvements to then-existing technology, namely those associated with electronically programmable thermostats and other HVAC controls. *See Alice*, 573 U.S. at 217 (claims patent-eligible as a matter of law if "they improve an existing technological process"). Therefore, the administrative law judge finds that the asserted claims are patent-eligible as a matter of law. *Id.*

Moreover, the specification provides further evidence that this claimed system and method is a significant departure and improvement over the existing electronic thermostat and HVAC control system. For example, "conventional" electronic thermostats and other HVAC controls had "no mechanism by which it might take the thermal mass of the structure into account, but thermal mass significantly affects many parameters relating to energy efficiency." JX-0001 ('497 patent) & JX-0002 ('322 patent) at col. 3, lns. 1-4; col. 2, lns. 52-67. The claims of the '322 and '497 patents purport to overcome the limitations in the conventional electronic thermostat HVAC control system at the time. For instance, the inventions use a networked thermostat HVAC control system to "measure[] temperature" in a building and "reporting said temperature measurements as well as the status of an HVAC control system over the Internet." *Id.* at col. 3, ln. 62 – col. 4, ln. 14, col. 6, lns. 14-59, Fig. 1.

The administrative law judge thus finds that respondents have not shown that the asserted claims of the of the '497 and '322 patents are directed to an abstract idea, devoid of a concrete or tangible application.

**b. *Alice* Step Two**

Respondents argue, in part:

> None of the claims of either the '497 or '322 patent provide any inventive concept under step two of *Alice*. As EcoFactor's own experts and the named inventor admit, the claimed components of the asserted claims of the '497 and '322

[redacted]

patents are conventional and generic: one or more processors, one or more databases, and an HVAC control system. EcoFactor did not invent any of these components. Hearing Tr. 248:2-25 (Gomez) (testifying that EcoFactor did not invent the Internet, web browsers, servers, databases, or HVAC units). Nor did EcoFactor invent the programmable communicating thermostat (PCT). RX-0001C, Auslander QA55, 65; Hearing Tr. 961:21-962:1 (Palmer) (admitting that PCTs were "well-known" in 2007). Despite testifying that the patents teach nothing unconventional about the thermostat (RX-0001C, Auslander QA55, 65), Dr. Palmer admits the conventional PCT can be "an element of the inventions of the '322 and '497 patents." Hearing Tr. 961:17-20 (Palmer). Mr. Hublou's testimony confirmed this by admitting that EcoFactor used only "off-the-shelf" components including a conventional PCT to implement the '497 patent. Hearing Tr. 246:11-17 (Gomez); RX-0004C (Hublou Dep.) 71:7-16, 77:1-10, 54:21-55:3. In addition, the asserted claims of the '497 and '322 patents do not limit the collection and analysis of data relating to HVAC systems. to a technical means for performing the functions that constitute an advance over conventional computer and network technology. *See* Hearing Tr. 961:4–7 (Palmer) (asserted claims do not require modifications or operational changes to the HVAC system itself).

Moreover, the specification does not identify the construct of the claimed "HVAC control system." Rather, claim 1 requires that the HVAC control system simply "receive[] temperature measurements from at least a first location conditioned by at least one HVAC system." CX-0001C ('497 patent) 13:34–36. The specification further discloses that the ability to sense temperature is a "basic" component of any thermostat and does not require any specialized hardware. *See id.* 1:26–31. The specification further describes databases as containing information, which is stored using "any method of storing information." *Id*. 7:1–6, 7:26–29. Finally, the specification describes processors as any "general-purpose processors, multi-chip processors, embedded processors and the like." *Id*. 6:57–59. Each of the claimed components, an HVAC control system that receives temperature measurements, a database that stores information, and a processor, are conventional general-purpose hardware performing their ordinary functions.

Thus, none of the claim limitations, either individually, or as an ordered combination, provide an inventive concept sufficient to turn the abstract idea into a patent-eligible invention. Simply disclosing an abstract idea and adding the words, "apply it with a computer" is not sufficient under step two of *Alice* as a matter of law. *Alice*, 573 U.S. at 223.

Resps. Br. at 250-51.

EcoFactor argues, in part:

Because Respondents fail at Step 1, the ALJ need not consider Step 2. But Step 2 also exposes Respondents' legal and factual flaws, as they likewise cannot meet their burden, e.g., because the claims recite an undoubtedly *unconventional*

[redacted]

> electronic HVAC control system. *See, e.g., Cellspin Soft, Inc. v. Fitbit, Inc*., 927 F.3d 1306-07 (Fed. Cir. 2019) (Step 2 considers "whether the claimed elements—individually and as an ordered combination—recite an inventive concept."); *Diamond v. Diehr*, 450 U.S. 175, 188 (1981) ("In determining the eligibility of respondents' claimed process for patent protection under § 101, their claims must be considered as a whole. It is inappropriate to dissect the claims into old and new elements"). To argue otherwise, Respondents parse out each of the elements of the claim and argue—without support—that "*each and every limitation*" may be performed by a generic computer and memory. But that analysis runs contrary to precedent, which requires considering the entire claim as an *ordered combination*. Even worse, their statements on the claim elements they parse and dissect are based on nothing more than conclusory attorney argument. Indeed, Respondents' invalidity expert ***Dr. Auslander (or any other expert in this Investigation) has never argued (not even in his expert report) that any patents are ineligible under §101*****,** even after he reviewed EcoFactor expert Dr. Palmer's declarations in support of EcoFactor's oppositions to Respondents' §101 MSDs.
>
> * * *
>
> And though the intrinsic record alone is enough soundly defeat Respondents' arguments, EcoFactor's extrinsic evidence only takes all this one step further and makes it even clearer. *See, e.g.,* CX-0699C.0034-.0037. But there is even more: *Respondents' own documents and witnesses* also confirm that aspects of the ordered combination of elements were not "conventional"—even as late as the mid-2010s. *See, e.g.,* CX-0063C at GOOG-ITC1185-00001749; CX-0088C at 313-314; CX-0590C at GOOG-ITC1185-00035845; CX-0103C at 120-121; CX-0194C; CX-0195C; CX-0196C; CX-0228C; CX-0217C. The asserted claims are not directed to abstract idea.

Compl. Br. at 278-80.

> The Staff argues, in part:
>
> Even if the claims are found to be directed to an abstract idea, pursuant to the second step of the § 101 analysis, the details provided in the invention of claim 1 of each patent amount to more than just the abstract idea. *See Content Extraction*, 776 F.3d at 1347. That is, as discussed above, the inventive concept of the claims are ***not*** simply applying conventional and well-understood techniques to an abstract idea. *See BSG Tech.*, 899 F.3d at 1290–91.

Staff Br. at 82.

The administrative law judge finds that respondents have not met their burden of showing that the asserted claims of the '497 and '322 patents lack an inventive concept, insofar as the

particular arrangement of claimed elements purports to provide unconventional electronic HVAC control systems. In particular, the administrative law judge finds that the asserted claims of the '497 and '322 patents are directed toward improvements in energy-efficient HVAC systems that may correct for the distortion caused by thermal mass. *See Bascom Glob. Internet Servs., Inc. v. AT&T Mobility LLC*, 827 F.3d 1341, 1350 (Fed. Cir. 2016) (the patent-eligible inventive concept identified was "the installation of a filtering tool at a specific location, remote from the end-users, with customizable filtering features specific to each end user. This design gives the filtering tool both the benefits of a filter on a local computer and the benefits of a filter on the ISP server.").

As the patents themselves confirm, conventional electronic thermostats and other HVAC controls had "no mechanism by which it might take the thermal mass of the structure into account, but thermal mass significantly affects many parameters relating to energy efficiency." JX-0001 ('497 patent) and JX-0002 ('322 patent) at col. 3, lns. 1-4. Yet, the claims are purportedly directed to a specific system and method designed to improve/evaluate the operational efficiency of an HVAC system using an alleged new and non-conventional technique, which includes calculating the effective thermal mass of the structure set forth by the limitations set forth in elements 1[d] of each patent. *See* JX-0002 ('322 patent) at col. 3, ln. 35 – col. 4, ln. 40; col. 4, lns. 38-54; col. 5, lns. 4-30; col. 11, ln. 20 – col. 12, ln. 23; col. 13, lns. 50-53.

Accordingly, the administrative law judge has determined that respondents have not demonstrated that the asserted claims of the '497 and '322 patents are directed toward ineligible subject matter.

[redacted]

### 2. The '371 Patent

#### a. *Alice* Step One

Respondents argue, in part:

> The asserted claim of the '371 patent is directed to nothing more than the abstract mental process of detecting and interpreting manual changes to HVAC temperature settings. The claims provide no meaningful limitations to preclude a person from using a pen and paper to collect and analyze setpoint data to detect and interpret a manual change. The '371 patent specification acknowledges that the claimed analysis is performed by a "server," which is nothing more than "a conventional computer[]" and simply proposes using a generic processor to perform the claimed analysis. *See* '371 patent, at 3:25–27, 5:66–6:43.

Resps. Br. at 276.

EcoFactor argues that the asserted claim of the '371 patent does not merely recite computer components to perform any "abstract idea" untethered to any technological problem or process. *See* Compl. Br. at 278.

The Staff argues, in part:

> Respondents argue that claim 9 of the '371 patent is not patent eligible under Section 101. RPreHBr. at 182. The Staff disagrees. First, with respect to step one of *Alice*, Respondents offer no expert testimony for their conclusion that the claim provides no meaningful limitations to preclude a person from using a pen and paper to collect and analyze setpoint data to detect and interpret a manual change. *Id*. In Staff's view, at least elements 1[a] and 1[c] cannot be performed using a pen and paper.

Staff Br. at 103.

The administrative law judge finds that respondents have not shown that claim 9 of the '371 patent is directed to an abstract idea, devoid of a concrete or tangible application. Rather, claim 9 is directed to a technical improvement in HVAC systems. *See Alice*, 573 U.S. at 223 ("[T]he claims in [*Diamond v. Diehr*, 450 U.S. 175, 188 (1981)] were patent eligible because they improved an existing technological process, not because they were implemented on a computer.").

The '371 patent recognized the problems associated with frequent "manual overrides" in conventional HVAC control systems. *See* JX-0004 ('371 patent) at col. 1, ln. 65 – col. 2, ln. 19. The '371 patent discloses a method for implementing a smart thermostat utilizing automated setpoint (computer-calculated temperature setting) with rules for interpretation of manual change to setpoint. *See, e.g., id.* at col. 5, ln. 66 – col. 6, ln. 19; col. 7, lns. 17-28; claim 9. These disclosures show that the claims recite technical solutions to the existing technical problems.

The administrative law judge thus finds that claim 9 of the '371 patent is patent-eligible. The claimed method electronically detects a manual change to an automated setpoint, generating an electronic difference value by comparing an actual versus automated temperature setpoint to detect and log a manual change to that setpoint, and electronically logging the detected change to a database.

**b. *Alice* Step Two**

Respondents argue, in part:

> The asserted claim of the '371 patent fails to provide an inventive concept under step two of *Alice*. The claim recites two components that perform the steps of the abstract idea: (1) a thermostatic controller; and (2) at least one computer. As EcoFactor's own expert admits, programmable thermostats were conventional well before the priority date of the '371 patent. RDX-0001C-015; Hearing Tr. 961:21-962:1 (Palmer) (admitting that PCTs were "well-known" in 2007); RX-0001C, Auslander QA55, 65. Both of the claimed components, a thermostatic controller and a computer, are conventional general-purpose hardware performing their ordinary functions. Thus, none of the claim limitations, either individually, or as an ordered combination, provide an inventive concept sufficient to turn the abstract idea into a patent-eligible invention.

Resps. Br. at 276-77.

EcoFactor argues, in part:

> As another example, the '371 patent confirms that it describes "novel methods and systems" that use "automated setpoints" and "rules for interpretating manual overrides," and that address problems associated with conventional HVAC control

[redacted]

> systems. *E.g.,* JX-0004 ('371 patent) at 5:66-6:19, 7:17-28, 8:11-19. Indeed, there were no conventional HVAC system that implemented these novel elements before the '371 patent.

Compl. Br. at 280.

> The Staff argues, in part:
>
> Second, with respect to step two of *Alice,* even if found to be directed to an abstract idea, the inventive concept of claim 1 is ***not*** simply applying conventional and well-understood techniques to the claims to an abstract idea. *Content Extraction and Transmission LLC v. Wells Fargo Bank Nat. Ass'n.,* 776 F.3d 1343, 1347 (Fed. Cir. 2014) (citing *Alice*, 134 S. Ct. at 2355 (quoting *Mayo*, 132 S.Ct. at 1294)).

Staff Br. at 103.

The administrative law judge finds that respondents have not met their burden of showing that claim 9 lacks an inventive concept, insofar as the particular arrangement of claimed elements purports to provide an unconventional method for incorporating manual changes to a thermostatic controller. In particular, the administrative law judge finds that claim 9 is directed toward a new and specific method for incorporating manual changes to setpoints for a thermostatic controller. *See Bascom Glob. Internet Servs., Inc. v. AT&T Mobility LLC*, 827 F.3d 1341, 1350 (Fed. Cir. 2016) (the patent-eligible inventive concept identified was "the installation of a filtering tool at a specific location, remote from the end-users, with customizable filtering features specific to each end user. This design gives the filtering tool both the benefits of a filter on a local computer and the benefits of a filter on the ISP server.").

The '371 patent describes "novel methods and systems" that use "automated setpoints" and "rules for interpretating manual overrides," and that address problems associated with conventional HVAC control systems. *See, e.g.,* JX-0004 ('371 patent) at col. 5, ln. 66 – col. 6, ln. 19, col. 7, lns. 17-28, col. 8, lns. 11-19. The '371 patent discloses a method for implementing a smart thermostat utilizing automated setpoint (computer-calculated temperature setting) with

rules for interpretation of manual change to setpoint. *See, e.g., id.* at col. 5, ln. 66 – col. 6, ln. 19, col. 7, lns. 17-28; claim 9.

Accordingly, the administrative law judge has determined that respondents have not demonstrated that the asserted claim of the '371 patent is directed toward ineligible subject matter.

### B. Validity Under 35 U.S.C. §§ 102 and 103

#### 1. The '497 Patent

##### a. Anticipation – Ehlers

Ehlers was published on April 17, 2001, and therefore qualifies as prior art to the '497 patent. *See* RX-0022 (Ehlers).

Respondents argue, in part:

> Ehlers anticipates claim 1 of the '497 patent because it discloses each of the limitations of that claim ([1Pre] to [1d]). RDX-0001C-064 to 70, 72 to 76, 78, 80 to 083 (RX-0022 (Ehlers) 1:6-18, 1:26-36, 7:11-36, 8:16-17, 9:50-63, 10:14-19, 10:30-11:18, 12:45-13:2, 14:9-15, 17:56-64, 20:4-7, 21:5-25, 27:62-63, 26:55-58, 26:53-55, 29:4-13, 30:65-31:6, 32:48-51, 34:32-67, 35:46-50, 35:65-36:1, 36:11-38, 36:61-37:3, 37:17-50, 38:14-26, 38:33-40:58, Figs. 4, 6, Title, Abstract); RX-0001C, Auslander QA103-14; RDX-0012 (Appendix A-1 Invalidity Claim Chart). EcoFactor does not dispute that Ehlers discloses limitations [1a], [1b], and parts of [1d]. PHB at 70-72; CX-0702C, Palmer QA37; RX-0001C, Auslander QA110, 112-13. Only the claim limitations that EcoFactor alleges are not anticipated by Ehlers are described in detail here.
>
> ***Limitation 1Pre****:* Ehlers calculates "[t]he operational efficiency factor of each appliance being monitored." RX-0022 (Ehlers) 39:21-23, 38:33-41; RDX-0001C-066 (RX-0022 (Ehlers) at 39:21-23, 34:32-33, 38:33-41, 40:45-47, 20:4-7, 21:19-22, Fig. 4); RX-0001C, Auslander QA105. EcoFactor's sole argument regarding Ehlers's disclosure of this limitation is that the "operational efficiency factor" in Ehlers is for generic appliances, not an HVAC system. PHB at 72. However, in Ehlers, an example of a monitored appliance is an HVAC unit, which is the claimed HVAC system. RX-0022 (Ehlers) at 34:42-43, Fig. G. 4; RX-0001C, Auslander QA105. The operational efficiency factor in Ehlers is the claimed operational efficiency under any party's construction. RX-0001C, Auslander QA105-106.

[redacted]

***Limitation 1c****:* Ehlers's functions 31-36 are implemented on a "processor." RX-0022 (Ehlers) 35:65-36:1, Fig. 4. As shown in Fig. 4 of Ehlers and further explained below, outside temperature measurements from input functions 13 (providing weather data) and 15 (providing data from outside temperature sensors) are stored in storage 21, which provides the data to at least functions 31, 35, and 36. RX-0022 (Ehlers) 9:49-63, 10:14-19, Fig. 4; RX-0001C, Auslander QA111.

Ehlers discloses the "outside temperature measurements from at least one source other than said HVAC system" in at least two ways. First, Ehlers's input function 15 interfaces with sensors that sense "external environmental conditions including temperature." RX-0022 (Ehlers) 10:14-19, Fig. 4; RX-0001C, Auslander QA111. EcoFactor does not dispute that Ehlers's sensors provide "outside temperature measurements." PHB at 71; CX-0702C, Palmer QA48-56. Instead, EcoFactor's sole argument is that the sensors are not a "source other than said HVAC system" because they are part of Ehlers's thermostat-like device. PHB at 71; CX-0702C, Palmer QA48-56. As an initial matter, while Ehlers does state that temperature sensors can be part of the system shown in Fig. 4, the portion of Ehlers relied on by Respondents clearly states that the outside temperature sensors are separate from the system because input function 15 "interfac[es] with sensors" that "sense internal and external environmental conditions including temperature." RX-0022 (Ehlers) 10:14-19, Fig. 4; RX-0001C, Auslander QA111. Furthermore, EcoFactor's position is contradicted by its own expert. Mr. Gomez testified that the "the source, other than an HVAC system, can be a local sensor outside of a home" (Hearing Tr. 242:7-10 (Gomez)), which is consistent with Ehlers's teaching of outside temperature sensors that interface with a thermostat-like device (RX-0022 (Ehlers) 10:14-19, Fig. 4; RX-0001C, Auslander QA111).

Second, under at least EcoFactor's interpretation of the claims, Ehlers's disclosure that "[i]nput function 13 provides weather information" that includes "discrete parameters representing temperature," comprise outside temperature measurements from a source other than said HVAC system. RX-0022 (Ehlers) 35:65-36:1, 9:50-63, 10:14-19; RDX-0001C-073 to 074 (RX-0022 (Ehlers) at 35:65-36:1, 9:50-63, 1:6-18, 10:14-19, 10:30-11:4, 32:48-51, 34:32-50, 36:11-38, 36:61-37:3, 37:17-35, 39:36-40, Fig. 4); RX-0001C, Auslander QA111. EcoFactor does not dispute that Ehlers's "weather information" provides "outside temperature" from at least one source other than said HVAC system. PHB at 70; CX-0702C, Palmer QA57-59. Instead, EcoFactor's sole argument is that the temperature field in Ehlers's weather service data could be "historical record or average temperature, forecasts, etc." as opposed to "outside temperature measurements." PHB at 70-71; CX-0702C, Palmer QA59. But this argument relies on reading qualifications into the disclosure that are simply not there. The patent simply refers to obtaining weather information, including parameters representing temperature, humidity, wind speed, and so on. RX-0022 (Ehlers) at 9:50-63. There is nothing to teach or suggest to the reader that the received temperatures had been averaged or forecasted, rather than being actual measured temperatures. Moreover,

Dr. Palmer's opinion and EcoFactor's position on this point directly contradict the infringement positions EcoFactor's own experts have taken in this Investigation. For example, EcoFactor's expert Mr. de la Iglesia testified "outside temperature measurements can be estimates" and because "a forecast is an estimate, I think it follows logically that a forecast would qualify [as a measurement]." Hearing Tr. 488:12-15, 396:12-18, 413:9-19 (de la Iglesia). Another EcoFactor expert, Mr. Gomez, also testified that "outside temperature measurements" can be recorded "historical" temperature values. CX-0674C, Gomez QA485. Thus, to the extent EcoFactor is correct (it is not) that outside temperature estimates, forecasts, or historical records are "outside temperature measurements," then Ehlers discloses this limitation.

***Limitation 1d****:* Ehlers discloses calculating rates of change in temperature for periods during which the status of the HVAC system is "on." Dr. Palmer does not dispute that Ehlers's disclosure of an "average thermal recovery time per degree" is a change in time divided by a change in temperature, which "is the same information expressed in a different way" as its inverse, and the recovery time is for "when heating and cooling systems. are operational," meaning the status of the HVAC system is on. RX-0022 (Ehlers) 26:56-57, 39:16-18; RDX-0001C-076 (RX-0022 (Ehlers) at 39:16-18, 11:6-18, 26:55-58, 35:65-36:1, Fig. 4); RX-0001C, Auslander QA112; CX-0702C, Palmer QA61.

Ehlers discloses calculating rates of change in temperature for periods during which the status of the HVAC system is "off." Dr. Palmer admits that Ehlers's disclosure of a "natural thermal rate of change," represented by a change in time divided by a change in temperature "is the same information expressed in a different way" as its inverse, and the "natural thermal rate" in Ehlers is measured when the HVAC system is off. RX-0001C, Auslander QA113; RDX-0001C-078 (RX-0022 (Ehlers) at 29:4-7, 26:53-55, 39:13-15, Fig. 4); RX-0022 (Ehlers) 39:13-15, 26:53-55, 29:4-7.

Ehlers also discloses relating these calculated rates of change to outside temperature measurements. Ehlers combines the average normalized thermal gain or loss (the claimed rate of change when off) with the computed thermal recovery time (the claimed rate of change when on), and adjusts the combination to compensate for outside temperature measurements. RX-0022 (Ehlers) 39:43-57; RDX-0001C-080 to 081 (RX-0022 (Ehlers) at 39:41-57, 17:56-64, 21:5-25, 27:62-63, 29:4-13, 37:36-41, 38:14-26, 40:32-39, Fig. 4); RX-0001C, Auslander QA114.

Resps. Br. at 252-56 (footnotes omitted).

EcoFactor argues, in part:

RX-0022 (Ehlers) does not anticipate '497 patent claim 1 for several reasons. *See* CX-0702C (Palmer WS) Q/A 34-66. ***First***, Ehlers does not disclose element 1[b] "one or more processors that receive outside temperature

measurements from at least one source other than said HVAC system" CX-0702C (Palmer WS) Q/A 37. Respondents point to two disclosures that fail for two separate reasons. First, Respondents point to Ehlers' disclosure of receipt from a weather service of a message with "discrete parameters representing temperature." CX-0702C (Palmer WS) Q/A 47; quoting Ehlers at 9:50-63. CX-0702C (Palmer WS) Q/A 47; quoting Ehlers at 9:50-63. However, there is no disclosure that the temperature field represents outside temperature measurements rather than any other temperature quantity (such as, for example, historical record or average temperature, forecasts, etc.). *E.g.*, CX-702 (Palmer WS) Q/A 59. Indeed, elsewhere Ehlers teaches that the relevant embodiment of Ehlers requires external temperature sensors that are ***part of the HVAC system***. RX-0022 (Ehlers) at 39:51-57 (referencing "***the need for external sensors at each location***" in the embodiment relied on by Respondents (emphasis added)); *see* CX-702 (Palmer WS) Q/A 59. RX-0022 (Ehlers) at 39:51-57 (referencing "***the need for external sensors at each location***" in the embodiment relied on by Respondents (emphasis added)); *see* CX-702 (Palmer WS) Q/A 59. The second disclosure relied upon by Respondents are indoor and outdoor sensors that, critically, are part of the HVAC system. Specifically, Respondents rely on a disclosure of sensors that are party of Ehlers' thermostat-like device that "sense internal and external environmental conditions including temperature and humidity, as well as other conditions such as occupancy." RX-0022 (Ehlers) at 10:14-29. However, the '497 patent requires temperatures from a "source ***other than said HVAC system***." However, the '497 patent requires temperatures from a "source ***other than said HVAC system***." The sensors that are part of each of Ehlers' thermostat-like devices are not "sources other than [the] HVAC system." The '497 patent specifically teaches away from using such outdoor sensors that are part of the smart thermostat because "such systems require additional hardware, additional thermostat complexity, and skilled installation and configuration." JX-0001 ('497 patent) at 2:43-51. Ehlers' itself acknowledges that this is a drawback of its approach—referring (in an embodiment on which Respondents do not rely) to a design where "[t]ransmitting centrally computer factors will eliminate the need for external sensors at each location, thus lowering the cost of installation and ongoing maintenance." RX-0022 (Ehlers) at 39:51-57.

***Second***, Ehlers does not disclose "one or more processors [that] are configured to calculate one or more rates of change in temperature at said first location for periods during which the status of the HVAC system is 'on' and wherein said one or more processors are further configured to calculate one or more rates of change in temperature at said first location for periods during which the status of the HVAC system is 'off'" in element 1[d], because RX-0022 (Ehlers does not disclose calculating any rate of change or correlating any alleged rate of change with outside temperature. CX-0702C (Palmer WS) Q/A 60-66. Respondents rely on disclosures of "the average thermal degree gain or loss per unit of time for the premise for a rolling 30, 60 and 90 day period by hour of the day." However, there is no disclosure that either average is calculated by determining a rate of change of

[redacted]

temperature. CX-0702C (Palmer WS) Q/A 61-62. Indeed, as Dr. Palmer explained, both values can be calculated in ways such as by comparing runtime of a structure against runtime of similar structures. *Id.* Q/A 63. Ehlers simply does not disclose the approach used.

Moreover, Ehlers' statement regarding "recovery time … for a rolling 30, 60, and 90 day period" does not disclose calculation of rates of change in temperature regarding when HVAC system is "on" also because HVAC systems do not run for 30, 60, or 90 days straight. Indeed, Respondents' expert Dr. Auslander admitted that he could not identify a single HVAC system that ran for 30, 60, or 90 days. Hearing Tr. 896:18-897:7. In other words, Ehlers does not disclose specific instances of HVAC system being "on" or "off." Accordingly, Respondents fail to show that Ehlers discloses calculation of any value while HVAC system is "on."

Further, even assuming ***arguendo*** that Ehlers discloses calculating a rate of change, there is no disclosure whatsoever that any alleged rate of change is correlated with outdoor temperature. *Id.* Q/A 64-65. Respondents' expert points to Ehlers' disclosure of "'[c]omputed thermal recovery time for heating and cooling adjusted to compensate for external temperature, wind speed, direction, UV index, humidity and cooling or heating degree day factors.'" *Id.* (quoting CX-0022 (Ehlers) at 39:43-57. However, compensating for external temperature is not a disclosure of correlating a rate of change with outside disclosure. *Id.* In addition, this disclosure of recovery time (when an HVAC is "on") does not provide any support that there is a correlation for a rate of change when an HVAC system whose status is "off." Respondents' expert also contends that "'[t]o the extent that EcoFactor contends that relating rates of change to outside temperature measurements involves combining thermal gains or losses and compensating for outside temperatures, then, applying that reasoning to the prior art would mean that RX-0022 (Ehlers) would anticipate this element.'" *Id.* Q/A 64. However, that is not EcoFactor's position. Instead, EcoFactor has identified specific features and functions of the Accused Products and Domestic Industry Product that correlate outside temperature with calculated rates of change. *Id.*

***Third***, to the extent it is found to be limiting, Ehlers does not disclose the preamble of claim 1 of the '497 patent. Respondents rely on Ehlers' disclosure of an "operational efficiency factor" that is calculated for generic appliances. 0702C (Palmer WS) Q/A 38-44. However, the parties' constructions for "operational efficiency" relate specifically to the operation of an HVAC, and in particular, to an HVAC system's ability to heat or cool a structure. *Id.* *The*re is no express disclosure in Ehlers of an "operational efficiency factor" being calculated for an HVAC system—let alone one that looks at the HVAC's ability to heat or cool a location. *Id.*

Compl. Br. at 145-47.

[redacted]

The Staff argues, in part:

Respondents contend that Ehlers (RX-0022) anticipates claim 1 of the '497 patent. RPreHBr. at 161; RDX-0001C-064 to 083; RX-0001C (Auslander) QA 103-14; RX-0034 (Appendix A-1 Invalidity Claim Chart); RDX-0001C-068 to 070. EcoFactor does not dispute that Ehlers discloses elements 1[a], 1[b], and parts of 1[d]. *See* CX-702C (Palmer) QA 37; RX-0001C (Auslander) QA 110, 112-13. For the reasons discussed below, the evidence does not demonstrate that Ehlers anticipates claim 1.

**Preamble**: The evidence shows that Ehlers discloses the preamble. RX-001C (Auslander) QA 105-106. Ehlers discloses "[t]he operational efficiency factor of each appliance being monitored based on historical consumption patterns and current operating statistic," and a monitored appliance can be an HVAC system. RX-0022 (Ehlers) at 39:21-23, 38:33-41, 34:42-43, 7:45-52; FIG. 4; RDX-0001C-066; RX-0001C (Auslander) QA 105-106. Ehlers further discloses:

> Function 35 will monitor the system for faults, provide alarm status and initiate alarms. ….. Since submetering is in place and large amounts of historical data can be stored and processed, historical operations analysis can be provided. This entails extracting performance data from the collected data, ***tracking it over time*** and making periodic comparisons. For example, the ***time to cool*** the premise one degree [inside temperature] with known [outdoor] temperature and weather conditions can be determined as with comfort ramping. ***This value can be stored and a new value measured and stored monthly***. The system then can calculate a trend in operation and determine if the cooling unit is ***operating at the same level*** as when the initial measurement was taken. At a user defined level of lower ***performance***, if provided, an alarm can activated or a report can be issued. The ***power consumption profile*** can be used in a similar manner where the equipment becomes a heavier load as it becomes less efficient."

RX-0022, at 37:17-35 (emphases added). Accordingly, the "system creates a power consumption profile" (an energy metric) based on the "time" to cool "the premises one degree" with known [outdoor] temperature and weather conditions, *i.e.*, a set of indoor and outdoor conditions. Thus, Ehlers discloses the preamble of claim 1 of the '497 patent.

**Element 1[c]**: The evidence does not demonstrate that Ehlers discloses this element. Ehlers discloses receiving "discrete parameters representing temperature" from a weather service or energy provider. RX-0033, 9:50-65. However, there is no express disclosure in Ehlers that this refers to temperature *measurements*, as opposed to, *e.g.*, forecasted temperatures. *See* CPreHBr. at 70-71; CX-702C (Palmer WS) QA 47, 59 (referring to same). Therefore, this limitation is not

[redacted]

disclosed in Ehlers. To hold otherwise would be inconsistent with Respondents' and Staff's contentions regarding infringement of this limitation. *See* Section IV, above.

**Element 1[d]**: The evidence does not show that Ehlers discloses element 1[d]. EcoFactor admits that Ehlers' disclosure of an "average thermal recovery time per degree" is a change in time divided by a change in temperature, which "is the same information expressed in a different way" as its inverse, and the recovery time is for "when heating and cooling systems are operational," meaning the status of the HVAC system is on. RX-0022, at 26:56-57, 39:16-18; RDX-0001C-076; RX-0001C (Auslander) QA 112. EcoFactor further admits that Ehlers' disclosure of a "natural thermal rate of change," represented by a change in time divided by a change in temperature "is the same information expressed in a different way" as its inverse, and the "natural thermal rate" in Ehlers is measured when the HVAC system is off. RDX-0001C-078 to 79; RX-0022, at 39:13- 15, 26:53-55, 29:4-7; RX-0001C (Auslander) QA 113. However, because Ehlers does not disclose receiving outside temperature *measurements*, it does not teach "relat[ing] said calculated rates of change to said outside temperature *measurements*," as required by element 1[d]. Therefore, Ehlers does not disclose element 1[d].

Staff Br. at 87-89.

The administrative law judge finds that respondents have not shown by clear and convincing evidence that Ehlers anticipates claim 1 of the '497 patent.

As an initial matter, the preamble of claim 1 of the '497 patent has been found to be limiting and "operational efficiency" has been construed to mean "energy required by the HVAC system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions."

Regarding the preamble, EcoFactor argues that the parties' constructions for "operational efficiency" relate to an HVAC system's ability to heat or cool a structure, and there is no express disclosure in Ehlers of an "operational efficiency factor" being calculated for an HVAC system. *See* Compl. Br. at 147 (citing CX-0702C (Palmer WS) at Q/A 38-44). However, Ehlers discloses "[t]he operational efficiency factor of each appliance being monitored based on historical consumption patterns and current operating statistic," and a monitored appliance can

be an HVAC system. *See* RX-0022 (Ehlers) at col. 39, lns. 21-23, col. 38, lns. 33-41, col. 34, lns. 42-43, col. 7, lns. 45-52; Fig. 4; RX-0001C (Auslander DWS) at Q/A 105-06. Thus, the administrative law judge finds that Ehlers discloses a system for calculating a value for the operational efficiency of an HVAC system.

EcoFactor does not dispute that Ehlers discloses element 1[a] or 1[b] of claim 1. *See* Compl. Br. at 145-47.

Regarding element 1[c], "outside temperature measurements" means "measurements of the temperature outside (or external to) [the structure]", as found above.

Respondents argue that Ehlers's input function 15 interfaces with sensors that sense "external environmental conditions including temperature." *See* Resps. Br. at 253 (quoting RX-0022 (Ehlers) at col. 10, lns. 14-19, Fig. 4; RX-0001C (Auslander DWS) at Q/A 111). Respondents contend the outside temperature sensors are separate from the system because input function 15 "interfac[es] with sensors" that "sense internal and external environmental conditions including temperature." *See id.* at 253-54 (quoting RX-0022 (Ehlers) col. 10, lns. 14-19, Fig. 4; RX-0001C (Auslander DWS) at Q/A 111). However, the '497 patent requires temperatures from a "source other than said HVAC system." The sensors that are part of each of Ehlers's thermostat-like devices are not "sources other than [the] HVAC system" because these sensors are part of Ehlers's thermostat-like device that "sense internal and external environmental conditions including temperature and humidity, as well as other conditions such as occupancy." RX-0022 (Ehlers) at col. 10, lns. 14-29.

Respondents further contend that that "[i]nput function 13 provides weather information" that includes "discrete parameters representing temperature," comprise outside temperature measurements from a source other than said HVAC system. *See* Resps. Br. at 254-55. However,

there is no express disclosure in Ehlers that this refers to outside temperature measurements rather than any other temperature quantity (such as, for example, historical record or average temperature, forecasts, etc.). *See* CX-0702 (Palmer RWS) at Q/A 59. The administrative law judge thus finds that Ehlers does not disclose element 1[c].

The administrative law judge further finds that Ehlers does not disclose element 1[d]. Respondents argue Ehlers combines the average normalized thermal gain or loss (the claimed rate of change when off) with the computed thermal recovery time (the claimed rate of change when on), and adjusts the combination to compensate for outside temperature measurements. *See* Resps. Br. at 256 (citing RX-0022 (Ehlers) at col. 39, lns. 43-57; RX-0001C (Auslander DWS) at Q/A 114). However, compensating for external temperature is not a disclosure of correlating a rate of change with outside disclosure. *See* CX-0702C (Palmer RWS) at Q/A 64-65. Moreover, this disclosure of recovery time (when an HVAC is "on") does not provide any support that there is a correlation for a rate of change when an HVAC system whose status is "off." In addition, inasmuch as Ehlers does not disclose receiving outside temperature measurements, it does not disclose "relat[ing] said calculated rates of change to said outside temperature measurements," as required by element 1[d].

The administrative law judge thus finds that respondents have not shown by clear and convincing evidence that Ehlers anticipates claim 1 of the '497 patent.

**b. Obviousness – Ehlers in View of Rosen**

Rosen was published on September 14, 2004, and therefore qualifies as prior art to the '497 patent. *See* RX-0047 (Rosen).

Respondents argue, in part:

[redacted]

***Claim 2***: In Ehlers, the weather service provider should provide weather data that is "sufficiently localized for acceptable accuracy." RX-0022 (Ehlers) 9:50-63; RX-0001C, Auslander QA116. As Dr. Auslander testified, based on that teaching in Ehlers, a POSITA would have been motivated to look to analogous references to understand how to implement Ehlers's system so that the weather service provides the localized weather data for geographic regions based on ZIP codes. RX-0001C, Auslander QA116. Rosen discloses a thermostat system that transmits its zip code as location data over the Internet to a weather website, which responds by transmitting the local weather data, including outside temperature, for the thermostat's zip code to the thermostat. RX-0047 (Rosen) 7:42-43, 7:10-32, 9:6-10; RX-0001C, Auslander QA117. According to Dr. Auslander, the POSITA would have been motivated to combine Ehlers with Rosen because both references are in the same field and are analogous (*i.e.,* both describe systems. that model and interact with HVAC systems., using outside temperature data received from weather service providers) and their combination would have had the advantage of delivering sufficiently localized outside temperature data from a weather service provider to a thermostat system. RX-0001C, Auslander QA118. Furthermore, the POSITA would have had a reasonable expectation of success when combining Ehlers with Rosen because the ZIP code was such a common method of delivering weather data. RX-0001C, Auslander QA119.

***Claim 5***: Ehlers discloses a thermostat-like unit that is used to control an HVAC system. As Dr. Auslander testified, a POSITA would have found it obvious to implement Ehlers's thermostat-like unit to include the functionality of the thermostat system in Rosen, which is a programmable thermostat under any party's construction, and is the sole source for current data regarding temperature inside said location conditioned by said HVAC system. RX-0001C, Auslander QA120-122; RX-0047 (Rosen) 3:4-53, 1:17-55, 6:19-27, Figs. 1-4. Rosen discloses a thermostat system including a processor 1 (which further includes a central processing unit (CPU) 9) and controls space conditioning equipment 3 to provide heating and cooling to a conditioned space 4 by including a switch that controls the on and off state of the HVAC system. RX-0047 (Rosen) 3:4-53, 1:17-27, 3:31-53; RX-0001C, Auslander QA120. The user also defines desired temperatures that the thermostat maintains over time. RX-0047 (Rosen) 3:20-24, 1:43-55. According to Dr. Auslander, the POSITA would have been motivated to combine Ehlers with Rosen because both references are in the same field and are analogous and their combination would have had the advantage of saving cost and reducing redundancy by using the thermostat as the sole source of inside temperature data. RX-0001C, Auslander QA121. Furthermore, it would have been a common-sense implementation to rely on the existing thermostat system, and the POSITA would have had a reasonable expectation of success when combining Ehlers with Rosen. RX-0001C, Auslander QA122.

Resps. Br. at 256-58 (footnote omitted).

[redacted]

EcoFactor argues, in part:

RX-0022 (Ehlers) in combination with RX-0047 (Rosen) does not render obvious claims 2 and 5 of the '497 patent. *See* CX-0702C (Palmer WS) Q/A 67-97. RX-0047 (Rosen) was cited and considered by the USPTO before the '497 patent issued. *See* JX-0001 ('497 patent) at Page 2. Further, Respondents are not asserting that Rosen addresses any shortcomings of Ehlers with respect to claim 1. Accordingly, adding Rosen to Ehlers does nothing to address the deficiencies in the limitations of claim 1, which are also limitations of its dependent claims 2 and 5.

Moreover, Respondents does not show how any such combination would be suggested, why it would be desirable, why PHOSITA would or could combine them, and how or whether any such combination would work. *See* CX-0702C (Palmer WS) Q/A 67-97. Respondents contend that a person of ordinary skill in the art would have been motivated to combine Ehlers with Rosen because both relate to thermostats and because both relate to weather services. Not so.

As it relates to claim 2, Respondents have identified no benefit to combining Ehlers with Rosen. Ehlers already provides a one-way connection to a weather service. CX-0702C (Palmer WS) Q/A 76. Further, Ehlers also already requires outside temperature sensors that can sense outside temperature. *Id.* Any benefit from using the ZIP-code based two-way weather service of Rosen is thus redundant. *Id.* Indeed, Ehlers actually teaches away from using a weather service for outside temperature when it teaches that external temperature sensors are a necessary part of each of the relevant Ehlers HVAC systems. *Id.* Q/A 83.

Moreover, the ZIP code-based weather service of Rosen is incompatible with Ehlers. CX-0702C (Palmer WS) Q/A 76-87. Indeed, the two are fundamentally different systems. For example, RX-0047 (Rosen) is a system that simply "display" information and message from "remote correspondent," and not a system that "model" anything. Moreover, Rosen requires a two-way communication link to communicate with a weather service (e.g., to send it ZIP code information). CX-0702C (Palmer WS) Q/A 76-87. Ehlers provides a system in which provides only a uni-directional communication link. *Id.* In addition, Ehlers cautions that any information from a weather service must be "sufficiently localized" to support Ehlers' modeling. CX-0702C (Palmer WS) Q/A 83 (quoting Ehlers). There is no suggestion either in Ehlers or Rosen that ZIP-code-level information would be adequate for the system of Ehlers. *Id.* Finally, the system of Ehlers does not receive or store ZIP code information. As a result, it would be impossible for the Ehlers system to query weather information based on ZIP code without even further modification to the Ehlers system. CX-0702C (Palmer WS) Q/A 76-87. Respondents do not explain why a person of skill in the art would be motivated to overcome these incompatibilities, nor do they explain how such a person would do so. CX-0702C (Palmer WS) Q/A 76-87.

[redacted]

With regard to claim 5, Respondents similarly fail to show why or how a person of ordinary skill in the art would be motivated to combine Ehlers with Rosen. CX-0702C (Palmer WS) Q/A 86-97. Respondents acknowledge that Ehlers' relevant embodiment requires an array of sensors. *Id.* Nonetheless, Respondents contend that a person of ordinary skill in the art would be motivated to replace the array with a single thermostat found in Rosen. *Id. But* using the thermostat of Rosen would undermine the disclosure in Ehlers. *Id.* Q/A 93-94.

Compl. Br. at 148-49.

The Staff argues, in part:

The evidence clearly and convincingly shows that claims 2 and 5 of the '497 patent are obvious in view of Ehlers (RX-0022) and Rosen (RX-0047), and thus are invalid. RPreHBr. at 162.

Respondents only use Rosen for the additional limitations of claim 2, not to address any deficiencies in the limitations of claim 1, which are also limitations of its dependent claims 2 and 5. *Id*.

**Claim 2**: As discussed above, the only limitation missing from Ehlers is receiving an outdoor temperature *measurement* from a source other than the HVAC system. Rosen discloses this limitation: "Periodically, as determined by times stored in the memory 8, the CPU9 issues signals to access the remote correspondent 15 (a site providing local Montreal weather in the example) and download the current weather information as a data stream." RX-0047, at 4:40-49; RX-0001C (Auslander) QA 116, 117. This current weather information includes the "current temperature," indicating it is a temperature measurement. *See* RX-0047, Fig. 6; RX-0047, at 4:40-49. In Staff's view, this, combined with Rosen's disclosure that it can receive the outside temperature measurement based on ZIP codes (*see* RPreHBr. at 162-163; RX-0047 (Rosen), at 7:42-43, 7:10-32, 9:6-10; RX-0001C (Auslander) QA 117), demonstrates that claim 2 (as well as claim 1) is obvious based the Ehlers/Rosen combination. In addition, the evidence shows that one of ordinary skill in the art would have been motivated to combine Ehlers with Rosen to arrive at the claimed combination. *See* RX-0001C (Auslander) QA 118, 119.

**Claim 5**: For the reasons discussed above in claim 2 regarding outdoor temperature measurements, the Ehlers/Rosen combination discloses all the limitations of claim 1. With respect to the additional limitations of dependent claim 5, Rosen discloses a programmable thermostat that includes a temperature sensor for measuring the inside temperature. *See* RX-0047, at 1: 65-67; 2:1-5; 3:1-53; 5:27-37; 6:19-27; RX-0001C (Auslander) QA 120. Rosen further discloses that only one such thermostat is used (*i.e.*, is the sole source) for obtaining inside temperature measurements. *See id*., Figs. 1-4; RX-0001C (Auslander) QA 120. The evidence further shows that a person of ordinary skill in the art would have been motivated to combine Ehlers with Rosen to arrive at the claimed combination.

> *See* RX-0001C (Auslander) QA 121, 122. Therefore, the evidence shows that the Ehlers/Rosen combination renders claim 5 of the '497 patent obvious.

Staff Br. at 89-91 (footnote omitted).

The administrative law judge finds that respondents have not shown by clear and convincing evidence that the combination of Ehlers and Rosen renders claims 2 or 5 of the '497 patent obvious.

Respondents contend that a person of ordinary skill in the art would have been motivated to combine Ehlers with Rosen because both relate to thermostats and because both relate to weather services. *See* Resps. Br. at 256. However, Rosen uses a two-way Internet connection to communicate with the weather service, while Ehlers uses one-way communication links in separate input and output blocks. *See* CX-0702C (Palmer RWS) at Q/A 77. The relationship between the input and output blocks and the flow of information through unidirectional communication links is part of the basic architecture of Ehlers's system, and a person of ordinary skill would need to substantially modify Ehlers if it were to implement an Internet connection instead. *See id.* In addition, Ehlers cautions that any information from a weather service must be "sufficiently localized" to support Ehlers's modeling. *See id.* at Q/A 83 (quoting Ehlers). There is no suggestion either in Ehlers or Rosen that ZIP-code-level information would be adequate for the system of Ehlers. *See id.*

Moreover, as found above, Ehlers does not anticipate claim 1, and Rosen fails to cure the deficiencies of Ehlers. In particular, Ehlers does not disclose "relat[ing] said calculated rates of change to said outside temperature measurements," as required by element 1[d]. Respondents do not contend that Rosen teaches this element. *See* Resps. Br. at 256-58.

[redacted]

Regarding claim 5, the administrative law judge also finds that respondents have not shown that one of ordinary skill in the art would combine Ehlers and Rosen because such a combination would require substantial modification to Ehlers's system, and Ehlers's system already includes a mechanism for obtaining outside temperature. *See* CX-0702C (Palmer RWS) at Q/A 76. Moreover, Ehlers recites: "In its simplest form, the system of the invention acts as a thermostat replacement to sense and control temperature." RX-0022 (Ehlers) at col. 2, lns. 45-47. Ehlers's system was designed to be used instead of a thermostat, not to be combined with one. A single temperature sensor may not suffice for Ehlers's system, and respondents have not shown that a single point of temperature data would be sufficient for the processing performed by Ehlers. *See* CX-0702C (Palmer RWS) at Q/A 96.

The administrative law judge thus finds that respondents have not shown by clear and convincing evidence that the combination of Ehlers and Rosen renders claims 2 or 5 of the '497 patent obvious.

**c. Anticipation – Oswald**

Oswald was published on August 4, 2005, and qualifies as prior art to the '497 patent. *See* RX-0038 (Oswald).

Respondents argue, in part:

> Oswald anticipates claim 1 of the '497 patent because it discloses each of the limitations of that claim ([1Pre] to [1d]). RDX-0001C-085 to 90, 92 to 96, 98 to 104 (RX-0038 (Oswald) at ¶¶ 24, 36, 44, 52-55, 58-59, 101, 121-48, Title, Abstract, cl. 27, Figs. 1, 2, 3, 4, 8); RX-0001C, Auslander QA123-132; RDX-0013 (Appendix A-3 Invalidity Claim Chart). EcoFactor does not dispute that Oswald discloses limitations [1Pre] and [1a]. PHB at 68-69; CX-0702C, Palmer QA99; RX-0001C, Auslander QA127. As Dr. Auslander testified, Oswald discloses these limitations. RX-0001C, Auslander QA125-126, RDX-0001C-087 to 090 (RX-0038 (Oswald) at ¶¶ 24, 36, 53-55, 101, 122-48, Title, Abstract, Figs. 1, 2, 3, 8). Only the claim limitations that EcoFactor alleges are not anticipated by Oswald are described in detail here.

[redacted]

***Limitation 1b****:* Oswald discloses storing inside temperatures in a database within the single central sensor 2. RX-0038 (Oswald) at ¶¶ 24, 58-59, 135-36, 121, Figs. 1-2; RDX-0001C-093 (RX-0038 (Oswald) at ¶¶ 58-59, 121, 135-36, Figs. 1, 2, 8); RX-0001C, Auslander QA128. EcoFactor alleges that Oswald stores heating and cooling times, instead of measured temperatures. PHB at 68. However, Oswald describes a transient thermal model that uses "inside and outside temperature measurements . . . [to] predict changes in the inside temperature on the basis of the information about the outside temperature and on the basis of the operation of heating and/or cooling electrical appliances." RX-0038 (Oswald) ¶ 24. Those inside temperature measurements therefore provide a stored record of the inside temperature of the house, and are stored in Oswald's database. RX-0038 (Oswald) ¶¶ 55, 58-59 135-36, 121, Figs. 1-2; RDX-0001C-093 (RX-0038 (Oswald) at ¶¶ 58-59, 121, 135-36, Figs. 1, 2, 8); RX-0001C, Auslander QA128.

***Limitation 1c****:* Oswald's computers receive outside temperature measurements, under any party's construction, from "a source of information about the temperature outside the house," which is a source other than the heating and cooling appliances (the claimed HVAC system). RX-0038 (Oswald) ¶¶ 52, 55, 24, 122-134, 137, 147, cl. 27, Figs. 3-4; RDX-0001C-095 to 096 (RX-0038 (Oswald) at ¶¶ 24, 52, 55, 122-34, 137, 147, cl. 27, Figs. 3, 4, 8); RX-0001C, Auslander QA129.

EcoFactor's first argument is that "an outdoor sensor that is connected to the HVAC system is a type of 'source' that would be outside of element 1[c]'s requirement." PHB at 68. But that is illogical. By definition, an outdoor sensor that is "connected to" the HVAC system is not a part of that HVAC system, and would therefore be a "source other than said HVAC system," as claimed. Thus, Oswald's source of outside temperature is a "source other than said HVAC system."

EcoFactor's next argument that Oswald's "Internet weather databases" are for "wind, rain, humidity" but not temperature measurements (PHB at 68) is similarly flawed and contradicted by its own expert's testimony. Dr. Palmer admitted that the "PHOSITA would be able to infer that [Oswald's] Internet weather database is a potential source for outside temperature." RX-0001C, Auslander QA129. Thus, Oswald's weather database provides the "outside temperature measurements" used by the transient thermal model. RX-0038 (Oswald) ¶¶ 24, 137.

EcoFactor's last argument that the claimed "outside temperature measurements" cannot be constant (as depicted in Oswald's Fig. 8) is also incorrect. PHB at 68-69. While the time-scale is not shown in Oswald's Fig. 8, outside temperature does not always fluctuate – it can remain constant for hours at a time. Thus, contrary to EcoFactor's argument, it is plausible to receive multiple outside temperature measurements that are the same.

[redacted]

***Limitation 1d****:* Oswald discloses calculating rates of change in temperature for periods during which the status of the HVAC system is "on." Oswald detects when "the house will begin to take longer to heat up" as part of a transient thermal model. RDX-0001C-099 (RX-0038 (Oswald) at ¶¶ 44, 122-43, 146-47, Figs. 3, 8); RX-0038 (Oswald) ¶¶146-47, 122-143. Oswald's HVAC control system can receive on/off status from the HVAC system. RX-0038 (Oswald) Fig. 3; RX-0001C, Auslander QA131. This means that Oswald's system calculates the rate of change (under any party's construction) in temperature when the heating system is "on," and compares it to a previous value. RX-0001C, Auslander QA130; RDX-0001C-099 (RX-0038 (Oswald) at ¶¶ 44, 122-43, 146-47, Figs. 3, 8).

Oswald discloses calculating rates of change in temperature for periods during which the status of the HVAC system is "off" by detecting "that the house cools down unusually quickly." RDX-0001C-100 (RX-0038 (Oswald) at ¶¶ 141, 143, Figs. 3, 8); RX-0038 (Oswald) ¶ 143. This means that Oswald calculates the rate of change (under any party's construction) in temperature when the heating system is "off," and compares that rate to a previous value. RX-0001C, Auslander QA131; RDX-0001C-100 (RX-0038 (Oswald) at ¶¶ 141, 143, Figs. 3, 8).

Oswald also discloses relating these calculated rates of change to outside temperature measurements. Oswald "automatically account[s]" for changes in weather, including outside temperature in its transient thermal model. RDX-0001C-101 to 102 (RX-0038 (Oswald) at ¶¶ 139, 147, Figs. 3, 8); RX-0038 (Oswald) ¶¶ 147, 139; RX-0001C, Auslander QA132.

Resps. Br. at 258-61 (footnotes omitted).

EcoFactor argues, in part:

Oswald does not anticipate '497 patent claim 1. *See* CX-0702C (Palmer WS) Q/A 98-109. ***First***, Oswald does not disclose element 1[b] "one or more databases that store at least said temperatures measured at said first location over time." CX-0702C (Palmer WS) Q/A 102. While Oswald mentions "database," it does not disclose that it "store[s] at least said temperatures measured at said first location over time." Oswald describes a system that stores "***times***" rather than temperatures. RX-0038 (Oswald) at ¶0136 ("database of known heating and cooling <u>times</u>"). Moreover, Oswald describes that its "model" is intended to be used "without referring to the house thermocouple temperature sensor." RX-0038 (Oswald) at ¶0141. Oswald describes a system that ***estimates*** inside temperature based on heating and cooling <u>times</u>, as opposed to a system that stores temperatures measured over time. CX-0702C (Palmer WS) Q/A 99-102.

***Second***, Oswald does not disclose element 1[c] "one or more processors that receive outside temperature measurements from at least one source other than said HVAC system." CX-0702C (Palmer WS) Q/A 103. This element requires the "source" to be one "other than said HVAC system." For example, an outdoor sensor

that is connected to the HVAC system is a type of "source" that would be outside of element 1[c]'s requirement, as the '497 patent specifically teaches away from using such an outdoor sensor as being "sub-optimal" and undesirable. JX-0001 ('497 patent) at 2:43-51. Oswald's mention of "sensors external to existing appliances" (at ¶ 0030) is not a "source other than said HVAC system," and Oswald also does not teach that such a sensor sends "outside temperature measurements." Further, while Oswald mentions "Internet weather databases" (at ¶ 0137), it does not say that such databases sends "outside temperature measurements." In fact, Oswald discloses "wind, rain, humidity," which suggests that Oswald is talking about those when it discusses "weather." Also, Oswald Figure 8 is merely showing a graph of temperatures, and does not show how Oswald's "model" actually work and is not about a "processor that receive[s]" anything. Figure 8 of Oswald also merely shows a single, constant "external temperature" value, and not multiple "outside temperature measurements" as claimed.

***Third***, Oswald does not disclose the limitation "one or more processors [that] are configured to calculate one or more rates of change in temperature at said first location for periods during which the status of the HVAC system is 'on' and wherein said one or more processors are further configured to calculate one or more rates of change in temperature at said first location for periods during which the status of the HVAC system is 'off'" in element 1[d], because Oswald is entirely lacking in any detail regarding its alleged "model." CX-0702C (Palmer WS) Q/A 104-105. Respondents' argument otherwise is based on their attempt to conjure up details that are entirely lacking in the actual disclosures. The actual disclosures of Oswald contradicts Respondents' arguments. For example, Oswald states that its model "does not require a house thermocouple for feedback" (at ¶ 141), indicating that inside temperature may not even be used in Oswald's "model," much less "rates of change in temperature" as claimed. Moreover, Oswald states that its system "sens[es] the electrical operation of heating controls such as a thermostat or gas valve," and by doing so, it "will detect the time points when the maximum and minimum temperatures are reached," indicating that Oswald is merely sensing whether heating controls is turned on or off, not calculation of "rates of change in temperature." RX-0038 (Oswald) at ¶ 136.

***Fourth***, Oswald does not disclose the limitation "relate said calculated rates of change to said outside temperature measurements" in element 1[d], also because Oswald is entirely lacking in any detail regarding its alleged "model." CX-0702C (Palmer WS) Q/A 108. For example, Oswald ¶0147 states that "changes in weather are automatically accounted for," but that is neither a clear nor convincing evidence that "calculated rates of changes are correlated to said outside temperature measurements" as in the construction for this limitation. For instance, Oswald suggests that "weather" might be in reference to "wind, rain, humidity" and not about temperatures. Moreover, Figure 8's depiction of constant, unchanging value for "external temperature" suggests that Oswald does not actually correlate outside temperature measurements, as outside temperature naturally changes as time

[redacted]

passes.

***Fifth***, Respondents has not shown that Oswald discloses the limitation "HVAC control system" in element 1[a]. Respondents identified "single central sensor" in Oswald as meeting the claimed "HVAC control system." Hearing Tr. 903:16-21. But "single central sensor" in Oswald is not an HVAC control system. All parties agree, as they must, that "HVAC control system" is a system that must, at the very least "control" an HVAC. But "single central sensor" in Oswald does not "control" anything, much less the HVAC system. Rather, "single central sensor" is a sensor "to monitor the flow of electricity into the house." RX-0038 (Oswald) ¶ 0047. Indeed, the "single central sensor" merely monitors "which appliance has been turned on and how long it has been on for at what time of day." RX-0038 (Oswald) at ¶0047, ¶0055 ("The single central sensor 2 monitors the electrical power feeding into the house (e.g. current, voltage and power factor)"), ¶0062 ("single central sensor … ***can recognize*** what is being turned on and off," not that it controls turning on or off); ¶0063 ("single central sensor system may ***identify*** that an 'unknown appliance' has been used"); ¶¶ 0102, 0115, 0118 ("single central sensor could ***monitor*** ..."). For instance, Oswald's "single central sensor" connects to a "washing machine," which obviously has nothing to do with HVAC. *See* RX-0038 (Oswald) at ¶0086. Moreover, as explained with respect to other limitations (e.g., element 1[b]) and shown in CDX-0010C (citing RX-0038 (Oswald) at ¶141), Oswald teaches that its system (including "single central sensor") does not "refer[]" to temperature sensor, indicating that "single central sensor" does not receive temperature measurements. Accordingly, Respondents fail to show that Oswald discloses "HVAC control system."

In sum, RX-0038 (Oswald) does not anticipate claim 1.

Compl. Br. at 149-52.

The Staff argues, in part:

The evidence clearly and convincingly shows that Oswald (RX-0038) anticipates claim 1 of the '497 patent, and thus is invalid. RPreHBr. at 164; RDX-0001C-085 to 104; RX-0001C (Auslander) QA 123-132; RX-0037 (Appendix A-3 Invalidity Claim Chart). In its prehearing brief, EcoFactor does not dispute that Oswald discloses the preamble and elements 1[a]. CPreHBr. at 68-70; CX-702C (Palmer) QA 99; RDX-0001C-091; RX-0001C (Auslander) QA 127, 125-126; Hearing Tr. at 898:3-908:20 (Auslander); 919:23-921:25 (Auslander).

**Element 1[b]:** The evidence shows that Oswald discloses element 1[b]. Oswald discloses:

> The household energy management system according to the second aspect of the invention may further comprise ***one or more temperature sensors for measuring the temperature inside the***

[redacted]

> ***house***; a source of information about the temperature outside the house; a modelling means, which uses ***the inside and outside temperature measurements to derive a transient thermal model of the house***, which can predict changes in the inside temperature on the basis of the information about the outside temperature and on the basis of the operation of heating and/or cooling electrical appliances identified as connected to the supply…

RX-0038 at ¶¶ 24. Oswald discloses that the mathematical models it builds include "all appliances used in the house and their pattern of use," and "*the house's transient thermal behavior under heating and cooling conditions*." *Id*. at ¶¶ 47-49; Fig. 8 (graph of inside temperature vs. time). In Staff's view, the graph in Figure 8 and the model's use of "house's transient thermal behavior under heating and cooling conditions" creates and includes a stored record of the inside temperature of the house. Thus, Oswald discloses that this is "data acquired" or collected, which is implicitly, if not expressly, stored in a database along with time, appliance characteristics, times appliances are on and off, etc. RX-0038 at ¶¶ 59; RX-0001C (Auslander) QA 128.

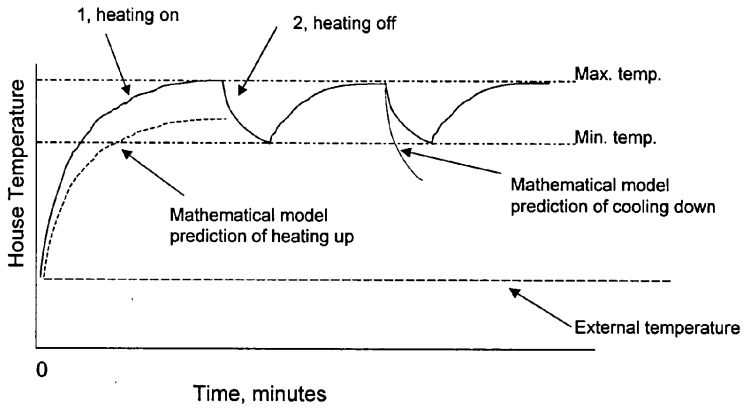
**Element 1[c]:** As seen in the excerpt above, Oswald discloses "a source of information about the temperature outside the house," and that those inside and outside temperatures are "*measurements*." RX-0038 at ¶ 24. Oswald also discloses that the "system can use network data to improve validity. For example, it can be informed of local weather from existing Internet weather databases which have weather information from nearby weather Stations." RX-0038 at ¶ 137; Fig. 4. Thus, Oswald discloses element 1[c]. *See* RX-0001C (Auslander) QA 129.

**Element 1[d]**: Oswald discloses this limitation. Oswald discloses, in reference to Figure 8:

> ***At time 0 the heating is turned <u>on</u> and the actual temperature rises (as shown by Line 1) until it reaches the control temperature at its peak and the heating is turned <u>off</u>. From here the temperature falls according to Line 2 until the minimum temperature is recorded and the heating is started up again***. By sensing the electrical operation of heating controls such as a thermostat or gas valve, the single central sensor 2 will detect the time points when the maximum and minimum temperatures are reached and it can compare the actual times to the mathematically predicted response. Differences in these two will demand the software changes the coefficient terms in the model until the best fit with all known data is achieved. For the first few days the system may be inaccurate, but later ***once a larger database of known heating and cooling times is known the mathematical model will become increasingly accurate***.

RX-0038 at ¶ 136 (emphases added). Figure 8 of Oswald is shown below.

[redacted]




RX-0038, Fig. 8; *see also* Fig. 9. As seen in Figure 8 above, the graphs and mathematical model consider and/or account for the external temperature, thereby relating the outside temperature to the rates of change of inside temperature when the HVAC is on and off. In this regard, Oswald further discloses

> The validated thermal transient model can be used to compare the house to national house norms. In this way the thermal characteristics of the house can be compared to acceptance limits and weaknesses in the house thermal characteristics can be identified and remedied. ***For example the system may notice that the house cools down unusually quickly on windy days and yet has a normal cooling characteristic under still air conditions.*** This will indicate that the house is susceptible to wind and is therefore draughty. An email could be sent to the householder or maintenance contractor to investigate and remedy the Situation.

RX-0038 at ¶ 143 (emphasis added). This is disclosure relates the outside temperature to the rates of change of inside temperature when the HVAC is on and off. In addition, Oswald discloses:

> With the use of the transient thermal model, the householder can now define when the house is to reach the controlled temperature schedule ***rather than when to start heating***. This allows the single central sensor system to calculate the optimum time ***to turn on***. For example, say the householder returns home at 17:30 in the evening and wants the house at the desired temperature at 17:30. ***The system can use the transient model to calculate the time it will take to reach the desired temperature: on a cold windy day this might be 1 hour and on a mild day it might be 30 minutes.*** In this way the heating system is turned on for the minimum time and the house consumes the minimum heat energy.

> RX-0038 at ¶ 139. The system disclosed thus automatically accounts for changes in weather, including outside temperature. RX-0038 at ¶ 147; *see also* RX-0001C (Auslander) QA 130-132.
>
> Therefore, the evidence demonstrates that Oswald anticipates claim 1 of the '497 patent.

Staff Br. at 91-94.

The administrative law judge finds that respondents have not shown by clear and convincing evidence that Oswald anticipates claim 1 of the '497 patent.

EcoFactor does not dispute that Oswald discloses the preamble of claim 1. *See* Compl. Br. at 149-52.

Regarding element 1[a], EcoFactor did not dispute that Oswald's disclosure of element [1a] of the '497 patent in its pre-hearing brief. *See* Compl. Pre-Hearing Br. at 68-70. By not advancing this argument in its pre-hearing brief, EcoFactor is precluded from raising it now. *See* G.R. 7(c).

Regarding element 1[b], EcoFactor argues that Oswald does not disclose that it "store[s] at least said temperatures measured at said first location over time" because Oswald describes a system that stores "times" rather than temperatures. *See* Compl. Br. at 149-50 (quoting RX-0038 (Oswald), ¶ 0136 ("database of known heating and cooling times")). EcoFactor further argues that Oswald describes a system that estimates inside temperature based on heating and cooling times, as opposed to a system that stores temperatures measured over time. *See id.* (citing CX-0702C (Palmer RWS) at Q/A 99-102). However, Oswald describes a transient thermal model that uses "inside and outside temperature measurements . . . [to] predict changes in the inside temperature on the basis of the information about the outside temperature and on the basis of the operation of heating and/or cooling electrical appliances." RX-0038 (Oswald), ¶ 24.

Those inside temperature measurements therefore provide a stored record of the inside temperature of the house, and are stored in Oswald's database. RX-0038 (Oswald), ¶¶ 55, 58-59, 135-36, 121, Figs. 1-2.

Regarding element 1[c], EcoFactor argues that Oswald's mention of "sensors external to existing appliances" (at ¶ 0030) is not a "source other than said HVAC system," and Oswald also does not teach that such a sensor sends "outside temperature measurements." However, Oswald's source of outside temperature is a "source other than said HVAC system." An outdoor sensor that is "connected to" the HVAC system is not a part of that HVAC system, and would therefore be a "source other than said HVAC system," as claimed.

EcoFactor further argues that, though Oswald mentions "Internet weather databases" (at ¶ 0137), it does not say that such databases sends "outside temperature measurements." However, Dr. Palmer admitted that the "PHOSITA would be able to infer that [Oswald's] Internet weather database is a potential source for outside temperature." RX-0001C (Auslander DWS) at Q/A 129. Thus, Oswald's weather database provides the "outside temperature measurements" used by the transient thermal model. RX-0038 (Oswald), ¶¶ 24, 137. The administrative law judge finds that Oswald discloses element 1[c].

The administrative law judge finds that Oswald does not disclose element 1[d]. Respondents argue that Oswald detects when "the house will begin to take longer to heat up" because Oswald's system calculates the rate of change in temperature when the heating system is "on," and compares it to a previous value. *See* Resps. Br. at 260-61 (citing RX-0001C (Auslander DWS) at Q/A 130). Respondents further argue Oswald discloses calculating rates of change in temperature for periods during which the status of the HVAC system is "off" by detecting "that the house cools down unusually quickly," and that this means that Oswald

calculates the rate of change in temperature when the heating system is "off," and compares that rate to a previous value. *See id.* (citing RX-0001C (Auslander DWS) at Q/A 131; RX-0038 (Oswald), ¶¶ 141, 143, Figs. 3, 8)).

The administrative law judge finds that this is not clear and convincing evidence that Oswald discloses element 1[d]. Oswald states that its model "does not require a house thermocouple for feedback" (at ¶ 141), indicating that inside temperature may not even be used in Oswald's system, much less "rates of change in temperature" as claimed. Moreover, Oswald states that its system "sens[es] the electrical operation of heating controls such as a thermostat or gas valve," and by doing so, it "will detect the time points when the maximum and minimum temperatures are reached," indicating that Oswald is merely sensing whether heating controls is turned on or off, not calculating "rates of change in temperature." RX-0038 (Oswald) at ¶ 136.

Respondents further argue that Oswald discloses relating these calculated rates of change to outside temperature measurements because Oswald "automatically account[s]" for changes in weather, including outside temperature in its transient thermal model. *See* Resps. Br. at 260-61 (citing RX-0038 (Oswald), ¶¶ 147, 139; RX-0001C (Auslander DWS) at Q/A 132). However, the administrative law judge finds that this is not clear and convincing evidence that the "calculated rates of changes are correlated to said outside temperature measurements." For instance, Oswald suggests that "weather" might refer to "wind, rain, humidity" and have no reference to temperature. Moreover, Figure 8's depiction of a constant, unchanging value for "external temperature" suggests that Oswald does not actually correlate outside temperature measurements, as outside temperature naturally changes as time passes.

The administrative law judge thus finds that respondents have not shown by clear and convincing evidence that Oswald anticipates claim 1 of the '497 patent.

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**d. Obviousness – Oswald in View of Rosen**

Respondents argue, in part:

> ***Claim 2***: In Oswald, the "local weather from existing Internet weather databases" should "improve validity" of the transient thermal model. RX-0038 (Oswald) ¶ 137, Fig. 4; RX-0001C, Auslander QA134. As Dr. Auslander testified, a POSITA would have found it obvious to implement Oswald's system so that the Internet weather databases provide the local weather data for geographic regions based on ZIP codes, such as the weather service providers in Rosen. RX-0047 (Rosen) 7:42-43, 7:10-32, 9:6-10; RX-0001C, Auslander QA134-137. As explained above, Rosen discloses the additional limitation of claim 2. RX-0047 (Rosen) 7:42-43, 7:10-32, 9:6-10; RX-0001C, Auslander QA135. According to Dr. Auslander, the POSITA would have been motivated to combine Oswald with Rosen because both references are in the same field and are analogous (*i.e.*, both describe systems. that model and interact with HVAC systems., using outside temperature data received from weather service providers) and their combination would have had the advantage of delivering sufficiently localized outside temperature data from a weather service provider to a thermostat system. RX-0001C, Auslander QA136. Furthermore, the POSITA would have had a reasonable expectation of success when combining Oswald with Rosen because the ZIP code was such a common method of delivering weather data. RX-0001C, Auslander QA137.
>
> ***Claim 5***: Oswald describes a "thermostat [that] acts as a normal house thermostat - switching open and closed as the temperature rises and falls through set limits… [and] communicates this to the single central sensor 2 so that the system can still determine when temperature limits are reached." RX-0038 (Oswald) ¶148. As Dr. Auslander testified, a POSITA would have found it obvious to implement Oswald's system to include Rosen's programmable thermostat as the sole source for current data regarding temperature inside the house. RX-0001C, Auslander QA138-40; RX-0047 (Rosen) 3:4-53, 1:17-55, 6:19-27, figs.1-4. As explained above, Rosen discloses the additional limitation of claim 5. RX-0047 (Rosen) 3:4-53, 1:17-27, 3:31-53; RX-0001C, Auslander QA138, 120. According to Dr. Auslander, the POSITA would have been motivated to combine Oswald with Rosen because both references are in the same field and are analogous and their combination would have had the advantage of saving cost and reducing redundancy by including a single temperature sensor in Oswald's thermostat. RX-0001C, Auslander QA139. Furthermore, it would have been a common-sense implementation to rely on the existing thermostat system to provide inside temperature data, and the POSITA would have had a reasonable expectation of success when combining Ehlers with Rosen. RX-0001C, Auslander QA140.

Resps. Br. at 261-62.

EcoFactor argues, in part:

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Oswald in combination with Rosen does not render obvious claims 2 and 5. *See* CX-0702C (Palmer WS) Q/A 110-114. Rosen was cited and considered by the USPTO before the '497 patent issued. *See* JX-0001 ('497 patent) at Page 2. Respondents are not asserting that Rosen addresses any shortcomings of Oswald with respect to claim 1. Accordingly, adding Rosen to Oswald does nothing to address the deficiencies in the claim 1, which are also limitations of claims 2 and 5.

Moreover, Respondents did not show how the combination is suggested, why PHOSITA would or could combine them, and how or whether any such combination would work. *See* CX-0702C (Palmer WS) Q/A 110-114. There would be no reason why PHOSITA would combine Rosen with Oswald because, e.g., the two are fundamentally different systems. For example, Rosen is a system that simply "display" information and message from "remote correspondent," and not a system that "model" anything. Also, Oswald allegedly already includes a "thermostat" and a "single central sensor 2." Accordingly, there would be no reason for PHOSITA to introduce another thermostat to Oswald, particularly regarding claim 5. Moreover, doing so would also defeat claim 5's requirement regarding "sole source for current data regarding temperature inside," as there would be multiple thermostats in a combined system.

Compl. Br. at 152.

The Staff argues, in part:

**Claim 2**: Oswald in view of Rosen discloses all of the elements of claim 2, and thus the evidence clearly and convincingly shows that claim 2 is obvious. Oswald does not disclose obtaining outside temperature measurements using ZIP codes, which is required in claim 2. As discussed above, Rosen (RX-0047) discloses this limitation. *See* RX-0047, at 7:20-66. The evidence further shows that one of ordinary skill in the art would have been motivated to combine Oswald with Rosen to arrive at the claimed combination. *See* RX-0001C (Auslander) QA 136, 137. The evidence thus shows that the Oswald/Rosen combination renders claim 2 obvious. RX-0001C (Auslander) QA 133-137.

**Claim 5**: The evidence shows that claim 5 is obvious in view of Oswald and Rosen. As argued by Respondents,

> Oswald describes a "thermostat [that] acts as a normal house thermostat - switching open and closed as the temperature rises and falls through set limits… [and] communicates this to the single central sensor 2 so that the system can still determine when temperature limits are reached." RX-0038, at ¶148. As Dr. Auslander will testify, a POSITA would have found it obvious to implement Oswald's system to include Rosen's programmable thermostat as the sole source for current data regarding temperature

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> inside the house. RX-0001C (Auslander) QA 138-40; RX-0047, at 3:4-53, 1:17-55, 6:19-27, figs.1-4. As explained above, Rosen discloses the additional limitation of claim 5. RX-0047, at 3:4-53, 1:17-27, 3:31-53; RX-0001C (Auslander) QA 138, 120. According to Dr. Auslander, the POSITA would have been motivated to combine Oswald with Rosen because both references are in the same field and are analogous (RX-0001C (Auslander) QA 139), and the POSITA would have had a reasonable expectation of success when combining Ehlers with Rosen. RX-0001C (Auslander) QA 140.
>
> RPreHBr. at 166. The Staff agrees. The evidence thus shows that the Oswald/Rosen combination renders claim 5 obvious. RX-0001C (Auslander) QA 138-140.

Staff Br. at 94-95.

The administrative law judge finds that respondents have not shown by clear and convincing evidence that the combination of Oswald and Rosen renders claims 2 or 5 of the '497 patent obvious.

Respondents contend that a person of ordinary skill in the art would have been motivated to combine Oswald with Rosen because both relate to thermostats and because both relate to weather services. *See* Resps. Br. at 261. However, Rosen is a system that simply displays information and messages from a remote correspondent, in contrast with Oswald's modeling system. *See* CX-0702C (Palmer RWS) at Q/A 111. Moreover, Oswald already includes a source of weather data. *See id.* The administrative law judge finds that one of ordinary skill in the art would not have been motivated to combine Oswald and Rosen.

Furthermore, as found above, Oswald does not anticipate claim 1, and Rosen fails to cure the deficiencies of Oswald. In particular, Oswald does not disclose "relat[ing] said calculated rates of change to said outside temperature measurements," as required by element 1[d]. Respondents do not contend that Rosen teaches this element.

Regarding claim 5, the administrative law judge also finds that respondents have not shown that one of ordinary skill in the art would combine Oswald and Rosen for the reasons noted above. Moreover, such a combination would not meet the limitation of claim 5, which recites that the "programmable thermostat" is the "sole source for current data regarding temperature inside." The proposed combination would result in multiple thermostats, and would not meet the "sole source" requirement of claim 5. *See id.* at Q/A 113.

The administrative law judge thus finds that respondents have not shown by clear and convincing evidence that the combination of Oswald and Rosen renders claims 2 or 5 of the '497 patent obvious.

**e. Secondary Considerations**

The objective evidence, also known as "secondary considerations," includes commercial success, long felt need, and failure of others. *Graham v. John Deere Co.*, 383 U.S. 1, 13-17 (1966); *Dystar Textilfarben GmbH v. C.H. Patrick Co.*, 464 F.3d 1356, 1361 (Fed. Cir. 2006). "[E]vidence arising out of the so-called 'secondary considerations' must always when present be considered en route to a determination of obviousness." *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538 (Fed. Cir. 1983). Secondary considerations, such as commercial success, will not always dislodge a determination of obviousness based on analysis of the prior art. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 426 (2007) (commercial success did not alter conclusion of obviousness).

As found above, EcoFactor has not demonstrated that the '497 patent is implemented in the EcoFactor DI products. Therefore, EcoFactor has not established a nexus between the EcoFactor DI products and the '497 patent, and the secondary considerations, to the extent they rely on a nexus to the EcoFactor DI products, do not support a finding of non-obviousness.

### i. Commercial Success

EcoFactor argues that its products are commercially successful, and customer demand for these products is driven at least in part by the patented inventions. *See* Compl. Br. at 153 (citing CX-0702C (Palmer RWS) at Q/A 120). For the reasons discussed above in the domestic industry section concerning the preamble and element 1[d], EcoFactor has not demonstrated that the '497 patent is implemented in the EcoFactor DI products. As the administrative law judge finds that the EcoFactor DI products do not practice the '497 patent, EcoFactor has not established a nexus between the EcoFactor DI products and the '497 patent.

### ii. Long-Felt But Unresolved Need

EcoFactor argues that was a long-felt but unresolved need for smart thermostats embodying the claims of the '497 patent. *See* Compl. Br. at 152-53. For the reasons discussed above in the domestic industry section concerning the preamble and element 1[d], EcoFactor has not demonstrated that the '497 patent is implemented in the EcoFactor DI products. Moreover, EcoFactor mainly relies on the testimony of its expert, Dr. Palmer, who mainly cites the asserted patent and the deposition testimony of an inventor for support. *See id*. (citing CX-0702C (Palmer RWS) at Q/A 119).

The administrative law judge finds this evidence of little probative value. *See Certain Strontium-Rubidium Infusions Systems, and Components Thereof Including Generators*, 337-TA-1110, Final Initial Determination (Aug. 1, 2019) at 120, *aff'd in pertinent part*, Comm'n Opinion (Dec. 11, 2019) (Public Version) (EDIS Doc. ID 696920) at 38. EcoFactor's other evidence does not demonstrate any long-felt unresolved need for the claimed invention of the '497 patent. Viewing the evidence as a whole, this factor does not support a conclusion of non-obviousness.

[redacted]

### iii. Praise by Others

EcoFactor argues that it has received awards and praise stemming from its patented inventions. *See* Compl. Br. at 153 (citing CX-0013 (Demand Response Award), CX-0014 (EcoFactor Innovator of the Year), CX-0015 (EcoFactor Project of the Year), CX-0381C (EcoFactor Historical Overview); CX-0677C (Habib DWS) at Q/A 24-25; CX-0702C (Palmer RWS) at Q/A 118 (citing and explaining CX-0015, CX-0792, CX-0013, CX-0014, CX-790, CX-0381, CX-0791)). It has not been established that any praise was for the patent, apart from EcoFactor products or services. For the reasons discussed above in the domestic industry section concerning the preamble and element 1[d], EcoFactor has not demonstrated that the '497 patent is implemented in the EcoFactor DI products. As the administrative law judge finds that the EcoFactor DI products do not practice the '497 patent, EcoFactor has not established a nexus between the EcoFactor DI products and the '497 patent.

### iv. Copying

EcoFactor argues that there is also evidence that respondents discussed EcoFactor's products and inventions and tried to copy features of EcoFactor's products and inventions into their systems. *See* Compl. Br. at 153-54 (citing CX-0702C (Palmer RWS) at Q/A 121). EcoFactor contends Alarm.com emails discuss EcoFactor's HVAC Performance Monitoring and Alarm.com's copycat feature, HVAC Analytics. *See id.* EcoFactor further argues that Schneider and Daikin considered EcoFactor's products. *See id*.

The administrative law judge finds this evidence insufficient to demonstrate that Alarm.com, Schneider or Daikin in fact copied EcoFactor's products. EcoFactor does not contend that Alarm.com infringes an asserted claim of the '497 patent. Neither Schneider nor

[redacted]

Daikin are presently involved in this investigation, and cannot respond to EcoFactor's allegations.

* * *

Accordingly, the administrative law judge finds that there is little evidence of secondary considerations that tends to support non-obviousness of the claims of the '497 patent.

**2. The '322 Patent**

**a. Anticipation – Ehlers**

Ehlers was published on April 17, 2001, and therefore qualifies as prior art to the '322 patent. *See* RX-0022 (Ehlers).

Respondents argue, in part:

> Ehlers anticipates claim 1 of the '322 patent because it discloses each of the limitations of that claim ([1Pre] to [1d]). RDX-0001C-109 to 121, 123 to 127 (RX-0022 (Ehlers) 1:26-36, 7:11-36, 8:16-17, 9:50-63, 10:14-11:18, 12:26-13:2, 14:9-15, 14:26-40, 19:27-20:3, 20:4-7, 21:19-22, 30:65-31:6, 32:48-51, 33:37-50, 34:32-50, 34:59-67, 35:46-50, 35:65-36:1, 36:11-38, 36:50-54, 36:61-37:3, 37:17-50, 38:33-40:58, Title, Abstract, Figs. 4, 6); RX-0001C, Auslander QA145-53; RDX-0017 (Appendix B-1 Invalidity Claim Chart). EcoFactor does not dispute that Ehlers discloses limitation [1c]. PHB at 112-114; CX-0702C, Palmer QA125; RX-0001C, Auslander QA152. Only the claim limitations that EcoFactor alleges are not anticipated by Ehlers are described in detail here.
>
> ***Limitation 1Pre****:* Ehlers discloses a system that maintains "[t]he operational efficiency factor of each appliance being monitored," which is the claimed operational efficiency under any party's construction, for an HVAC unit corresponding to the claimed HVAC system. RX-0022 (Ehlers) 39:21-23, 38:33-41, 34:42-43, Fig. 4; RDX-0001C-111-112 (RX-0022 (Ehlers) 12:39-43, 20:4-7, 21:19-22, 33:37-50, 34:32-33, 34:42-43, 37:22-35, 38:33-41, 39:21-23, 40:45-47, Fig. 4); RX-0001C, Auslander QA105-106, 146-47. Ehlers evaluates changes over time in the "operational efficiency of an HVAC system" by "tracking [performance data] over time and making periodic comparisons." RX-0022 (Ehlers) 37:22-35, 12:39-43; RDX-0001C-111-112 (RX-0022 (Ehlers) 12:39-43, 20:4-7, 21:19-22, 33:37-50, 34:32-33, 34:42-43, 37:22-35, 38:33-41, 39:21-23, 40:45-47, Fig. 4); RX-0001C, Auslander QA146.

[redacted]

***Limitation 1a****:* Ehlers discloses "at least one HVAC control system" in the form of functions 31-37, including temperature decision and execution function 36, which is performed by a "thermostat-like unit" or by a "computer," and receives temperature measurements from a temperature sensor. RDX-0001C-114 to 115 (RX-0022 (Ehlers) 1:26-36, 10:14-29, 12:45-13:2, 14:9-15, 14:26-40, 30:65-31:6, 33:37-50, 34:41-47, 34:59-67, 35:46-50, 36:15-22, 36:50-54, 37:17-35, 37:37-50, Fig. 4); RX-0001C, Auslander QA107-108, 148. Ehlers further discloses that "[a]ll other functions will report their statuses" to function 35, which includes status provided by "heating and cooling equipment" corresponding to the HVAC system. RDX-0001C-116 (RX-0022 (Ehlers) 1:26-36, 10:14-29, 12:26-13:2, 14:9-15, 14:26-40, 30:65-31:6, 33:37-50, 34:41-47, 34:59-67, 35:46-50, 36:15-22, 36:50-54, 37:17-35, 37:37-50, Fig. 4); RX-0022 (Ehlers) 12:26-43, 14:9-15, 10:14-29, 14:26-40; RX-0001C, Auslander QA148.

According to Dr. Auslander, bidirectional communication between HVAC systems. and their controllers was well-known since the 1980s (Hearing Tr. 921:8-25 (Auslander)), which contradicts EcoFactor's unsupported contention that bidirectional communication in such systems. were not "known at the time of Ehlers" (PHB at 113).

***Limitation 1b****:* As explained for limitation [1c] of the '497 patent, Ehlers teaches the claimed measurements of outside temperature in at least two ways, with input functions 13 or 15. Specifically, Ehlers discloses an "[i]nput function 13 provides weather information" that includes "discrete parameters representing temperature." RX-0022 (Ehlers) 35:65-36:1, 9:50-63, 10:14-19; RDX-0001C-118 to 119 (RX-0022 (Ehlers) 9:50-63, 10:14-19, 10:30-11:4, 11:6-18, 19:27-20:3, 32:48-51, 34:32-50, 35:65-36:1, 36:11-38, 36:61-37:3, 37:17-35, 37:38-50, 39:16-18, 39:36-40, 39:44-46, Figs. 4, 6); RX-0001C, Auslander QA111, 149. Separately, Ehlers discloses an input function 15 that interfaces with sensors that sense "external environmental conditions including temperature." RDX-0001C-118 and RDX-0001C-119 (RX-0022 (Ehlers) 9:50-63, 10:14-19, 10:30-11:4, 11:6-18, 19:27-20:3, 32:48-51, 34:32-50, 35:65-36:1, 36:11-38, 36:61-37:3, 37:17-35, 37:38-50, 39:16-18, 39:36-40, 39:44-46, Figs. 4, 6); RX-0001C, Auslander QA111, 149. As explained for limitation [1c] of the '497 patent, either teaching in Ehlers corresponds to receiving measurements of outside temperature from a source other than the HVAC system, and EcoFactor's arguments on validity are inconsistent with the opposite positions EcoFactor's own infringement experts have taken as to the satisfaction of these same limitations. *Compare* PHB at 70-71 *with* Hearing Tr. 488:12-15, 396:12-18, 413:9-19 (de la Iglesia); Hearing Tr. 242:7-10 (Gomez).

Ehlers further discloses the "one or more processors compares the inside temperature of said first structure and the outside temperature over time." Ehlers's function 35 determines "the time to cool the premise one degree with known temperature and weather conditions." RX-0022 (Ehlers) 37:17-27. This means that the one or more processors in Ehlers measure the starting temperature, and compare

[redacted]

temperature measurements by continuously or periodically monitoring the actual temperature until it reaches one degree below the starting temperature. RX-0001C, Auslander QA150. Ehlers's weather data is used "to modify load calculations to reflect the additional load that weather applies to heating or cooling the premise" by comparing inside and outside temperature over time. RX-0022 (Ehlers) 36:15-17; RX-0001C, Auslander QA151. Moreover, as Dr. Auslander testified, the file history of the '322 patent citing the Rayburn reference is informative for interpreting this limitation, as Rayburn discloses feedback from an outdoor ambient temperature sensor 40, similar to the external sensor providing temperature measurements to Ehlers's input function 15. RX-0001C, Auslander QA143; RDX-0001C-105-106 (RX-0123 ('322 file history), Response to Office Action dated December 3, 2012; RX-0095 (Rayburn) Fig. 1, ¶17).

***Limitation 1d****:* As explained for limitation [1b] of the '322 patent, Ehlers determines "the time to cool the premise one degree with known temperature and weather conditions." RX-0022 (Ehlers) 37:17-27. Ehlers's disclosure of calculating a trend in operation is in the claimed "determine whether the operational efficiency of the HVAC system has decreased over time," under EcoFactor's proposed construction for "operational efficiency." RX-0001C, Auslander QA153; RDX-0001C-124 to 125 (RX-0022 (Ehlers) 12:39-43, 37:27-35, Fig. 4); RX-0022 (Ehlers) 37:27-35. Moreover, Ehlers's disclosure of "submetering" combined with determining the time to cool the premise one degree, satisfies Respondents' and Staff's proposed constructions. RX-0001C, Auslander QA153; RX-0022 (Ehlers) 37:17-24, 12:39-43.

Resps. Br. at 263-67 (footnotes omitted).

EcoFactor argues, in part:

Ehlers does not anticipate '322 patent claim 1 for several reasons. *See* CX-0702C (Palmer WS) at Q/A 122-158. ***First***, Ehlers does not disclose element 1[a] "at least one HVAC control system associated with a first structure that . . . receives status of said HVAC system" CX-0702C (Palmer WS) at Q/A 125, 130-144. Respondents contend that both the Accused Products and Ehlers disclose controlling an HVAC system, and thus if the Accused Products infringe, Ehlers discloses this limitation. CX-0702C (Palmer WS) at Q/A 130-144. But EcoFactor has not relied on the mere ability of the Accused Products to control an HVAC system. Instead, EcoFactor has identified specific components that receive specific messages including HVAC system status. Ehlers contains no such disclosure—nor do Respondents identify any such disclosure. CX-0702C (Palmer WS) at Q/A 125, 130-144.

Next, Respondents contend that the HVAC system in Ehlers ***could be*** a bidirectional HVAC system that sends messages to the thermostat-like device in Ehlers. *Id.* However, there is no disclosure of any such device or any receipt of messages containing HVAC system status. *Id.* Nor would such a device have been

[redacted]

1) known at the time of Ehlers or 2) capable of communicating with the thermostat-like device in Ehlers, which contains only uni-directional communications links. CX-0702C (Palmer WS) at Q/A 125, 130-144. Respondents also point to the receipt of an alarm status message. But this message only communicates whether there is an alarm—not whether the HVAC is on or off (or any other HVAC status). CX-0702C (Palmer WS) at Q/A 125, 130-144. Finally, Respondents point to disclosure of receipt of information from "equipment that can affect the environmental conditions of the premise." But the listed equipment does not include HVAC equipment, and there is no disclosure that the received information includes a status of any such equipment. CX-0702C (Palmer WS) at Q/A 125, 130-144.

***Second*** Ehlers does not disclose the portion of element 1[b] that reads "one or more processors that receive measurements of outside temperatures from at least one source other than said HVAC system" CX-0702C (Palmer WS) at Q/A 125. Respondents arguments regarding this element are the same as they were for element 1[b] of the '497 patent, and those arguments fail for the same reasons. CX-0702C (Palmer WS) at Q/A 145-46.

***Third*** Ehlers does not disclose the portion of element 1[b] that reads "one or more processors that . . . wherein said one or more processors compares the inside temperature of said first structure and the outside temperature over time." CX-0702C (Palmer WS) at Q/A 125, 147-153. Ehlers does not disclose any comparison of inside to outside temperature. *Id.* Respondents point to "[modify]ing load calculations to reflect the additional load that weather applies to heating or cooling the premise" and a "Weather Modified Comfort Ramping Feature." But this fails because 1) the weather information identified by Respondents does not include outside temperature, and 2) Ehlers does not disclose any comparison of temperatures. *Id.* Respondents resort to an inherency argument, but they cannot show that such a comparison is necessary. *Id.*

***Fourth***, Ehlers does not disclose the limitation "wherein said one or more processors compares an inside temperature recorded inside the first structure with an inside temperature of said first structure recorded at a different time to determine whether the operational efficiency of the HVAC system has decreased over time" in element 1[d], because Ehlers does not disclose any comparisons of inside temperatures. *Id.* *R*espondents point to Ehlers' disclosure of "the time to cool the premise by one degree with known temperature and weather conditions" and contend that Ehlers "***must*** continuously or periodically monitor the actual temperature until it reaches one degree below the starting temperature." Respondents have not found a disclosure of a comparison, and thus their argument amounts to inherency. However, determining the "the time to cool the premise by one degree with known temperature and weather conditions" does not require the comparison of inside temperatures. CX-0702C (Palmer WS) at Q/A 152-53. Because such a comparison is neither disclosed nor required, Ehlers does not anticipate this element. CX-0702C (Palmer WS) at Q/A 125, 147-153. In addition,

[redacted]

Respondents cannot show that Ehlers determines that "operation efficiency of the HVAC system has decreased over time" both because they cannot show that such a determination is related to a comparison, and because there is no disclosure in Ehlers of submeter or any other determination of changes in the amount of time or energy necessary to heat or cool a building. *Id.* at 156-58.

***Fifth***, to the extent it is found to be limiting, Ehlers does not disclose the preamble. Respondents arguments regarding it are the same as they were for the preamble of the '497 patent, and those arguments fail for the same reasons. CX-0702C (Palmer WS) at Q/A 126-29.

Compl. Br. at 230-32.

The Staff argues, in part:

Respondents contend that Ehlers (RX-0022) anticipates claim 1 of the '322 patent. RPreHBr. at 167; RDX-0001C-109 to 127; RX-0001C (Auslander) QA 145-53; RX-0052 (Appendix B-1 Invalidity Claim Chart). The Staff disagrees.

**Preamble**: For the same reasons discussed above for the preamble of claim 1 of the '497 patent, the evidence shows that Ehlers discloses the preamble.

**Element 1[a]:** The evidence shows that Ehlers discloses "at least one HVAC control system associated with a first structure that . . . receives status of said HVAC system," which is the limitation that EcoFactor contends is not disclosed. CPreHBr. at 112. With respect to the HVAC control system, Ehlers discloses "output functions control and provide data to output devices, communication links and environmental equipment. Output functions, for example, control external devices [*e.g.*, HVAC system (*see* 7:45-51)] to maintain an environmental condition within a comfort range while minimizing energy consumption by the external devices." RX-0022, at 13:21-27; 14:9-15 ("output function 44 provides ***control for heating and cooling equipment***. ***Function 36 will determine the need for heating or cooling and signal function 44 to initiate the process***. Contact closures, similar to standard thermostats, may be used to control the heating or cooling of the premise. A communications link 52 also may be available to communicate to equipment remote to the system."); RX-0001C (Auslander) QA 148.

With respect to receiving the status of the HVAC system, Ehlers discloses that "user interface and control box 40 …. controls an external environmental condition control device 50 by ***providing a control signal or signals to such external devices 50***." RX-0022, at 7:39-44. Ehlers discloses that the user interface "may be provided with data directly from process functions 33 through 37 for immediate access without an inquiry," and the user interface can include "additional indicators or enunciators [that] may be implemented for ***providing statuses*** of certain functions such as ***power on, equipment state*** and alarm." RX-

[redacted]

0022, at 14:5-9; 15:1-5; *see also* 10:3-13; 12:27-32; 15:16-18; 34:21-29. Ehlers further discloses that "for comfort data, the user will be prompted ***for ramping on or off, preconditioning on or off***, rate of change for ramping and preconditioning (at fixed intervals in minutes per degree or learned)…" *Id*. at 28:1-8. Thus, Ehlers discloses element 1[a].

**Element 1[b]:** For the same reasons discussed above for element 1[c] of the '497 patent, the evidence will ***not*** demonstrate that Ehlers discloses this element 1[b] of the '322 patent. EcoFactor also argues that Ehlers does not disclose "one or more processors that . . . wherein said one or more processors compares the inside temperature of said first structure and the outside temperature over time," which is also required in element 1[b]. CPreHBr. at 113. Although Ehlers discloses a comparison of indoor temperature and outdoor temperature over time, the outdoor temperature is not disclosed as a measurement, as discussed above. Therefore, for this additional reason, element 1[b] is not disclosed.

**Element 1[c]:** This limitation is not disputed by EcoFactor, and as discussed above with respect to element 1b] of the '497 patent, Ehlers discloses this element. *See* CPreHBr. at 113-114.

**Element 1[d]:** For the same reasons discussed above with respect to the preamble of and element 1[d] of the '497 patent, Ehlers discloses element 1[d] of the '322 patent. RX-0022, at 37:17-35; 26:56-57, 39:16-18; 39:13- 15, 26:53-55, 29:4-7; RDX-0001C-076 to 79; RX-0001C (Auslander) QA 112, 113.

Staff Br. at 96-98 (footnote omitted).

The administrative law judge finds that respondents have not shown by clear and convincing evidence that Ehlers anticipates claim 1 of the '322 patent.

As an initial matter, the preamble of claim 1 of the '322 patent has been found to be limiting and "operational efficiency" has been construed to mean "energy required by the HVAC system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions."

Regarding the preamble, EcoFactor argues that the parties' constructions for "operational efficiency" relate to an HVAC system's ability to heat or cool a structure, and there is no express disclosure in Ehlers of an "operational efficiency factor" being calculated for an HVAC system. *See* Compl. Br. at 232 (citing CX-0702C (Palmer RWS) at Q/A 126-29). However, Ehlers

discloses "[t]he operational efficiency factor of each appliance being monitored based on historical consumption patterns and current operating statistic," and a monitored appliance can be an HVAC system. RX-0022 (Ehlers) at col. 39, lns. 21-23, col. 38, lns. 33-41, col. 34, lns. 42-43, col. 7, lns. 45-52; FIG. 4; RX-0001C (Auslander DWS) at Q/A 105-06. Thus, the administrative law judge finds that Ehlers discloses a system for calculating a value for the operational efficiency of an HVAC system.

The administrative law judge finds that Ehlers discloses element 1[a]. EcoFactor argues there is no disclosure that Ehlers's HVAC system is a bidirectional HVAC system that sends messages to the thermostat-like device in Ehlers, and that such a device would not have been known at the time of Ehlers, or capable of communicating with the thermostat-like device in Ehlers, which contains only uni-directional communications links. *See* Compl. Br. at 230-31 (citing CX-0702C (Palmer RWS) at Q/A 125, 130-44). However, Ehlers discloses "output functions control and provide data to output devices, communication links and environmental equipment. Output functions, for example, control external devices [*e.g.*, HVAC system (*see* RX-0022 (Ehlers) at col. 7, lns. 45-51)] to maintain an environmental condition within a comfort range while minimizing energy consumption by the external devices." RX-0022 (Ehlers) at col. 13, lns. 21-27; col. 14, lns. 9-15. Moreover, Dr. Auslander testified that bidirectional communication between HVAC systems and their controllers was well-known since the 1980s. *See* Auslander Tr. 921.

Regarding element 1[b], respondents argue that "Ehlers discloses an '[i]nput function 13 provides weather information' that includes 'discrete parameters representing temperature.'" Resps. Br. at 265 (quoting RX-0022 (Ehlers) col. 35, ln. 65 – col. 36, ln. 1, col. 9, lns. 50-63, col.. 10, lns. 14-19). It is thus argued that Ehlers discloses receiving "discrete parameters

representing temperature" from a weather service or energy provider. *See id.* However, there is no express disclosure in Ehlers that this refers to temperature measurements, as opposed to, *e.g.*, forecasted temperatures.

Respondents further argue that Ehlers discloses an input function 15 that interfaces with sensors that sense "external environmental conditions including temperature." *See* Resps. Br. at 265 (citing RX-0022 (Ehlers) at col. 9, lns. 50-63); RX-0001C (Auslander DWS) at Q/A 111, 149). However, the '322 patent requires temperatures from a "source other than said HVAC system", and the identified sensors are part of each of Ehlers's thermostat-like devices are not "sources other than [the] HVAC system" because these sensors are part of Ehlers's thermostat-like device that "sense[s] internal and external environmental conditions including temperature and humidity, as well as other conditions such as occupancy." RX-0022 (Ehlers) at col. 10, lns. 14-29. The administrative law judge thus finds that respondents have not shown by clear and convincing evidence that Ehlers discloses element 1[b].

EcoFactor does not dispute that Ehlers discloses element 1[c] of claim 1. *See* Compl. Br. at 230-32.

The administrative law judge further finds that Ehlers does not disclose element 1[d]. Respondents argue Ehlers discloses "determin[ing] whether the operational efficiency of the HVAC system has decreased over time" because Ehlers discloses calculating a trend in operation. *See* Resps. Br. at 267 (citing RX-0001C (Auslander DWS) at Q/A 153; RX-0022 (Ehlers) at col. 37, lns. 27-35). However, Ehlers does not disclose any comparisons of inside temperatures. *See* CX-0702C (Palmer RWS) at Q/A 147-53. Respondents have not shown by clear and convincing evidence that determining the "the time to cool the premise by one degree

with known temperature and weather conditions" requires a comparison of inside temperatures. *See id.* at Q/A 152-53.

The administrative law judge thus finds that respondents have not shown by clear and convincing evidence that Ehlers anticipates claim 1 of the '322 patent.

**b. Obviousness – Ehlers in View of Rosen**

Rosen was published on September 14, 2004, and therefore qualifies as prior art to the '322 patent. *See* RX-0047 (Rosen).

Respondents argue, in part:

> ***Claim 2***: As explained for the '497 Patent, the weather service provider in Ehlers should provide weather data that is "sufficiently localized for acceptable accuracy." RX-0022 (Ehlers) 9:50-63; RX-0001C, Auslander QA116, 155. As explained for claim 2 of the '497 patent, a POSITA would have found it obvious to implement Ehlers's system so that the weather service provides the localized weather data for geographic regions based on ZIP codes, as taught by Rosen, because both references are in the same field and are analogous (*i.e.*, both describe systems. that model and interact with HVAC systems., using outside temperature data received from weather service providers) and their combination would have had the advantage of delivering sufficiently localized outside temperature data from a weather service provider to a thermostat system. RX-0001C, Auslander QA118, 157. Furthermore, the POSITA would have had a reasonable expectation of success when combining Ehlers with Rosen because the ZIP code was such a common method of delivering weather data. RX-0047 (Rosen) 7:42-43, 7:10-32, 9:6-10; RX-0001C, Auslander QA116-119, 155-158.
>
> ***Claim 5***: As explained for the '497 Patent, a POSITA would have found it obvious to implement Ehlers's thermostat-like unit to include the functionality of the thermostat system in Rosen, which, as discussed above, discloses the additional limitation of claim 5. RX-0001C, Auslander QA120-122, 159; RX-0047 (Rosen) 3:4-53, 1:17-55, 6:19-27, 3:31-53, Figs. 1-4. According to Dr. Auslander, the POSITA would have been motivated to combine Ehlers with Rosen because both references are in the same field and are analogous and their combination would have had the advantage of saving cost and reducing redundancy by using the thermostat as the sole source of inside temperature data. RX-0001C, Auslander QA121, 159. Furthermore, the combination would have made Ehlers's system compatible with existing HVAC systems. that already include a programmable thermostat, and the POSITA would have had a reasonable expectation of success when combining Ehlers with Rosen. RX-0001C, Auslander QA122, 159.

Resps. Br. at 267-68 (footnote omitted).

EcoFactor argues, in part:

> Ehlers in combination with Rosen does not render obvious claims 2 and 5 of the '322 patent. *See* CX-0702C (Palmer WS) at Q/A 159-67. Rosen was cited and considered by the USPTO before the '322 patent issued. *See* JX-0002 ('322 patent) at page 2. Respondents are not asserting that Rosen addresses any shortcomings of Ehlers with respect to claim 1. Accordingly, adding Rosen to Ehlers does nothing to address the deficiencies in the limitations of claim 1, which are also limitations of its dependent claims 2 and 5. With regard to the additional limitations of claims 2 and 5, Respondents arguments are the same as they were for claims 2 and 5 of the '497 patent, and those arguments fail for the same reasons. CX-0702C (Palmer WS) at 159-67.

Compl. Br. at 232.

The Staff argues, in part:

> For the same reasons discussed above with respect to claims 2 and 5 of the '497 patent, the evidence shows that claims 2 and 5 of the '322 patent are obvious based on the Ehlers/Rosen combination. *See* RX-0001C (Auslander) QA 154-159.

Staff Br. at 98.

The administrative law judge finds that respondents have not shown by clear and convincing evidence that the combination of Ehlers and Rosen renders claims 2 or 5 of the '322 patent obvious.

Respondents contend that a person of ordinary skill in the art would have been motivated to combine Ehlers with Rosen because both relate to thermostats and because both relate to weather services. *See* Resps. Br. at 267. However, Rosen uses a two-way Internet connection to communicate with the weather service, while Ehlers uses one-way communication links in separate input and output blocks. *See* CX-0702C (Palmer RWS) at Q/A 159-67. The relationship between the input and output blocks and the flow of information through unidirectional communication links is part of the basic architecture of Ehlers's system, and a

person of ordinary skill would need to substantially modify Ehlers if it were to implement an Internet connection instead. *See id.* In addition, Ehlers cautions that any information from a weather service must be "sufficiently localized" to support Ehlers's modeling. *See id.* at Q/A 83 (quoting Ehlers). There is no suggestion either in Ehlers or Rosen that ZIP-code-level information would be adequate for the system of Ehlers. *See id.*

Moreover, as found above, Ehlers does not anticipate claim 1, and Rosen fails to cure the deficiencies of Ehlers. In particular, Ehlers does not disclose "determin[ing] whether the operational efficiency of the HVAC system has decreased over time," as required by element 1[d]. Respondents do not contend that Rosen teaches this element.

Regarding claim 5, the administrative law judge also finds that respondents have not shown that one of ordinary skill in the art would combine Ehlers and Rosen because such a combination would require substantial modification to Ehlers's system, and Ehlers's system already includes a mechanism for obtaining outside temperature. *See id.* at Q/A 167. Moreover, Ehlers recites: "In its simplest form, the system of the invention acts as a thermostat replacement to sense and control temperature." RX-0022 (Ehlers) at col. 2 lines 45-47. Ehlers's system was designed to be used instead of a thermostat, not to be combined with one. A single temperature sensor may not suffice for Ehlers's system, and respondents have not shown that a single point of temperature data would be sufficient for the processing performed by Ehlers. *See* CX-0702C (Palmer RWS) at Q/A 167.

The administrative law judge thus finds that respondents have not shown by clear and convincing evidence that the combination of Ehlers and Rosen renders claims 2 or 5 of the '322 patent obvious.

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**c. Anticipation – Hildebrand**

Hildebrand was published on March 17, 1998, and therefore qualifies as prior art to the '322 patent. *See* RX-0036 (Hildebrand).

Respondents argue, in part:

> Hildebrand anticipates claim 1 of the '322 patent because it discloses each of the limitations of that claim ([1Pre] to [1d]). RDX-0001C-129 to 132, 134 to 143, 145 to 150 (RX-0036 (Hildebrand) 1:5-10, 1:58-60, 1:64-2:2, 2:39-46, 3:41-57, 4:1-10, 4:16-21, 4:46-52, 4:55-62, 5:11-17, 5:28-34, 5:40-52, 5:61-6:11, 6:26-40, 6:65-7:7, 7:18-66, 8:33-49, Title, Abstract, Fig. 1; RX-0094 (File History: US Pat. No. 8,886,488), Response to Office Action dated Nov. 27, 2013, p. 6); RX-0001C, Auslander QA160-69; RDX-0018 (Appendix B-2 Invalidity Claim Chart). EcoFactor does not dispute that Hildebrand discloses limitations [1Pre] and [1c]. PHB at 108-109; CX-0702C, Palmer QA169; RX-0001C, Auslander QA162, 168. As Dr. Auslander testified, Hildebrand discloses these limitations. RX-0001C, Auslander QA162-163, 168; RDX-0001C-131 to 132, 142 to 143 (RX-0036 (Hildebrand) 1:5-10, 3:41-43, 4:1-3, 4:46-52, 4:55-62, 5:11-17, 5:40-49, 5:51-52, 6:29-40, 7:18-66, Title, Abstract, Fig. 1).
>
> Notably, EcoFactor previously admitted during prosecution of a related patent that Hildebrand discloses limitations [1b] and [1d]. RX-0094 (File History: US Pat. No. 8,886,488), Response to Office Action dated Nov. 27, 2013, p. 6; RDX-0001C-148 (RX-0094 (File History: US Pat. No. 8,886,488), Response to Office Action dated Nov. 27, 2013, p. 6); RX-0001C, Auslander QA166, 169. Yet EcoFactor now alleges that these limitations are not disclosed in Hildebrand. PHB at 108-109. Only the claim limitations that EcoFactor currently alleges are not anticipated by Hildebrand are described in detail here.
>
> ***Limitation 1a****:* Hildebrand's energy management apparatus 2 is in the claimed HVAC control system because it "generat[es] a control signal for energizing the HVAC system." RDX-0001C-135 to 137 (RX-0036 (Hildebrand) 3:41-57, 4:1-10, 4:46-52, 4:55-62, 5:11-17, 5:28-34, Fig. 1); RX-0036 (Hildebrand) 4:57-62, 5:28-34, 13:55-14:15, fig.1; RX-0001C, Auslander QA164. Hildebrand's HVAC control system is "in a building," which is in the claimed first structure conditioned by at least one HVAC system. RX-0036 (Hildebrand) 4:46-52, 5:11-17, Fig. 1; RX-0001C, Auslander QA164.
>
> ***Limitation 1b****:* Hildebrand's temperature sensor 22 is a source other than the HVAC system 12, and provides outside temperature measurements to the microprocessor 4. RX-0036 (Hildebrand) 4:16-21, 5:61-6:11, 3:43-49, fig.1; RX-0001C, Auslander QA165; RDX-0001C-139 (RX-0036 (Hildebrand) Fig. 1). Moreover, Hildebrand's microprocessor 4 compares inside temperature measurements by measuring the amount of time ($\Delta t$) for the HVAC system 12 to

[redacted]

change inside temperature from a starting temperature ($T_{start}$) to a target temperature ($T_{aim}$). RDX-0001C-140 (RX-0036 (Hildebrand) 1:58-60, 1:64-2:2, 2:39-46, 3:43-49, 4:16-21, 5:61-6:11, 6:26-33, 6:65-7:4, 8:33-49, Fig. 1); RX-0036 (Hildebrand) 6:26-33; RX-0001C, Auslander QA166. Hildebrand's further disclosure of controlling an HVAC system to heat or cool a structure based on outside temperature would anticipate this limitation. RX-0036 (Hildebrand) 6:26-33, 8:33-49; RX-0001C, Auslander QA167.

***Limitation 1d****:* Hildebrand's microprocessor 4 determines an efficiency over time, where the efficiency is the claimed operational efficiency under EcoFactor's construction. RX-0036 (Hildebrand) 6:26-33, 7:18-66, 7:5-7; RDX-0001C-146-47 (RX-0036 (Hildebrand) 6:26-40, 7:5-7, 7:18-66, Fig. 1); RX-0001C, Auslander QA169.

Resps. Br. at 268-70 (footnotes omitted).

EcoFactor argues, in part:

Hildebrand does not anticipate claim 1. *See* CX-0702C (Palmer WS) Q/A 168-174. ***First***, Hildebrand does not disclose "HVAC control system … receives status of said HVAC system" in element 1[a]. CX-0702C (Palmer WS) Q/A 170. Respondents and their expert Dr. Auslander argues that Hildebrand discloses communication from item 12 (Respondents' alleged "HVAC system") to item 2 (Respondents' alleged "HVAC control system"). But Respondents' premise is incorrect because Hildebrand Figure 1 shows the communication arrow points <u>from</u> item 2 (Respondents' alleged "HVAC control system") <u>to</u> item 12 (Respondents' alleged "HVAC system"), but not in the other direction. Hildebrand does not disclose what Respondents asserts.

***Second***, Hildebrand does not disclose the limitation "receive measurements of outside temperature from at least one source other than said HVAC system" in element 1[b]. CX-0702C (Palmer WS) Q/A 171. This element requires the "source" to be one "other than said HVAC system." For example, an outdoor sensor that is connected to the HVAC system is a type of "source" that would be outside of element 1[b]'s requirement, as the '322 patent specifically teaches away from using such an outdoor sensor as being "sub-optimal" and undesirable. JX-0002 ('322 patent) at 2:43-51. Respondents identify "temperature sensor 22" in Hildebrand as purportedly meeting this, but such a sensor is the type of sensor that the '322 patent taught was undesirable, and accordingly fails to meet element 1[b].

***Third***, Hildebrand does not disclose the limitation "compares the inside temperature … and the outside temperature over time" in element 1[b] or element 1[d] which also includes a "compares" limitation. CX-0702C (Palmer WS) Q/A 172-173. Hildebrand mentions $T_{start}$, $T_{aim}$, and $T_{out}$, but does not disclose comparing any values. *Id.* Moreover, "$T_{start}$" and "$T_{aim}$," are not "inside temperature" in Hildebrand. Rather, $T_{start}$ is just the "starting zone temperature" and $T_{aim}$ is just the

[redacted]

"desired temperature setpoint." Further, Hildebrand discusses "keeping track of the time" (at 6:29-40), but not comparing inside ***temperature*** at different times. And Respondents fail to analyze Hildebrand and "operational efficiency" under all constructions. In sum, Respondents will be unable to show that Hildebrand meets multiple limitations of '322 patent claim 1.

Compl. Br. at 233.

The Staff argues, in part:

> The evidence clearly and convincingly shows that Hildebrand (RX-0036) anticipates claim 1 of the '322 patent, and thus is invalid. RPreHBr. at 170; RDX-0001C-129 to 150; RX-0001C (Auslander) QA 160-69; RX-0053 (Appendix B-2 Invalidity Claim Chart). EcoFactor argues that Hildebrand does not disclose (i) "HVAC control system … receives status of said HVAC system" in element 1[a], (ii) "receive measurements of outside temperature from at least one source other than said HVAC system" in element 1[b], and (iii) "compares the inside temperature … and the outside temperature over time" in element 1[b] or element 1[d] which also includes a "compares" limitation. CPreHBr. at 108-109. The Staff disagrees with EcoFactor.
>
> **Disputed portion of element 1[a]:** Hildebrand discloses the "HVAC control system … receives status of said HVAC system" limitation. Hildebrand discloses:
>
> > energizing an HVAC system to provide a selected one of heated air or cooled air to a zone, including:…
> >
> > > determining a difference between the stored desired temperature setpoint value and the stored actual temperature value and ***determining whether the difference indicates the need for the selected one of heated air or cooled air***; and
> >
> > > generating a control signal for energizing the HVAC system in response to the difference indicating the need for the selected one of heated air or cooled air so that heated air or cooled air is provided to the zone for changing the temperature in the Zone from Tstart to Taim.
>
> RX-0036, at 13:55-14:15 (emphases added). In determining whether the difference indicates the need for heating or cooling and then sending the appropriate signal, the system necessarily knows the status of the HVAC system. *See* RX-0001C (Auslander) QA 164; RPreHBr. at 170.
>
> **Disputed portions of element 1[b]:** Hildebrand discloses the "receive measurements of outside temperature from at least one source other than said

[redacted]

HVAC system" limitation of element 1[b]. Hildebrand's temperature sensor 22 is a source other than the HVAC system 12, and provides outside temperature measurements to the microprocessor 4. RX-0036, at 4:16-21, 5:61-6:11, 3:43-49, fig.1; RX-0001C (Auslander) QA 165; RDX-0001C-139; RPreHBr. at 170-171.

Further, Hildebrand discloses "compar[ing] the inside temperature … and the outside temperature over time" in element 1[b]. Hildebrand discloses:

> Each efficiency determination is made with regard to the particular Tout obtained at the time of making the determination. This is so that comparisons can be made as to determinations made ***at different times*** but under the same external condition(s) (only the ***Tout condition*** [***outside temperature***] is used in the preferred embodiment, but it is contemplated that other or additional conditions can be used for defining the external environment within which the efficiency determination is made). ***For the particular condition or conditions [i.e., Tout]***, the efficiency determination further includes determining an actual rate at which the temperature modification device changes the sensed temperature in the zone 18 from a first temperature value to a second temperature value. More specifically, the amount of time, deltaTime, it takes for the energized HVAC system 12 to change the actual temperature in the zone 18 from the respective Tstart to the respective Taim is determined. This is obtained by the microprocessor 4 ***keeping track of the time***, as counted in response to the timing circuit 6, from when the microprocessor 4 starts to effect temperature change from Tstart until Taim is achieved. Then an efficiency value is computed under control of the programmed microprocessor 4. The efficiency value is computed by dividing At by the difference between the two temperatures: deltaTime/absvalue (Tstart-Taim).

RX-0036, at 6:17-41. From this, the efficiency value is computed for a particular outside temperature condition, which is stored, and then the computation is repeated for another set of conditions, *i.e*., outdoor temperature, over time:

> After a first efficiency value has been calculated, it is stored in the table of efficiency values retained in memory 10. The value is stored in correspondence with the value of the sensed at least one ambient condition. ***That is, in the preferred embodiment the table is indexed by Tout*** so that the calculated efficiency value is stored at the index corresponding to the ***actually sensed Tout***.
>
> The foregoing steps are repeated at the ***next time*** at which another efficiency evaluation is to be made (***e.g. the next morning***). Thus, this determines, for the then sensed at least one ambient condition, a current actual rate at which the temperature

[redacted]

> modification device changes the sensed temperature. ***If the sensed ambient condition (i.e., Tout in the preferred embodiment) is different from previous determinations***, the efficiency value is stored in the table for that ambient condition. If, however, the ambient condition is the same as the ambient condition for a prior efficiency calculation, then a comparison is made to determine whether the efficiency of the HVAC system 12 ***has changed overtime (more, less or unchanged efficiency can be indicated)***.

RX-0036, at 6:65-7:17; RX-0001C (Auslander) QA 165-167.

> **Element 1[d]:** The foregoing excerpts show that Hildebrand discloses element 1[d]. That is, Hildebrand discloses performing the calculation of efficiency using an inside temperature, and then calculating the efficiency again using an inside temperature (Tstart) recorded at a different time, i.e., the second time the efficiency is calculated, and then "a comparison is made to determine whether the efficiency of the HVAC system ***has changed overtime (more, less or unchanged efficiency can be indicated)***." RX-0036, at 6:17-7:17; RX-0001C (Auslander) QA 169.
>
> Therefore, the evidence demonstrates that Hildebrand anticipates claim 1 of the '322 patent.

Staff Br. at 98-100.

The administrative law judge finds that respondents have shown by clear and convincing evidence that Hildebrand anticipates claim 1 of the '322 patent.

As an initial matter, the preamble of claim 1 of the '322 patent has been found to be limiting and "operational efficiency" has been construed to mean "energy required by the HVAC system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions."

Regarding the preamble, EcoFactor argues that respondents fail to analyze Hildebrand's "operational efficiency." *See* Compl. Br. at 233. However, Hildebrand discloses that "a comparison is made to determine whether the efficiency of the HVAC system has changed over time (more, less or unchanged efficiency can be indicated)." RX-0036 (Hildebrand) at col. 6, ln. 17 – col. 7, ln. 17; RX-0001C (Auslander DWS) at Q/A 163, 169. Thus, the administrative law

judge finds that Hildebrand discloses a system for evaluating changes in the operational efficiency of an HVAC system over time.

Regarding element 1[a], EcoFactor argues that Hildebrand does not disclose "HVAC control system … receives status of said HVAC system" because Hildebrand's Figure 1 shows the communication arrow points from item 2 (Respondents' alleged "HVAC control system") to item 12 (Respondents' alleged "HVAC system"), but not in the other direction. *See* Compl. Br. at 233. However, Hildebrand discloses "determining a difference between the stored desired temperature setpoint value and the stored actual temperature value and determining whether the difference indicates the need for the selected one of heated air or cooled air." RX-0036 (Hildebrand) at col. 13, ln. 55 – col. 14, ln. 15. In determining whether the difference indicates the need for heating or cooling and then sending the appropriate signal, the system necessarily knows the status of the HVAC system. *See* RX-0001C (Auslander DWS) at Q/A 164. The administrative law judge finds that Hildebrand discloses element 1[a].

Regarding element 1[b], EcoFactor argues that Hildebrand does not disclose the limitation "receive measurements of outside temperature from at least one source other than said HVAC system" because Hildebrand's outdoor sensor is connected to the HVAC system, and the '322 patent teaches away from using such an outdoor sensor as being "sub-optimal" and undesirable. *See* Compl. Br. at 233 (citing CX-0702C (Palmer WS) Q/A 171; JX-0002 ('322 patent) at col. 2, lns. 43-51). However, such a statement in the specification is not an unambiguous disavowal of claim scope. *See Teleflex, Inc. v. Ficosa North America Corp.*, 299 F.3d 1313, 1326-27 (Fed. Cir. 2001). The administrative law judge finds that Hildebrand's temperature sensor 22 is a source other than the HVAC system 12, and provides outside temperature measurements to the microprocessor 4. *See* RX-0036 (Hildebrand) at col. 4, lns.

16-21, col. 5, ln. 61 – col. 6, ln. 11; RX-0001C (Auslander DWS) at Q/A 165. Hence, Hildebrand discloses element 1[b] of the '322 patent.

EcoFactor further contends that Hildebrand does not disclose the limitation "compares the inside temperature … and the outside temperature over time" in element 1[b]. *See* Compl. Br. at 233 (citing CX-0702C (Palmer RWS) at Q/A 172-73). However, the efficiency value is computed for a particular outside temperature condition, which is stored, and then the computation is repeated for another set of conditions, *i.e.*, outdoor temperature, over time. Hildebrand recites:

> Each efficiency determination is made with regard to the particular $T_{out}$ obtained at the time of making the determination. This is so that comparisons can be made as to determinations made at different times but under the same external condition(s) (only the $T_{out}$ condition is used in the preferred embodiment, but it is contemplated that other or additional conditions can be used for defining the external environment within which the efficiency determination is made). For the particular condition or conditions, the efficiency determination further includes determining an actual rate at which the temperature modification device changes the sensed temperature in the zone 18 from a first temperature value to a second temperature value. More specifically, the amount of time, $\Delta t$, it takes for the energized HVAC system 12 to change the actual temperature in the zone 18 from the respective $T_{start}$ to the respective $T_{aim}$ is determined. This is obtained by the microprocessor 4 keeping track of the time, as counted in response to the timing circuit 6, from when the microprocessor 4 starts to effect temperature change from $T_{start}$ until $T_{aim}$ is achieved. Then an efficiency value is computed under control of the programmed microprocessor 4. The efficiency value is computed by dividing $\Delta t$ by the difference between the two temperatures: $\Delta t/|T_{start}-T_{aim}|$.

RX-0036 (Hildebrand) at col. 6, lns. 17-41. Hildebrand's microprocessor 4 compares inside temperature measurements by measuring the amount of time for the HVAC system 12 to change inside temperature from a starting temperature ($T_{start}$) to a target temperature ($T_{aim}$). The efficiency value is computed for a particular outside temperature condition, which is stored, and then the computation is repeated for another set of conditions, *i.e.*, outdoor temperature, over time. *See id.* at col. 6, ln. 65 – col. 7, ln. 17 ("The foregoing steps are repeated at the next time at

which another efficiency evaluation is to be made. . . . If [] the ambient condition is the same as the ambient condition for a prior efficiency calculation, then a comparison is made to determine whether the efficiency of the HVAC system 12 has changed overtime."). The administrative law judge finds that Hildebrand discloses comparing the inside temperature and the outside temperature over time.

EcoFactor does not dispute that Hildebrand discloses element 1[c] of claim 1. *See* Compl. Br. at 233.

Regarding element 1[d], EcoFactor argues that Hildebrand does not disclose the limitation "compares an inside temperature recorded inside the first structure with an inside temperature of said first structure recorded at a different time to determine whether the operational efficiency of the HVAC system has decreased over time" because $T_{start}$ is the "starting zone temperature" and $T_{aim}$ is the "desired temperature setpoint." *See* Compl. Br. at 233. However, Hildebrand recites, "[T]he amount of time, $\Delta t$, it takes for the energized HVAC system 12 to change the actual temperature in the zone 18 from the respective $T_{start}$ to the respective $T_{aim}$ is determined." RX-0036 (Hildebrand) at col. 6, lns. 17-41; RX-0001C (Auslander DWS) at Q/A 169.

The administrative law judge thus finds that respondents have shown, by clear and convincing evidence, that Hildebrand anticipates claim 1 of the '322 patent.

**d. Obviousness – Hildebrand in View of Rosen**

Respondents argue, in part:

> ***Claim 2***: Hildebrand discloses that the processors receive outside ambient temperature measurements $T_{out}$ from a temperature sensor 22, which is outside of the energy management apparatus 2 (the claimed HVAC control system). RX-0036 (Hildebrand) 4:16-21, 5:61-6:11. As Dr. Auslander testified, it would have been obvious to a POSITA to implement Hildebrand's system to receive outside

[redacted]

temperatures for geographic regions from sources other than said HVAC control systems., and those geographic regions would have been "ZIP codes" as taught by Rosen. RX-0036 (Hildebrand) 4:22-29; RX-0047 (Rosen) 7:42-43, 7:10-32, 9:6-10; RX-0001C, Auslander QA171-174. As discussed, Rosen discloses the additional limitation of claim 2. RX-0047 (Rosen) 7:42-43, 7:10-32, 9:6-10; RX-0001C, Auslander QA172, 117. According to Dr. Auslander, the POSITA would have been motivated to combine Hildebrand with Rosen because both references are in the same field and are analogous (*i.e.*, both describe systems. that model and interact with HVAC systems., using outside temperature data) and their combination would have had the advantage of outside temperature data being sufficiently localized. RX-0001C, Auslander QA173. Furthermore, the POSITA would have had a reasonable expectation of success when combining Hildebrand with Rosen because the ZIP code was such a common method of delivering weather data. RX-0001C, Auslander QA174.

***Claim 5***: Hildebrand discloses a thermostat. RX-0036 (Hildebrand) 1:11-18, 3:49-54, 2:11-28. As Dr. Auslander testified, it would have been obvious to a POSITA to implement Hildebrand's system to include the functionality of the thermostat system in Rosen, which discloses the additional limitation of claim 5. RX-0001C, Auslander QA120, 175-77; RX-0047 (Rosen) 3:4-53, 1:17-55, 6:19-27, figs.1-4. According to Dr. Auslander, the POSITA would have been motivated to combine Hildebrand with Rosen because both references are in the same field and are analogous and their combination would have had the advantage of delivering temperature data in a cost effective manner so that inside temperature data comes from a single source, the thermostat. RX-0001C, Auslander QA176. Furthermore, using a programmable thermostat as the only source that provides the inside temperature data would have saved on cost and reduced redundancy, and would have been a common-sense implementation, such that the POSITA would have had a reasonable expectation of success when combining Hildebrand with Rosen. RX-0001C, Auslander QA177.

Resps. Br. at 270-71.

EcoFactor argues, in part:

Hildebrand in combination with Rosen does not render obvious claims 2 and 5 of the '322 patent. *See* CX-0702C (Palmer WS) Q/A 175-179. Rosen was cited, discussed, and considered by the USPTO before the '322 patent issued. *See* JX-0002 ('322 patent) at Page 2. Further, Respondents are not asserting that Rosen addresses any shortcomings of Hildebrand with respect to claim 1. Accordingly, adding Rosen to Hildebrand does nothing to address the deficiencies in the limitations of claim 1, which are also limitations of its dependent claims 2 and 5.

Moreover, Respondents did not show how any such combination would be suggested, why PHOSITA would or could combine them, and how or whether any such combination would work. *See* CX-0702C (Palmer WS) Q/A 175-179. There

> would be no reason why PHOSITA would combine Rosen with Hildebrand because, e.g., the two are fundamentally different systems. For example, Rosen is a system that simply "display" information and message from "remote correspondent," and not a system that "model" anything. Also, Hildebrand allegedly already includes a "thermostat." Accordingly, there would be no reason for PHOSITA to introduce another thermostat to Hildebrand, particularly regarding claim 5. Moreover, doing so would also defeat claim 5's requirement regarding "sole source for current data regarding temperature inside," as there would be multiple thermostats in a combined system.

Compl. Br. at 234.

The Staff argues, in part:

> **Claim 2**: For the same reasons discussed above with respect to claim 2 of the '497 patent regarding Rosen's (RX-0047) disclosure of receiving outside temperature measurement based on ZIP codes, the evidence shows that claim 2 of the '322 patent is obvious based the Hildebrand/Rosen combination. *See* RPreHBr. at 171; RX-0001C (Auslander) QA 170-177. The evidence further shows that a person of ordinary skill in the art would have been motivated to combine Hildebrand with Rosen to arrive at the claimed combination. *See* RX-0001C (Auslander) QA 173, 174.
>
> **Claim 5**: For the same reasons discussed above with respect to claim 5 of the '497 patent regarding Rosen's disclosure of the limitations of claim 5, the evidence demonstrates that claim 5 of the '322 patent is obvious based the Hildebrand/Rosen combination. *See* RPreHBr. at 171; RX-0001C (Auslander) QA 170-177. The evidence further shows that a person of ordinary skill in the art would have been motivated to combine Hildebrand with Rosen to arrive at the claimed combination. *See* RX-0001C (Auslander) QA 176, 177.

Staff Br. at 101.

The administrative law judge finds that respondents have shown by clear and convincing evidence that the combination of Hildebrand and Rosen renders claims 2 and 5 of the '322 patent obvious.

As found above, Hildebrand anticipates claim 1, upon which claims 2 and 5 rely.

EcoFactor contends that a person of ordinary skill in the art would not have been motivated to combine Ehlers with Rosen because the two are fundamentally different systems. *See* Compl. Br. at 234. However, Hildebrand discloses at col. 4, lns. 22-29 the energy

management apparatus 2 (including the microprocessor 4) communicates bidirectionally with a remote communication system 24, "so that information can be transferred either to or from the energy management apparatus 2," and at 4:24-27 that "remote communication system 24 can be implemented in any suitable manner, such as by a modem link to which a personal computer is connected at the remote end." In addition, Hildebrand already discloses bidirectional communication with the remote communication system 24, such that one of ordinary skill in the art would have been motivated to implement Hildebrand's system so that the outside temperature data is provided via the remote communication system 24, instead of or in addition from the temperature sensor 22. *See* RX-0001 (Auslander DWS) at Q/A 171.

Regarding claim 2, Rosen discloses a thermostat system that transmits its zip code as location data over the Internet to a weather website, which responds by transmitting the local weather data, such as outside temperature, for the thermostat location to the thermostat. *See* RX-0001 (Auslander DWS) at Q/A 173 (citing RX-0047 (Rosen) at col. 7, lns. 42-43; col. 7, lns. 10-32; col. 9, lns. 6-10). The administrative law judge finds that Rosen discloses said processors receive measurements of outside temperatures for geographic regions such as ZIP codes from sources other than said HVAC control systems. The combination of Hildebrand and Rosen renders obvious claim 2 of the '322 patent.

Regarding claim 5, Rosen discloses "a programmable thermostat" that is the "sole source for current data regarding temperature inside said first structure conditioned by said HVAC system." Rosen discloses a temperature sensor 5 as a simple thermistor that is the only source for current data regarding temperature inside the conditioned space 4, which is conditioned by the space conditioning equipment 3. RX-0047 (Rosen) at Figs. 1-4.

[redacted]

The administrative law judge thus finds that respondents have shown by clear and convincing evidence that the combination of Hildebrand and Rosen renders obvious claims 2 and 5 of the '322 patent.

**e. Anticipation – Oswald**

Oswald was published on August 4, 2005, and qualifies as prior art to the '322 patent. *See* RX-0038 (Oswald).

Respondents argue, in part:

> Oswald anticipates claim 1 of the '322 patent because it discloses each of the limitations of that claim ([1Pre] to [1d]). RDX-0001C-152 to 157, 159 to 168 (RX-0038 (Oswald) at ¶¶ 24-25, 36, 38, 51-55, 58-59, 101, 121-48, cl. 27-29, Title, Abstract, Figs. 1, 2, 3, 4, 8, 9); RX-0001C, Auslander QA179-88; RDX-0019 (Appendix B-3 Invalidity Claim Chart). EcoFactor does not dispute that Oswald discloses limitations [1Pre] and [1a]. PHB at 110-112; CX-0702C, Palmer QA181; RX-0001C, Auslander QA183. As Dr. Auslander testified, Oswald discloses these limitations. RX-0001C, Auslander QA180-81, RDX-0001C at 154-57 (RX-0038 (Oswald) at ¶¶ 24-25, 36, 51, 53-55, 101, 122-48, cl. 27-29, Title, Abstract, Figs. 1, 2, 3, 8, 9). Only the claim limitations that EcoFactor alleges are not anticipated by Oswald are described in detail here.
>
> ***Limitation 1b****:* As explained for element 1c of the '497 patent, Oswald's computer receives outside temperature measurements under any party's construction, from an internet weather database, which is a source other than the heating and cooling appliances. RX-0038 (Oswald) at ¶¶ 24, 122-34, 137, 147, cl. 27, Fig. 4; RDX-0001C-160 to 161 (RX-0038 (Oswald) at ¶¶ 24, 52, 55, 122-37, 147, cl. 27-28, Figs. 1, 3, 4, 8); RX-0001C, Auslander QA129, 184.
>
> Regarding Oswald's disclosure of receiving outside temperature measurements, EcoFactor repeats its flawed arguments for element [1c] of the '497 patent. EcoFactor's first argument that "an outdoor sensor that is connected to the HVAC system" is not a source other than said HVAC system (PHB at 110) is illogical because by definition, an outdoor sensor that is "connected to" the HVAC system is not a part of that HVAC system and is therefore a "source other than said HVAC system," as claimed. EcoFactor's second argument that such an outdoor temperature sensor does not actually provide outside temperature measurements (PHB at 110) is similarly flawed because it is the main function of an outdoor temperature sensor to provide outside temperature measurements. EcoFactor's final argument that the claimed outside temperature measurements cannot be constant (as depicted in Oswald's Fig. 8) is also incorrect (PHB at 110) because outside temperature can remain constant for hours at a time.

[redacted]

Regarding Oswald's disclosure of comparing said temperature measurements from said structure and comparing the inside and outside temperature over time, EcoFactor argues that Oswald "is entirely lacking in any detail regarding its alleged 'model'" and that Oswald compares times, not temperatures. PHB at 110. In fact, Oswald provides detail on how its transient thermal model (as implemented by a computer) works by adjusting predicted inside temperatures to achieve a better fit with previously measured actual inside temperatures. RX-0038 (Oswald) at ¶¶ 24, 135-36, cl. 27, fig.8; RX-0001C, Auslander QA185. Oswald also detects that "the house will begin to take longer to heat up," which involves comparing temperature measurements. RX-0038 (Oswald) at ¶ 146; RX-0001C, Auslander QA185. Oswald compares inside and outside temperatures, by measuring "the actual response of the house to varying thermal conditions," such as by detecting that "the house cools down unusually quickly on windy days." RDX-0001C-160 to 161 (RX-0038 (Oswald) at ¶¶ 24, 52, 55, 122-37, 147, cl. 27-28, Figs. 1, 3, 4, 8); RX-0038 (Oswald) at ¶¶ 24, 135-36, 139, 143, cl. 27-28, Fig. 8; RX-0001C, Auslander QA186.

***Limitation 1c****:* As explained for element 1b of the '497 patent, Oswald stores inside temperatures over time in a database within the single central sensor 2. RX-0038 (Oswald) at ¶¶ 58-59, 135-36, 121, figs.1-2; RDX-0001C-163 (RX-0038 (Oswald) at ¶¶ 58-59, 121, 135-36, Figs. 1, 2, 8); RX-0001C, Auslander QA128, 187.

***Limitation 1d****:* Oswald detects when "the house will begin to take longer to heat up" (comparing inside temperatures recorded at different times) due to a heating boiler that "becomes fouled through use" and therefore detects a "deterioration in boiler efficiency." RX-0038 (Oswald) at ¶¶ 146-47, 36, 24; RDX-0001C-165 to 166 (RX-0038 (Oswald) at ¶¶ 146-47, Figs. 1, 3); RX-0001C, Auslander QA188. That deterioration in boiler efficiency means operational efficiency decreases over time, under any party's construction. RX-0001C, Auslander QA188; RX0038 at ¶¶ 36, 139, 144, 24; RDX-0001C at 165-67 (RX-0038 (Oswald) at ¶¶ 146-47, Figs. 1, 3).

EcoFactor argues that Oswald's model lacks detail and "'does not require a house thermocouple for feedback,' indicating that inside temperature measurements may not even be used." PHB at 111. As explained for limitation [1b] of the '322 patent, Oswald does provide detail on how its mathematical model works, by adjusting predicted inside temperatures to achieve a better fit with previously measured actual inside temperatures. RX-0038 (Oswald) at ¶¶ 24, 135-36, cl. 27, fig.8; RX-0001C, Auslander QA185. Moreover, EcoFactor takes Oswald's statement out of context. Oswald did not state that the house thermocouple temperature sensor is never used. Indeed, the next sentence in Oswald clearly states that not using the house temperature sensor "is unacceptable in the long term" (RX-0038 (Oswald) at ¶ 141), indicating that the house temperature sensor is actually used.

[redacted]

Resps. Br. at 272-74 (footnotes omitted).

EcoFactor argues, in part:

> Oswald does not anticipate claim 1. CX-0702C (Palmer WS) Q/A 180-188. ***First***, Oswald does not disclose the limitation "one or more processors that receive measurements of outside temperatures from at least one source other than said HVAC system" in element 1[b]. CX-0702C (Palmer WS) Q/A 182. This element requires the "source" to be one "other than said HVAC system." For example, an outdoor sensor that is connected to the HVAC system is a type of "source" that would be outside of element 1[b]'s requirement. *See* JX-0002 ('322 patent) at 2:43-51. Accordingly, Oswald's mention of "sensors external to existing appliances" (at ¶ 0030) does not meet element 1[b] because it is not a "source other than said HVAC system," and also because Oswald does not teach that such a sensor sends "outside temperature measurements." Other portions of Oswald that Respondents may point to also fail. For example, Oswald Figure 8 merely shows a graph of temperatures, and does not show how Oswald's "model" actually works and is not about a "processor that receive[s]" anything. Figure 8 of Oswald also merely shows a single, constant "external temperature" value, and not multiple "measurements of outside temperatures."
>
> ***Second***, Oswald does not disclose the limitation "one or processors … compare said temperature measurements from said first structure, wherein said one or more processors compares the inside temperature of said first structure and the outside temperature over time" in element 1[b]. CX-0702C (Palmer WS) Q/A 183-184. This is because Oswald is entirely lacking in any detail regarding its alleged "model." Respondents' argument otherwise is based on their attempt to conjure up details that are entirely lacking in the actual disclosures of Oswald. For example, the only comparison that is mentioned in Oswald is about "compar[ing] … ***times***" (at ¶ 0136), and not about comparing ***temperatures***. Moreover, Oswald states that its system "sens[es] the electrical operation of heating controls such as a thermostat or gas valve," and by doing so, it "will detect the time points when the maximum and minimum temperatures are reached" (at ¶ 0136), indicating that Oswald is merely sensing whether heating controls is turned on or off, not that there is any "compar[ing]" of temperatures. Further, Oswald states that its "transient thermal model" is intended to be used "without referring to the house thermocouple temperature sensor," and that its model "does not require a house thermocouple for feedback," indicating that inside temperature measurements may not even be used in Oswald's system, much less that it compares temperature measurements. RX-0038 (Oswald) at ¶ 0141. Comparison of temperature is also not necessary in Oswald—indeed, Oswald apparently functions by merely comparing "times," not temperatures.
>
> ***Third***, Oswald does not disclose element 1[c] "one or more databases that store at least said temperature measurements obtained from said first structure over

time." CX-0702C (Palmer WS) Q/A 185. While Oswald mentions "database," it does not disclose a database that "store[s] at least said temperatures measured at said first location over time." In fact, Oswald describes a system that stores "***times***" rather than temperatures. RX-0038 (Oswald) at ¶ 136. Moreover, Oswald describes that its "model" is intended to be used "without referring to the house thermocouple temperature sensor." RX-0038 (Oswald) at ¶ 0141. Oswald describes a system that ***estimates*** inside temperature based on heating and cooling times, as opposed to a system that stores temperatures measured over time. CX-0702C (Palmer WS) Q/A 99-102.

***Fourth***, Oswald does not disclose element 1[d] "one or more processors compares an inside temperature recorded inside the first structure with an inside temperature of said first structure recorded at a different time to determine whether the operational efficiency of the HVAC system has decreased over time," because Oswald does not disclose how its "model" works, as explained above. CX-0702C (Palmer WS) Q/A 186-187. For example, Oswald states that its model "does not require a house thermocouple for feedback," indicating that inside temperature measurements may not even be used in Oswald's system, much less that it compares temperature measurements recorded at different time. RX-0038 (Oswald) at ¶ 0141. Indeed, the only comparison described in Oswald is comparison of ***times*** and not temperatures. Further, Respondents may point to "deterioration in boiler efficiency" mentioned in Oswald at ¶ 147 to argue that "operational efficiency" limitation is met, but Oswald does not explain what it means by that statement, nor does Oswald teach that such "deterioration" is something that is actually determined in Oswald's system (as opposed to by the homeowner).

***Fifth***, Respondents has not shown that Oswald discloses the limitation "HVAC control system" in element 1[a]. Respondents identified "single central sensor" in Oswald as meeting the claimed "HVAC control system." Hearing Tr. 903:16-21. But "single central sensor" in Oswald is not an HVAC control system. All parties agree, as they must, that "HVAC control system" is a system that must, at the very least "control" an HVAC. But "single central sensor" in Oswald does not "control" anything, much less the HVAC system. Rather, "single central sensor" is a sensor "to monitor the flow of electricity into the house." RX-0038 (Oswald) ¶ 0047. Indeed, the "single central sensor" merely monitors "which appliance has been turned on and how long it has been on for at what time of day." RX-0038 (Oswald) at ¶0047, ¶0055 ("The single central sensor 2 monitors the electrical power feeding into the house (e.g. current, voltage and power factor)"), ¶0062 ("single central sensor … ***can recognize*** what is being turned on and off," not that it controls turning on or off); ¶0063 ("single central sensor system may ***identify*** that an 'unknown appliance' has been used"); ¶¶ 0102, 0115, 0118 ("single central sensor could ***monitor*** ..."). For instance, Oswald's "single central sensor" connects to a "washing machine," which obviously has nothing to do with HVAC. *See* RX-0038 (Oswald) at ¶0086. Moreover, as explained with respect to other

[redacted]

limitations (e.g., element 1[b]) and shown in CDX-0010C, Oswald teaches that its system (including "single central sensor") does not "refer[]" to temperature sensor, indicating that "single central sensor" does not receive temperature measurements. Accordingly, Respondents fail to show that Oswald discloses "HVAC control system." In sum, Oswald does not anticipate claim 1.

Compl. Br. at 234-37.

The Staff argues, in part:

The evidence clearly and convincingly shows that Oswald (RX-0038) anticipates claim 1 of the '322 patent, and thus is invalid. RPreHBr. at 172; RX-001C (Auslander) QA 178-188. EcoFactor argues that Oswald does not disclose elements 1[b], 1[c], and 1[d]. CPreHBr. at 110-111. The Staff disagrees with EcoFactor.

**Element 1[b]:** For the same reasons discussed above with respect to element 1[c] of the '497 patent, Oswald discloses receiving outside temperature measurements from a source other than the HVAC. In addition, for the same reasons discussed above with respect to element 1[d] of the '497 patent, Oswald discloses the "comparing" limitation of element 1[b] of the '322 patents. For instance, as discussed above, Oswald's Figure 8 discloses inside temperature in relation to external temperature. Oswald further discloses, as discussed above, that the system "may notice that the house *cools down* unusually quickly on windy days and yet has a normal cooling characteristic under still air conditions," and that the "system can use the transient model to calculate the time it will take to reach the *desired temperature*: on a cold windy day this might be 1 hour and on a mild day it might be 30 minutes." RX-0038 at ¶ 143, 139. This is a disclosure of the claimed comparing inside temperature (desired temperature) and the outside temperature (cold windy day) over time. *See also* RX-001C (Auslander) QA 183-186.

**Element 1[c]:** For the same reasons discussed above with respect to element 1[b] of the '497 patent, Oswald discloses element 1[c] of the '322 patent. RX-001C (Auslander) QA 187.

**Element 1[d]:** Oswald detects when "the house will begin to take longer to heat up" (*i.e.*, comparing inside temperatures recorded at different times) due to a heating boiler that "becomes fouled through use" and therefore detects a "deterioration in boiler efficiency." RPreHBr. at 173; RX-0038, at ¶¶ 146-47, 36, 24; RDX-0001C-165 to 166; RX-0001C (Auslander) QA 188. As argued by Respondents, "that deterioration in boiler efficiency means operational efficiency decreases over time, under any party's construction." RPreHBr. at 173-174; RX-0001C (Auslander) QA 188; RX0038 at ¶¶ 36, 139, 144, 24; RDX-0001C at165-67.

Therefore, the evidence shows that Oswald anticipates claim 1 of the '322 patent.

Staff Br. at 101-02.

The administrative law judge finds that respondents have not shown by clear and convincing evidence that Oswald anticipates claim 1 of the '322 patent.

EcoFactor does not dispute that Oswald discloses the preamble of claim 1. *See* Compl. Br. at 234-37.

Regarding element 1[a], EcoFactor did not dispute that Oswald's disclosure of element [1a] of the '322 patent in its pre-hearing brief. *See* Compl. Pre-Hearing Br. at 110-12. By not advancing this argument in its pre-hearing brief, EcoFactor is precluded from raising it now. *See* G.R. 7(c).

Regarding the first portion of element 1[b], EcoFactor argues that Oswald's mention of "sensors external to existing appliances" (at ¶ 0030) is not a "source other than said HVAC system," and Oswald also does not teach that such a sensor sends "outside temperatures." *See* Compl. Br. at 234-35. However, Oswald's source of outside temperature is a "source other than said HVAC system." An outdoor sensor that is "connected to" the HVAC system is not a part of that HVAC system, and would therefore be a "source other than said HVAC system," as claimed.

The administrative law judge finds that Oswald does not disclose the second portion of element 1[b]: "compar[ing] said temperature measurements from said first structure, wherein said one or more processors compares the inside temperature of said first structure and the outside temperature over time." Respondents argue that Oswald detects when "the house will begin to take longer to heat up" because Oswald's system calculates the rate of change in

temperature when the heating system is "on," and compares it to a previous value. *See* Resps. Br. at 273 (citing RX-0001C, Auslander QA185). Respondents further argue Oswald discloses calculating rates of change in temperature for periods during which the status of the HVAC system is "off" by detecting "that the house cools down unusually quickly," and that this means that Oswald calculates the rate of change in temperature when the heating system is "off," and compares that rate to a previous value. *See id.* (citing RX-0001C (Auslander DWS) at Q/A 186).

The administrative law judge finds that this is not clear and convincing evidence that Oswald discloses the second portion of element 1[b]. Oswald states that its system "sens[es] the electrical operation of heating controls such as a thermostat or gas valve," and by doing so, it "will detect the time points when the maximum and minimum temperatures are reached," indicating that Oswald may operate by sensing whether heating controls is turned on or off, rather than by comparing temperatures. *See* CX-0702C (Palmer RWS) at Q/A 184 (quoting RX-0038 (Oswald) at ¶ 0136).

Regarding element 1[c], EcoFactor argues that Oswald does not disclose that it "store[s] at least said temperature measurements obtained from said first structure over time" because Oswald describes a system that stores "times" rather than temperatures. *See* Compl. Br. at 235-36 (quoting RX-0038 (Oswald) at ¶0136 ("database of known heating and cooling times")). EcoFactor further argues that Oswald describes a system that estimates inside temperature based on heating and cooling times, as opposed to a system that stores temperatures measured over time. *See id.* (citing CX-0702C (Palmer RWS) at Q/A 99-102). However, Oswald describes a transient thermal model that uses "inside and outside temperature measurements . . . [to] predict changes in the inside temperature on the basis of the information about the outside temperature and on the basis of the operation of heating and/or cooling electrical appliances." RX-0038

(Oswald), ¶ 24. Those inside temperature measurements therefore provide a stored record of the inside temperature of the house, and are stored in Oswald's database. RX-0038 (Oswald), ¶¶ 55, 58-59, 135-36, 121, Figs. 1-2.

The administrative law judge finds that Oswald does not disclose element 1[d]. Respondents argue that Oswald detects a "deterioration in boiler efficiency", which means that Oswald's system determines whether the operational efficiency of the HVAC system has decreased over time. *See* Resps. Br. at 274 (citing RX-0001C (Auslander DWS) at Q/A 188).

The administrative law judge finds that this is not clear and convincing evidence that Oswald discloses element 1[d]. Oswald states that its system "sens[es] the electrical operation of heating controls such as a thermostat or gas valve," and by doing so, it "will detect the time points when the maximum and minimum temperatures are reached." RX-0038 (Oswald), ¶ 136. Respondents have not shown by clear and convincing evidence that Oswald discloses comparing an inside temperature recorded inside the first structure with an inside temperature of said first structure recorded at a different time because Oswald discloses a system that compares times rather than temperatures.

The administrative law judge thus finds that respondents have not shown by clear and convincing evidence that Oswald anticipates claim 1 of the '322 patent.

**f. Obviousness – Oswald in View of Rosen**

Respondents argue, in part:

> ***Claim 2***: As explained for the '497 patent, the "local weather from existing Internet weather databases" in Oswald should "improve validity" of the transient thermal model (RX-0038 (Oswald) at ¶ 137, fig.4; RX-0001C, Auslander QA134), and a POSITA would have found it obvious to implement Oswald's system so that the Internet weather databases provide the local weather data for geographic regions based on ZIP codes, such as the weather service providers in Rosen, which discloses the additional limitation of claim 2. RX-0047, at 7:42-43, 7:10-32, 9:6-10; RX-

[redacted]

0001C, Auslander QA117, 190-193. As explained, the POSITA would have been motivated to combine Oswald with Rosen because both references are in the same field and are analogous and their combination would have had the advantage of delivering sufficiently localized outside temperature data from a weather service provider to a thermostat system. RX-0001C, Auslander QA192. Furthermore, the POSITA would have had a reasonable expectation of success when combining Oswald with Rosen because the ZIP code was such a common method of delivering weather data. RX-0001C, Auslander QA193.

***Claim 5***: As explained for the '497 patent, Oswald describes a thermostat that communicates with the single central sensor 2. RX-0038 (Oswald) at ¶ 148. Rosen discloses the additional limitation of claim 5, and as Dr. Auslander testified, a POSITA would have found it obvious to implement Oswald's system to include Rosen's programmable thermostat as the sole source for current data regarding temperature inside the house. RX-0001C, Auslander QA120, 138-40, 194; RX-0047, at 3:4-53, 1:17-55, 6:19-27, figs.1-4. According to Dr. Auslander, the POSITA would have been motivated to combine Oswald with Rosen because both references are in the same field and are analogous and their combination would have had the advantage of saving cost and reducing redundancy by using the thermostat as the sole source of inside temperature data. RX-0001C, Auslander QA194. Furthermore, it would have been a simple matter of design choice to implement the thermostat as the sole source of such data, such that the POSITA would have had a reasonable expectation of success when combining Oswald with Rosen. RX-0001C, Auslander QA194.

Resps. Br. at 275-76.

EcoFactor argues, in part:

Oswald in combination with Rosen does not render obvious claims 2 and 5 of the '322 patent. *See* CX-0702C (Palmer WS) Q/A 189-193. Rosen was cited and considered by the USPTO before the '322 patent issued. *See* JX-0002 ('322 patent) at Page 2. Further, Respondents are not asserting that Rosen addresses any shortcomings of Oswald with respect to claim 1. Accordingly, adding Rosen to Oswald does nothing to address the deficiencies in the limitations of claim 1, which are also limitations of its dependent claims 2 and 5.

Moreover, Respondents did not show how any such combination would be suggested, why PHOSITA would or could combine them, and how or whether any such combination would work. *See* CX-0702C (Palmer WS) Q/A 189-193. There would be no reason why PHOSITA would combine Rosen with Oswald because, e.g., the two are fundamentally different systems. For example, Rosen is a system that simply "display" information and message from "remote correspondent," and not a system that "model" anything. Oswald allegedly already includes a "thermostat" and a "single central sensor 2." Accordingly, there would be no reason for PHOSITA to introduce another thermostat to Oswald, particularly regarding

> claim 5. Moreover, doing so would also defeat claim 5's requirement regarding "sole source for current data regarding temperature inside," as there would be multiple thermostats in a combined system. In sum, Respondents will be unable to show obviousness.

Compl. Br. at 237-38.

The Staff argues, in part:

> For the same reasons discussed above with respect to claims 2 and 5 of the '495 patent regarding Rosen (RX-0047) in combination with Oswald, Rosen discloses the additional limitations of claims 2 and 5. In addition, one of ordinary skill in the art would have been motivated to combine Oswald with Rosen to arrive at the combination of elements in claims 2 and 5. *See* RX-0001C (Auslander) QA 192, 193. Therefore, the evidence shows that the Oswald/Rosen combination renders obvious claims 2 and 5 of the '322 patent. RX-0001C (Auslander) QA 189-194.

Staff Br. at 102-03 (footnote omitted).

The administrative law judge finds that respondents have not shown by clear and convincing evidence that the combination of Oswald and Rosen renders claims 2 or 5 of the '322 patent obvious.

Respondents contend that a person of ordinary skill in the art would have been motivated to combine Oswald with Rosen because both relate to thermostats and because both relate to weather services. *See* Resps. Br. at 275. However, Rosen is a system that simply displays information and messages from a remote correspondent, in contrast with Oswald's modeling system. *See* CX-0702C (Palmer RWS) at Q/A 190. Moreover, Oswald already includes a source of weather data. *See id.* The administrative law judge finds that one of ordinary skill in the art would not have been motivated to combine Oswald and Rosen.

Furthermore, as found above, Oswald does not anticipate claim 1, and Rosen fails to cure the deficiencies of Oswald. In particular, Oswald does not disclose "compar[ing] an inside temperature recorded inside the first structure with an inside temperature of said first structure

recorded at a different time to determine whether the operational efficiency of the HVAC system has decreased over time," as required by element 1[d]. Respondents do not contend that Rosen teaches this element.

Regarding claim 5, the administrative law judge also finds that respondents have not shown that one of ordinary skill in the art would combine Oswald and Rosen for the reasons noted above. Moreover, such a combination would not meet the limitation of claim 5, which recites that the "programmable thermostat" is the "sole source for current data regarding temperature inside." The proposed combination would result in multiple thermostats, and would not meet the "sole source" requirement of claim 5. *See id.* at Q/A 192.

The administrative law judge thus finds that respondents have not shown by clear and convincing evidence that the combination of Oswald and Rosen renders claims 2 or 5 of the '322 patent obvious.

**g. Secondary Considerations**

The objective evidence, also known as "secondary considerations," includes commercial success, long felt need, and failure of others. *Graham v. John Deere Co.*, 383 U.S. 1, 13-17 (1966); *Dystar Textilfarben GmbH v. C.H. Patrick Co.*, 464 F.3d 1356, 1361 (Fed. Cir. 2006). "[E]vidence arising out of the so-called 'secondary considerations' must always when present be considered en route to a determination of obviousness." *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538 (Fed. Cir. 1983). Secondary considerations, such as commercial success, will not always dislodge a determination of obviousness based on analysis of the prior art. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 426 (2007) (commercial success did not alter conclusion

of obviousness).

As found above, EcoFactor has not demonstrated that the '322 patent is implemented in the EcoFactor DI products. Therefore, EcoFactor has not established a nexus between the EcoFactor DI products and the '322 patent, and the secondary considerations, to the extent they rely on a nexus to the EcoFactor DI products, do not support a finding of non-obviousness.

**i. Commercial Success**

EcoFactor argues that its products are commercially successful, and customer demand for these products is driven at least in part by the patented inventions. *See* Compl. Br. at 153 (citing CX-0702C (Palmer RWS) at Q/A 120). For the reasons discussed above in the domestic industry section concerning the preamble and element 1[d], EcoFactor has not demonstrated that the '322 patent is implemented in the EcoFactor DI products. As the administrative law judge finds that the EcoFactor DI products do not practice the '322 patent, EcoFactor has not established a nexus between the EcoFactor DI products and the '322 patent.

**ii. Long-Felt But Unresolved Need**

EcoFactor argues that was a long-felt but unresolved need for smart thermostats embodying the claims of the '322 patent. *See* Compl. Br. at 152-53. For the reasons discussed above in the domestic industry section concerning the preamble and element 1[d], EcoFactor has not demonstrated that the '322 patent is implemented in the EcoFactor DI products. Moreover, EcoFactor mainly relies on the testimony of its expert, Dr. Palmer, who mainly cites the asserted patent and the deposition testimony of an inventor for support. *See id*. (citing CX-0702C (Palmer RWS) at Q/A 119).

The administrative law judge finds this evidence of little probative value. *See Certain Strontium-Rubidium Infusions Systems, and Components Thereof Including Generators*, 337-TA-

1110, Final Initial Determination (Aug. 1, 2019) at 120, *aff'd in pertinent part*, Comm'n Opinion (Dec. 11, 2019) (Public Version) (EDIS Doc. ID 696920) at 38. EcoFactor's other evidence does not demonstrate any long-felt unresolved need for the claimed invention of the '322 patent. Viewing the evidence as a whole, this factor does not support a conclusion of non-obviousness.

**iii. Praise by Others**

EcoFactor argues that it has received awards and praise stemming from its patented inventions. *See* Compl. Br. at 153 (citing CX-0013 (Demand Response Award), CX-0014 (EcoFactor Innovator of the Year), CX-0015 (EcoFactor Project of the Year), CX-0381C (EcoFactor Historical Overview); CX-0677C (Habib DWS) at Q/A 24-25; CX-0702C (Palmer RWS) at Q/A 118 (citing and explaining CX-0015, CX-0792, CX-0013, CX-0014, CX-790, CX-0381, CX-0791)). It has not been established that any praise was for the patent, apart from EcoFactor products or services. For the reasons discussed above in the domestic industry section concerning the preamble and element 1[d], EcoFactor has not demonstrated that the '322 patent is implemented in the EcoFactor DI products. As the administrative law judge finds that the EcoFactor DI products do not practice the '322 patent, EcoFactor has not established a nexus between the EcoFactor DI products and the '322 patent.

**iv. Copying**

EcoFactor argues that there is also evidence that respondents discussed EcoFactor's products and inventions and tried to copy features of EcoFactor's products and inventions into their systems. *See* Compl. Br. at 153-54 (citing CX-0702C (Palmer RWS) at Q/A 121). EcoFactor contends Alarm.com emails discuss EcoFactor's HVAC Performance Monitoring and Alarm.com's copycat feature, HVAC Analytics. *See id.* EcoFactor further argues that Schneider and Daikin considered EcoFactor's products. *See id*.

[redacted]

The administrative law judge finds this evidence insufficient to demonstrate that Alarm.com, Schneider or Daikin in fact copied EcoFactor's products. As found above, Alarm.com does not infringe an asserted claim of the '322 patent. Neither Schneider nor Daikin are presently involved in this investigation, and cannot respond to EcoFactor's allegations. The administrative law judge finds that Alarm.com's accused products are not similar enough to demonstrate that Alarm.com copied EcoFactor's technology.

* * *

Accordingly, the administrative law judge finds that there is little evidence of secondary considerations that tends to support non-obviousness of the claims of the '322 patent.

### 3. The '371 Patent

#### a. Anticipation – Fairless

Fairless published on March 30, 2006, and therefore qualifies as prior art to the '371 patent. *See* RX-0012 (Fairless).

Respondents argue, in part:

> Fairless anticipates claim 9 of the '371 patent because it discloses each of the limitations of that claim ([9Pre] to [9g]). RDX-0001C-236 to 248 (RX-0012 (Fairless) ¶¶ 3, 6, 8, 10, 48-49, 51-54, 59, 64, 79-80, 87-88, Figs. 1, 2, 6, 9-11, 13, 14); RX-0001C, Auslander QA251-260; RDX-0011 (Appendix D-1 Invalidity Claim Chart). EcoFactor does not dispute that Fairless discloses limitations [9Pre], [9a], [9c], and [9d], but disputes Fairless's disclosure of limitations [9b], [9e], [9f], and [9g]. PHB at 158-160; CX-0702C, Palmer QA293. Only the limitations that EcoFactor alleges are not anticipated by Fairless are described in detail here.
>
> ***Limitation 9b****:* The only dispute for limitations [9b], [9e], and [9f] is whether Fairless's "contracted setpoints" are computer-calculated, and therefore disclose the claimed "automated setpoint[s]." PHB at 158-160. They are. EcoFactor alleges that Fairless's contracted setpoints are not computer-calculated and are instead simply specified in a written contract. PHB at 158-160. However, Fairless makes no mention of any written contract at all, let alone a written contract that specifies the values of any setpoints. Instead, contrary to EcoFactor's position and as explained below, Fairless is explicit that the contracted setpoints are output

[redacted]

by a computerized system and are therefore automated setpoints, as claimed. RX-0012 (Fairless) at ¶¶ 52-53, 60, 64, 79, 87-88, Figs. 1, 6, 11.

Specifically, Fairless discloses a "computerized schedule optimizing system 112 [that] output[s] one or more reports that include a schedule for operating the energy consuming equipment 150 170, and setpoints to use in operating the energy consuming equipment 150 170 in the future." RX-0012 (Fairless) at ¶¶ 52-53, 64, 87-88, Figs. 6, 11; RX-0001C, Auslander QA255; RDX-0001C-241 (RX-0012 (Fairless) ¶¶ 52-53, 64, Figs. 1, 6). There is no dispute that those setpoints output by the system 112 include the claimed "automated setpoint[s]." PHB at 158-160. EcoFactor's only argument is that these automated setpoints are not the same as the contracted setpoints. PHB at 158-159. However, Fairless explicitly ties these automated setpoints (provided by the computerized system 112 of Fig. 1) to the contracted setpoints and report depicted in the table of Fig. 11, by stating that "Examples of the reports that can be generated by the systems. shown in FIGS. 1 and 2 are illustrated in FIGS. 8-14" and that a performance contractor utilizes these same reports and setpoints to determine past HVAC performance and energy savings. RX-0012 (Fairless) ¶¶ 60, 79.

Thus, the contracted setpoints depicted in Fig. 11 of Fairless reflect the automated setpoints output by the computerized system. RX-0012 (Fairless) at ¶¶ 60, 79-80. Rather than having setpoint values defined in a written contract, the contract refers to an agreement between the school district (depicted in Fig. 11) and a contractor to utilize the automated setpoints calculated by the computerized system. RX-0012 (Fairless) at ¶¶ 60, 77-82, 87-88. Indeed, Fairless teaches that for facilities such as a school district, the "contracted parameters" generally include "for example, setpoints and schedules" and "[t]he HVAC units operate using contracted temperature variations in setpoints and contracted schedules." RX-0012 (Fairless) at Fig. 11, ¶¶ 87-88; RX-0001C (Auslander WS), Q255.

***Limitation 9e****:* EcoFactor's sole argument for this limitation stems from its position that Fairless's contracted setpoints do not disclose the automated setpoints. PHB at 159. However, as explained for limitation [9b], the contracted setpoints are computer-calculated because they are output by the computerized system 112, and therefore disclose the automated setpoints. RX-0012 (Fairless) at ¶¶ 52-53, 60, 64, 79, 87-88, Figs. 1, 6, 11.

Additionally, Fairless's Fig. 11 is an example of an HVAC temperature setpoint report, and depicts the deviation ("Avg Cooling Setpoint Deviation") between actual and contracted (automated) setpoints, where the deviation is the result of comparing the actual setpoint to the contracted setpoint. RX-0012 (Fairless) at ¶ 79, figs.1, 11; RX-0001C, Auslander QA258; RDX-0001C-244 (RX-0012 (Fairless) ¶ 79, Figs. 1, 11). As Fairless explains, "[t]he HVAC temperature setpoint report provides the user the capability to *compare the contracted temperature setpoints to the actual temperature setpoints* for a specified date range." RX-0012 (Fairless) at ¶ 80 (emphasis added).

[redacted]

***Limitation 9f****:* EcoFactor's sole argument for this limitation stems from its position that Fairless's contracted setpoints do not disclose the automated setpoints. PHB at 158-159. However, as explained for limitation [9b], the contracted setpoints are computer-calculated because they are output by the computerized system 112, and therefore disclose the automated setpoints. RX-0012 (Fairless) at ¶¶ 52-53, 60, 64, 79, 87-88, Figs. 1, 6, 11.

Additionally, Fairless's Fig. 11 depicts non-zero and zero deviation ("Avg Cooling Setpoint Deviation") between actual and contracted (automated) setpoints, that indicate whether the actual and automated setpoints are the same or different. RX-0012 (Fairless) ¶¶ 80, 87-88, figs.11, 14; RX-0001C, Auslander QA259; RDX-0001C-245 (RX-0012 (Fairless) ¶¶ 80, 87-88, Figs. 1, 11, 14). Fairless teaches that "[t]he HVAC temperature setpoint report provides the user the capability to compare the contracted temperature setpoints to the actual temperature setpoints for a specified date range," for example, by considering whether the Avg Cooling Setpoint Deviation is zero or non-zero. RX-0012 (Fairless) at ¶0080. When the deviation is non-zero (Wednesday and Friday in Figure 11), this corresponds to detecting a manual change.

***Limitation 9g****:* The process 700 in Fairless (which is executed by system 110, or the claimed thermostatic controller) learns user patterns based on the "Setpoint Deviations" of the HVAC temperature setpoint report (*see* Fig. 11) and modifies the automated setpoint schedule accordingly. RX-0012 (Fairless) at ¶¶ 64-69, 79-80; RX-0001C, Auslander QA260; RDX-0001C-246-47 (RX-0012 (Fairless) ¶ 79, Figs. 1, 11). Specifically, according to Fairless, the process 700 provides optimized setpoints based on a schedule received from the scheduler optimizer module 600 of Fig. 6, which predicts system loads taking into account the actual "Setpoint Deviations" that reflect manual changes. RX-0012 (Fairless) at ¶¶ 64-69, 79, Figs. 6-7, 11; RX-0001C, Auslander QA260. The process 700 applies "mathematical models" to calculate the optimized setpoints, where those "mathematical models" include rules for the interpretation of manual changes to the control and monitoring system 110 (the claimed thermostatic controller). RX-0012 (Fairless) at 64-69, 79, Figs. 6, 7, 11; RX-0001C, Auslander QA260.

Resps. Br. at 277-80 (footnote omitted).

EcoFactor argues, in part:

Respondents and Dr. Auslander fail to prove that Fairless anticipates elements 9[b], 9[e], 9[f], and 9[g]. Respondents argue that the "automated setpoints" of claim elements 9[b], 9[e], 9[f], and 9[g] correspond to the "***contracted setpoints***" described in Fairless at *e.g.,* FIG. 11. CX-0702C (Palmer WS) Q/A 294-296, citing RX-0001C-78 (Auslander WS) Q/A 255. But "contracted setpoints" are exactly what they say they are: setpoints specified in a written contract. *Id.* Q/A 306 citing Fairless ¶0088, and Q/A 305, citing Fairless ¶0060 ("Utilizing the installed HVAC controls, the performance contractor has based energy savings on

[redacted]

both contracted setpoints and contracted equipment run times"), ¶77 ("The HVAC equipment performance report compares the molded performance of the HVAC equipment with the specified performance at contracted setpoints"), ¶80 ("HVAC temperature setpoint report provides the user the capability to compare the contracted temperature setpoints to the actual temperature setpoints for a specified date range"), ¶¶87-88. Even Respondents' expert, Dr. Auslander, admits that "setpoints are generally contracted for very large energy consuming facilities such as 'central plants' and school districts." RX-0001C-78 (Auslander WS) Q/A 255. These contracted setpoints do not meet the agreed construction for "automated setpoint," which requires a "computer-calculated" setpoint – not a setpoint specified in a contract. CX-0702C (Palmer WS) Q/A 292. As such, Dr. Auslander fails to show element 9[b], which requires a computer-calculated automated setpoint, based on "contracted setpoints."

As to element 9[e], the only setpoint comparison in Dr. Auslander's theory is not a comparison of an automated setpoint to an actual setpoint, but instead a comparison of a setpoint ***specified in a contract*** to a setpoint used by a plant operator, which provides a way to measure and verify savings or costs attributable to the contractor's operation of the HVAC equipment. *Id.* Q/A 308-314. Indeed, Fairless explains that "HVAC units operate using contracted temperature setpoints and contracted schedules. This value [adjustment for variations in HVAC operations] represents the costs associated with operating the equipment differently than is specified in the contract." RX-0012 (Fairless) ¶¶87-88. Accordingly, Dr. Auslander fails to prove that the difference in how the plant operator operated the HVAC equipment relative to the setpoints specified in the written contract discloses "detecting a manual change" to an "automated setpoint." *Id.* Q/A 316-317. This does not anticipate element 9[e], which requires a comparison involving an automated setpoint, not a contracted setpoint. *Id.* Nor does it anticipate element 9[f], which requires detecting a user's manual change to an automated setpoint, not a contracted setpoint. *Id.*

Fairless is also alleged to disclose other setpoint processes, but Dr. Auslander's theory of anticipation ignores them entirely for elements 9[e] and 9[f] (including the "comparing" and "detecting a manual change" steps), where he only theories anticipation from the comparison of "contracted setpoints" disclosed for the Figure 11 embodiment. He does not provide any testimony regarding the other setpoint processes for claim elements 9[e] and 9[f], where his opinion is limited to contracted setpoints. *Id.* Q/A 302. Dr. Palmer's analysis shows that Dr. Auslander fails to explain how any other setpoint process or embodiment in Fairless is related to the "contracted setpoints" functionality he does analyze for elements 9[e] and 9[f]. *Id.* Q/A 296-298, 300-303.

Dr. Auslander also fails to show that Fairless discloses element 9[g]. CX-0702C (Palmer WS) Q/A 318-322. He fails to articulate any theory for how the "contracted setpoint," which is the "automated setpoint" in his theory, changes as required for claim 9[g]. *Id.* Q/A 322. Further, Dr. Auslander's theories are entirely

[redacted]

conclusory, because Dr. Auslander cannot identify any portions of Fairless that describe a rule for interpretation of a manual change to an automated setpoint, let alone the rule he proposes. *Id.* Q/A 322. In fact, Fairless does not even mention a "thermostat" or a "user" in the portions of the specification cited by Dr. Auslander for his theories (*e.g.,* Figures 1, 11, and 14), nor does it even suggest the concept of interpreting manual changes. *Id.* Q/A 320-321. Indeed, the only reference to a "thermostat" in Fairless is in the patent background section, which contrasts a residential system with a manually changeable thermostats with a complex commercial HVAC system that manages a large facility such as a plant or school district. *Id.*

Dr. Palmer also explains that there is no evidence to support Dr. Auslander's arguments about the schedule optimizer process 600 or setpoint controller process 700 in Fairless. *Id.* Q/A 323-324. For example, Fairless ¶¶0064-0069 never describes learning or incorporating a user's manual changes, instead scheduling only in view of pricing rates for gas, coal, and other energy costs. *Id.* Q/A 324-325, citing Fairless ¶¶0064-0069. As such, these portions of Fairless do not disclose interpreting a manual change to an automated setpoint. *Id.* Moreover, Dr. Auslander fails to prove any relationship between his theory regarding the "contracted setpoints" for elements 9[b], 9[e], and 9[f], and his conclusory opinions about the processes discussed in Fairless ¶¶64-69.

Compl. Br. at 267-70.

The Staff argues, in part:

The evidence does not clearly and convincingly show that claim 9 of the '371 patent is anticipated by Fairless (RX-0012). RPreHBr. at 183; RDX-0001C-236 to RDX-0001C-248; RX-0001C (Auslander) QA 251-60; RX-0011 (Appendix D-1 Invalidity Claim Chart). EcoFactor argues that Fairless (i) does not disclose "automated setpoints" of element 1[b], which the parties agree means "a computer-calculated temperature setting for a thermostat to achieve or maintain," and (ii) does not disclose "rules" of element 1[g]. CPreHBr. at 158-160. The Staff agrees.

**Element 9[b]:** The parties agree that "automated setpoint" means "a computer-calculated temperature setting for a thermostat to achieve or maintain." However, as argued by EcoFactor, Fairless discloses "contracted setpoints," which are setpoints specified in a written contract. CX-702C (Palmer) QA 294-296, 305; RX-0012 at ¶¶ 0088, 0060, 0077, 0080, 0087-0088; RX-0001C (Auslander) QA 255. Fairless disclosed that these contract setpoints likely makeup a schedule of setpoints, rather than automated setpoints that are calculated based on a schedule of first and second automated setpoints, as claimed. *See* RX-0012 at ¶ 0087 ("The adjusted savings report 1400 includes adjustments to the Option C energy savings calculation by including the effects of operating HVAC units and lighting systems outside of the ***contracted parameters*** (***for example, setpoints and schedules***.))." Thus, Fairless does not disclose the claimed automated setpoints of element 1[b].

> Accordingly, Fairless does not disclose any other elements that contain the "automated setpoint" limitation – elements 1[e], 1[f], and 1[g].
>
> **Element 9[g]:** In addition to the above, Fairless does not disclose "changing the operation of the HVAC… based on at least one ***rule for the interpretation of the manual change***," required this element. Mr. Auslander relies on the table in Figure 11 of Fairless for his conclusion that this element is met. RX-0001C (Auslander) QA 260. However, that table is an example of an HVAC temperature report generated by the reporting module, and gives the user "the capability to compare the contracted temperature setpoints to the actual temperature setpoints for a specified date range." RX-0012 at ¶¶ 0079, 0080. There is no disclosure of changing the HVAC operation based on any rule for interpreting the manual change. Thus, Fairless does not disclose the element 9[g] for this additional reason. CX-702C (Palmer) QA 318-327.

Staff Br. at 104-05.

The administrative law judge finds that respondents have not shown by clear and convincing evidence that Fairless anticipates claim 9 of the '371 patent.

As an initial matter, the agreed claim construction for "automated setpoint" is "a computer-calculated temperature setting for a thermostat to achieve or maintain." Joint Claim Construction Chart at 2 (Mar. 6, 2020) (EDIS Doc. ID No. 704350). Thus, an "automated setpoint" is "computer-calculated".

Respondents argue that Fairless discloses "automated setpoints" because "the contracted setpoints depicted in Fig. 11 of Fairless reflect the automated setpoints output by the computerized system." Resps. Br. at 278 (citing RX-0012 (Fairless), ¶¶ 60, 79-80). However, Fairless discloses that these contract setpoints correspond to a schedule of setpoints, rather than automated setpoints that are calculated based on a schedule of first and second automated setpoints, as claimed. *See* RX-0012 (Fairless), ¶0060 ("Utilizing the installed HVAC controls, the performance contractor has based energy savings on both contracted setpoints and contracted equipment run times"), ¶77 ("The HVAC equipment performance report compares the molded

performance of the HVAC equipment with the specified performance at contracted setpoints"), ¶ 0087 ("The adjusted savings report 1400 includes adjustments to the Option C energy savings calculation by including the effects of operating HVAC units and lighting systems outside of the contracted parameters (for example, setpoints and schedules)."). Fairless does not disclose that any of these setpoints are "computer-calculated."

The administrative law judge further finds that Fairless does not disclose element 9[e] or element 9[f] because Fairless does not disclose "automated setpoints." Respondents argue Fairless discloses comparing the actual setpoint to the contracted setpoint because Fairless's Fig. 11 depicts the deviation ("Avg Cooling Setpoint Deviation") between actual and contracted setpoints. *See* Resps. Br. at 279 (citing RX-0012 (Fairless), ¶ 79, figs.1, 11; RX-0001C (Auslander DWS) at Q/A 258). However, element 9[e] requires a comparison to an automated setpoint, not a contracted setpoint, and element 9[f] requires detecting a user's manual change to an automated setpoint, not a contracted setpoint.

Furthermore, Fairless does not disclose changing the HVAC operation based on any rule for interpreting the manual change. Respondents argue that "[t]he process 700 in Fairless (which is executed by system 110, or the claimed thermostatic controller) learns user patterns based on the 'Setpoint Deviations' of the HVAC temperature setpoint report (*see* Fig. 11) and modifies the automated setpoint schedule accordingly." Resps. Br. at 280 (citing RX-0012 (Fairless), ¶¶ 64-69, 79-80; RX-0001C (Auslander DWS) at Q/A 260). However, Figure 11 of Fairless is an example of an HVAC temperature report generated by the reporting module, and gives the user "the capability to compare the contracted temperature setpoints to the actual temperature setpoints for a specified date range." RX-0012, ¶¶ 0079, 0080. Fairless does not disclose

changing the HVAC operation based on any rule for interpreting the manual change. *See* CX-0702C (Palmer RWS) at Q/A 322.

The administrative law judge thus finds that respondents have not shown, by clear and convincing evidence, that Fairless anticipates claim 9 of the '371 patent.

**b. Obviousness – Fairless in View of Proliphix**

Proliphix was published in August 2007, and therefore qualifies as prior art to the '371 patent. *See* RX-0076 (Proliphix).

Respondents argue, in part:

> As Dr. Auslander testified, based on the teachings in Fairless, a POSITA would have been motivated to look to analogous references to understand how to implement detection of the deviation in setpoints. RX-0001C, Auslander QA264. Proliphix determines whether the Heat or Cool Settings (the claimed actual setpoints) are different from the current scheduled settings (the claimed automated setpoints), and displays that determination in an "Override" field. RX-0076 (Proliphix) at 3-10-11; RX-0001C, Auslander QA262-63. According to Dr. Auslander, a POSITA would have been motivated to combine Fairless with Proliphix because both references are in the same field and are analogous and their combination would have had the advantage of identifying setpoint deviations in a residential or small commercial setting. RX-0001C, Auslander QA264. Furthermore, the POSITA would have had a reasonable expectation of success in combining Fairless with Proliphix because the combination is merely combining prior art elements according to known methods to yield predictable results. RX-0001C, Auslander QA265.

Resps. Br. at 280-81.

EcoFactor argues, in part:

> Respondents fails to show that Fairless in combination with Proliphix renders claim 9 obvious. CX-0702.0105-0106 (Palmer WS) Q/A 328-332. Dr. Auslander does not assert obviousness based on this combination for any elements except for 9[e] and 9[f]. *Id.* citing RX-0001C-80 (Auslander WS) Q/A 261-265. Dr. Auslander cannot show a motivation to combine the references from his theory that a POSITA would be looking for ways to identify setpoint deviations (RX-0001C-80-80, Q/A 264), because there would be no reason to add the "Override" field in Proliphix where a setpoint deviation is already asserted to be disclosed for Fairless in Figure 11. *Id.* Q/A 330-331. Further, Dr. Auslander has failed to prove

> (i) how the proposed combination would work, (ii) why the "Override" field in Proliphix discloses a setpoint comparison, or (iii) why adding an "Override" field to the HVAC temperature setpoint report would supply the missing element of a comparison involving an "automated setpoint." *Id.* Q/A 332.

Compl. Br. at 270.

The Staff argues, in part:

> The evidence does not clearly and convincingly show that claim 9 of the '371 patent is obvious in view of Fairless (RX-0012) and Proliphix (RX-0076). RPreHBr. at 184; RX-0001C (Auslander) QA 261-265; CX-702C (Palmer) QA 328-332. As indicated by EcoFactor, Dr. Auslander's testimony does not assert obviousness based on this combination for any elements except for elements 9[e] and 9[f]. CPreHBr. at 161.
>
> Proliphix discloses an "override" function which "displays whether Heat or Cool Settings are different from the current schedule settings." RX-0076 at pg. 3-10. Respondents contend that the heat or cool settings are the actual setpoints, and Proliphix determines whether these are different from current scheduled settings, which they contend are automated setpoints. RX-0001C (Auslander) QA 263. However, Dr. Auslander does not point to any disclosure in Proliphix for his contention that current scheduled settings are the claimed automated setpoints. *Id*.; *see also* CX-702C (Palmer) QA 332. Therefore, Proliphix does not remedy the missing limitations of elements 9[e], 9[f] and 9[g] of Fairless. Therefore, the Fairless/Proliphix combination does not establish a *prima facie* case of obviousness. *See also* CX-702C (Palmer) QA 328-332.

Staff Br. at 105-06.

The administrative law judge finds that respondents have not shown, by clear and convincing evidence, that the combination of Fairless and Proliphix renders claim 9 of the '371 patent obvious.

As found above, Fairless does not disclose "automated setpoints." Respondents do not contend that Proliphix discloses "automated setpoints." *See* Resps. Br. at 280-81. Hence, the combination of Fairless and Proliphix does not render obvious element 9[b], 9[e], 9[f] or 9[g].

Furthermore, respondents argue that "Proliphix determines whether the Heat or Cool Settings (the claimed actual setpoints) are different from the current scheduled settings (the

claimed automated setpoints), and displays that determination in an 'Override' field." *Id.* at 281 (citing RX-0076 (Proliphix) at 3-10-11; RX-0001C (Auslander DWS) at Q/A 262-63). However, Proliphix does not disclose or render obvious a comparison of any two setpoints or a determination that one setpoint is different from another setpoint. *See* CX-0702C (Palmer RWS) at Q/A 332. Moreover, Dr. Auslander fails to establish a motivation to combine Fairless and Proliphix, given that a setpoint deviation is already asserted to be disclosed for Fairless in Figure 11. *See id.* at Q/A 331.

**c. Obviousness – Fairless in View of OpenJDK**

OpenJDK 6, Build 9 was released on April 11, 2008, and therefore is prior art to the '371 patent. *See* RX-0082 (OpenJDK).

Respondents argue, in part:

> RX-0082 (OpenJDK) provides classes including JSlider.java, JSplitPane.java, and JTabbedPane.javA. These classes utilize accessor properties represented by "setter" and "getter" methods, which are run when a user, over a user interface, changes a property such as temperature setpoint. As Dr. Auslander testified, each of these classes describes detecting a manual change to an automated setpoint by determining whether an actual setpoint and the automated setpoint are the same or different. RX-0001C, Auslander QA267-70. According to Dr. Auslander, a POSITA would have been motivated to combine Fairless with OpenJDK because both references are in the same field and are analogous and their combination would have had the advantage of identifying setpoint deviations. RX-0001C, Auslander QA271. Furthermore, the POSITA would have had a reasonable expectation of success in combining Fairless with OpenJDK because the combination is merely combining prior art elements according to known methods to yield predictable results. RX-0001C, Auslander QA272.

Resps. Br. at 281-82 (footnote omitted).

EcoFactor argues, in part:

> Respondents fails to show that Fairless in combination with OpenJDK renders claim 9 obvious. CX-0702.0106-0108 (Palmer WS) Q/A 333-337. Dr. Auslander does not assert obviousness based on this combination for any elements except for 9[e] and 9[f]. *Id.* citing RX-0001C-82 (Auslander WS) Q/A 266-273.

[redacted]

> Dr. Auslander cannot show a motivation to combine the references from his theory that a POSITA would be looking for ways to identify setpoint deviations (RX-0001C-80-80, Q/A 264-273), because there would be no reason to add functionality in OpenJDK where a setpoint deviation is already asserted to be disclosed for Fairless in Figure 11. *Id.* Q/A 336-337. Further, Dr. Auslander fails to prove how any user interface in OpenJDK supplies any of the elements missing from his anticipation theory based on Fairless alone, such as the missing "automated setpoints." *Id.* Indeed, OpenJDK has nothing to do with setpoints, or even HVAC in general, as OpenJDK discloses generic software widgets that has nothing to do with HVAC systems specifically.

Compl. Br. at 270.

The Staff argues, in part:

> The evidence does not clearly and convincingly show that claim 9 of the '371 patent is obvious in view of Fairless (RX-0012) and OpenJDK (RX-0082). RPreHBr. at 184. As indicated by EcoFactor, Dr. Auslander's testimony does not assert obviousness based on this combination for any elements except for elements 9[e] and 9[f]. CPreHBr. at 161; RX-0001C (Auslander) QA 267-270. However, even assuming *arguendo* that elements 9[e] and 9[f] are disclosed in OpenJDK, element 9[g] would still be missing from the combination, as discussed above. Therefore, the Fairless/Proliphix combination does not establish a *prima facie* case of obviousness. *See also* CX-702C (Palmer) QA 333-337.

Staff Br. at 106.

The administrative law judge finds that respondents have not shown, by clear and convincing evidence, that the combination of Fairless and OpenJDK renders claim 9 of the '371 patent obvious.

As found above, Fairless does not disclose "automated setpoints." Respondents do not contend that OpenJDK discloses "automated setpoints." *See* Resps. Br. at 281-82. Hence, the combination of Fairless and OpenJDK does not render obvious element 9[b], 9[e], 9[f] or 9[g].

Furthermore, respondents argue that OpenJDK "provides classes . . . [which] describe[] detecting a manual change to an automated setpoint by determining whether an actual setpoint and the automated setpoint are the same or different." *Id.* at 281 (citing RX-0001C (Auslander

DWS) at Q/A 267-70). However, OpenJDK does not disclose a comparison of two setpoints including an automated setpoint or changing an automated setpoint based on a rule for interpreting a manual change. *See* CX-0702C (Palmer RWS) at Q/A 337. Moreover, Dr. Auslander fails to establish a motivation to combine Fairless and OpenJDK, given that a setpoint deviation is already asserted to be disclosed in Fairless. *See id.* at Q/A 336.

**d. Anticipation – Nicodem**

Nicodem was published on May 1, 2008, and therefore qualifies as prior art to the '371 patent. *See* RX-0087 (Nicodem).

Respondents argue, in part:

> Nicodem anticipates claim 9 of the '371 patent because it discloses each of the elements of that claim ([9Pre] to [9g]). RDX-0001C-250 to 259 (RX-0087 (Nicodem) at ¶¶ 24-26, 28, 32, 37, 39-42, Figs. 1, 2; RX-0076 (Proliphix) 3-10-11, 19, Fig. 3-3; RX-0082 (OpenJDK), Build 9 JSlider.java, JSplitPane.java, JTabbedPane.java); RX-0001C, Auslander QA273-82; RDX-0023 (Appendix D-3 Invalidity Claim Chart). EcoFactor does not dispute that Nicodem discloses limitations [9Pre], [9a], [9c], and [9d]. PHB at 161-164; CX-0702C, Palmer QA346. Only the limitations that EcoFactor alleges are not anticipated by Nicodem are described in detail here.
>
> ***Limitation 9b****:* Again, the only dispute for this limitation is whether Nicodem's setpoints are computer-calculated, and therefore disclose the claimed "automated setpoint[s]." PHB at 162-163. They are. EcoFactor alleges that Nicodem's set points are input by a user and therefore are not calculated by a computer. PHB at 162. However, as clearly stated in Nicodem, the thermostat receives "programming data… [which] may include set points, time periods, and other settings for a thermostat 106," from "a personal computer 214." RX-0087 (Nicodem) at ¶¶ 24, 26, 32, 41-42; RX-0001C, Auslander QA277; RDX-0001C-253 (RX-0087 (Nicodem) at ¶¶ 24, 26, 32, 41-42). For example, the thermostat can "enter a temporary mode of operation" and "resume a programmed mode of operation based on predefined or default set points." RX-0087 (Nicodem) at ¶ 26. In order to determine which setpoints to use in the temporary mode or programmed mode, the personal computer 214 performs calculations to select the temporary, predefined, or default setpoints. RX-0087 (Nicodem) at ¶ 26; RX-0001C, Auslander QA277. Therefore, the setpoints in Nicodem are automated setpoints, as claimed. Moreover, Nicodem clearly discloses setpoints for different time periods, or a schedule of setpoints representing multiple automated setpoints. RX-

[redacted]

0087 (Nicodem) at ¶¶ 24, 26-27. The different automated setpoints for different time periods correspond to the claimed first and second automated setpoints. RX-0087 (Nicodem) at ¶¶ 24, 26-27; RX-0001C, Auslander QA277.

***Limitation 9e****:* Nicodem's override is a "change [of] use of [a] room" corresponding to a change in the setpoint. RX-0087 (Nicodem) ¶¶ 40-42; RX-0001C, Auslander QA280; RDX-0001C-256 (RX-0087 (Nicodem) at ¶¶ 41-42; RX-0076 (Proliphix) 3-10-11, 19, Fig. 3-3; RX-0082 (OpenJDK), Build 9 JSlider.java, JSplitPane.java, JTabbedPane.java). When Nicodem's user uses the override button, the actual setpoint is different from the automated setpoint, resulting in the claimed comparing. *Id.* As Dr. Auslander testified, by describing the override as a "change" in setpoints, Nicodem discloses comparing actual to automated setpoints in order know if a change occurred. *Id*.

***Limitation 9f****:* Nicodem's override is detected by determining whether the temperatures are the same or different. RX-0087 (Nicodem) ¶ 0042; RX-0001C, Auslander QA281; RDX-0001C-257 (RX-0087 (Nicodem) at ¶¶ 41-42; RX-0076 (Proliphix) 3-10; RX-0082 (OpenJDK), Build 9). As Dr. Auslander testified, if the two temperatures are the same, then the system would not restore the temperature of the original programming. *Id*. In contrast, if the two temperatures are different, then the system would restore the temperature of the original programming. *Id*.

***Limitation 9g****:* In response to the override, Nicodem "restore[s] the original programming data," which corresponds to changing the operation of the HVAC system based on a rule. RX-0087 (Nicodem) ¶ 0042; RX-0001C, Auslander QA282; RDX-0001C-258 (RX-0087 (Nicodem) at ¶ 42). As Dr. Auslander testified, the restoration to the "original programming" corresponds to the claimed change in operation of the HVAC system, based on at least the following rule, quoted from Nicodem: "restore the original programming data in a set time, such as three hours, or at a set time, such as at 11:59 PM the day the override button was activated." *Id*. In other words, Nicodem discloses a rule that specifies a manual change (override) has an expiration time, after which the operation of the HVAC system reverts to the original programming. *Id*. But until the manual change expires, it remains in effect, which means that the automated setpoints occurring after the manual change but before the reset time are *changed* to reflect the manual change (and therefore the changes to HVAC operation are based on the claimed rule). *Id.* Because those automated setpoints occur before the reset time, they are not restored.

EcoFactor argues that Dr. Auslander relies on the same step of restoring a setpoint for both the calculating the second automated setpoint (in limitation [9b]) and changing of the second automated setpoint (in limitation [9g]). PHB at 163. However, EcoFactor ignores Dr. Auslander's reliance on Nicodem's explicit disclosure of the above rule and its expiration time (the "set time" in Nicodem) for these limitations. RX-0001C, Auslander QA277, 282.

[redacted]

Moreover, Dr. Palmer's unsupported statement that "restoring the original setpoint is not changing that setpoint" (CX-0702C, Palmer QA344) contradicts the '371 patent's disclosure of the same type of restoring as an example rule. In fact, Nicodem's disclosure of restoring original programming at a set time after a manual change is consistent with the teachings of the '371 patent, which states: "if outside temperature is greater than 85 degrees and inside temperature is more than 2 degrees above setpoint and manual override lowers setpoint by 3 or more degrees, then *revert to original setpoint in 2 hours*." CX-0004 ('371 patent) at 6:67-7:4 (emphasis added). Thus, Nicodem's disclosure of setpoint restoration is similar to the example rule contemplated by the '371 patent. *Oatey Co. v. IPS Corp.*, 514 F.3d 1271, 1277 (Fed. Cir. 2008) ("where claims can reasonably [be] to interpreted to include a specific embodiment, it is incorrect to construe the claims to exclude that embodiment, absent probative evidence on the contrary.").

Resps. Br. at 282-85.

EcoFactor argues, in part:

Respondents fail to show that Nicodem anticipates claim 9 (including elements 9[b], 9[e], 9[f], and 9[g]) based on a disclosure of an "override" capability in Nicodem. The element of incorporating a user's manual changes from such an "override" is completely absent from Nicodem. Nicodem teaches that a user can press the "override buttons" to change a temperature setting temporarily. If a user presses the override buttons, Nicodem states that the original setpoint before the override will be restored within a set time, such as at 11:59 PM on the day the override occurred. RX-0087 (Nicodem) ¶¶0041-0042 ("a system may be programmed such that if the programming data is overridden by an override button, the system is to restore the original programming data in a set time…such as at 11:59 PM the day the override button was activated."). Dr. Auslander's theory is that the "original setpoint" before the override represents the "first automated setpoint" of claim 9. RX-0001C (Auslander WS) Q/A 277. He also theorizes that the "original setpoint," once restored following an override, represents the "second automated setpoint" of claim 9. *Id.* Further, he also asserts that restoring the "original setpoint" after the override represents the claimed "changing the second automated setpoint at the second time based on at least one rule for interpreting the manual change." *Id.* Q/A 282.

Dr. Auslander's theory fails for several reasons. For example, he fails to show the element of an "automated setpoint" disclosed in Nicodem. The agreed claim construction for "automated setpoint" requires that it be "computer-calculated." But Dr. Auslander fails to show a "computer-calculated" setpoint in Nicodem. CX-0702C (Palmer WS) Q/A 348-350. To the contrary, Dr. Auslander's references to Nicodem is shown to refer to a user who inputs setpoints, not a computer that calculates them. *Id.,* citing RX-0087 (Nicodem) ¶¶0024, 0026, 0033, 0041-0042. As such, Dr. Auslander fails to show element 9[b], and each other

element of claim 9 requiring an "automated setpoint," including elements 9[e], 9[f], and 9[g].

Another reason Dr. Auslander's theory fails is that he argues that the "original setpoint" represents both the "first" and "second" automated setpoints of claim 9[b]. RX-0001C-81-82 (Auslander WS) Q/A 277. Even setting aside the lack of evidence that this original setpoint was calculated by a computer, Dr. Auslander fails to show that programming a single setpoint in Nicodem for when the room is unoccupied anticipates calculating both the "first automated setpoint at a first time" and "second automated setpoint at a second time" required for claim 9[b]. RX-0702C (Palmer WS) Q/A 352-353.

Next, Dr. Auslander's theory fails for another simple reason: he argues that a single step in Nicodem represents both the "calculating the second automated setpoint" of element 9[b], and "changing the second automated setpoint" of element 9[g]. Dr. Auslander has theorized that the step of restoring the "original setpoint" after the override corresponds to calculating the "second automated setpoint" for element 9[b]. RX-0001C-81-82 (Auslander WS) Q/A 277. But he has also theorized that the same step of restoring the original setpoint after the override corresponds to "changing" the second automated setpoint for element 9[g]. *Id.* Q/A 282. This theory fails to anticipate element 9[g], because Dr. Auslander's theory fails to show that the single step of restoring an original setpoint following an override corresponds to both "calculating" the second automated setpoint in the first instance for element 9[b], as well as "changing" the second automated setpoint for element 9[g]. Likewise, Dr. Auslander's theory fails to show a change to his alleged second automated setpoint based on a "rule for interpreting a manual change." *Id.*

Nicodem also fails to anticipate elements 9[e] and 9[f], which require comparing an automated setpoint to an actual setpoint and detecting a manual change by determining whether the setpoints are the same or different. CX-0702C (Palmer WS) Q/A 354-362. Dr. Auslander has failed to prove that the override in Nicodem discloses a comparison of any two setpoints, as required for claim 9[e]. *Id.*, citing RX-0001C-86 (Auslander WS) Q/A 280. For example, Nicodem fails to disclose a comparison of the original setpoint before the override to the temperature setting during the override. *Id.* 355-356. Likewise, Nicodem does not disclose comparing the setpoint during the override to the original setpoint in order to determine whether they are the same or different (claim 9[f]). *Id.* 358-362. In fact, Nicodem teaches away from elements 9[e]-9[f] by restoring the original programming regardless of what happens during the override. *Id.* Q/A 362.

Compl. Br. at 271-72.

The Staff argues, in part:

[redacted]

The evidence does not clearly and convincingly show that claim 9 of the '371 patent is anticipated by Nicodem (RX-0087). CX-702C (Palmer) QA 273-282; RPreHBr. at 185; RDX-0001C-250 to 259; RX-0001C (Auslander) QA 273-82; RX-0121 (Appendix D-3 Invalidity Claim Chart). EcoFactor argues that Nicodem (i) does not disclose "automated setpoints" of element 1[b], and (ii) does not disclose comparing two different setpoints required in elements 9[e] and 9[f]. CPreHBr. at 158-160. The Staff agrees with EcoFactor.

**Element 9[b] ("automated setpoints"):** Respondents contend that Nicodem's disclosure of "programming data… [which] may include set points, time periods, and other settings for a thermostat 106" satisfies this element. RPreHBr. at 185; RX-0087 at ¶¶ 24, 26, 32, 41-42. However, Nicodem does not disclose that any of the setpoints referred to are "computer-calculated." Thus, this limitation is not disclosed. *See* CX-702C (Palmer) QA 351-353. Accordingly, Nicodem does not disclose any other elements that contain the "automated setpoint" limitation – elements 9[e], 9[f], and 9[g]. *See also* CX-702C (Palmer) QA 363-367.

**Element 9[e] and 9[f]:** As argued by EcoFactor,

> Dr. Auslander has failed to prove that the override in RX-0087 (Nicodem) discloses a comparison of any two setpoints, as required for claim 9[e]. *Id.*, citing RX-0001C-86 (Auslander WS) Q/A 280. For example, RX-0087 (Nicodem) fails to disclose a comparison of the original setpoint before the override to the temperature setting during the override. *Id.* 355-356. Likewise, the evidence will show that RX-0087 (Nicodem) does not disclose comparing the setpoint during the override to the original setpoint in order to determine whether they are the same or different (claim 9[f]).

CPreHBr. at 163-164. Therefore, elements 9[e] and 9[f] are not disclosed for this additional reason. *See* CX-702C (Palmer) QA 354-362.

Accordingly, the evidence will not show that Nicodem anticipates claim 9.

Staff Br. at 106-07 (footnote omitted).

The administrative law judge finds that respondents have not shown by clear and convincing evidence that Nicodem anticipates claim 9 of the '371 patent.

As an initial matter, the agreed claim construction for "automated setpoint" is "a computer-calculated temperature setting for a thermostat to achieve or maintain." Joint Claim

Construction Chart at 2 (Mar. 6, 2020) (EDIS Doc. ID No. 704350). Thus, an "automated setpoint" is "computer-calculated".

Respondents argue that Nicodem discloses "automated setpoints" because "Nicodem's thermostat receives 'programming data… [which] may include set points, time periods, and other settings for a thermostat 106, from "a personal computer 214.'" Resps. Br. at 282 (citing RX-0087 (Nicodem), ¶¶ 24, 26, 32, 41-42; RX-0001C (Auslander DWS) at Q/A 277). However, Nicodem states that "a user may input data into a personal computer 214 via a control program. The user may input set points and time periods into the control program's user interface for all thermostats in a system. . . . After the user enters all data, the control program may provide the programming data to the control transmitter. . ." RX-0087 (Nicodem), ¶ 0033. Nicodem does not disclose that any of the setpoints referred to are "computer-calculated."

Respondents further argue the setpoints in Nicodem are automated setpoints because Nicodem's thermostat can "enter a temporary mode of operation" and "resume a programmed mode of operation based on predefined or default set points", and the personal computer 214 performs calculations to select the temporary, predefined, or default setpoints. *See* Resps. Br. at 282 (citing RX-0087 (Nicodem), ¶ 26; RX-0001C, RX-0001C (Auslander DWS) at Q/A 277). However, Nicodem's description of resuming a programmed mode of operation does not indicate how the setpoints in the program were generated, and does not confirm that the "predefined or default setpoints" were automated or calculated by a computer. *See* CX-0702C (Palmer RWS) at Q/A 350.

Respondents further argue Nicodem discloses comparing actual to automated setpoints because Nicodem's override is a "change [of] use of [a] room" corresponding to a change in the setpoint. *See* Resps. Br. at 283 (citing RX-0087 (Nicodem) ¶¶ 40-42; RX-0001C (Auslander

DWS) at Q/A 280). However, the cited portion of Nicodem does not disclose comparing two setpoints. Nicodem describes an override as a "change," but a "change" is not the same as a "comparison" of what has changed with what came before. *See* CX-0702C (Palmer RWS) at Q/A 356. Nicodem also fails to disclose detecting a manual change by determining whether the setpoints are the same or different because Nicodem does not disclose a comparison of the original setpoint before the override to the temperature setting during the override. *See id.* at Q/A 362.

The administrative law judge thus finds that respondents have not shown, by clear and convincing evidence, that Nicodem anticipates claim 9 of the '371 patent.

**e. Obviousness – Nicodem in View of Proliphix**

Respondents argue, in part:

> As explained above, Proliphix detects manual changes to automated setpoints by determining differences in actual and automated setpoints in an "Override" field. RX-0076 (Proliphix) at 3-10; RX-0001C, Auslander QA262-63, 284. According to Dr. Auslander, a POSITA would have been motivated to combine Nicodem with Proliphix because both references are in the same field and are analogous and their combination would have had the advantage of identifying setpoint deviations to determine whether an override took place. RX-0001C, Auslander QA285. Furthermore, the POSITA would have had a reasonable expectation of success in combining Nicodem with Proliphix because the combination is merely combining prior art elements according to known methods to yield predictable results. RX-0001C, Auslander QA286.

Resps. Br. at 285.

EcoFactor argues, in part:

> Respondents fail to show that Nicodem in combination with Proliphix renders claim 9 obvious. CX-0702C.0117-0118 (Palmer WS) Q/A 368-372. Dr. Auslander's testimony does not assert obviousness based on this combination for any elements except for 9[e] and 9[f]. *Id.* Q/A 369, citing RX-0001C-87-88 (Auslander WS) Q/A 283-286. The "override" field in Proliphix does not disclose comparing two setpoints or determining that one setpoint is different from another setpoint. *Id.* Dr. Auslander also fails to establish a motivation to add Proliphix to

[redacted]

> Nicodem, given that Nicodem already discloses an override. *Id.* Q/A 370-373. Regardless, Dr. Auslander's combination theory fails to cure the many flaws in his argument that Nicodem discloses the rest of claim 9, such as claims 9[b] and 9[g]. *Id.* Q/A 372.

Compl. Br. at 273.

The Staff argues, in part:

> Respondents contend that Nicodem in view of Proliphix (RX-0076) renders obvious claim 9. RPreHBr. at 184. As indicated by EcoFactor, Dr. Auslander's testimony does not assert obviousness based on this combination for any elements except for 9[e] and 9[f]. CPreHBr. at 164.
>
> However, for the same reasons discussed above with respect to Proliphix in combination with Fairless, Proliphix does not remedy the missing limitations of element 9[e], 9[f] and 9[g] of Nicodem. Therefore, the Nicodem/Proliphix combination does not establish a *prima facie* case of obviousness. *See also* CX-702C (Palmer) QA 368-372.

Staff Br. at 107.

The administrative law judge finds that respondents have not shown, by clear and convincing evidence, that the combination of Nicodem and Proliphix renders claim 9 of the '371 patent obvious.

As found above, Nicodem does not disclose "automated setpoints." Respondents do not contend that Proliphix discloses "automated setpoints." *See* Resps. Br. at 285. Hence, the combination of Nicodem and Proliphix does not render obvious element 9[b], 9[e], 9[f] or 9[g].

Furthermore, respondents argue that "Proliphix detects manual changes to automated setpoints by determining differences in actual and automated setpoints in an 'Override' field." *Id.* (citing RX-0076 (Proliphix) at 3-10; RX-0001C (Auslander DWS) at Q/A 262-63, 284). However, the "override" field in Proliphix does not disclose comparing two setpoints or determining that one setpoint is different from another setpoint. *See* CX-0702C (Palmer DWS)

at Q/A 372. Moreover, Dr. Auslander fails to establish a motivation to combine Nicodem and Proliphix, given that Nicodem already discloses an override. *See id.* at Q/A 371.

**f. Obviousness – Nicodem in View of OpenJDK**

Respondents argue, in part:

> As explained above, OpenJDK detects manual changes to automated setpoints by determining differences in actual and automated setpoints. RX-0001C, Auslander QA267-70, 288. According to Dr. Auslander, a POSITA would have been motivated to combine Nicodem with OpenJDK because both references are in the same field and are analogous and their combination would have had the advantage of using a well-known commercial solution implementing a widely used design pattern to determine whether an automated setpoint is overridden. RX-0001C, Auslander QA289. Furthermore, the POSITA would have had a reasonable expectation of success in combining Nicodem with OpenJDK because the combination is merely combining prior art elements according to known methods to yield predictable results. RX-0001C, Auslander QA290.

Resps. Br. at 285-86.

EcoFactor argues, in part:

> Respondents also fail to show that Nicodem in combination with OpenJDK renders claim 9 obvious. CX-0702C (Palmer WS) Q/A 373-377. There is no motivation to combine because there would be no reason to combine a user interface for changing temperature settings in OpenJDK when such an interface is already asserted to be disclosed for Nicodem. *Id.* Q/A 375-376. Further, Dr. Auslander fails to show that this combination supplies elements 9[e] and 9[f] (the only elements for which Dr. Auslander analyzes the combination), let alone the other elements absent from Nicodem, because including a different user interface supplied by OpenJDK does not add missing elements such as a comparison of two setpoints including an automated setpoint or changing an automated setpoint based on a rule for interpreting a manual change. *Id.* Q/A 377. Indeed, OpenJDK has nothing to do with setpoints, or even HVAC in general, as OpenJDK discloses generic software widgets that has nothing to do with HVAC systems specifically.

Compl. Br. at 273.

The Staff argues, in part:

> Respondents contend that Nicodem in view of OpenJDK (RX-0082) renders obvious claim 9. RPreHBr. at 186. Respondents contend that OpenJDK detects manual changes to automated setpoints by determining differences in actual and automated setpoints. RPreHBr. at 186. However, Dr. Auslander does not point

> to anything in OpenJDK for his conclusion that it discloses "automated setpoints," as claimed. RX-0001C (Auslander) QA 267, 268. Therefore, Respondents have not demonstrated that OpenJDK discloses any automated setpoints. Therefore, OpenJDK does not remedy the missing limitations of element 9[e], 9[f] and 9[g] of Nicodem. Therefore, the Nicodem/Proliphix combination does not establish a *prima facie* case of obviousness. *See also* CX-702C (Palmer) QA 373-377.

Staff Br. at 108 (footnote omitted).

The administrative law judge finds that respondents have not shown, by clear and convincing evidence, that the combination of Nicodem and OpenJDK renders claim 9 of the '371 patent obvious.

As found above, Nicodem does not disclose "automated setpoints." Respondents do not contend that OpenJDK discloses "automated setpoints." *See* Resps. Br. at 285-86. Hence, the combination of Nicodem and OpenJDK does not render obvious element 9[b], 9[e], 9[f] or 9[g].

Furthermore, respondents argue that "OpenJDK detects manual changes to automated setpoints by determining differences in actual and automated setpoints." *Id.* (citing RX-0001C (Auslander DWS) at Q/A 267-70, 288). However, OpenJDK does not disclose a comparison of two setpoints including an automated setpoint or changing an automated setpoint based on a rule for interpreting a manual change. *See* CX-0702C (Palmer RWS) at Q/A 377. Moreover, Dr. Auslander fails to establish a motivation to combine Nicodem and OpenJDK, given that Nicodem already discloses an override. *See id.* at Q/A 376.

**g. Secondary Considerations**

The objective evidence, also known as "secondary considerations," includes commercial success, long felt need, and failure of others. *Graham v. John Deere Co.*, 383 U.S. 1, 13-17 (1966); *Dystar Textilfarben GmbH v. C.H. Patrick Co.*, 464 F.3d 1356, 1361 (Fed. Cir. 2006). "[E]vidence arising out of the so-called 'secondary considerations' must always when present be

considered en route to a determination of obviousness." *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538 (Fed. Cir. 1983). Secondary considerations, such as commercial success, will not always dislodge a determination of obviousness based on analysis of the prior art. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 426 (2007) (commercial success did not alter conclusion of obviousness).

As found above, EcoFactor has not demonstrated that the '371 patent is implemented in the EcoFactor DI products. Therefore, EcoFactor has not established a nexus between the EcoFactor DI products and the '371 patent, and the secondary considerations, to the extent they rely on a nexus to the EcoFactor DI products, do not support a finding of non-obviousness.

**i. Commercial Success**

EcoFactor argues that its products are commercially successful, and customer demand for these products is driven at least in part by the patented inventions. *See* Compl. Br. at 273-74 (citing CX-0702C (Palmer RWS) at Q/A 383). For the reasons discussed above in the domestic industry section concerning "communicating the actual setpoints from the thermostatic controller to the at least one computer" and "comparing at least one of the actual setpoints at the first time for the thermostatic controller to the first automated setpoint for the thermostatic controller," EcoFactor has not demonstrated that the '371 patent is implemented in the EcoFactor DI products. As the administrative law judge finds that the EcoFactor DI products do not practice the '371 patent, EcoFactor has not established a nexus between the EcoFactor DI products and the '371 patent.

**ii. Long-Felt But Unresolved Need**

EcoFactor argues there was a long-felt but unresolved need for smart thermostats embodying the claims of the '371 patent. *See* Compl. Br. at 273-74. For the reasons discussed

above in the domestic industry section concerning "communicating the actual setpoints from the thermostatic controller to the at least one computer" and "comparing at least one of the actual setpoints at the first time for the thermostatic controller to the first automated setpoint for the thermostatic controller," EcoFactor has not demonstrated that the '371 patent is implemented in the EcoFactor DI products. Moreover, EcoFactor mainly relies on the testimony of its expert, Dr. Palmer, who mainly cites the asserted patent and the deposition testimony of an inventor for support. *See id*. (citing CX-0702C (Palmer RWS) at Q/A 382).

The administrative law judge finds this evidence of little probative value. *See Certain Strontium-Rubidium Infusions Systems, and Components Thereof Including Generators*, 337-TA-1110, Final Initial Determination (Aug. 1, 2019) at 120, *aff'd in pertinent part*, Comm'n Opinion (Dec. 11, 2019) (Public Version) (EDIS Doc. ID 696920) at 38. EcoFactor's other evidence does not demonstrate any long-felt unresolved need for the claimed invention of the '371 patent. Viewing the evidence as a whole, this factor does not support a conclusion of non-obviousness.

**iii. Praise by Others**

EcoFactor argues that it has received awards and praise stemming from its patented inventions. *See* Compl. Br. at 274 (citing CX-0013 (Demand Response Award), CX-0014 (EcoFactor Innovator of the Year), CX-0015 (EcoFactor Project of the Year), CX-0381C (EcoFactor Historical Overview); CX-0677C (Habib DWS) at Q/A 24-25; CX-0702C (Palmer RWS) at Q/A 118 (citing and explaining CX-0015, CX-0792, CX-0013, CX-0014, CX-790, CX-0381, CX-0791)). It has not been established that any praise was for the patent, apart from EcoFactor products or services. For the reasons discussed above in the domestic industry section concerning "communicating the actual setpoints from the thermostatic controller to the at least one computer" and "comparing at least one of the actual setpoints at the first time for the

thermostatic controller to the first automated setpoint for the thermostatic controller," EcoFactor has not demonstrated that the '371 patent is implemented in the EcoFactor DI products. As the administrative law judge finds that the EcoFactor DI products do not practice the '371 patent, EcoFactor has not established a nexus between the EcoFactor DI products and the '371 patent.

**iv. Copying**

EcoFactor argues that there is also evidence that respondents discussed EcoFactor's products and inventions and tried to copy features of EcoFactor's products and inventions into their systems. *See* Compl. Br. at 274-75 (citing CX-0702C (Palmer RWS) at Q/A 384). EcoFactor contends Alarm.com emails discuss EcoFactor's HVAC Performance Monitoring and Alarm.com's copycat feature, HVAC Analytics. *See id.* EcoFactor further argues that Schneider and Daikin considered EcoFactor's products. *See id*.

The administrative law judge finds this evidence insufficient to demonstrate that Alarm.com, Schneider or Daikin in fact copied EcoFactor's products. EcoFactor does not contend that Alarm.com infringes the asserted claim of the '371 patent. Neither Schneider nor Daikin are presently involved in this investigation, and cannot respond to EcoFactor's allegations.

* * *

Accordingly, the administrative law judge finds that there is little evidence of secondary considerations that tends to support non-obviousness of the claims of the '371 patent.

**C. Validity Under 35 U.S.C. § 112, ¶1: Written Description**

**1. The '497 Patent**

Respondents argue, in part:

[redacted]

Despite being limiting, the preamble of the '497 patent, claim 1's requirement of "calculating a value for the operational efficiency" of an HVAC system is not described in the patent. RX-0001C, Auslander QA69-70. At the hearing, Dr. Henze stated the patent discloses no algorithm, calculations, or equations. Hearing Tr. 808:18-809:4 (Henze) ("Q. Okay. Does the patent disclose an algorithm? A. I could not find one. Q. Does it disclose any kinds of calculations or equations? A. No, I did not find any in the patent.").

No mathematical formulation. Testimony by EcoFactor's own validity expert Dr. Palmer confirms the '497 patent lacks written description for element 1[Pre]. At the hearing, Dr. Palmer admitted "[t]o calculate a value [for operational efficiency], [a skilled person] would need to use a formula." Hearing Tr. 958:9-14 (Palmer). But as Dr. Palmer further admitted, he was "not prepared to provide any mathematical formulations for calculating operational efficiency" at his deposition after having reviewed the patent, and his witness statement "did not provide any specific mathematical formulations for calculating operational efficiency." Hearing Tr. 951:5-12 (Palmer); *see also* RX-0001C, Auslander QA70.

Cited portions refer to thermal mass, not operational efficiency. EcoFactor and Dr. Palmer currently allege that the patent discloses this element at 8:31-9:44 and Figs. 6A-10B. PHB at 75; CX-0702C (Palmer WS), QA21 ("Palmer QA"). However, none of these portions describe calculating operational efficiency of an HVAC system. The cited figures and their descriptions only refer to various temperature plots of (1) houses having different "thermal mass" (CX-0001, Figs. 6AB, 7AB, 9AB, 8:31-62, 9:48-10:5), (2) houses having thermostats positioned in different locations (CX-0001, Figs. 10AB, 10:6-56), or (3) the same house on different days (CX-0001, Figs. 8AB, 9:10-44). The temperature plots in Figs. 8AB reflect the same house having a drop in efficiency from 86$^{th}$ percentile to 23$^{rd}$ percentile, where the percentile represents how the house compares "relative to other nearby houses." CX-0001, 9:10-44. However, the patent provides no explanation regarding how to "calculate" that efficiency, or even whether the efficiency of the house is the same as the claimed "operational efficiency" of an HVAC system.

The only remaining portion of the patent relied on by EcoFactor and Dr. Palmer is the paragraph at 8:63-9:9, but that paragraph refers to calculating thermal mass, not operational efficiency. Dr. Palmer admitted the thermal mass index is not the operational efficiency. Hearing Tr. 952:20-22 (Palmer) ("Q: And the thermal mass index by itself is not the operational efficiency value; right? A. Not specifically, no."). In fact, according to Dr. Auslander, "the thermal mass is defined incorrectly in the patent" and it "isn't [in claim 1 of the '497 patent] at all and doesn't have anything in particular to do with this claim" and is therefore "not relevant" to the claim. Hearing Tr. 912:10-11, 915:1-22 (Auslander).

Even if calculating the thermal mass index were somehow relevant to calculating the operational efficiency, Dr. Auslander explained at the hearing that

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thermal mass index involves "a complex calculation and there's no explanation of how to do that" in the patent. Hearing Tr. 912:8-10 (Auslander). In a portion not relied on by EcoFactor or Dr. Palmer, the patent refers to calculating the thermal mass index by applying a "basic algorithm that weighs each of these external variables [including climate data, HVAC duty cycle data, recent temperature readings, profile data for home X, and current inside temperature reading] as well as variables for various characteristics of the home itself (such as size, level of insulation, method of construction, etc.) and data from other houses and environments." CX-0001, 11:14-19. However, as Dr. Auslander further explained, "[t]here's nothing in the patent that expands on what this basic algorithm is. It doesn't tell us anything about what it is, what it looks like, what the nature of – I mean, it lists quite a large number of variables here, and then to – just the characteristics of the home itself is a vast quantity of data, and it [] does not tell us anything about what to do with all of this information." Hearing Tr. 909:15-910:14 (Auslander). Thus, the patent only generically states that a "basic algorithm" that weighs dozens of variables should be used, but provides no detail on how to perform any calculation of the thermal mass index from such variables, nor does it describe any calculation of operational efficiency.

Inventor confirms no possession. Testimony from EcoFactor's co-founder and named inventor on all of the asserted patents, Mr. Scott Hublou, confirms that EcoFactor did not have possession of this claim element at the time of the alleged invention. Mr. Hublou testified he "wouldn't expect" the '497 patent to include any algorithm for this claim element because EcoFactor *had no algorithm* as of the asserted priority date. RX-0004C (Hublou Dep.) 215:2-216:5 ("I think at the time of when we filed [the application for the '497 patent] *we were more in the theoretical side*, as to how it could actually be done *as opposed to actually having a – an exact algorithm itself*. Q So at the point you filed this to your recollection *you hadn't actually worked out a specific algorithm* for [calculating operational efficiency of an HVAC system]? A *Correct*. . . . Q And because you didn't work [the algorithm] out until later, *you wouldn't expect that algorithm to be in [the '497] patent*, correct, in this physical document? A *I wouldn't expect that it would be*."); RDX-0001C-027C (RX-0004C (Hublou Dep.) 215:2-216:5.

Mr. Hublou further testified that at the time of filing, EcoFactor only had a "high level theoretical" idea, but no practical implementation of how to perform the claimed calculation. RX-0004C (Hublou Dep.) 49:2-5 ("So the concepts that we came up with were, you know, both kind of a *high level theoretical*, but then there's actually the practical implementation of it."); RDX-0001C-028C (RX-0004C (Hublou Dep.) 49:2-24, 50:21-51:2). According to Mr. Hublou, EcoFactor only "believed [] *theoretically* [the calculation] could be done" but "*needed to see in practice* does it actually really work." RX-0004C (Hublou Dep.) 49:6-20; RDX-0001C-028C (RX-0004C (Hublou Dep.) 49:2-24, 50:21-51:2). Thus, when it filed for the patent, EcoFactor only had a theoretical belief that its idea could work, but possessed no actual knowledge that would work.

[redacted]

EcoFactor did know, however, as testified by Mr. Hublou, that the calculation "required some very advanced math." RX-0004C (Hublou Dep.) 49:6-11; RDX-0001C-028C (RX-0004C (Hublou Dep.) 49:2-24, 50:21-51:2). Mr. Hublou admits he is "not an advanced mathematician," so, unable to perform that math, EcoFactor "engaged with U.C. Berkeley to say all right, here is our theory. What kind of math would be needed to be involved in order to be able to kind of see this thing all the way through." RX-0004C (Hublou Dep.) 49:21-24, 50:21-51:2; RDX-0001C-028C (RX-0004C (Hublou Dep.) 49:2-24, 50:21-51:2). In fact, EcoFactor reached out to Respondents' invalidity expert in this Investigation, Dr. Auslander at U.C. Berkeley, for his expertise in the field of energy management controls, to help derive the algorithms needed to practice the claims. RX-0004C (Hublou Dep.) 246:8-19. When EcoFactor approached Dr. Auslander and U.C. Berkeley "in the fall of 2007," it had already filed its patent application but only had "a concept and a business model," not algorithms. Hearing Tr. 919:4-20 (Auslander) ("Q. And what did EcoFactor have when they approached you at that time in terms of their technology? A. They had basically a concept and a business model. Q. Did they have any technology that you – that they showed to you? A. In terms – in terms of algorithms, no.").

It was only after EcoFactor engaged with U.C. Berkeley, that Dr. Auslander's graduate students Dr. Xue Chen and Dr. Jaehwi Jang "helped [EcoFactor] figure out the mathematics behind [the patent]," spending "about a year to come up with the solution" and resulting in parts of two Ph.D. dissertations. Hearing Tr. 910:15-911:10 (Auslander).

***'497 Patent Limitation 1d:*** The '497 patent is devoid of any description of the limitation "relate said calculated rates of change to outside temperature measurements." RX-0001C, Auslander QA71-72.

EcoFactor's expert admits this limitation is not described in the patent. EcoFactor and Dr. Palmer attempt to rely on 8:31-9:44 and Figs. 6A-7B as providing written description of this claim element (PHB at 76; CX-0702C, Palmer QA22), but upon questioning of these portions at his deposition, Dr. Palmer admitted that these same portions "do not describe the analysis," "provide illustrations, but not specifically the calculations," and otherwise "may not [] expressly state[]" the claim limitation. Hearing Tr. 971:11-17, 972:22-973:8 (Palmer); RX-0001C, Auslander QA72.

Specifically, EcoFactor and Dr. Palmer refer to the following single sentence in the patent as providing written description support: "the speed with which the temperature inside a given building will change in response to changes in outside temperature and differences between inside and outside temperatures." PHB at 76, quoting '497 patent, at 9:2-5; CX-0702C, Palmer QA22. However, this portion of the patent does not state that the rates of change are calculated when the status of the HVAC system is "on" or "off." RX-0001C, Auslander QA72. And

[redacted]

more critically it fails to explain how any of the rates of change are related to outside temperatures. *Id*.

EcoFactor's position is inconsistent with its prior art positions. Here, EcoFactor contends that inside temperature changing in response to changes in outside temperature meets this claim element. PHB at 76. However, that position directly contradicts EcoFactor's own position when evaluating Ehlers and Oswald. Specifically, EcoFactor contends that the more detailed disclosure in both references (of compensating or accounting for changes in outside temperature when computing or predicting changes in inside temperatures) is outside the scope of this claim element. PHB at 69-72; CX-0702C, Palmer QA64-65, 108; RX-0022, at 39:43-51 ("Computed thermal recovery time for heating and cooling adjusted to compensate for the external temperature . . . and cooling or heating degree day factors. This computed factor is used to more accurately compute the recovery time for thermal gain or loss when combined with the averaged normalized thermal gain or loss for the premise."); RX-0038 (Oswald) at ¶¶ 147 ("monitor the time it takes for the house heating to reach temperature . . . . By using the transient thermal model as the basis, changes in weather are automatically accounted for within the model leaving just deterioration in boiler efficiency as the remaining explanation for deteriorating performance."), 139 ("The system can use the transient model to calculate the time it will take to reach the desired temperature: on a cold windy day this might be 1 hour and on a mild day it might be 30 minutes.").

Resps. Br. at 235-41 (footnotes omitted).

EcoFactor argues, in part:

Respondents assert that JX-0001 ('497 patent) lacks written description for two claim phrases: (1) "calculating a value for the operational efficiency of a heating, ventilation, and air conditioning (HVAC) system" and (2) "relate said calculated rates of change to said outside temperature measurement." *See* CX-0702C (Palmer WS) Q/A 20-22. Neither argument has any merit. ***First***, the "calculating a value for the operational efficiency …" phrase is found only in the '497 patent claim 1's preamble. Moreover, the preamble does not recite essential structure, nor is it "necessary to give life, meaning, and vitality" to claim 1. *Arctic Cat Inc. v. GEP Power Prod., Inc.*, 919 F.3d 1320, 1327 (Fed. Cir. 2019). Accordingly, '497 patent claim 1's preamble is not limiting, and there is no written description requirement regarding it.

Regardless, the specification gives PHOSITA the conclusion that inventors were in possession of "calculating a value for the operational efficiency." CX-0702C (Palmer WS) Q/A 21. For example, the patent describes "log[ging] the temperature readings from inside each house …, as well as the timing and duration of air conditioning cycles." JX-0001 ('497 patent) at 8:63-9:44. The patent further describes a "database" with "history of the thermal performance of each house," which "will allow the server 106a to calculate an effective thermal mass for each

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such structure—that is the speed with which the temperature inside a given building will change in response to changes in outside temperature and differences between inside and outside temperatures." *Id*. The patent further describes calculating efficiencies—e.g., "***50% drop in efficiency***"—of different houses and determining which "percentile" that they belong. *Id.* at 9:31-44, 8:31-8:62, Figs. 6A-10B. All of these disclosures show that inventors invented what's claimed.

Rather than focusing on the written description of the '497 patent, Respondents instead mischaracterizes testimony of co-inventor Scott Hublou. But, if anything, Mr. Hublou's testimony confirms that he and his co-inventor had possession of the invention, and that EcoFactor was merely contracting U.C. Berkeley for a study to validate a commercial embodiment of EcoFactor's inventions. CX-0702C (Palmer WS) Q/A 21; *see also, e.g.,* CX-0701 (Hublou Tr.) at 49:21-50:17, 244:7-246:19. Mr. Hublou's testimony actually contradicts Respondents' arguments.

Respondents also mischaracterizes Dr. Palmer's deposition testimony. *See* CX-0702C (Palmer WS) Q/A 21. For example, Dr. Palmer did not say that "the patent specification 'do[es] not describe calculating the operational efficiency." *Id.* Rather, he stated: "Those figures [Figs. 6A and 6B of the '497 patent] ***themselves in isolation*** do not describe calculating the operational efficiency, ***but they do provide context to understand what the --- what the approach is***." *Id*. This in fact confirms that the inventors invented what is claimed. As another example, Dr. Palmer did not say that the patent "does not lay out the formulation per se." That statement was only about a specific paragraph in the patent, not the entire patent. *Id*. Moreover, Dr. Palmer also said that the patent's paragraph "***does explain that you[']r[e] calculating rates [of] change[]***" (*id.*), which also supports that inventors have invented what's claimed. As another example, Dr. Palmer did not say that the patent "do[es] not illustrate the calculation." *Id*. That statement was also about a specific portion of the patent, not about the entire patent. And regardless, Dr. Palmer said that the same portion of the patent "***illustrate the system that – that performs that calculation***." *Id.* That directly contradicts what Dr. Auslander is arguing.

***Second***, the '497 patent's specification would also give a PHOSITA the conclusion that inventors were in possession of "relate said calculated rates of change to said outside temperature measurement." CX-0702C (Palmer WS) Q/A 22. For example, the '497 patent describes a novel system that "allow the server 106 a to calculate an effective thermal mass for each such structure—that is, the speed with which the temperature inside a given building will change in response to changes in ***outside temperature*** and differences between ***inside*** and ***outside temperatures***." JX-0001 ('497 patent) at 8:63-9:44. The patent further describe novel components that log, record, and diagnose various input and data regarding HVAC system, including rates of change and outside temperature measurements. *Id.*; *see also, e.g.*, *id.* at 8:31-8:62, Figs. 6A-7B. All of these disclosures show that inventors invented what's claimed.

> Respondents again focuses on Mr. Hublou's testimony instead of the patent's specification, which fails for the same reason as explained above. For instance, Mr. Hublou confirmed that he does not believe U.C. Berkeley came up with ideas that EcoFactor "hadn't thought of in order to make [EcoFactor's] theories work." CX-0701 (Hublou Tr.) at 244:7-246:19.
>
> Respondents, again, mischaracterizes Dr. Palmer's deposition testimony. *See* CX-0702C (Palmer WS) Q/A 22. Indeed, even in the deposition testimony cited by Dr. Auslander, Dr. Palmer has repeatedly stated that the portions of the '497 patent that he has been asked about at the deposition "provide illustrations" regarding rates of change to outside temperature measurements, and that they "illustrate how that relationship works." *Id*. And Dr. Auslander expressly omits citing to my deposition testimony where Dr. Palmer unequivocally stated "Yes" to the question "Does this paragraph describe relating rates of change to outside temperatures?" *Id*. Dr. Auslander's attempt to mischaracterize Dr. Palmer shows merely that his argument regarding written description lacks merit.

Compl. Br. at 141-43.

The Staff argues, in part:

> As discussed above with respect to Section 101, the '497 and '322 patents are directed to (*via* the preamble and elements 1[d] of claim 1 of each patent) calculating and/or evaluating changes in the operational efficiency of an HVAC system by calculating the "effective thermal mass" of the structure, even though that term is not recited in the claims. However, the evidence will demonstrate that the specifications do *not* demonstrate possession of the preamble and element 1[d] with reasonable clarity to those skilled in the art, as of the priority date. *See* RX-0001C (Auslander) QA 68; RDX-0001C-025 to 032 (Auslander Direct Demonstratives); RX-0001C (Auslander) QA 73; RDX-0001C-033 to 037.

Staff Br. at 82-83.

As found above, the administrative law judge construed the preamble of claim 1 of the '497 patent to be limiting. Moreover, the term "operational efficiency" means "energy required by the HVAC system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions."

The administrative law judge finds that the asserted claims of the '497 patent are invalid because EcoFactor was not in possession of the claimed subject matter as of the filing date of the application. "The test for sufficiency of a written description is 'whether the disclosure of the

application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.'" *Bard Peripheral Vascular, Inc. v. W.L. Gore & Assocs., Inc.*, 670 F.3d 1171, 1188 (Fed. Cir. 2012) (quoting *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (*en banc*)). EcoFactor was not in possession of a system for calculating a value for the operational efficiency of an HVAC system.

EcoFactor argues that the specification of the '497 patent describes "log[ging] the temperature readings from inside each house …, as well as the timing and duration of air conditioning cycles", as well as a "database" with "history of the thermal performance of each house," which "will allow the server 106a to calculate an effective thermal mass for each such structure—that is the speed with which the temperature inside a given building will change in response to changes in outside temperature and differences between inside and outside temperatures." *See* Compl. Br. at 141-43 (quoting JX-0001 ('497 patent) at col. 8, ln. 63 – col. 9, ln. 44). It is argued that the patent further describes calculating efficiencies of different houses and determining which "percentile" that they belong. *See id.* (citing JX-0001 ('497 patent) at col. 9, lns. 31-44, col. 8, lns. 31-62, Figs. 6A-10B).

However, the referenced portions of the '497 patent specification do not describe calculating the energy required by the HVAC system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions. The cited figures and their descriptions only refer to various temperature plots of (1) houses having different "thermal mass" (JX-0001, Figs. 6AB, 7AB, 9AB, col. 8, lns. 31-62), (2) houses having thermostats positioned in different locations (JX-0001, Figs. 10AB), or (3) the same house on different days (JX-0001, Figs. 8AB, 9:10-44). The temperature plots in Figs. 8AB reflect the same house having a drop in efficiency from 86$^{th}$ percentile to 23$^{rd}$ percentile, where the percentile represents

how the house compares "relative to other nearby houses." JX-0001 ('497 patent) at col. 9, lns. 10-44. However, the patent provides no explanation regarding how to "calculate" that efficiency, or even whether the efficiency of the house is the same as the claimed "operational efficiency" of an HVAC system.

Moreover, even were calculating the thermal mass tantamount to calculating the operational efficiency, EcoFactor has not shown that the specification of the '497 patent demonstrates that the inventors were in possession of calculating the thermal mass. Dr. Auslander explained at the hearing that thermal mass index involves "a complex calculation and there's no explanation of how to do that" in the patent. Auslander Tr. 912. The patent refers to calculating the thermal mass index by applying a "basic algorithm that weighs each of these external variables [including climate data, HVAC duty cycle data, recent temperature readings, profile data for home X, and current inside temperature reading] as well as variables for various characteristics of the home itself (such as size, level of insulation, method of construction, etc.) and data from other houses and environments." JX-0001 ('497 patent) at col. 11, lns. 14-19. Yet, as Dr. Auslander explained, "[t]here's nothing in the patent that expands on what this basic algorithm is. It doesn't tell us anything about what it is, what it looks like, what the nature of – I mean, it lists quite a large number of variables here, and then to – just the characteristics of the home itself is a vast quantity of data, and it [] does not tell us anything about what to do with all of this information." Auslander Tr. 910.

Furthermore, EcoFactor's co-founder and named inventor on all of the asserted patents, Mr. Scott Hublou, testified that EcoFactor did not have an algorithm for calculating a value for the operational efficiency of an HVAC system as of the filing date. Mr. Hublou testified that he "wouldn't expect" the '497 patent to include any algorithm for calculating the operational

efficiency because EcoFactor had no algorithm as of the asserted priority date. RX-0004C (Hublou Dep.) at 215:2-216:5 ("I think at the time of when we filed [the application for the '497 patent] we were more in the theoretical side, as to how it could actually be done as opposed to actually having a – an exact algorithm itself. Q So at the point you filed this to your recollection you hadn't actually worked out a specific algorithm for [calculating operational efficiency of an HVAC system]? A Correct. . . . Q And because you didn't work [the algorithm] out until later, you wouldn't expect that algorithm to be in [the '497] patent, correct, in this physical document? A I wouldn't expect that it would be.").

EcoFactor's own validity expert Dr. Palmer, was unable to identify any portion of the patent that disclosed calculating the operational efficiency, nor could he provide a single "mathematical formulation[]" or "equation[] that would [] meet the [] requirements of the claim." RX-0001C (Auslander DWS) at Q/A 70.

Regarding the limitation "relate said calculated rates of change to said outside temperature measurement", EcoFactor argues that the '497 patent describes "allow[ing] the server 106a to calculate an effective thermal mass for each such structure—that is, the speed with which the temperature inside a given building will change in response to changes in outside temperature and differences between inside and outside temperatures." *See* Compl. Br. at 143 (quoting JX-0001 ('497 patent) at col. 8, ln. 63 – col. 9, ln. 44). EcoFactor further argues the patent also describes novel components that log, record, and diagnose various input and data regarding HVAC system, including rates of change and outside temperature measurements. *See id.* (citing JX-0001 at col. 8, lns. 31-62, Figs. 6A-7B).

As found above, however, the referenced portions of the '497 patent only refer to various temperature plots of (1) houses having different "thermal mass", (2) houses having thermostats

positioned in different locations, or (3) the same house on different days. The cited portion of the '497 patent does not state that the rates of change are calculated when the status of the HVAC system is "on" or "off", and it does not explain how any of the rates of change are related to outside temperatures. *See* RX-0001C (Auslander DWS) at Q/A 72. Dr. Palmer admitted that these same portions "do not [] describe the analysis," and "provide illustrations, but not calculations." Palmer Tr. 971, 972-973.

The administrative laws judge thus finds that it has been shown by clear and convincing evidence that the asserted claims of the '497 patent are invalid as lacking sufficient written description.[14]

**2. The '322 Patent**

Respondents argue, in part:

> The '322 patent provides no indication that EcoFactor was in possession of "determin[ing] whether the operational efficiency of the HVAC system has decreased over time" at the time of the alleged invention because the patent provides no formulation for determining that the operational efficiency has decreased. RX-0001C, Auslander QA74.
>
> This limitation is technically infeasible. In fact, Dr. Auslander and Dr. Palmer agree that element 1d of the '322 patent is "technically infeasible" because it is "not possible" to determine that the operational efficiency of an HVAC system has decreased based only on comparing two temperature measurements. RX-0001C, Auslander QA76; Hearing Tr. 917:9-24 (Auslander) ("[T]he last element in this claim simply makes no sense, from a technical point of view. No algorithm can do what that says."; "So this – this claim clause, at best, tells you nothing, and at worst, sends the reader off in the wrong direction."); Hearing Tr. 953:12-954:20 (Palmer) ("The only two measurements in isolation would not be sufficient [to determine that the operational efficiency has decreased].").
>
> EcoFactor's expert admits this limitation is not in the patent. EcoFactor and Dr. Palmer currently allege that the patent discloses this element at 8:21-9:44, 10:57-11:47, 12:48-55, Fig. 11. PHB at 115-116; CX-0702C, Palmer QA23. Dr.

[14] With respect to § 112, the asserted claims were discussed in the aggregate by complainant. *See, e.g.,* Compl. Br. at 141-43.

[redacted]

Palmer relied on roughly the same portions of the patent in his expert report, but he admitted these portions "do not expressly tie the comparison and analysis of the described to a change in operational efficiency per se." Hearing Tr. 956:9-19 (Palmer); RX-0001C, Auslander QA75.

Inventor confirms no possession. Mr. Scott Hublou (EcoFactor's co-founder and named inventor on all of the asserted patents) confirmed that EcoFactor did not have possession of this claim element at the time of the alleged invention. Specifically, when asked whether the "series of steps . . . to determine whether the operational efficiency had actually decreased over time" had actually "been worked out . . . at the time of [] filing" the patent application, Mr. Hublou testified "I'm suspecting not because of the date of the initial filing [of the '322 patent] was prior to – was prior to engaging with U.C. Berkeley." RX-0004C (Hublou Dep.) 218:25-219:11; RDX-0001C-035C (RX-0004C (Hublou Dep.) 218:25-220:10). As Mr. Hublou further explained, "John [Steinberg] nor I had the mathematically capabilities in which to be able to mathematically prove that it was actually correct" and "[w]e needed to first prove that our theories were actually correct." RX-0004C (Hublou Dep.) 219:24-220:10; RDX-0001C-035C (RX-0004C (Hublou Dep.) 218:25-220:10).

In fact, EcoFactor reached out to Dr. Auslander and U.C. Berkeley in the fall of 2007, after the patent's priority date, for his expertise in the field of energy management controls, to help derive the algorithms needed to practice the claims. Hearing Tr. 919:4-20 (Auslander); RX-0004C (Hublou Dep.) 57:10-59:9, 105:6-25, 109:21-110:6. It was only after EcoFactor engaged with U.C. Berkeley, that Dr. Auslander's students Dr. Xue Chen and Dr. Jaehwi Jang provided the algorithms to perform the claimed calculations, resulting in two Ph.D. dissertations. RX-0004C (Hublou Dep.) 49:12-24; RDX-0001C-028C (RX-0004C (Hublou Dep.) 49:2-24, 50:21-51:2); Hearing Tr. 910:15-911:6 (Auslander).

Resps. Br. at 241-42 (footnote omitted).

EcoFactor argues, in part:

Respondents assert that JX-0002 ('322 patent) lacks written description for one claim phrase "wherein said one or more processors compares an inside temperature recorded inside the first structure with an inside temperature of said first structure recorded at a different time to determine whether the operational efficiency of the HVAC system has decreased over time." But the '322 patent's specification would give a PHOSITA the conclusion that the inventors were in possession of the claimed invention, including this phrase. CX-0702C (Palmer WS) Q/A 23. For example, the '322 patent describes "compar[ing] outside temperature, inside temperature, thermostat settings, cycling behavior of the HVAC system, and other variables … [to allow] numerous diagnostic and controlling functions beyond those of a standard thermostat." JX-0002 ('322 patent) at 8:26-30. The patent further describes exemplary algorithm, including in Figure 11

[redacted]

> describing inputs, including current and prior inside temperatures. *Id.* at Fig. 11. The patent further describes retrieving data including "recent temperature readings as recorded by the thermostat in home X," "current inside temperature reading as transmitted by the thermostat," and "calculat[ing] the thermal mass index for the home under those conditions," including "applying a basic algorithm that weighs each of these external variables as well as variables for various characteristics of the home itself (such as size, level of insulation, method of construction, etc.) and data from other houses and environments." *Id.* at 10:57-11:47, 12:48-55. Moreover, all of the portions described above for written description regarding the '497 patent's "calculating a value for the operational efficiency" are also applicable here, as the '497 patent and '322 patent share the same specification, and even the citations are identical, *e.g.*, at 8:31-9:44.
>
> Respondents again focuses on Mr. Hublou's testimony instead of the patent's specification, which fails for the same reason as explained above with respect to the '497 patent. For instance, Mr. Hublou confirmed that he does not believe U.C. Berkeley came up with ideas that EcoFactor "hadn't thought of in order to make [EcoFactor's] theories work." CX-0701 (Hublou Tr.) at 244:7-246:19, 49:21-50:17. Respondents also mischaracterize Dr. Palmer's deposition testimony. *See* CX-0702C (Palmer WS) at Q/A 23. For example, Respondents omit to mention that Dr. Palmer testified at the deposition that the portions of the patent that he was asked about "describe[] comparing temperatures," and that they describe "part of the process" regarding "determining whether the operational efficiency has decreased." *Id.* These contradict Respondents' arguments.

Compl. Br. at 228-29.

> The Staff argues, in part:
>
> As discussed above with respect to Section 101, the '497 and '322 patents are directed to (*via* the preamble and elements 1[d] of claim 1 of each patent) calculating and/or evaluating changes in the operational efficiency of an HVAC system by calculating the "effective thermal mass" of the structure, even though that term is not recited in the claims. However, the evidence will demonstrate that the specifications do *not* demonstrate possession of the preamble and element 1[d] with reasonable clarity to those skilled in the art, as of the priority date. *See* RX-0001C (Auslander) QA 68; RDX-0001C-025 to 032 (Auslander Direct Demonstratives); RX-0001C (Auslander) QA 73; RDX-0001C-033 to 037.

Staff Br. at 82-83.

As found above, the term "operational efficiency" means "energy required by the HVAC system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions."

[redacted]

The administrative law judge finds that the asserted claims of the '322 patent are invalid because EcoFactor was not in possession the claimed subject matter as of the filing date of the application. "The test for sufficiency of a written description is 'whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.'" *Bard Peripheral Vascular, Inc. v. W.L. Gore & Assocs., Inc.*, 670 F.3d 1171, 1188 (Fed. Cir. 2012) (quoting *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (*en banc*)). EcoFactor was not in possession of "wherein said one or more processors compares an inside temperature recorded inside the first structure with an inside temperature of said first structure recorded at a different time to determine whether the operational efficiency of the HVAC system has decreased over time."

EcoFactor argues that "the '322 patent describes 'compar[ing] outside temperature, inside temperature, thermostat settings, cycling behavior of the HVAC system, and other variables … [to allow] numerous diagnostic and controlling functions beyond those of a standard thermostat.'" Compl. Br. at 228-29 (quoting JX-0002 ('322 patent) at col. 8, lns. 26-30). EcoFactor further argues the patent also describes an exemplary algorithm, including in Figure 11 describing inputs, including current and prior inside temperatures. *See id.* (citing JX-0002 at Fig. 11).

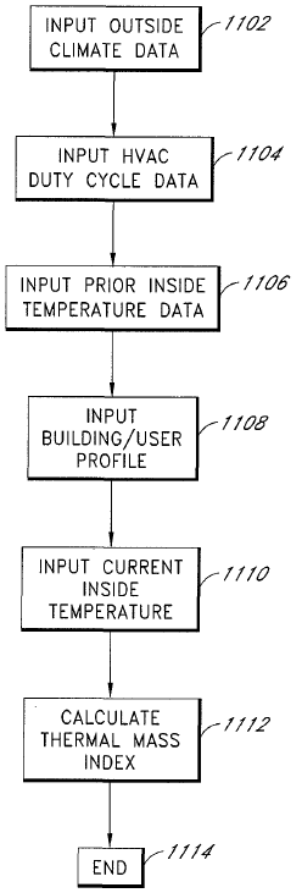



FIG. 11 of JX-0002 ('322 patent)

EcoFactor further argues the patent also describes retrieving data including "recent temperature readings as recorded by the thermostat in home X," "current inside temperature reading as transmitted by the thermostat," and "calculat[ing] the thermal mass index for the home under those conditions," including "applying a basic algorithm that weighs each of these external variables as well as variables for various characteristics of the home itself (such as size, level of insulation, method of construction, etc.) and data from other houses and environments." *See id.* (citing JX-0002 at col. 10, ln. 57 – col. 11, ln. 47, col. 12, lns. 48-55).

However, as Dr. Palmer testified, these portions "do not expressly tie the comparison and analysis of the described to a change in operational efficiency per se." Palmer Tr. 956;

RX-0001C (Auslander DWS) at Q/A 75. Moreover, Dr. Auslander testified that element 1[d] of the '322 patent is "technically infeasible" because it is "not possible" to determine that the operational efficiency of an HVAC system has decreased based only on comparing two temperature measurements. RX-0001C (Auslander DWS) at Q/A 76; Auslander Tr. 917 ("[T]he last element in this claim simply makes no sense, from a technical point of view. No algorithm can do what that says."; "So this – this claim clause, at best, tells you nothing, and at worst, sends the reader off in the wrong direction."). Dr. Palmer testified that "[t]he only two measurements in isolation would not be sufficient [to determine that the operational efficiency has decreased]." Palmer Tr. 953.

Furthermore, Mr. Hublou confirmed that EcoFactor did not have possession of this claim element at the time of the alleged invention. Specifically, when asked whether the "series of steps . . . to determine whether the operational efficiency had actually decreased over time" had actually "been worked out . . . at the time of [] filing" the patent application, Mr. Hublou testified "I'm suspecting not because of the date of the initial filing [of the '322 patent] was prior to – was prior to engaging with U.C. Berkeley." RX-0004C (Hublou Dep.) 218:25-219:11. As Mr. Hublou further explained, "John [Steinberg] nor I had the mathematically capabilities in which to be able to mathematically prove that it was actually correct" and "[w]e needed to first prove that our theories were actually correct." *Id.* at 219:24-220:10. EcoFactor contacted Dr. Auslander and U.C. Berkeley in the fall of 2007, after the patent's priority date, for his expertise in the field of energy management controls, to help derive the algorithms needed to practice the claims. Auslander Tr. 919; RX-0004C (Hublou Dep.) at 57:10-59:9, 105:6-25, 109:21-110:6. After EcoFactor engaged with U.C. Berkeley, Dr. Auslander's students Dr. Xue Chen and Dr. Jaehwi

Jang provided the algorithms to perform the claimed calculations, resulting in two Ph.D. dissertations. RX-0004C (Hublou Dep.) 49:12-24; Auslander Tr. 910-911.

The administrative laws judge thus finds by clear and convincing evidence that the asserted claims of the '322 patent are invalid as lacking sufficient written description.

### D. Validity Under 35 U.S.C. § 112, ¶1: Enablement

#### 1. The '497 Patent

Respondents argue, in part:

> For a POSITA to implement the claims of the '497 patent, the POSITA would need to somehow relate calculated rates of change to outside temperature measurements. The POSITA would also need to calculate one or more rates of change for when the status of the HVAC system is "on," and calculate one or more rates of change for when the status of the HVAC system is "off." As explained above, the patent specification does not disclose how to relate calculated rates of change to the outside temperature measurements for any purpose, or how such "relating" would contribute to calculating a value of an operational efficiency of the HVAC system.
>
> * * *
>
> The specifications of the '497 and '322 patents are nearly identical, and both are theoretical and conceptual in nature, as they only describe "applying a basic algorithm" (CX-0001 ('497 patent) 11:14-19; CX-0002 ('322 patent) 11:14-19) without providing any description of such an algorithm or working examples. Hearing Tr. 909:7-918:20 (Auslander); RX-0001C, Auslander QA82, 95. Moreover, according to Dr. Auslander, the claims are very broad and recite generic structural components without defining any structural relationship between the components. *Id.* The lack of explanation in the patent and the breadth of the claims are evidence against enablement for *Wands* factors 1-4 and 8. RX-0001C, Auslander QA81-82, 95; RDX-0001C-039, 054.
>
> EcoFactor's own experts confirmed that neither patent is enabled and would require "undue experimentation" to practice the full scope of the claims. Despite Mr. Gomez acknowledging that there are "an indefinite number" of ways to calculate the operational efficiency (which he equated to the "rate of change" of the '497 patent) (RX-0001C, Auslander QA86), as explained above, Dr. Palmer was unable to point to any portion of either specification as providing any formulation for calculating the operational efficiency, relating rates of change to outside temperature measurements, or comparing two inside temperatures to determine that the operational efficiency has decreased over time. Hearing Tr. 951:5-8, 956:9-

[redacted]

957:7, 957:17-21, 959:9-14, 971:11-17, 972:22-973:8 (Palmer); RX-0001C, Auslander QA85-87, 98; RDX-0001C-046, 050, 060. Testimony from Mr. Gomez and Dr. Palmer provide evidence against enablement for *Wands* factors 1-3 and 8. RX-0001C, Auslander QA85-87, 98; RDX-0001C-0001C-046, 050, 060.

* * *

Inventor confirmed that neither patent is enabled. Mr. Hublou's testimony also confirms that EcoFactor only had an unproven theory at the time of the alleged inventions. In fact, Mr. Hublou admitted that he "wouldn't expect" the patent to include any algorithm because EcoFactor had no algorithm for implementing the claims of either patent, at the time of the alleged inventions. RX-0004C (Hublou Dep.) 216:2-5; RDX-0001C-040C (RX-0004C (Hublou Dep.) 215:2-216:5). Mr. Hublou testified "John [Steinberg] nor I had the mathematical capabilities in which to be able to mathematically prove that [the theory] was actually correct." RX-0004 (Hublou Dep.) 219:24-220:1. EcoFactor sought assistance from Respondents' invalidity expert Dr. Auslander and his graduate students at U.C. Berkeley, Dr. Chen and Dr. Jang, who spent nearly one year of "constant[] iterating" and "trial and error" of "very advanced math" to develop the prototype algorithms. RDX-0001C-042C to 043C, 056C (RX-0004C (Hublou Dep.) 200:12-201:1, 138:1-21, 49:2-24); RX-0004C (Hublou Dep.) at 49:2-24, 200:12-201:1; RX-0001C, Auslander QA96.

The result of that work resulted in an equation that Mr. Hublou acknowledged was "the practical implementation" of the patents, and which EcoFactor promptly implemented into its platform. RX-0004C (Hublou Dep.) 138:1-21 ("[the equation] is them [U.C. Berkeley] proving that our theory actually does work."). Rather than "merely assist[ing] in 'validating' a commercial widespread use," as EcoFactor alleges, Mr. Hublou admitted that Dr. Chen "proved that our theories were actually correct." RX-0004C (Hublou Dep.) 109:25-110:6; RX-0001C, Auslander QA85; CX-0702C, Palmer QA27. Mr. Hublou's testimony is evidence against enablement for *Wands* factors 1-4, 6, and 7. RX-0001C, Auslander QA83-85, 96-97; RDX-0001C-044, 057.

Together, the evidence indicates that seven of the eight *Wands* factors weigh against enablement, with the remaining factor (number 5, state of the art) being neutral. RX-0001C, Auslander QA88, 99; RDX-0001C-051, 061). Thus, the claims of the '497 and '322 patents are not enabled because they require undue experimentation.

Resps. Br. at 243-47.

EcoFactor argues, in part:

The JX-0001 ('497 patent) enables PHOSITA to practice the invention without undue experimentation. *See* CX-0702C (Palmer WS) Q/A 24-30. The

portions of the patent specification cited above regarding "written description" are also applicable here to show that the '497 patent's disclosure enables the asserted claims. Indeed, the specification provides full and ample disclosure regarding exemplary and detailed embodiments, including thirteen figures and fourteen columns of description, providing substantial guidance to a PHOSITA. CX-0702C (Palmer WS) Q/A 26; *see, e.g.,* JX-0001 ('497 patent) at 8:31-13:13, Figs. 1-13. All of these disclosures contradict Respondents' arguments regarding factors 1 (quantity of experimentation), 2 (amount of direction or guidance presented), 3 (presence or absence of working examples), and 4 (nature of invention).

Mr. Hublou's testimony also confirms that the '497 patent is enabled. *See, e.g.,* CDX-0010C.11 – CDX-0010C.19 (quoting Hublou testimony). For example, Mr. Hublou testified that his conceptions, like all conceptions, started as theories, but the patent itself clearly describes how to implement them and sufficiently enables them. And it was a wide-scale commercial embodiment of the claims that was merely validated by the graduate students. *See CFMT, Inc. v. Yieldup Int'l Corp*., 349 F.3d 1333, 1338 (Fed. Cir. 2003) ("Enablement does not require an inventor to meet lofty standards for success in the ***commercial*** marketplace. Title 35 does not require that a patent disclosure enable one of ordinary skill in the art to make and use a perfected, ***commercially*** viable embodiment"). Even then, the mathematical algorithms for such commercial validation were "simple," as he put it. In other words, the graduate students did not provide any special missing links without which the claims could not be enabled to a POSITA. Moreover, he testified that the patent did not contain any type or kind of "trade secret math"--but did include "sufficient enough" information to achieve the claims of the '497 patent. CX-0701 (Hublou Tr.) at 49:25-50:17. Mr. Hublou also stated that the graduate students were merely assisting in "validating" a commercial, widespread use. And that process took less than a year and, as it turns out, even the commercial embodiment was indeed so validated. *See, e.g.,* CX-0701 (Hublou Tr.) at 244:7-246:19. To be clear, Mr. Hublou testified that this was a commercial embodiment beyond what is necessary to practice the claims. In other words, the trial and error described was in this specific commercial-use context. It was for commercial "trials" to be exact. *See, e.g.,* CX-0701 (Hublou Tr.) at 109:17-110:6; 48:18-50:17. Moreover, the graduate students merely provided simple or basic algorithms to do this commercial validation. *See, e.g.,* CX-0701 (Hublou Tr.) at 250:4-23, 200:10-201:1, 126:1-127:18, 219:220:10, 248:4-250:3.

Further, Respondents' arguments regarding U.C. Berkeley and its graduate students is contradicted by EcoFactor's "Field Trial Study" results document, which confirms that graduate students were hired to try to implement EcoFactor's already enabled ideas in a specific ***commercial*** study. *See, e.g.,* CX-0699C.0005, .0009, .0016, .0017. Other relevant factors also support the '497 patent's enablement. *See* CX-0702C (Palmer WS) Q/A 27-30. In sum, Respondents cannot prove lack of enablement by clear and convincing evidence.

Compl. Br. at 143-45.

The Staff argues, in part:

> The evidence shows that the '497 and '322 patents are not enabled because they require undue experimentation. As explained above, the patent specifications do not disclose how to calculate/evaluate operational efficiency of the preambles and elements 1[d] of the patents, which include, as EcoFactor contends, calculating the "effective thermal mass" of the structure.

Staff. Br. at 84.

The administrative law judge finds that respondents have shown by clear and convincing evidence that the asserted claims of the '497 patent are invalid for lack of enablement.

EcoFactor argues that the specification provides full and ample disclosure regarding exemplary and detailed embodiments that provide sufficient guidance to one of ordinary skill in the art. *See* Compl. Br at 143 (citing JX-0001 ('497 patent) at col. 8, ln. 31 – col. 13, ln. 13, Figs. 1-13). However, the specification only discloses applying a basic algorithm that weighs certain external variables without providing any description of such an algorithm or working examples. The specification recites:

> In step 1112, the server calculates the thermal mass index for the home under those conditions; that is, for example, it calculates the likely rate of change for internal temperature in home X from a starting point of 70 degrees when the outside temperature is 85 degrees at 3:00 PM on August 10th when the wind is blowing at 5 mph from the north and the sky is cloudy. The server accomplishes this by applying a basic algorithm that weighs each of these external variables as well as variables for various characteristics of the home itself (such as size, level of insulation, method of construction, etc.) and data from other houses and environments….
>
> … In step 1212, the server calculates the current relative efficiency of home X as compared to other homes. Those comparisons will take into account differences in size, location, age, etc. in making those comparisons.

JX-0001 ('497 patent) at col. 11, lns. 9-19; 20-47. The lack of explanation in the patent and the breadth of the claims are evidence against enablement for *Wands* factors 1-4 and 8.[15] *See* RX-0001C (Auslander DWS) at Q/A 81-82, 86.

Regarding the first three *Wands* factors, Dr. Palmer was unable to point to any portion of the specification as providing any formulation for calculating the operational efficiency, relating rates of change to outside temperature measurements, or comparing two inside temperatures to determine that the operational efficiency has decreased over time. Palmer Tr. 951, 956-957, 959, 971, 972-973; RX-0001C (Auslander DWS) at Q/A 85-87, 98.

As to the fourth, sixth and seventh *Wands* factors, Mr. Hublou testified that EcoFactor had no algorithm for implementing the claims of the '497 patent, at the time of the alleged invention, because it lacked "the mathematical capabilities" to implement the theory. RX-0001C (Auslander DWS) at Q/A 83; RX-0004C (Hublou Dep.) at 215:2-216:5, 49:2-24, 105:15-20, 219:24-220:10.

Furthermore, respondents adduced evidence showing that after the '497 patent application was filed, EcoFactor sought assistance from Dr. Chen and Dr. Jang, then two graduate students at U.C. Berkeley, who spent nearly one year of "constant[] iterating" and "trial and error" of "very advanced math" to develop the prototype algorithms and to formulate an equation that Mr. Hublou acknowledged was "the practical implementation" of the patents, and

[15] To determine whether a patent disclosure requires undue experimentation, the Federal Circuit has identified several factors to consider: (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims. *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988). Lack of enablement must be proven by clear and convincing evidence. *AK Steel Corp. v. Sollac*, 344 F.3d 1234, 1238-39 (Fed. Cir. 2003).

[redacted]

which EcoFactor promptly implemented into its platform. RX-0004C (Hublou Dep.) at 45:21-46:21; 48:18-22; 49:2-24, 200:12-201:1, 138:1-21; RX-0001C (Auslander DWS) at Q/A 83-85. Mr. Hublou testified that Dr. Chen "proved that [EcoFactor's] theories were actually correct." RX-0004C (Hublou Dep.) at 109:25-110:6. Dr. Auslander testified that EcoFactor provided no algorithms, calculations, or ideas for how to do such calculations when they approached him in the fall of 2007. Auslander Tr. 919, 923. This presents further evidence that the asserted claims lack enablement under *Wands* factors 1-4, 6, and 7.

In summary, the administrative law judge finds that seven of the eight *Wands* factors weigh against a finding of enablement. The asserted claims of the '497 patent are found invalid as lacking enablement.

**2. The '322 Patent**

Respondents argue, in part:

> To implement the claims of the '322 patent, the POSITA would need to somehow "compare[] an inside temperature recorded inside the first structure with an inside temperature of said first structure recorded at a different time to determine whether the operational efficiency of the HVAC system has decreased over time." Both Dr. Auslander and Dr. Palmer agree that this claim element is "technically infeasible" because it is "not possible" to determine that the operational efficiency of an HVAC system has decreased over time based solely on two temperature measurements. RX-0001C, Auslander QA76; Hearing Tr. 917:9-24 (Auslander); Hearing Tr. 953:12-954:20 (Palmer). Even setting that aside, as Dr. Palmer testified, the patent specification does not disclose any method or formula to compare two temperatures to determine whether the operational efficiency of an HVAC system has decreased over time. Hearing Tr. 957:1–21 (Palmer).
>
> * * *
>
> With respect to the '322 patent, Dr. Palmer testified that to "evaluat[e] changes in the operational efficiency of an HVAC system," a POSITA would need to take into account many factors. Hearing Tr. 951:13-16 (Palmer). Specifically, he testified that a POSITA could potentially take into account the "outside temperature", the "time of day", the season ("whether it's summer or winter"); the "status of the HVAC system", among other factors, to practice the asserted claims of the '322 patent. Hearing Tr. 953:18–954:15 (Palmer). Dr. Palmer further

[redacted]

testified "there are many mathematical formulas that may be used to evaluate changes in operational efficiency." Hearing Tr. 954:21–24 (Palmer). But the asserted claims of the '322 patent are not limited to a single formula or mathematical approach for evaluating changes in operational efficiency. (Hearing Tr. 954:25–955:3 (Palmer)). Under *Wyeth*, undue experimentation would be required for a POSITA to practice the full scope of the claims. At minimum, because many of the potential approaches for evaluating changes in operational efficiency are likely inoperable (*see* Hearing Tr. 917:9–24 (Auslander); Hearing Tr. 953:12–954:20 (Palmer)), a POSITA would need to engage in trial and error to identify even one formula or mathematical approach that could be used to practice the claims, let alone the full scope of what EcoFactor has claimed. This would be a herculean endeavOr. Indeed, Dr. Palmer could not identify even one formula for evaluating operational efficiency at either his deposition or in his witness statement. Hearing Tr. 955:4–12 (Palmer).

Resps. Br. at 243-45.

EcoFactor argues, in part:

> The disclosures of the JX-0002 ('322 patent) enables PHOSITA to practice the invention without undue experimentation. *See* CX-0702C (Palmer WS) Q/A 31-33. The portions of the patent specification cited above regarding "written description" are also applicable here to show that the '322 patent's disclosure enables the asserted claims. The specification provides ample disclosure regarding detailed embodiments, including thirteen figures and fourteen columns of description, providing substantial guidance to a PHOSITA. CX-0702C (Palmer WS) Q/A 32; *see, e.g.,* JX-0002 ('322 patent) at 8:31-13:13, Figs. 1-13. All of these disclosures contradict Respondents' arguments regarding factors 1 (quantity of experimentation), 2 (amount of direction or guidance presented), 3 (presence or absence of working examples), and 4 (nature of invention).
>
> Respondents arguments regarding enablement of the '322 patent are substantially similar to their argument regarding enablement of the '497 patent. Accordingly, the discussion above regarding enablement of the '497 patent is also applicable here, including explanations about Mr. Hublou's deposition testimony, EcoFactor's "Field Trial Study" document, and other factors. *See* CX-0702C (Palmer WS) Q/A 31-33; CDX-0010C.11 – CDX-0010C.19 (quoting Hublou testimony); CX-0701 (Hublou Tr.) at 49:25-50:17, 244:7-246:19, 109:17-110:6; 48:18-50:17, 250:4-23, 200:10-201:1, 126:1-127:18, 219:220:10, 248:4-250:3; CX-0699C.0005, .0009, .0016, .0017. In sum, Respondents cannot prove lack of enablement by clear and convincing evidence.

Compl. Br. at 229-30.

The Staff argues, in part:

> The evidence shows that the '497 and '322 patents are not enabled because they require undue experimentation. As explained above, the patent specifications do not disclose how to calculate/evaluate operational efficiency of the preambles and elements 1[d] of the patents, which include, as EcoFactor contends, calculating the "effective thermal mass" of the structure.

Staff Br. at 84.

The administrative law judge finds that respondents have shown by clear and convincing evidence that the asserted claims of the '322 patent are invalid for lack of enablement.

EcoFactor argues that the specification provides full and ample disclosure regarding exemplary and detailed embodiments that provide sufficient guidance to one of ordinary skill in the art. *See* Compl. Br at 229-30 (citing JX-0002 ('322 patent) at col. 8, ln. 31 – col. 13, ln. 13, Figs. 1-13). However, the specification only discloses applying a basic algorithm that weighs certain external variables without providing any description of such an algorithm or working examples. The specification recites:

> In step 1112, the server calculates the thermal mass index for the home under those conditions; that is, for example, it calculates the likely rate of change for internal temperature in home X from a starting point of 70 degrees when the outside temperature is 85 degrees at 3:00 PM on August 10th when the wind is blowing at 5 mph from the north and the sky is cloudy. The server accomplishes this by applying a basic algorithm that weighs each of these external variables as well as variables for various characteristics of the home itself (such as size, level of insulation, method of construction, etc.) and data from other houses and environments….
>
> … In step 1212, the server calculates the current relative efficiency of home X as compared to other homes. Those comparisons will take into account differences in size, location, age, etc. in making those comparisons.

JX-0002 ('322 patent) at col. 11, lns. 9-19; 20-47. The lack of explanation in the patent and the breadth of the claims are evidence against enablement for *Wands* factors 1-4 and 8. *See* RX-0001C (Auslander DWS) at Q/A 81-82, 86, 95.

Regarding the first three *Wands* factors, Dr. Palmer was unable to point to any portion of the specification as providing any formulation for calculating the operational efficiency, relating rates of change to outside temperature measurements, or comparing two inside temperatures to determine that the operational efficiency has decreased over time. Palmer Tr. 951, 956-957, 959, 971, 972-973; RX-0001C (Auslander DWS) at Q/A 85-87, 98.

As to the fourth, sixth and seventh *Wands* factors, Mr. Hublou testified that EcoFactor had no algorithm for implementing the claims of the '322 patent, at the time of the alleged invention, because it lacked "the mathematical capabilities" to implement the theory. RX-0001C (Auslander DWS) at Q/A 83; RX-0004C (Hublou Dep.) at 215:2-216:5, 49:2-24, 105:15-20, 219:24-220:10.

Furthermore, respondents adduced evidence showing that after the '322 patent application was filed, EcoFactor sought assistance from Dr. Chen and Dr. Jang, then two graduate students at U.C. Berkeley, who spent nearly one year of "constant[] iterating" and "trial and error" of "very advanced math" to develop the prototype algorithms and to formulate an equation that Mr. Hublou acknowledged was "the practical implementation" of the patents, and which EcoFactor promptly implemented into its platform. RX-0004C (Hublou Dep.) at 45:21-46:21; 48:18-22; 49:2-24, 200:12-201:1, 138:1-21; RX-0001C (Auslander DWS) at Q/A 96. Mr. Hublou testified that Dr. Chen "proved that [EcoFactor's] theories were actually correct." RX-0004C (Hublou Dep.) at 109:25-110:6. Dr. Auslander testified that EcoFactor provided no algorithms, calculations, or ideas for how to do such calculations when they approached him in the fall of 2007. Auslander Tr. 919, 923.

[redacted]

In summary, the administrative law judge finds that seven of the eight *Wands* factors weigh against a finding of enablement. The asserted claims of the '322 patent are found invalid as lacking enablement.

### E. Validity Under 35 U.S.C. § 112, ¶2: Indefiniteness

Respondents argue, in part:

> The claims of the '497 and '322 patents are indefinite because they merely recite catalogues of elements, but fail to specify any structural relationship between the claimed system components – the HVAC control system, the database, and the one or more processors. *See In re Collier*, 397 F.2d 1003, 1005 (C.C.P.A. 1968). While the claims do recite certain functions performed by each of these three elements (*e.g.*, receiving, storing, or comparing temperatures, or calculating rates of change in temperature), none of these functions provide insight into any structural relationship between the elements. For example, the claims do not recite whether the elements are all separate from one another, or whether one element (*e.g.*, the one or more processors) is part of or connected to another element (*e.g.,* the HVAC control system).

Resps. Br. at 247.

EcoFactor argues, in part:

> "[A] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc*., 572 U.S. 898, 901 (2014). Respondents do not come close to meeting their burden. Respondents do not contend that any specific claim terms are indefinite. Nevertheless, they contend that the *entirety of the claims* are indefinite, based a fifty-year old CCPA caselaw regarding an examiner's rejection of a draft claim during examination. But beyond the obvious difference in setting, that case is inapposite. In *Collier,* the CCPA construed the applicant's claim as reciting "nothing more than a bare combination of a crimpable perforated ferrule and a ground wire, regardless of particular relationships." *In re Collier*, 397 F.2d 1003, 1005 (C.C.P.A. 1968). Despite the breadth of the claim and lack of any recited elements with structural relationships of any sorts, during examination, the applicant ***argued patentability based on unrecited structural relationships*** between the recited elements. *Id*.; *see also Ex Parte Parsons*, 2010 WL 200291, *6 (P.T.A.B. January 12, 2010). Unlike in *Collier,* the '497/'322 patents are issued patents with presumption of validity, and there is no assertion that structural relationship is crucial to patentability here.

Compl. Br. at 280-81.

The Staff argues that the evidence does not show that the asserted claims of the '497 and '322 patents are invalid under 35 U.S.C § 112, ¶ 2. *See* Staff Br. at 86-87.

The administrative law judge finds that respondents have not shown that the claims, "read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc*., 572 U.S. 898, 901 (2014).

Respondents argue, "The claims of the '497 and '322 patents are indefinite because they merely recite catalogues of elements, but fail to specify any structural relationship between the claimed system components – the HVAC control system, the database, and the one or more processors)." Resps. Br. at 247. However, the claims themselves show sufficient connections, for example that the HVAC control system "receive[s]" temperature measurements "from … a first location conditioned by … HVAC system." *See, e.g.,* JX-0001 ('497 patent) at claim 1. The administrative law judge finds that the claim limitations and terms provide reasonable clarity to a person of skill as to all the structural relationships.

Moreover, the specification discloses example embodiments that describe "architecture of the specific components connected to network 102 showing the relationship between the major elements of one embodiment of the subject invention." *Id.* at col. 7, lns. 14-17, Fig. 2.

The administrative law judge thus finds that respondents have not shown that the asserted claims are indefinite under 35 U.S.C § 112, ¶ 2.

**XI. Economic Prong**

A violation of section 337(a)(1)(B), (C), (D), or (E) can be found "only if an industry in the United States, with respect to the articles protected by the patent, copyright, trademark, mask

work, or design concerned, exists or is in the process of being established." 19 U.S.C. § 1337(a)(2). Section 337(a) further provides:

> (3) For purposes of paragraph (2), an industry in the United States shall be considered to exist if there is in the United States, with respect to the articles protected by the patent, copyright, trademark, mask work, or design concerned—
>
> (A) significant investment in plant and equipment;
>
> (B) significant employment of labor or capital; or
>
> (C) substantial investment in its exploitation, including engineering, research and development, or licensing.

19 U.S.C. § 1337(a)(3).

These statutory requirements consist of an economic prong (which requires certain activities)[16] and a technical prong (which requires that these activities relate to the intellectual property being protected). *Certain Stringed Musical Instruments and Components Thereof*, Inv. No. 337-TA-586, Comm'n Op. at 13 (May 16, 2008) ("*Stringed Musical Instruments*"). The burden is on the complainant to show by a preponderance of the evidence that the domestic industry requirement is satisfied. *Certain Multimedia Display and Navigation Devices and*

[16] The Commission practice is usually to assess the facts relating to the economic prong at the time that the complaint was filed. *See Certain Coaxial Cable Connectors and Components Thereof and Products Containing Same*, Inv. No. 337-TA-560, Comm'n Op. at 39 n.17 (Apr. 14, 2010) ("We note that only activities that occurred before the filing of a complaint with the Commission are relevant to whether a domestic industry exists or is in the process of being established under sections 337(a)(2)-(3).") (citing *Bally/Midway Mfg. Co. v. U.S. Int'l Trade Comm'n*, 714 F.2d 1117, 1121 (Fed. Cir. 1983)). In some cases, however, the Commission will consider later developments in the alleged industry, such as "when a significant and unusual development occurred after the complaint has been filed." *See Certain Video Game Systems and Controllers*, Inv. No. 337-TA-743, Comm'n Op., at 5-6 (Jan. 20, 2012) ("[I]n appropriate situations based on the specific facts and circumstances of an investigation, the Commission may consider activities and investments beyond the filing of the complaint.").

*Systems, Components Thereof, and Products Containing Same*, Inv. No. 337-TA-694, Comm'n Op. at 5 (July 22, 2011) ("*Navigation Devices*").

With respect to the economic prong, and whether or not section 337(a)(3)(A) or (B) is satisfied, the Commission has held that "whether a complainant has established that its investment and/or employment activities are significant with respect to the articles protected by the intellectual property right concerned is not evaluated according to any rigid mathematical formula." *Certain Printing and Imaging Devices and Components Thereof*, Inv. No. 337-TA-690, Comm'n Op. at 27 (Feb. 17, 2011) ("*Printing and Imaging Devices*") (citing *Certain Male Prophylactic Devices*, Inv. No. 337 TA-546, Comm'n Op. at 39 (Aug. 1, 2007)). Rather, the Commission examines "the facts in each investigation, the article of commerce, and the realities of the marketplace." *Id.* "The determination takes into account the nature of the investment and/or employment activities, 'the industry in question, and the complainant's relative size.'" *Id.* (citing *Stringed Musical Instruments* at 26).

EcoFactor argues, "The record evidence shows that EcoFactor has made and continues to make significant U.S. investments in plant, equipment, labor, and capital under 19 U.S.C. §§ 1337(a)(3)(A) and (B) based on the quantitative and qualitative significance of EcoFactor's investments of U.S. resources for activities directed to the EcoFactor Platform (the 'Domestic Industry Product')." Compl. Br. at 281-82. As detailed below, EcoFactor argues that it satisfies the economic prong of the domestic industry requirement under subparagraphs (A) and (B). *See id.* at 281-96.[17]

Respondents argue, in part:

[17] EcoFactor does not allege a domestic industry under subsection (C) of Section 337(a)(3). *See* Compl. Br. at 281-96.

EcoFactor and its expert Mr. Lasinski identify no investments that are properly attributable to the DI product, or to the exploitation of any patent, and instead claim 10 years of historical investments based on faulty and unreliable assumptions. EcoFactor's arguments that these historical investments establish a DI fail on their own terms, and for the reasons stated in Part B.3, infra, these historical investments cannot establish the existence of a DI.

* * *

EcoFactor argues, and Mr. Habib testifies, that all activities since at least 2010 "relate to" and have been "in furtherance" of the EcoFactor Platform. *See, e.g.*, CX-0677C, Habib QA39-40. This is not credible. Mr. Habib and Mr. Okita, the only two remaining employees of EcoFactor, only started working for the company in 2015 and have no first-hand knowledge of EcoFactor's activities before 2015. CX-0677C, Habib QA5; CX-0678C, Okita QA2; RX-0005C, Habib Dep. 30:4-33:13.

In fact, the so-called EcoFactor Platform, now [redacted] and [redacted], comprises three different data services with different functions and different applications—HVAC Performance Monitoring, Energy Efficiency, and Demand Response. EcoFactor separately marketed and sold these three cloud services to utilities, and did not even offer the HVAC Performance Monitoring Service until 2016, at the earliest. Hearing Tr. 146:2-10, 149:16-150:10; CX-0678C, Okita QA19; RX-0523C (Habib Ex.17-Recognized Revenue); RDX-0004C-0009 (RX-0006C, Kuo Dep. 122-23; RX-0203C (Ex.18 to Mulhern Rep.-EF Customer Agmts.); RX-0206C (2018 REP Program); RX-0217C (July 2017 EF Bd. Meeting Pres.), at 12-13; RX-0233C (2014 Letter to Centerpoint), at 1; RX-0238C (EF Enercare Integration); RX-0288C (9-19 Email Kuo-Suacedo), at 1; RX-0303C (ThinkEnergy, S100 User Guide), at 15; RX-0334C (6-19 Email Tolliver-Gupta, Clark, Habib); RX-0335C (Draft SOW-Constellation & EF), at 2-3; RX-0337C (EF Utility Pilot SOW), at 1, 16; RX-0352C (KCPL-EF SOW), at 1, 14; RX-0353C (EF Pilot Proposal for Constellation), at 6-7, 12; RX-0372C (2018 Program Residential DR Agmt.); RX-0395C (EF Proposal for Portland Gen. Electric), at 1, 4-6, 12; RX-0529C (Habib Ex.23-Understanding EF-NVE Contract); RX-0582C (EF-Great Plains SOW 2014), at 7, 13; RX-0583C (EF-Great Plains Draft SOW), at 1, 14; RX-0587C (Constellation Draft SOW), at 1; RX-0590C (EF-Tangent MS Agmt.), at 9; RX-0592C (11-16 FE-EF PO), at 22, 24-25)).

EcoFactor also separately recorded revenue from the sale of the three services, and as Mr. Habib confirmed, EcoFactor's revenue documents show that past utility customers purchased only one or two of the three cloud services, and in some cases, customers separately purchased thermostats without purchasing any EcoFactor Platform services at all. *See* RX-0192C (Ex.4 to Mulhern Rep.-Sales by Prod.); RX-0523C (Habib Ex.17-Recognized Revenue); RX-0524C (Habib Ex.18-Recognized Revenue); Hearing Tr. 146:23-147:5 ("A customer can choose to purchase only energy efficiency or only demand response or only HVAC

[redacted]

performance monitoring"). Additionally, a customer who purchases the Simple Thermostat but does not take the steps to connect it to Wi-Fi and then to the EcoFactor Platform would not receive the EcoFactor services. Hearing Tr. 203:8-204:7.

EcoFactor separately marketed and sold the Simple Thermostat through a separate subsidiary, theSimple, Inc., and separately recorded revenue to that subsidiary from the sale of the Simple Thermostat. *Id*.; CX-0389C (R&D Cost System Rep.) (2019 Tab). Separately, EcoFactor marketed and supported the CT218 thermostat, which is not part of the DI product and was the only thermostat used with the NVE program until 2017. CX-0677C, Habib QA28. In fact, the evidence shows that only one customer, NVE, *ever* purchased HVAC Performance Monitoring, Energy Efficiency, Demand Response, and thermostats. RX-0523C (Habib Ex.17-Recognized Revenue); RX-0524C (Habib Ex.18-Recognized Revenue).

Indeed, EcoFactor [redacted] Hearing Tr. 142:4-25. [redacted] Hearing Tr. 143:1-144:3; CX-0677C, Habib QA31. [redacted] EcoFactor, however, failed to even attempt such allocation. Thus, the evidence shows that EcoFactor has never had one "all-encompassing" platform, but rather, different products sold separately to different customers.

Resps. Br. at 55-58.

The Staff argues that EcoFactor's expert witness "Mr. Lasinski fails to properly allocate investments to the EcoFactor Platform by not subtracting [] investments and activities relating to the non-DI products," and concludes, "EcoFactor has not and cannot identify the specific plant, equipment, labor or capital expenditures attributable solely to the DI product." Staff Br. at 126.

For the reasons discussed below, the record evidence does not support a finding that EcoFactor has satisfied the economic prong of the domestic industry requirement of 19 U.S.C. § 1337(a) under either of subparagraphs (A) or (B).

In summary, the evidence shows that EcoFactor is including investments with respect to "a thermostat other than the Simple Thermostat," contrary to Order No. 17. 19 U.S.C. § 1337(a)(3); Order No. 17 at 10; *Certain Earpiece Devices*, Inv. No. 337-TA-1121, Comm'n Op. at 17-18 (Nov. 8, 2019) ("in order to meet the domestic industry requirement of paragraph 337(a)(3) before the ALJ, [the complainant] needed to provide an allocation of its investments relevant to the subset of domestic industry products that practice the [] patent and to show that these investments are significant or substantial."). Furthermore, EcoFactor has not adduced reliable evidence demonstrating its investments in a domestic industry.

### A. EcoFactor's Investments in Plant and Equipment, or Labor and Capital

EcoFactor argues, in part:

> Mr. Lasinski testified that he analyzed EcoFactor's financial records showing its historical and current investments in plant and equipment in the United States to support the development and commercialization of the EcoFactor Platform in order to calculate EcoFactor's domestic investments attributable to plant and equipment under sub-prong A. *See* CX-0676C (Lasinski DWS) Q/A29.
>
> * * *
>
> Mr. Lasinski's analysis shows that EcoFactor's plant and equipment costs relating to the EcoFactor Platform are as follows:

| 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|---|---|---|
| [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |

> CDX-0006C.007 (citing CX-0389C (EcoFactor Cost System Report)). Thus, from 2010 through October 2019, Mr. Lasinski's analysis shows that EcoFactor's relevant plant and equipment expenses totaled [redacted] million, excluding amounts allocated to general and administrative, all of which supported the development of the EcoFactor Platform. *Id.* Q/A31; CX-0389C (EcoFactor Cost System Report).

[redacted]

For contextual analysis, Mr. Lasinski testified that during the relevant period from 2010 through October 2019, EcoFactor's relevant plant and equipment expenses accounted for 5.7% of EcoFactor's total operating expenses and cost of sales. *See* CX-0676C (Lasinski DWS) Q/A33. During that same period, EcoFactor's relevant plant and equipment expenses equaled 18.2% of EcoFactor's total revenue. *Id.*

Mr. Lasinski explained that because EcoFactor is a "one-product company in which all of its efforts were dedicated to the Domestic Industry Product, all of its expenses were incurred to develop and commercialize the Domestic Industry Product and are therefore properly considered." *Id*. at Q/A 54. Nonetheless, Mr. Lasinski performed a second, separate analysis, focusing only on EcoFactor's research and development expenses "to show that, even if consideration is limited to R&D, EcoFactor would have established and maintained a domestic industry for the Domestic Industry Product." *Id*.

Mr. Lasinski testified that the second analysis, focusing only on research and development, shows that EcoFactor's plant and equipment costs directly attributable to research and development of the EcoFactor Platform are as follows:

| 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|---|---|---|
| [redacted] | | | | | | | | | |

CDX-0006C.007 (citing CX-0389C (EcoFactor Cost System Report)). Thus, from 2010 through October 2019, Mr. Lasinski's analysis shows that EcoFactor's plant and equipment expenses specifically to the research and development efforts related to the EcoFactor Platform totaled [redacted] million. *Id.* Q/A34; CX-0389C (EcoFactor Cost System Report). Mr. Lasinski testified that he "confirmed with Mr. Habib that all the allocated research and development was 100% related to the research, development, and maintenance of the" EcoFactor Platform. CX-0676C (Lasinski DWS) Q/A52.

For contextual analysis, Mr. Lasinski testified that EcoFactor's domestic investments in research and development plant and equipment for its EcoFactor Platform from 2010 to October 2019 were 4.0% of EcoFactor's total cost of sales and operating expenses and 12.5% of its total revenue. *See* CX-0676C (Lasinski DWS) Q/A35.

* * *

Mr. Lasinski further testified that he analyzed EcoFactor's financial records showing its historical and current employment in labor and capital in the United States to support the development and commercialization of the EcoFactor Platform in order to calculate EcoFactor's domestic employment attributable to labor and capital under sub-prong B. *See* CX-0676C (Lasinski DWS) Q/A36-50.

[redacted]

* * *

Mr. Lasinski's analysis shows that EcoFactor's labor and capital costs relating to the EcoFactor Platform are as follows:

| 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|---|---|---|
| [redacted] | | | | | | | | | |

CDX-0006C.010, .013 (citing CX-0389C (EcoFactor Cost System Report)). Thus, Mr. Lasinski determined that EcoFactor's employment of labor and capital from 2010 through October 2019 totaled more than [redacted] million, all of which occurred in the United States. *See* CX-0676C (Lasinski DWS) Q/A40-41.

For contextual analysis, Mr. Lasinski determined that these expenditures on labor and capital constituted 54.1% of EcoFactor's total operating expenses and cost of sales during the same time period, and 171.5% of EcoFactor's total revenue. *Id.* Q/A42-43.

As with his plant and equipment analyses discussed above, Mr. Lasinski performed a second, separate analysis, focusing only on EcoFactor's research and development expenses "to show that, even if consideration is limited to R&D, EcoFactor would have established and maintained a domestic industry for the Domestic Industry Product." *Id*. Mr. Lasinski testified that the second analysis, focusing only on research and development, shows that EcoFactor's labor and capital costs directly allocated to research and development of the EcoFactor Platform are as follows:

| 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|---|---|---|
| [redacted] | | | | | | | | | |

CDX-0006C.010 (citing CX-0389C (EcoFactor Cost System Report)). Thus, from 2010 through October 2019, Mr. Lasinski's analysis shows that EcoFactor itself, in the ordinary course of maintaining its detailed financial records, allocated [redacted] million of labor specifically to research and development of the EcoFactor Platform, which accounted for more than half of its total payroll expenses from 2010 through October 2019. CX-0676C (Lasinski DWS) Q/A44-45. Mr. Lasinski testified that he "confirmed with Mr. Habib that all the allocated research and development was 100% related to the research, development, and maintenance of the" EcoFactor Platform. CX-0676C (Lasinski DWS) Q/A52.

For contextual analysis, Mr. Lasinski determined that these labor and capital costs directly allocated to research and development of the EcoFactor Platform constituted 33.8% of EcoFactor's total operating expenses and cost of sales, and 107.0% of its total revenue, over the same time period. *See* CX-0676C (Lasinski DWS) Q/A46-47. Mr. Lasinski further testified that in order to be conservative, he did not include any of the [redacted] million invested in consultants and contractors from

2010 to October 2019.

Compl. Br. at 288-93.

Respondents argue, in part:

> EcoFactor's expert, Mr. Lasinski, had never testified before as an expert on DI issues at the ITC. Hearing Tr. 506:8-20. Nor did he display any understanding of what is required to render an expert opinion on DI, choosing to ignore any contrary evidence, such as that considered by Respondents' expert, Ms. Mulhern. Mr. Lasinski's review of the available evidence was limited, cursory, and excluded any sources of evidence that might have called into question the assumptions underlying his DI calculations. For example, Mr. Lasinski reviewed only a few dozen EcoFactor documents, EcoFactor's DI contentions, EcoFactor's corporate deposition transcripts, EcoFactor's Complaint, and only spoke to EcoFactor's current CEO, Mr. Habib, and technical expert, Mr. Gomez. Hearing Tr. 508:3-512:15. Mr. Lasinski did not review Respondents' documents, Bidgely's documents, Respondents' DI contentions, the deposition transcripts of Glen Kuo or Tim Clark of Bidgely, or any other pleadings in the case, and did not speak to any other current or former employees of EcoFactor. *Id*. Ms. Mulhern, by contrast, reviewed and considered all of the materials considered by Mr. Lasinski, plus all other available materials. RX-0158C, Mulhern QA22; RX-0191C (Ex. 2 to Mulhern Rep.-Materials Reviewed).
>
> * * *
>
> Mr. Lasinski simply took an EcoFactor spreadsheet containing purported allocations of costs to EcoFactor departments, tallied the numbers, and then put those numbers into categories, such as plant and equipment, labor and capital, and research and development. Hearing Tr. 515:4-13. Mr. Lasinski included in his calculations a substantial amount of sales and marketing expenditures, contrary to Commission precedent, and classified all operations and engineering expenditures as "research and development" based on a conversation with Mr. Habib. RX-0158C, Mulhern QA189-92; Hearing Tr. 536:22-537:2. Mr. Lasinski undertook no efforts to confirm the accuracy of any of the financial information or allocations in the "income statement" spreadsheet, other than a conversation with Mr. Habib. Hearing Tr. 515:16-516:17. The one other spreadsheet Mr. Lasinski uses contains numerous errors and duplicate entries, and appears to contain no information for employees who left the company before 2014.

Resps. Br. at 63-66.

The Staff argues, in part:

> The evidence shows that EcoFactor was founded in 2006 and is headquartered in Palo Alto, California. *See* CX-0677C (Habib) QA 22. Mr. Habib

[redacted]

testified that EcoFactor was founded in Silicon Valley by the three inventors of the asserted patents—John Steinberg, Scott Hublou, and Leo Cheung. *Id*. The evidence shows that since its founding, EcoFactor has been in the business of researching, developing, building, implementing, and providing smart home energy management services through its flagship product, the EcoFactor Platform. *Id*. The evidence shows that all of EcoFactor's business operations have always been based entirely in the United States, and EcoFactor has only ever had offices in California and New York. *Id*. at QA 23; CPreHBr. at 178.

The evidence shows that the EcoFactor Platform was developed and built in the United States by EcoFactor employees, including data scientists, platform engineers, application engineers, development operations engineers, and quality assurance engineers. CX-0677C (Habib) QA 24. The evidence shows that the EcoFactor Platform is comprised of both hardware and software. *See* CX-0677C (Habib) QA 39-40; *see* CX-0678C ("Okita") QA 6-13; CX-0676C (Lasinski) QA 20.

The evidence shows that the EcoFactor Platform includes the following cloud services: InSite Platform, HVAC Performance Monitoring, Energy Efficiency, and/or Demand Response features. *See* CX-0377C (EcoFactor Demand Response Datasheet); CX-0378C (EcoFactor Energy Efficiency Datasheet); CX-0379C (EcoFactor HVAC Performance Monitoring Datasheet); *see* CX-0678C (Okita) QA 14-36. The evidence shows that

(i) the HVAC Performance Monitoring service was initially piloted in 2016 and first earned revenue in 2017 (*see* CX-0678C (Okita) QA 19; RX-0192C (Ex. 4 Mulhern Rep.-Sales by Prod.);

(ii) EcoFactor [redacted] (*see* RX-0229C (Asset Purchase Agreement between Trane and EcoFactor) at 81; *see* Hearing Tr. at 142:4-144:23 (Habib); 161:25-171:7 (Habib);

(iii) Energy Efficiency service was first offered in 2011, and [redacted] (*see* CX-0378C (EcoFactor, Automated Energy Efficiency Service); RX-0194C (Ex. 6 to Mulhern Rep.-Asserted Patents); RX-0229C at 81);

(iv) EcoFactor appears to have offered its Demand Response service as early as 2010 to utility customers (*see* RX-0192C; CX-0377C (EcoFactor, Personalized Demand Response Service);

(v) EcoFactor has marketed and sold the software modules as separate services to certain utilities (*see* RX-0589 (Green Tech Media, Trane Acquires EF Tech.); *see* Hearing Tr. at 145:4-147:5 (Habib));

> (vi) a customer purchasing the Simple Thermostat (discussed below) from EcoFactor would not receive the Demand Response service in the absence of an agreement between EcoFactor and the customer's utility (*see* RX-0585C (EF Product Sheet: Personalized Demand Response Service; *see* Hearing Tr. at 145:4-147:5 (Habib)); and
>
> (vii) the EcoFactor platform services receive data from dozens of connected thermostats, including at least Honeywell and [redacted] thermostats, in addition to the Simple Thermostat. *See* Hearing Tr. at 131:6-135:22 (Habib); RX-0549 (Ex. 6 to Lasinski Depo: EF Website); RX-0247C (EcoFactor Proactive Energy Efficiency Service); CX-0677C (Habib WS), at QA 26; CX-0678C (Okita) at QA 12-13; RX-0008C (Okita Depo.), at 86.

Staff Br. at 120-22.

The administrative law judge finds that EcoFactor has not adduced reliable evidence demonstrating its investments in either plants and equipment, or labor and capital.

EcoFactor contends, "The record evidence also shows, and Mr. Lasinski testified, that due to the detailed way in which EcoFactor maintained its records, and because EcoFactor has been dedicated to the EcoFactor Platform since its founding, there was no need to further allocate or apportion EcoFactor's relevant costs once they were pulled from EcoFactor's already-allocated financial documents." Compl. Br. at 287-88 (citing CX-0676C (Lasinski DWS) at Q/A 26-27). Mr. Lasinski testified that he performed no product- or patent-based allocations of any claimed expenditures. Lasinski Tr. 523. Mr. Lasinski testified that he performed no allocation of any investments or expenditures to any asserted patent. *Id.* at 524. Mr. Habib testified that EcoFactor performs no such analysis. *See* RX-0005C (Habib Dep.) at 337:24-338:9 ("We charge expenses against our platform. These are expenses for the entire platform. We -- and that's the way to think about it. We don't try to break out expenses in any other form.").

Inasmuch as the administrative law judge finds that EcoFactor did need to allocate its expenditures both to the domestic industry product and by the particular patent, as explained

further below, EcoFactor has not adduced adequate evidence regarding its investment in plant and equipment, or labor or capital. Mr. Lasinski testified that he relied on a conversation with Mr. Habib to establish that 100 percent of all of EcoFactor's claimed activities and investments were made with respect to the EcoFactor Platform. *See* Lasinski Tr. 522-23. Mr. Lasinski testified that his 100-percent assumption is based on a conversation with Mr. Habib, but that Mr. Lasinski did not do anything else to confirm the accuracy of the assumption. *See id.* at 521-522; CX-0676C (Lasinski DWS) at Q/A 52.

The administrative law judge thus finds that EcoFactor has not adduced reliable evidence demonstrating a domestic industry in plant and equipment, or labor and capital.

### B. EcoFactor's Allocation of Domestic Industry Investments

EcoFactor argues, in part:

> Mr. Habib testified that "the EcoFactor Platform is [EcoFactor's] flagship, and only, product" and that "[a]ll of [EcoFactor's] resources and efforts are in furtherance of the EcoFactor Platform and ways to deliver it to [EcoFactor's] customers." *See* CX-0677C (Habib DWS) Q/A 39-40. Mr. Okita testified that the "EcoFactor Platform refers to the energy management product provided by EcoFactor." CX-0678C (Okita DWS) Q/A 6.
>
> The EcoFactor Platform encompasses software and cloud services provided by EcoFactor which include the InSite Platform, HVAC Performance Monitoring, Energy Efficiency, and Demand Response features. *See* CX-0377C (EcoFactor Demand Response Datasheet); CX-0378C (EcoFactor Energy Efficiency Datasheet); CX-0379C (EcoFactor HVAC Performance Monitoring Datasheet); *see* CX-0678C (Okita DWS) Q/A 14-36. The EcoFactor Platform was developed and built in the United States by EcoFactor employees, including data scientists, platform engineers, application engineers, development operations engineers, and quality assurance engineers. *See* CX-0677C (Habib DWS) Q/A 24. The EcoFactor Platform continues to be developed, serviced, and implemented by EcoFactor employees in the United States. *Id. Mr.* Habib testified that the EcoFactor Platform is a cloud-based server-side backend developed and created that supports smart energy management services by communicating with and sometimes controlling programmable networked thermostats. *Id.* Q/A 24-28. The EcoFactor Platform is comprised of both hardware and software.

Compl. Br. at 285-86.

Respondents argue, in part:

[T]he evidence shows that the EcoFactor Platform services were predominantly used with thermostats other than the Simple Thermostat. Specifically, the evidence shows that the EcoFactor Platform has worked with at least six different networked thermostats, in addition to the Simple Thermostat, including Honeywell, Comcast, and [redacted] thermostats. Hearing Tr. 134:19-23; RX-0222C (July 2018 EF Overview Presentation), at 6. The evidence also shows that EcoFactor entered into several contracts specifying the use of the EcoFactor Platform with third-party thermostats, including Honeywell, [redacted] and Comcast, paid API fees to integrate the EcoFactor Platform with those third-party thermostats, and invested engineering and development resources to facilitate communication between those thermostats and the EcoFactor Platform cloud-based servers. Hearing Tr. 208:19-210:11; RDX-0004C-009 (EF Contracts); RX-0278C (Sample Template for Planned Outage) and RX-0265C (Enrollment and Device Count by Type); RX-0583C (Draft Statement of Work-Great Plains); RX-0217C (EF Board Meeting Presentation July 2017); RX-0582C (EF Pilot proposal for Constellation); RX-0592C (FirstEnergy P.O. for EF); RX-0590C (Master Services Agreement between EF and Tangent Energy Solutions), and RX-0395C (EF Proposal for Portland Gen. Elec.); CX-0677C, Habib QA28; RX-0229C at 169 (listing EcoFactor Platform source code files for [redacted] and other thermostats); RX-0158C, Mulhern QA96.

Indeed, until 2017, the EcoFactor Platform worked almost exclusively with third-party CT218 thermostats, which are ZigBee-based thermostats "manufactured by Computime" and "designed to be integrated into the EcoFactor Platform." CX-0050C (EF-Bidgely Collab. Agmt.), at 18; CX-0677C, Habib QA28; RX-0158C, Mulhern QA96; RX-0529C (Habib Ex.23-Understanding EF-NVE Contract). The EcoFactor Platform "server-side backend" includes a separate "Digi Cloud" for CT218 thermostats, and the cost to maintain that cloud to provide services with CT218 thermostats was the second highest software hosting cost for the platform. CX-0050C (EF-Bidgely Collab. Agmt.), at 19. As late as 2018-2019, CT218 thermostats made up as much as 75 percent of all thermostats working with the EcoFactor Platform in the NVE program. RX-0521C (Habib Ex.15-Questions to Answer), at 4; Hearing Tr. 137:21-138:13. EcoFactor also had to do extensive testing to support firmware updates for the CT218 thermostats. Hearing Tr. 214:5-11. None of these significant activities or investments with respect to the CT218 thermostat may be considered to support EcoFactor's alleged DI. Or. No. 17 at 10.

Moreover, to the extent EcoFactor is still permitted to argue that the system comprising the EcoFactor Platform and the Simple Thermostat is a DI product, allocations are necessary to remove irrelevant historical investments that had nothing to do with that combined system. *Certain Wireless Mesh Networking Prods.*, Inv. No. 337-TA-1131, Initial Determ. at 160 (Jan. 10, 2020) (Section 337(a)(3) "necessitates an appropriate allocation under each subsection to activities that relate to the protected articles"). For example, development of the Simple

Thermostat did not even begin until 2015, it was first sold in approximately 2017, and by the time of that first sale in 2017, development of the Simple Thermostat had largely ended. RDX-0004C-005 (Timeline of EcoFactor Events) (CDX-0006C.038; CX-0389C (R&D Cost System Rep.); RX-0008C, Okita Dep. at 118-21; RX-0229C (EF-Trane Agmt.); RX-0237C (Team Flat Bill Notes); RX-0301C (5-16 Stephancick-Okita, Habib, Carrasco); RX-0306C (5-16 Email Tolliver-Martin); RX-0516C (Habib Ex.8-EF-Reed Lease); CX-0050C (EF-Bidgely Agmt.); RX-0593C (Simple Strategy Discussion)); RX-0529C (Habib Ex.23-Understanding EF-NVE Contract). Glen Kuo testified that the Simple Thermostat "was all developed by the time that I arrived at the company" in May 2017, but that it had not yet launched for sale. RX-0006C, Kuo Dep. 31:10-20; 80:15-21. In addition, a retail purchaser of the Simple Thermostat does not obtain the Demand Response service or HVAC Performance Monitoring service, further restricting the types of investments that are relevant to the system. Hearing Tr. 202:19-203:7.

Product-based allocations are also necessary to account for activities and investments that had nothing to do with the EcoFactor Platform at all. For example, EcoFactor formerly had a contract with a company called Tangent that worked with a utility on a "bring your own thermostat" or BYOT program. Hearing Tr. 204:17-24. As part of that contract, EcoFactor initiated demand response events using accused Google Nest thermostats, which do not communicate or work with EcoFactor Platform software or services at all. Hearing Tr. 205:18-206:3; *see also* RX-0006C, Kuo Dep. 244:5-247:17 (admitting that "at least some portion" of the services provided through Google's "Rush Hour Rewards" does "not relate to the EcoFactor Platform"). To fulfill its obligations under the Tangent contract, EcoFactor had to enter into a separate agreement with Google, pay Google API fees, and then use Google's Nest console to execute Google's demand response software, which is called Rush Hour Rewards, and which EcoFactor relied on to allege that Google infringed the withdrawn '753 patent. RX-0373C (Nest API Agmt.); Hearing Tr. 150:20-152:2.

EcoFactor also spent significant time attempting to develop the so-called "Un-Thermostat" for Verizon, and developed a business method called "Flat Bill" that EcoFactor marketed starting in 2018, and still appears on the Simple's website. RDX-0004C-010 (Fails to Account for Activities Related to Other Non-DI Products) (RX-0005C, Habib Dep. 171, 188, 190-91, 353; RX-0008C, Okita Dep. 116, 137, 151; RX-0237C (Team Flat Bill Notes); RX-0593C (Simple Strategy Discussion); RX-0468 (Simple-Flat Bill); RX-0237C (Team Flat Bill Notes); RX-0593C (Simple Strategy Discussion); RX-0192C (Ex. 4 to Mulhern Rep.-Sales by Prod.); RX-0236C (Flat Bill Workflow); RX-0594C (EF Simple Flat Bill MVP Prod. Def.); RX-0595C (Alpha Link, Enrollment Business Model); RX-0235C (EF Flat Bill Introduction); RX-0396C (3-15 Das-Plante, Habib); RX-0398C (VZ Presentation-T-Stat Evolution); RX-0392C (Email from M. Plante to D. Das re VZ); RX-0401C (VZ T-Stat Update); RX-0306C (5-16 Email Tolliver-Martin); RX-0301C (5-16 Email Stephanchick re EF); and RX-0302C (Whipsaw Tablet &

Slim Refinement)). None of these significant activities or investments may be considered to support EcoFactor's alleged DI.

Patent-based allocations are also necessary in this Investigation. For example, the '322 patent discloses "evaluating changes in the efficiency of an HVAC system." RX-0156C, Henze QA47. EcoFactor describes its HVAC Performance Monitoring service as detecting "degradation in an HVAC system," which is why, as Dr. Henze testified, EcoFactor's technical DI contentions as to the '322 patent implicate only the HVAC Performance Monitoring service. CX-0678C, Okita QA14; Hearing Tr.197:17-24; RX-0156C, Henze QA228. Thus, any historical activities and investments unrelated to the HVAC Performance Monitoring service did not exploit the '322 patent, and any historical activities and investments related to the HVAC Performance Monitoring Service did not exploit the '497 or '371 patents. RX-0158C, Mulhern QA101. Allocation by each asserted patent is particularly important in this Investigation where different patents are asserted against different Respondents, requiring that a DI be evaluated with respect to each asserted patent.

Mr. Okita testified that the HVAC Performance Monitoring service was not offered until 2016, CX-0678C, Okita QA19, and EcoFactor's revenue documents show that EcoFactor only recorded revenue from the sale of HVAC Performance Monitoring to NVE. Hearing Tr. 149:16-150:10; RX-0523C (Habib Ex.17-Recognized Revenue); RX-0524C (Habib Ex.18-Recognized Revenue). The evidence therefore shows that EcoFactor is attempting to rely upon investments and expenditures, such as those from before 2016 and those unrelated to HVAC Performance Monitoring, that have no nexus to the '322 patent, and other investments and expenditures, such as those for HVAC Performance Monitoring, that have no nexus to the '497 or '371 patents.

Resps. Br. at 58-63 (footnote omitted).

The Staff argues, in part:

EcoFactor presented evidence that from 2010 through October 2019, EcoFactor's ***plant and equipment*** expenses total approximately $[redacted] million, excluding amounts allocated to general and administrative, all of which supported the development of the EcoFactor Platform. CPreHBr. at 180; CX-0676C (Lasinski) QA 31; CX-0389C (EcoFactor Cost System Report); Attachment 1 to CPreHBr. at 3- 4. The evidence shows that of this amount, approximately [redacted] was incurred in 2017, [redacted] was incurred in 2018, and [redacted] was incurred from January to October 2019. *Id*., and CX-0676C (Lasinski) QA 32-33. The evidence shows that for the period from 2010 to October 2019, the $[redacted] million equaled approximately 5.7% of EcoFactor's total operating expenses and cost of sales, and approximately 18.2% of EcoFactor's total revenue, for the same period from 2010 to October 2019. CX-0676C (Lasinski) QA 33, 34.

> EcoFactor presented evidence that since 2010 through October 2019, its ***labor and capital expenses*** for the EcoFactor Platform total approximately $[redacted] million, all of which occurred in the United States. *See* CX-0676C (Lasinski) QA 40-41. The evidence shows that of this amount, approximately $[redacted] million was incurred in 2017, $[redacted] million was incurred in 2018, and $[redacted] was incurred from January to October 2019. *Id*. The evidence shows that for the period from 2010 to October 2019, the $[redacted] million equaled approximately 54.1% of EcoFactor's total operating expenses and cost of sales, and approximately 171.5% of EcoFactor's total revenue, for that same period. *Id*. at QA 42, 43.
>
> However, EcoFactor has expressly asserted that only the EcoFactor Platform is the DI product, and thus all investments directed to non-DI products should be excluded from the economic prong analysis. *See Certain Multi-Stage Fuel*, 2020 WL 1026313, *119; *see also Subsea Telecoms*, Inv. No. 337-TA-1098, ID at 74-75.

Staff Br. at 125-26.

The administrative law judge finds that EcoFactor, through Mr. Lasinski, failed to allocate properly investments to the EcoFactor DI products because Mr. Lasinski did not subtract out investments and activities relating to at least four non-DI products: the (1) CT218 thermostat, (2) the integration with third-party thermostats, (3) Flat Bill and (4) the Un-Thermostat. *See* RX-0158C (Mulhern RWS) at Q/A 96; RX-0005C (Habib Dep.) at 171, 188, 353; RX-0008C (Okita Dep.) at 137, 151; RX-0237C (Team Flat Bill Notes); RX-0593C (Simple Strategy Discussion).

The evidence shows that EcoFactor's investments are based on Mr. Lasinski's assumption that "100% of EcoFactor's investments and activities have been in support of the Domestic Industry Product [the EcoFactor Platform]." CX-0676C (Lasinski DWS) at Q/A 23; Lasinski Tr. 521. Mr. Lasinksi testified that he did not allocate expenditures between the EcoFactor Platform and other products or services because, "EcoFactor has been singularly focused on developing ….the EcoFactor Platform…. So, there was no need to allocate EcoFactor's relevant costs to a portion attributable to the Domestic Industry Product [EcoFactor

Platform] and/or Asserted Patents." CX-0676C (Lasinski DWS) at Q/A 27; CX-0677C (Habib DWS) at Q/A 39, 46-50; Lasinski Tr. 522-524.

First, the administrative law judge finds that EcoFactor offered a third-party thermostat called the CT218 for use with certain EcoFactor Platform services. CX-0677C (Habib DWS) at Q/A 28. Indeed, the evidence shows that EcoFactor still supports the CT218 thermostat. *See* RX-0008C (Okita Dep.) at 136:14-137:22. The evidence shows that the EcoFactor Platform "server-side backend" includes a separate "Digi Cloud" for CT218 thermostats, and the cost to maintain that cloud to provide services with CT218 thermostats was the second-highest software hosting cost for the platform. CX-0050C (EF-Bidgely Collab. Agmt.) at 19. As late as 2018-2019, CT218 thermostats made up as much as [redacted] percent of all thermostats working with the EcoFactor Platform in the NVE program. RX-0521C (Habib Ex.15-Questions to Answer) at 4; Habib Tr. 137-138. EcoFactor also did extensive testing to support firmware updates for the CT218 thermostats. Okita Tr. 214.

Second, the evidence shows that EcoFactor has entered into contracts, submitted proposals for, and facilitated integration of the EcoFactor Platform services with third-party thermostats, *e.g*. at least Honeywell, Comcast, Google and [redacted] thermostats. *See* Habib Tr. 128-129, 131-135, 151-152; RX-0278C (Sample Template for Planned Outage) and RX-0265C (Enrollment and Device Count by Type); RX-0583C (Draft Statement of Work – Great Plains); RX-0217C (EcoFactor Board Meeting Presentation July 2017); RX-0582C (EcoFactor Pilot proposal for Constellation); RX-0592C (FirstEnergy Purchase Order for EcoFactor); RX-0590C (Master Services Agreement between EcoFactor and Tangent Energy Solutions), and RX-0395C (EcoFactor Proposal for Portland General Electric); RX-0008C (Okita Dep.) at 80:14-84:23. For example, the evidence shows that under its contract with Tangent, EcoFactor executed demand

response events using Google's Rush Hour Rewards system and Google's Nest thermostats. RX-0006C (Kuo Dep.) at 244:5-247:7.

Third, the evidence shows that EcoFactor spent significant time attempting to develop the "Un-Thermostat" for Verizon. *See* RX-0158C (Mulhern RWS) at Q/A 115; RX-0396C (3-15 Das-Plante, Habib); RX-0398C (VZ Presentation-T-Stat Evolution); RX-0392C (Email from M. Plante to D. Das re VZ); RX-0401C (VZ T-Stat Update); RX-0306C (5-16 Email Tolliver-Martin); RX-0301C (5-16 Email Stephanchick re EF); RX-0302C (Whipsaw Tablet and Slim Refinement.

Fourth, the evidence shows that EcoFactor developed a business method called "Flat Bill" that EcoFactor marketed starting in 2018. RX-0237C (Team Flat Bill Notes); RX-0468 (Simple-Flat Bill); RX-0237C (Team Flat Bill Notes); RX-0236C (Flat Bill Workflow); RX-0594C (EF Simple Flat Bill MVP Prod. Def.); RX-0595C (Alpha Link, Enrollment Business Model); RX-0235C (EF Flat Bill Introduction).

Inasmuch as EcoFactor has not subtracted out investments and activities relating to at least these non-DI products and services, the administrative law judge finds that EcoFactor has failed to allocate its investments relevant to the subset of domestic industry products that practice the asserted patents. *See Certain Earpiece Devices*, Inv. No. 337-TA-1121, Comm'n Op. at 17-18 (Nov. 8, 2019).

Moreover, the administrative law judge finds that there was a need for EcoFactor to allocate EcoFactor's costs because EcoFactor's technical DI evidence show that not all services within EcoFactor's platform relate to all patents-in-suit. For example, EcoFactor's technical DI evidence as to the '322 patent include the HVAC Performance Monitoring service. *See* RX-0156C (Henze RWS) at Q/A 228; CX-0674C (Gomez DWS) at Q/A 609, 615. As such, any

investments unrelated to the HVAC Performance Monitoring service did not exploit the '322 patent, and any historical activities and investments related to the HVAC Performance Monitoring Service did not exploit the '371 patent. *See* RX-0158C (Mulhern RWS) at Q/A 101; CX-0674C (Gomez DWS) at Q/A 650-62. Furthermore, EcoFactor did not sell the HVAC Performance Monitoring module before 2017, and has offered the EcoFactor Platform services separately. *See* RX-0192C; RX-0158C (Mulhern RWS) at Q/A 103.

### C. EcoFactor's Domestic Industry at the Time of Filing of the Complaint

EcoFactor argues, in part:

> EcoFactor may rely on its past investments in addition to its current investments because EcoFactor's qualifying domestic industry activities and investments have been ongoing, uninterrupted, and were still continuing as of the date of the complaint. Indeed, qualifying domestic industry activities and investments continue to this day. The Commission has previously held that "[p]ast expenditures may be considered to support a domestic industry claim so long as those investments pertain to the complainant's industry with respect to the articles protected by the asserted [intellectual property] rights and the complainant is continuing to make qualifying investments at the time the complaint is filed." *In the Matter of Certain Television Sets, Television Receivers, Television Tuners, & Components Thereof*, Inv. No. 337-TA-910, 2015 WL 6755093, at *36 (Oct. 30, 2015). The Federal Circuit agreed, stating that:
>
> > There is nothing in the statutory language that supports … rejecting research expenditures that are made more than five years earlier. To be sure, a past investment may have such an attenuated connection to the continued existence of a domestic industry as to be irrelevant, *see, e.g., Motiva*, 716 F.3d at 600–01, but that has not been shown to be the case here. We see no legal error in the ITC's conclusion that a past investment may, by virtue of its connection to ongoing field service and assembly expenses, support a finding that the economic prong of the domestic industry requirement is met.
>
> *Hyosung TNS Inc. v. ITC*, Case No. 2017-2563 (Fed. Cir. 2019) .
>
> In his analysis of EcoFactor's domestic industry, Mr. Lasinski appropriately considered on EcoFactor's past investments in the United States to exploit the Asserted Patents through design, research and development, engineering, and maintenance of the EcoFactor Platform, as well as EcoFactor's continuing U.S.

[redacted]

investments to develop and support the EcoFactor Platform. Indeed, EcoFactor has continued to invest in plant, equipment, labor, and capital in order to continue research, development, and maintenance of the EcoFactor Platform in the United States. EcoFactor's qualified and quantified investments—in engineering, research and development, and production—have been continuous since at least 2010 and EcoFactor does not intend to discontinue its U.S. activities and investments with respect to the Domestic Industry Product. *See* CX-0677C (Habib DWS) Q/A51-52; Hearing Tr. 183:14-15 (Mr. Habib testifying that EcoFactor has "no intention of discontinuing the EcoFactor Platform.") Because EcoFactor's ongoing activities and investments are cognizable under Section 337(a)(3), and have a clear and uninterrupted nexus to EcoFactor's past expenditures, EcoFactor is entitled to rely on those past expenditures, from 2010–2019, related to the EcoFactor Platform. *See Hyosung*, Case No. 2017-2563 (Fed. Cir. 2019). Like the complainant in *Hyosung*, there is no evidence whatsoever that EcoFactor's past investments "have such an attenuated connection" to EcoFactor's current investments "to be irrelevant." To the contrary, all of the past and current investments and expenses analyzed by Mr. Lasinski were in support of the EcoFactor Platform—which has always been and still is EcoFactor's only product offering.

Compl. Br. at 293-94.

Respondents argue, in part:

The evidence shows that by mid-2019, EcoFactor [redacted]. RX-0158C, Mulhern QA50, 157-87. For example, EcoFactor's financial data indicates that, in 2019, EcoFactor allocated [redacted]. CX-0389C (R&D Cost System Report) (col. H of the 2019 tab). Approximately 94 percent of EcoFactor's claimed plant and equipment investments and 97 percent of EcoFactor's claimed labor and capital investments occurred before 2019. *See* RX-0158C, Mulhern QA122 ("Mulhern QA"); *see also* RDX-0004C-012 (CDX-0006C.007, .013, .014; CX-0389C (R&D Cost System Report)). [redacted] RX-0007C (Clark Dep. Designations), 34-35, 43-44 ("Clark Dep.").

On February 28, 2019, EcoFactor entered into an asset purchase agreement, as well as ancillary agreements, with Trane U.S. Inc. ("Trane"). *See* CX-0677C, Habib QA31; RX-0229C (EF-Trane Agmt.); *see also* RX-0158C, Mulhern QA73-76, 123. [redacted]

[redacted] *See* RX-0229C (EF-Trane Agmt.), at 2-3; *see also* RX-0158C, Mulhern QA123. [redacted] RX-0229C (EF-Trane Agmt.), at 81; RX-0158C, Mulhern QA73-76, 123, 152. [redacted]. *See* RX-0229C (EF-Trane Agreement), at 81, 96 (Schedule A); RX-0158C, Mulhern QA47, 52. [redacted] *Id.* at RX-0229C (EF-Trane Agmt.), at 35. [redacted]. Hearing Tr. 154-55; RX-0516C (Habib Ex.8-EF-Reed Lease). [redacted] *See* CDX-0006C.038 (Summary of Findings).

Throughout 2019, EcoFactor continued to terminate its remaining employees and reduce its operations. At the beginning of 2019, EcoFactor had fifteen employees. *See* CX-0387C (Historical Employee Name Title Salary). By February 27, 2019—the day before the Trane agreement—EcoFactor had reduced its headcount to ten. *Id.* By August 2019, EcoFactor had only five remaining employees. *Id.*

EcoFactor could not maintain significant employment because, by 2019, [redacted] was the only significant customer of the EcoFactor Platform. EcoFactor's revenue documents indicate that [redacted] made up approximately [redacted] or more of EcoFactor's revenue in [redacted] and [redacted] RX-0158C, Mulhern QA125-28; RX-0523C (Habib Ex.17-Recognized Revenue); RX-0524C (Habib Ex.18-Recognized Revenue); CX-0387C (Historical Employee Name Title Salary). The other utility contracts identified by EcoFactor—[redacted]—generated [redacted], and have since terminated. RX-0158C, Mulhern QA226; RDX-0004C-015 (CX-0389C (R&D Cost System Report); RX-0005C (Habib Dep. Designations), 22-23, 292-93 ("Habib Dep."); RX-0006C, Kuo Dep. 118-20, 122, 205-08; RX-0193C (Mulhern Rep. Ex.5-Sales by Customer); RX-0205C (Task Order No. 10); RX-0223C (2015 EF Intro. Presentation); RX-0498C (Kuo Ex.27-10-19 Kuo-Habib); RX-0577C (Sales by Customer Detail); RX-0587C ([redacted] Draft SOW)). [redacted] RX-0007C, Clark Dep. 34:14-25 ([redacted]

[redacted] . . . .”); *id.* Clark Dep. 164:20-165:15.

On October 1, 2019, a few weeks before the Complaint, [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Not surprisingly, Bidgely itself views the product it now provides to NVE as the "Bidgely solution," ***not*** the "EcoFactor Platform," and has indicated that it wants the EcoFactor "name" to "slowly fade to black." RX-0006C, Kuo Dep. 141-42; RX-0500C (Kuo Ex.29-11-19 Kuo-Clark), at 2; RX-0007C, Clark Dep. 141-142. Bidgely has also encouraged the "key personnel" to switch all NVE communications to their Bidgely email addresses, rather than EcoFactor email addresses, and made efforts to make them "feel part of the Bidgely team." RX-0500C (Kuo Ex.29-11-19 Kuo-Clark), at 2; RX-0007C, Clark Dep. at 111. Tim Clark, a Bidgely employee, testified that Bidgely even offered stock options and made compensation decisions for the "key personnel." RX-0007C, Clark Dep. 70:7-71:14, 89:1-90:3; *see also* RX-0006C, Kuo Dep. 43-44 (Mr. Kuo testifying that "Tim Clark" was his "boss"). While Mr. Clark and Mr. Kuo speak nearly every day, Mr. Kuo—nominally still an EcoFactor employee—has never been to the new EcoFactor office, and at the time of his deposition in May 2020, had not spoken to Mr. Habib more than "maybe three to four" times since September 2019. *See* RX-0007C, Clark Dep. 135:21-25; RX-0006C, Kuo Dep. 41:25-42:21, 65:23-66:5.

In light of this evidence, the Court may assess the credibility of EcoFactor's witnesses, such as Mr. Habib and Mr. Lasinski, and their claims regarding the EcoFactor Platform and EcoFactor's business operations at the time of the Complaint. For example, of course EcoFactor has no "plans to discontinue the EcoFactor Platform," as Mr. Habib testified, [redacted]. *See* CX-0677C, Habib QA51. Mr. Lasinski testified that EcoFactor "continued to develop and market the Domestic Industry Product at the date of the Complaint and until today" and "continues to make significant US investments in plant, equipment, labor, and capital," but [redacted] *See* CX-0676C, Lasinski QA61-66. Yet Mr. Lasinski neither reviewed nor considered the deposition transcripts of Tim Clark or Glen Kuo, and did not look at any of the documents

produced by Bidgely or EcoFactor regarding the actual nature of the parties' "Collaboration Agreement" and its impact on EcoFactor's business at the time of the Complaint. Hearing Tr. 509:22-512:1.

Ms. Mulhern's analysis demonstrates the impact of these changes on a quantitative basis, and shows that EcoFactor's activities and investments were insignificant following the Bidgely agreement. At the time of the Complaint, EcoFactor's total plant and equipment expenditures were [redacted], and EcoFactor's total labor and capital expenditures were [redacted]. RX-0158C, Mulhern QA160. Expressed as a yearly number excluding general and administrative expenditures, this amounts to [redacted], before allocation to any product or patent.

Resps. Br. at 47-54 (footnotes omitted).

The Staff argues, in part:

The evidence shows that EcoFactor has and/or is winding down its business. In view of the significant changes to EcoFactor's business activity, especially in 2019, its historical expenditures do not reliably indicate the existence of a domestic industry at the time of the Complaint in October 2019. *See* CX-0676C (Lasinski) QA 31, 60; RX-0158C (Mulhern) QA 120-136, 203; RDX-0004C-011 (Mulhern Demonstratives). In particular, as discussed above, the evidence shows that Complainant (i) [redacted]; (ii) [redacted]; (iii) [redacted] (iv) [redacted]; and, (v) [redacted] RPreHBr. at 44; *see also* Hearing Tr. at 142:4-144:23 (Habib); 161:25-171:7 (Habib); 171:8-174:23 (Habib).

* * *

Ms. Mulhern testified how significantly EcoFactor's employees and labor investments were reduced as a result of the Trane and Bidgely transactions: in October 2018, EcoFactor employed 19 individuals, but by October 2019, there were only 5 employees remaining, a 73.7 percent reduction in head count. See RX-0158C (Mulhern) QA162-164; RDX-0004C-013. The evidence further shows that of the five remaining employees at the time of the Complaint, only two are purportedly based in EcoFactor's 200-square-foot room and purportedly focused on EcoFactor activities; the remaining three work at Bidgely, [redacted] See RX-0158C (Mulhern) QA 164-168; RDX-0004C-014 (Majority of Remaining Employees Work at Bidgely); RX-0199C (Ex 12 to Mulhern Rep. - Share of Payroll); CX-0387C (All Employee Salaries).

The evidence shows that as of October 2019, EcoFactor's monthly plant

[redacted]

> and equipment investments totaled [redacted], and EcoFactor's monthly labor and capital investments associated with the five remaining EcoFactor employees totaled [redacted]. *See* RPreHBr. at 49; RX-0158C (Mulhern) QA 160-164; RDX-0004C-0017 (EcoFactor's Investments as of Complaint Filing Minimal); RDX-0004C-0018 (EcoFactor's Office); RX-0516C (Ex 8 to S. Habib Dep. - AirCr Standard Multi Tenant Office Lease); RX-0199C; RX-0006C, at 16-18; RX-0007C, at 102-103.

Staff Br. at 129-32.

The administrative law judge finds that EcoFactor's agreements with Trane and Bidgely in 2019 significantly changed EcoFactor's business such that EcoFactor's alleged historical expenditures are not a qualitative or quantitative indicator of EcoFactor's industry as of October 23, 2019. In particular, under the February 2019 Trane Agreement, [redacted]. *See* RX-0229C; Habib Tr. 142-144, 161-174. [redacted]. *See* RX-0158C (Mulhern RWS) at Q/A 76; RX-0229C; Habib Tr. 142-144, 161-174.

In addition, the evidence shows that at the time the complaint was filed, EcoFactor no longer provided services to [redacted]. The evidence shows that in 2019, [redacted] represented [redacted] of EcoFactor's revenue. *See* RX-0193C (Ex. 5 to Mulhern Rep. - Sales by Customer); Habib Tr. 147-150. The evidence shows that according to EcoFactor's agreement with Bidgely entered into October 1, 2019, Bidgely became the "account

administrator" for EcoFactor's contract with [redacted] as well as for potential future contracts with utilities and energy providers. CX-0050C (EF-Bidgely Collab. Agmt.). Bidgely also took over responsibility for maintaining the EcoFactor platform, performing day-to-day operations, and communicating with [redacted] regarding the EcoFactor platform services. *See id.*; Habib Tr. 152-155, 171-174.

Moreover, the administrative law judge finds Mr. Lasinski's testimony insufficient as to EcoFactor's investments at the time of filing the complaint. Mr. Lasinski testified that he did not analyze EcoFactor's square footage because EcoFactor did not have significant square footage at that time. Lasinski Tr. 513. Mr. Lasinski testified that he did not analyze EcoFactor's employee headcount at that time. *Id.* at 513-514.

### D. Whether EcoFactor's Investments Are "Significant" and "Substantial"

Determining whether an investment is "significant" or "substantial" under 19 U.S.C. § 1337(a)(3) is context-dependent. *Certain Carburetors and Prod. Containing Such Carburetors* ("*Carburetors*"), Inv. No. 337-TA-1123, Comm'n Op. at 18 (Oct. 28, 2019). "[T]he magnitude of the investment cannot be assessed without consideration of the nature and importance of the complainant's activities to the patented products in the context of the marketplace or industry in question." *Id*. However, "qualitative factors alone are insufficient" to show that an investment is significant. *Lelo Inc. v. International Trade Comm'n*, 786 F.3d 879, 885 (Fed. Cir. 2015). Section 337(a)(3) "requires a quantitative analysis to determine whether there is a 'significant' increase or attribution by virtue of the claimant's asserted commercial activity in the United States." *Id*. at 883.

EcoFactor argues, in part:

[redacted]

Mr. Lasinski testified that based on his analysis, EcoFactor's investments and expenses related to the EcoFactor Platform are both quantitatively and qualitatively significant. To determine significance, the Commission requires that the complainant provide context for its expenditures. *Certain Printing & Imaging Devices & Components Thereof*, Inv. No. 337-TA-690, Comm'n Op. at 27, 31 (Feb. 17, 2011) ("[T]he magnitude of the investment cannot be assessed without consideration of the nature and importance of the complainant's activities to the patented products in the context of the marketplace or industry in question.").

While the Commission has considered several indicia in finding investments significant in a quantitative context, no single factor or indicia is dispositive. Some of the factors that the Commission has considered include: comparisons of the expenditures with the industry in question; the U.S. marketplace and complainant's relative size, U.S. or worldwide operations, activities, or revenues; the domestic value added to render the domestic industry product saleable; or the practice of the claimed elements of the asserted patents. *See Certain Magnetic Data Storage Tapes & Cartridges Containing the Same* ("*Data Storage Tapes*"), Inv. No. 337-TA-1012, Comm'n Op. at 109, 117–121 (Apr. 2, 2018); *Certain Optoelec. Devices for Fiber Optic Commc'ns, Components Thereof, & Prods. Containing the Same*, Inv. No. 337-TA-860, Comm'n Op. at 18–21 (May 9, 2014); *Printing & Imaging Devices*, Comm'n Op. at 27, 31 ("The determination [of significance] takes into account the nature of the investment and/or employment activities, 'the industry in question, and the complainant's relative size.'"). In addition, while the Commission requires a quantitative contextual analysis to determine significance, the Commission has not set a minimum threshold for proving such significance or substantiality. *See, e.g.*, *In the Matter of Certain Carburetors & Prods. Containing Such Carburetors*, Inv. No. 337-TA-1123, Comm'n Op. (Pub. Version) (Oct. 28, 2019) ("Depending on the particular company, industry, and marketplace in question, other contextual facts could be relevant in assessing whether the domestic industry investments and activities with respect to the protected articles are quantitively significant or substantial.").

Further, although EcoFactor's continuing investments may have declined, this does not detract from the fact that the investments are still quantitively significant in the relevant context. *See In the Matter of Certain Three-Dimensional Cinema Systems and Components Thereof*, Inv. No. 337-TA-939, Order No. 9 (Pub. Version) at 13-14 (Aug. 27, 2015) (unreviewed in relevant part by Notice of Commission Decision To Review-In-Part An Initial Determination (Sep. 25, 2015) (the ALJ found "the lack of or decrease in research and development expenses after November 2014 (and after the Domestic Industry Products were on the market) to be completely acceptable given the nature of the activities[.]").

Mr. Lasinski testified that EcoFactor's investments with respect to the EcoFactor Platform for each of the three Asserted Patents under sub-prongs A and B are significant based on his contextual analysis. *See* CX-0676C (Lasinski DWS) Q/A 64-66.

[redacted]

With respect to sub-prong A, Mr. Lasinski's contextual analysis shows that during the period from 2010 through October 2019, EcoFactor's relevant plant and equipment expenses accounted for 5.7% of EcoFactor's total operating expenses and cost of sales. *See* CX-0676C (Lasinski DWS) Q/A33. During that same period, EcoFactor's relevant plant and equipment expenses equaled 18.2% of EcoFactor's total revenue. *Id. Mr.* Lasinski performed a second contextual analysis, focusing exclusively on research and development, which shows that EcoFactor's domestic investments in plant and equipment related to the research and development of the EcoFactor Platform from 2010 to October 2019 were 4.0% of EcoFactor's total cost of sales and operating expenses and 12.5% of its total revenue. *See* CX-0676C (Lasinski DWS) Q/A35; CDX-0006C (Lasinski Demonstratives) at CDX-0006C.025.

With respect to sub-prong B, Mr. Lasinski's contextual analysis shows that during the period from 2010 through October 2019, EcoFactor's expenditures on labor and capital related to the EcoFactor Platform constituted 54.1% of EcoFactor's total operating expenses and cost of sales during the same time period, and 171.5% of EcoFactor's total revenue. *See* CX-0676C (Lasinski DWS) Q/A 42-43. As with his plant and equipment analyses discussed above, Mr. Lasinski performed a second contextual analysis, focusing exclusively on research and development, which shows that EcoFactor's domestic employment of labor and capital related to the research and development of the EcoFactor Platform from 2010 to October 2019 was 33.8% of EcoFactor's total operating expenses and cost of sales, and 107.0% of its total revenue, over the same time period. *See id*. Q/A 46-47; CDX-0006C (Lasinski Demonstratives) at CDX-0006C.036.

Compl. Br. at 294-96.

Respondents argue, in part:

EcoFactor and Mr. Lasinski also fail to establish that their overbroad calculations of 10 years of expenditures are significant or substantial in context. *See Certain Printing & Imaging Devices & Components Thereof*, Inv. No. 337-TA-690, Comm'n Op. at 26 (Feb. 17, 2011) (whether an investment is significant or substantial "is not measured in the abstract or in an absolute sense, but rather is assessed with respect to the nature of the activities and how they are 'significant' to the articles protected by the intellectual property right."). Mr. Lasinski testified that, after tallying the expenditures in the EcoFactor spreadsheet, he compared those numbers against EcoFactor's own expenses and cost of sales, and EcoFactor's own revenue. Hearing Tr. 520:14-19. Mr. Lasinski testified that he performed no comparisons of EcoFactor's claimed investments against any other company's investments. Hearing Tr. 520:20-23. Mr. Lasinski also testified that he performed no comparison of EcoFactor's claimed investments against the smart thermostat market or the HVAC industry. Hearing Tr. 520:24-521:2.

Mr. Lasinski's comparisons do not show significance or substantiality of

[redacted]

claimed investments in context; they simply demonstrate, in the abstract, that EcoFactor's total historical research, development, operations, engineering, sales, and marketing expenditures made up a large part of EcoFactor's own cost structure. RX-0158C, Mulhern QA205. Mr. Lasinski's analysis was preordained to show significance to EcoFactor, *see id.*, and should not serve as the basis for the issuance of any exclusion order covering substantially all of the US smart thermostat market, including the market-leading Nest and ecobee smart thermostats, which actually contribute to US employment and investment. In fact, EcoFactor's investments at the time of the Complaint are miniscule when compared to any objective benchmark, including the smart thermostat market, the market for utility demand response, and the market for residential bring-your-own-thermostat programs, or BYOT. *See* RX-0521C (Habib Ex.15-Questions to Answer), at 1-2; RX-0158C, Mulhern QA29-31; RX-0581 (US Dept. of Energy-Overview); RX-0212C (EF & Daikin Business Plan).

Resps. Br. at 66-67.

The Staff argues, in part:

> The evidence shows that Mr. Lasinski's significance analysis is insufficient. The evidence shows that
>
> > Mr. Lasinski's quantitative analysis of significance relies critically on historical EcoFactor investments over the period 2010 through October 2019. Given the substantial change in EcoFactor business activities in the months leading up to the Complaint, consideration of historical investments is an unreliable indicator of domestic industry at the time of the Complaint, representing a fundamental flaw in his analysis;
> >
> > There has been a substantial decline in claimed U.S. investments associated with the DI Product, undermining a conclusion of significance of the claimed investments in context; and
> >
> > Mr. Lasinski fails to establish that the investments associated with activities at the time of the Complaint were significant in context.
>
> RX-0158C (Mulhern) QA 203, 204-218.

Ms. Mulhern testified that the vast majority of EcoFactor's investments considered by Mr. Lasinski occurred before the Bidgely and Trane transactions, and that "approximately 94 percent of Mr. Lasinski's claimed investments in plant and equipment and approximately 97 percent of Mr. Lasinski's claimed investments in labor and capital expenses occurred prior to 2019." RX-0158C (Mulhern) QA 209. With respect to comparing EcoFactor's investments to its total revenue, the

[redacted]

evidence shows that this does not provide a reliable indicator of the significance or substantiality of claimed DI investments in context. Id. at QA 204, 205. "For example, for a complainant with a broad product portfolio with substantial revenues, claimed investments in a DI product may represent a tiny fraction of company revenue, notwithstanding that such DI activities may contribute considerable value to the product overall." *Id*.

From a qualitive perspective, the evidence shows that EcoFactor's business activity decline further demonstrates a lack of significance. RX-0158C (Mulhern) QA 213. The evidence shows that

> Although R&D associated with the EcoFactor platform software historically was performed predominantly in the U.S., by the time of [the] Complaint filing, EcoFactor's efforts in this area had declined substantially. This is evidenced by the substantial decline in R&D headcount from 2018 to 2019 … previously discussed. Consistent with this, Mr. Clark, Bidgely Vice President of Customer Success and Delivery, testified that EcoFactor has not performed any maintenance work associated with NVE since October 2019, apart from some database cleanups that were performed by a third-party contractor and paid for by Bidgely.

*Id*. Further, at the time the Complaint was filed, the evidence suggests that EcoFactor's activities and investments even with respect to the non-DI product, the Simple Thermostat, were not significant. *Id*. at QA 215.

Lastly, as discussed above, Mr. Lasinski's significance analysis includes investments in non-DI products, which is improper.

Staff Br. at 132-33.

First, in view of the significant changes to EcoFactor's business activity, especially in 2019, the administrative law judge finds that EcoFactor's historical expenditures dating back to 2010 are over-inclusive and do not reliably indicate the existence of a domestic industry at the time of the complaint in October 2019. *See* CX-0676C (Lasinski DWS) at Q/A 31, 60; RX-0158C (Mulhern RWS) at Q/A 120-136, 203. For many of the same reasons, EcoFactor's significance analysis is insufficient because it relies on those historical expenditures that do not reflect the state of EcoFactor's business at the time the complaint was filed.

[redacted]

Given the substantial change in EcoFactor business activities in the months leading up to the complaint, the administrative law judge finds that Mr. Lasinski's reliance on historical EcoFactor investments is an unreliable indicator of domestic industry at the time of the complaint. *See* RX-0158C (Mulhern RWS) at Q/A 203. Approximately 94 percent of Mr. Lasinski's claimed investments in plant and equipment and approximately 97 percent of Mr. Lasinski's claimed investments in labor and capital expenses occurred prior to 2019. *See id.* at Q/A 208; CX-0389C (R&D Cost System Report).

The Commission has held that "the appropriate date for determining whether a DI exists or is in the process of being established is the date of filing the Complaint," which here was October 23, 2019. *Certain Video Game Sys. and Controllers*, 337-TA-743, Comm'n Op. at 5 (Jan. 20, 2012). In this case, EcoFactor's agreements with Trane and Bidgely in 2019 significantly changed EcoFactor's business such that EcoFactor's alleged historical expenditures are not a qualitative or quantitative indicator of EcoFactor's industry as of October 23, 2019. *See* RX-0158C (Mulhern RWS) at Q/A 120-36.

The administrative law judge finds that EcoFactor's activities and investments were insignificant following the Bidgely agreement. After the Bidgely agreement, EcoFactor's [redacted], EcoFactor's total plant and equipment expenditures were [redacted] and EcoFactor's total labor and capital expenditures were [redacted] *See id.* at Q/A 160, 177, 180. However, expressed as a yearly number excluding general and administrative expenditures, this amounts to approximately [redacted], before allocation to any product or patent. *See id.* at Q/A 185.

Moreover, as found above, EcoFactor did not quantify the plant and equipment, or labor and capital expenditures attributable to the EcoFactor DI products. *See Certain Carburetors* at 8

("evidence to substantiate the significance of a complainant's activities with respect to the domestic industry articles protected by the asserted patent is required") (quotations omitted); *Certain Dynamic Sequential Gradient Compression Devices*, Inv. No. 337-TA-335, Initial Determ. at 60, U.S.I.T.C. Pub. No. 2575 (May 15, 1992) ("Congress did not intend . . . that activities of a complainant which generally relate to the subject area of the patent fall within the statutory definition of a domestic industry."). Mr. Lasinski testified that he neither identified investments that were made with respect to the DI product nor excluded investments not made with respect to the DI product. Lasinski Tr. 522-523.

Furthermore, as found above, EcoFactor's claimed investments include ineligible investments with respect to other thermostats. Habib Tr. 134, 150-152; RX-0222C (July 2018 EF Overview Pres.) at 6; RX-0373C (Nest API Agmt.). Mr. Lasinski relied on these investments in his calculations, thus rendering Mr. Lasinski's calculations unreliable. *See, e.g.*, RX-0521C (Habib Ex.15-Questions to Answer) at 4 (CT218 thermostats made up as much as 75 percent of all thermostats in NVE program). Consequently, the administrative law judge finds that EcoFactor has not adduced sufficient evidence allowing for an accurate assessment of the significance of its qualifying DI investments or expenditures in the appropriate context of EcoFactor's operations, the marketplace, or the industry in question. *See Certain Carburetors* at 17, 19 (complainant must provide evidence or arguments to substantiate the nature and significance of its domestic activities and investments with respect to the protected articles).

* * *

Accordingly, it is determined that EcoFactor has not satisfied the economic prong of the domestic industry requirement of 19 U.S.C. § 1337(a) under either of subparagraphs (A) or (B).

[redacted]

## XII. Conclusions of Fact and Law

### Jurisdiction

1. The Commission has personal jurisdiction in this investigation.

2. The Commission has subject matter jurisdiction in this investigation.

3. The Commission has *in rem* jurisdiction in this investigation.

4. Google is an importer of the accused products.

5. ecobee is an importer of the accused products.

6. Vivint is an importer of the accused products.

7. Alarm.com is an importer of the accused products.

### U.S. Patent No. 8,131,497

8. EcoFactor has shown that Google's Nest Learning Thermostat Third Generation and Nest Thermostat E infringe the asserted claims.

9. EcoFactor has not shown that ecobee's ecobee3 lite or the ecobee SmartThermostat with Voice Control infringe the asserted claims.

10. EcoFactor has not shown that Vivint's CT-100 and CT-200 smart thermostats or the Vivint SkyControl panels infringe the asserted claims.

11. EcoFactor has not shown that the EcoFactor Platform, with or without the Simple Thermostat, practices claims 1, 2, or 5.

12. Respondents have not shown that the asserted claims are patent-ineligible under 35 U.S.C. § 101.

13. Respondents have not shown, through clear and convincing evidence, that the asserted claims are invalid under 35 U.S.C. §§ 102 or 103.

14. Respondents have shown, through clear and convincing evidence, that the asserted claims are invalid under 35 U.S.C. § 112, ¶¶ 1 and 2.

**U.S. Patent No. 8,423,322**

15. EcoFactor has shown that Google's Nest Learning Thermostat Third Generation and Nest Thermostat E infringe the asserted claims.

16. EcoFactor has not shown that Alarm.com's T2000 or T3000 Smart Thermostats infringe the asserted claims.

17. EcoFactor has not shown that Vivint's CT-100 and CT-200 smart thermostats or the Vivint SkyControl panels infringe the asserted claims.

18. EcoFactor has not shown that the EcoFactor Platform, with or without the Simple Thermostat, practices claims 1, 2, or 5.

19. Respondents have not shown that the asserted claims are patent-ineligible under 35 U.S.C. § 101.

20. Respondents have shown, through clear and convincing evidence, that Hildebrand anticipates claim 1.

21. Respondents have shown, through clear and convincing evidence, that Hildebrand in view of Rosen renders obvious claims 2 and 5.

22. Respondents have shown, through clear and convincing evidence, that the asserted claims are invalid under 35 U.S.C. § 112, ¶¶ 1 and 2.

**U.S. Patent No. 10,018,371**

23. EcoFactor has shown that Google's Nest Learning Thermostat Third Generation and Nest Thermostat E infringe the asserted claim.

24. EcoFactor has not shown that the EcoFactor Platform, with or without the Simple Thermostat, practices claim 9.

25. Respondents have not shown that the asserted claim is patent-ineligible under 35 U.S.C. § 101.

26. Respondents have not shown, through clear and convincing evidence, that the asserted claim is invalid under 35 U.S.C. §§ 102 or 103.

**Domestic Industry**

27. The domestic industry's economic prong requirement has not been satisfied under § 337(a)(3)(A).

28. The domestic industry's economic prong requirement has not been satisfied under § 337(a)(3)(B).

## XIII. Initial Determination on Violation

Accordingly, it is the initial determination of the undersigned that a violation of section 337 (19 U.S.C. § 1337) has not occurred in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain smart thermostats, smart HVAC systems, and components thereof, with respect to asserted claims 1, 2, and 5 of U.S. Patent No. 8,131,497, asserted claims 1, 2, and 5 of U.S. Patent No. 8,423,322, and asserted claim 9 of U.S. Patent No. 10,018,371.

Further, this initial determination, together with the record of the hearing in this investigation consisting of (1) the transcript of the hearing, with appropriate corrections as may hereafter be ordered, and (2) the exhibits received into evidence in this investigation, is hereby certified to the Commission.

[redacted]

In accordance with 19 C.F.R. § 210.93(c), all material found to be confidential by the undersigned under 19 C.F.R. § 210.5 is to be given *in camera* treatment.

The Secretary shall serve a public version of this initial determination upon all parties of record and the confidential version upon counsel who are signatories to the Protective Order, as amended, issued in this investigation.

Pursuant to 19 C.F.R. § 210.42(h), this initial determination shall become the determination of the Commission unless a party files a petition for review pursuant to § 210.43(a) or the Commission, pursuant to § 210.44, orders on its own motion a review of the initial determination or certain issues herein.

**XIV. Order**

To expedite service of the public version of this document, the parties shall file a joint proposed public version, on the date and in the manner required by Order No. 29.

DPShaw

David P. Shaw
Administrative Law Judge

Issued: April 20, 2021

## PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **INITIAL DETERMINATION** has been served via EDIS upon the Commission Investigative Attorney, **Paul Gennari, Esq**., and the following parties as indicated, on **May 14, 2021.**



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U.S. International Trade Commission
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