

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COPELAND COMFORT CONTROL LP,
ECOBEE TECHNOLOGIES ULC
Petitioners,

v.

OLLNOVA TECHNOLOGIES LTD.,
Patent Owner.

IPR2023-00626
Patent 7,746,887 B2

Before BRIAN J. McNAMARA, ARTHUR M. PESLAK, and
ROBERT J. SILVERMAN, *Administrative Patent Judges*.

PESLAK, *Administrative Patent Judge*.

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

I. INTRODUCTION

Copeland Comfort Control LP¹ filed a Petitioner for *inter partes* review of claims 1, 3–8, 14, 15, and 18 (“the challenged claims”) of U.S. Patent No. 7,746,887 B2 (“the ’887 patent,” Ex. 1001). Paper 2 (“Petition,” “Pet.”). Petitioner filed a Declaration of Dean P. Neikirk in support of the Petition. Ex. 1002. Patent Owner, Ollnova Technologies Ltd., filed a Preliminary Response. Paper 8 (“Prelim. Resp.”). On October 2, 2023, we instituted this *inter partes* review as to all challenged claims and all grounds presented in the Petition. Paper 12 (“Dec.”).

ecobee Technologies ULC filed a separate request for *inter partes* of the challenged claims along with a motion for joinder with this proceeding. IPR2024-00131, Papers 1, 2. On May 21, 2024, we granted institution in IPR2024-00131 and the motion for joinder. IPR2024-00131, Paper 11. Unless otherwise noted, “Petitioner” refers to Copeland Comfort Control LP and ecobee Technologies ULC collectively.

After institution, Patent Owner filed a Response to the Petition (“PO Resp.”) supported by a Declaration of Erik De La Iglesia. Paper 16; Ex. 2006. Petitioner filed a Reply (“Pet. Reply”) supported by a Second Declaration of Dean P. Neikirk. Paper 17; Ex. 1052. Patent Owner filed a Sur-reply (“Sur-reply”). Paper 19. An oral hearing was held on July 9, 2024 and the transcript is entered into the record. Paper 29 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of the challenged claims of the ’887 patent. For the reasons discussed below, we determine

¹ Copeland Comfort Control LP is the legal successor to the original petitioner Emerson Electric Co. Paper 6, 1.

Petitioner establishes by a preponderance of the evidence that all of the challenged claims are unpatentable.

A. Related Matters

The parties identify the '887 patent as a subject of:

- 1) *Ollnova Technologies Ltd. v. Emerson Electric Co. et al.*, 4-22-cv-01387 (E.D. Mo.);
- 2) *Ollnova Technologies Ltd. v. Ecobee, Inc.*, 2-22-cv-00072 (E.D. Tex.) (“the Ecobee litigation”); and
- 3) *Ollnova Technologies, Ltd. v. Carrier Global Corp.*, 9-22-cv-80388 (S.D. Fla.).

Pet. 3–4; Paper, 3, 2.

B. Real Parties-in-Interest

Copeland Comfort Control LP identifies itself and Copeland LP, Copesub GP 1, LLC, Emerson Electric Co., and Verdant Environmental Technologies Inc. as real parties-in-interest. Paper 6, 1. ecobee Technologies ULC identifies itself and ecobee Ltd., Generac Power Systems, Inc., and Generac Holdings Inc. as real parties-in-interest. IPR2024-00131, Paper 1, 3.

Patent Owner identifies itself as the sole real party-in-interest. Paper 3, 2.

C. The '887 Patent

The '887 patent is titled “Dynamic Value Reporting for Wireless Automation Systems.” Ex. 1001, code (54). The '887 patent issued on June 29, 2010 from Application No. 11/402,743, which was filed on April 12, 2006. *Id.* at codes (45), (21), (22). The '887 patent discloses a wireless automation system that uses dynamic value reporting to “communicate[]

data among and between devices related to changes in a value of a monitored condition and/or measured parameter (e.g., a wireless sensor for monitoring environmental temperature).” *Id.* at 2:57–61.

Figure 1 of the '887 patent is reproduced below:

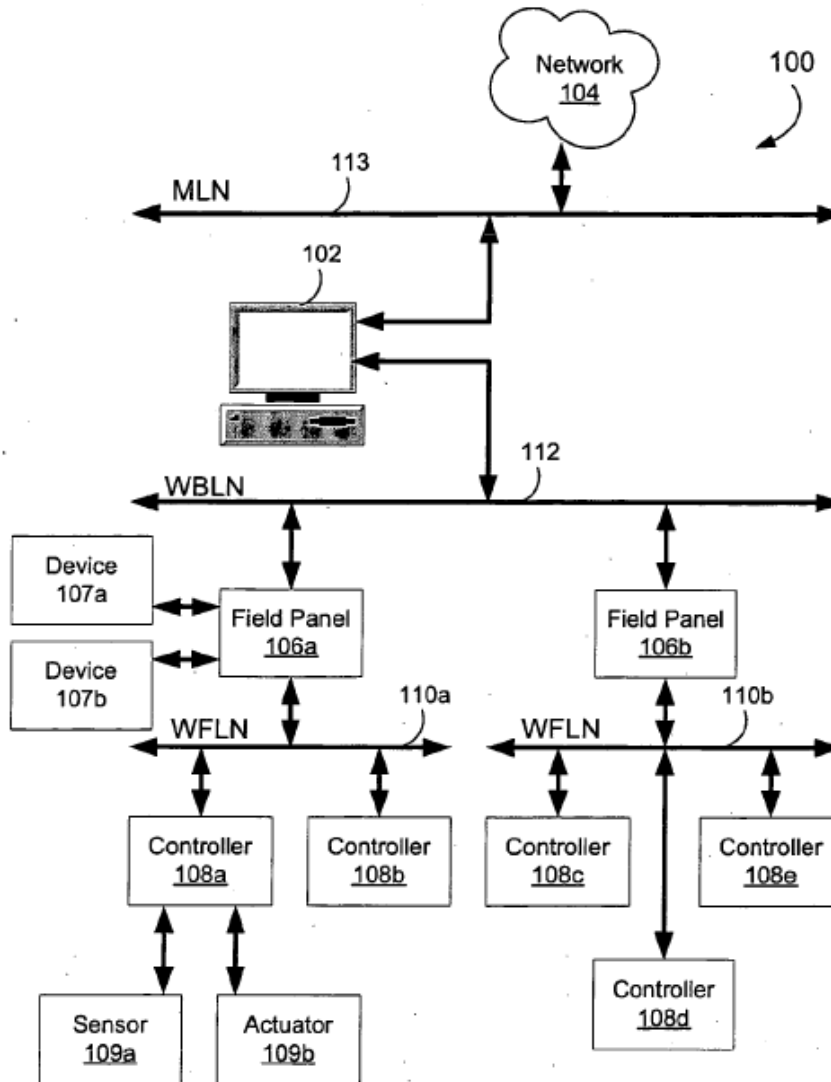


Figure 1

Figure 1 “is a block diagram for an example wireless automation system 100 configured for and/or using dynamic value reporting.” Ex. 1001, 3:45–47. System 100 “includes a supervisory control system or workstation 102, one or more field panels 106a, 106b and one or more controllers 108a-108e.” *Id.*

at 4:37–39. Controllers 108a-108e “correspond[] to an associated localized, standard building control subsystem such as a space temperature control, air quality control, lighting control, hazard detection, security, combinations thereof, or the like.” *Id.* at 4:40–43. Controllers 108a-108e may communicate with sensors 109a or actuators 109b using “two-way wireless communication protocol.” *Id.* at 4:44–45.

Figure 2 of the '887 patent is reproduced below:

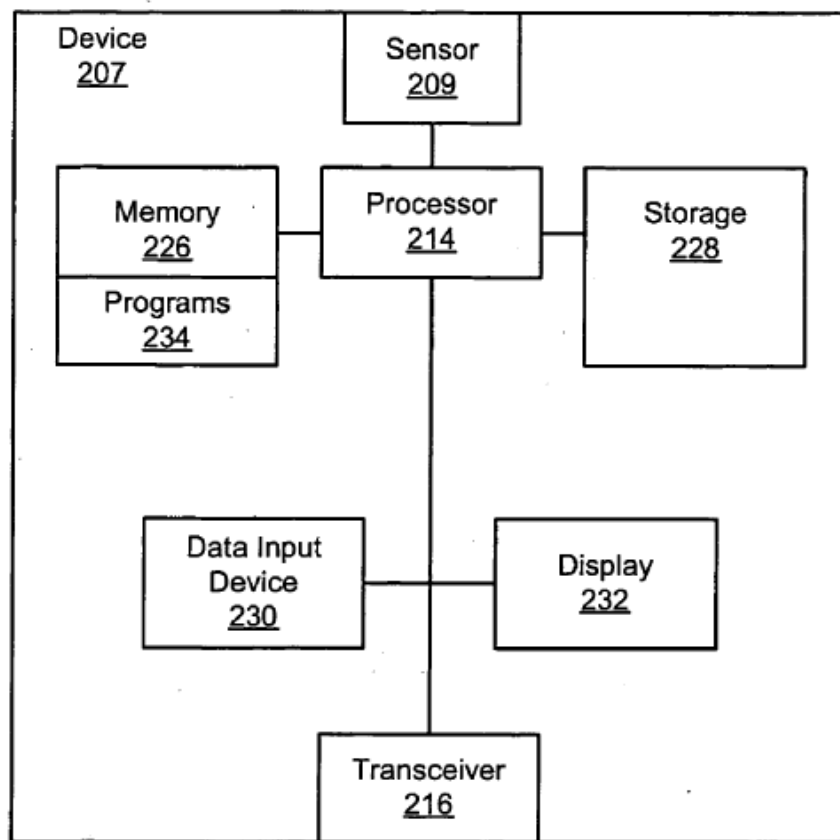


Figure 2

Figure 2 is “a block diagram of an automation device 207 for a wireless automation system using dynamic value reporting.” Ex. 1001 6:59–61. Device 207 “includes a processor 214, a transceiver 216, and a sensor 209.” *Id.* at 7:27–28. Processor 214 “implements a control process for device 207

. . . based on a signal that is read from and/or provided by the sensor 209, such as a measured value of a parameter, an indicator of a sensed condition and/or status of an event.” *Id.* at 7:48–52. Transceiver 216 “wirelessly communicates information using one or a combination of one-way and/or two-way wireless communications.” *Id.* at 8:24–26. Sensor 209 “is configured as any of a temperature sensor, humidity sensor, fire sensor, pressure sensor, smoke sensor, occupancy sensor, air quality sensor, gas sensor, O₂, CO₂, or CO sensor, accelerometer, velocity sensor, [and] combinations thereof.” *Id.* at 8:58–62.

D. Illustrative Claim

Claim 1, the only independent claim, is reproduced below with Petitioner’s annotations:

1. [1.pre] A wireless automation device, comprising:
 - [1.a] a transceiver operable to wirelessly communicate packets of information over a wireless network;
 - [1.b] a sensor operable to generate a indicator for a sensed condition;
 - [1.c] a controller configured to poll the sensor at a polling interval to read the indicator during a current period of the polling interval and to selectively operate the transceiver to communicate information associated with the reading of the indicator; and
 - [1.d] a memory, the controller storing a reading of the indicator during the current period in the memory, where the memory stores at least one prior reading of the indicator, the prior reading of the indicator made during a prior period of the polling interval,
 - [1.e] wherein the transceiver is configured to transmit a most recent reading of the indicator stored in the memory during a period of a transmission interval in response to detecting a change in the sensed condition outside a predetermined range and wherein transmission of the most recent reading of the indicator stored in the memory during the period of the

transmission interval is suspended in response to detecting a change in the sensed condition within the predetermined range.

Ex. 1001, 14:48–15:4, pp. 14, 15 (Certificates of Correction).

E. Prior Art and Asserted Grounds

Petitioner asserts that claims 1, 3–8, 14, 15, and 18 would have been unpatentable on the following grounds (Pet. 7):

Claim(s) Challenged	35 U.S.C. §²	Reference(s)/Basis
1, 3–8, 18	103(a)	Kates-711 ³
1, 3–8, 18	103(a)	Kates-711, Hitt ⁴
1, 3–8, 14, 15, 18	103(a)	Kates-711, Littrell ⁵
1, 3–8, 14, 15, 18	103(a)	Kates-711, Hitt, Littrell
1, 3–8, 18	103(a)	Kates-505 ⁶
1, 3–8, 18	103(a)	Kates-505, Hitt
1, 3–8, 14, 15, 18	103(a)	Kates-505, Littrell
1, 3–8, 14, 15, 18	103(a)	Kates-505, Hitt, Littrell
1, 3–8, 18	103(a)	Kates-505, Mueller ⁷
1, 3–8, 18	103(a)	Kates-505, Mueller, Hitt
1, 3–8, 14, 15, 18	103(a)	Kates-505, Mueller, Littrell
1, 3–8, 14, 15, 18	103(a)	Kates-505, Mueller, Hitt, Littrell

² The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), included revisions to 35 U.S.C. §§ 102 and 103 that became effective after the effective filing date of the challenged claims. Therefore, we apply the pre-AIA version of 35 U.S.C. § 103.

³ U.S. Patent No. 7,528,711 B2 (May 5, 2009) (“Kates-711”) (“Ex. 1004”).

⁴ U.S. Patent Publication No. 2004/0100394 A1 (May 27, 2004) (“Hitt”) (“Ex. 1005”).

⁵ U.S. Patent Publication No. 2005/0246593 A1 (Nov. 3, 2005) (“Littrell”) (“Ex. 1006”).

⁶ U.S. Patent No. 7,102,505 B2 (Sep. 5, 2006) (“Kates-505”) (“Ex. 1022”).

⁷ U.S. Patent No. 6,513,723 B1 (Feb. 4, 2003) (“Mueller”) (“Ex. 1031”).

II. ANALYSIS

A. Overview

Petitioner bears the burden of establishing the unpatentability of the challenged claims by a preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). This burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

A claim is unpatentable under § 103(a) if the differences between the claimed subject matter 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. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) when in evidence, objective indicia of non-obviousness (i.e., secondary considerations). *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

The Supreme Court explained in *KSR International Co. v. Teleflex Inc.* that

[o]ften, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.

550 U.S. 398, 418 (2007) (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir.

2006) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” (alteration in original))).

“Whether an ordinarily skilled artisan would have been motivated to modify the teachings of a reference is a question of fact.” *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1327 (Fed. Cir. 2016). “[W]here a party argues a skilled artisan would have been motivated to combine references, it must show the artisan ‘would have had a reasonable expectation of success from doing so.’” *Arctic Cat Inc. v. Bombardier Recreational Prods. Inc.*, 876 F.3d 1350, 1360–61 (Fed. Cir. 2017) (quoting *In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.*, 676 F.3d 1063, 1068–69 (Fed. Cir. 2012)).

B. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art “would have had a minimum of a bachelor’s degree in electrical engineering, or a related field, along with at least two years of professional experience in sensors, controls, and/or wireless communications.” Pet. 13–14 (citing Ex. 1002 ¶ 44–47). Petitioner further contends that “[a]dditional graduate education could substitute for professional experience, or significant experience in the field could substitute for formal education.” *Id.*

Patent Owner does not address the level of ordinary skill in the art. *See generally* PO Resp.

We apply Petitioner’s proposed level of skill in the art because it appears consistent with the problems addressed in the ’887 patent and the prior art.

C. Claim Construction

We apply the same claim construction standard used by Article III federal courts and the International Trade Commission, both of which follow *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b) (2023). The claim construction standard includes construing claims in accordance with the ordinary and customary meaning of such claims as understood by one of ordinary skill in the art at the time of the invention. *See id.*; *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005) (en banc). In construing claims in accordance with their ordinary and customary meaning, we take into account the specification and prosecution history. *Phillips*, 415 F.3d at 1315–17.

If the specification “reveal[s] a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess[,] . . . the inventor’s lexicography governs.” *Phillips*, 415 F.3d at 1316 (citing *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002)). Another exception to the general rule that claims are given their ordinary and customary meaning is “when the patentee disavows the full scope of a claim term either in the specification or during prosecution.” *Uship Intellectual Props., LLC v. United States*, 714 F.3d 1311, 1313 (Fed. Cir. 2013) (quoting *Thorner v. Sony Comput. Entm’t. Am., LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012)).

Petitioner contends that “[a]ll claim terms should be construed according to their plain and ordinary meaning as would have been understood by a [person of ordinary skill in the art] in view of the specification.” Pet. 14 (citing Ex. 1002 ¶ 48).

Patent Owner contends that the last clause of claim 1, “wherein transmission of the most recent reading of the indicator stored in the memory during the period of the transmission interval is suspended in response to detecting a [change] in the sensed condition within the predetermined range” should be construed as “wherein the transmission of the most recent reading of the indicator that would otherwise occur is stopped in response to detecting a change in the sensed condition within the predetermined range.” PO Resp. 8–9. In support of this construction, Patent Owner relies on statements by the district court in the *Ecobee* litigation. *Id.* at 9 (citing Ex. 2002, 7).⁸ Patent Owner also relies on a portion of the Specification of the ’887 patent. *Id.* (citing Ex. 1001, 11:8–11).

Petitioner replies that “to the extent there is a dispute, the term should be given its plain meaning, which is consistent with the *ecobee* district court construction that PO purports to adopt here, and inconsistent with PO’s characterization of the same.” Pet. Reply 5 (citing Ex. 1052 ¶ 14). Petitioner contends that “[i]f a transmission occurs unless there is no change in a sensed condition within the pre-determined range, ‘refraining’ or ‘forebearing’ from transmission based on that determination is suspending that transmission under the claim’s plain meaning . . . because, if a different determination is made, transmission would occur.” *Id.* at 7 (citing Ex. 1052

⁸ The district court construed this clause as “wherein the transmission of the most recent reading of the indicator that would otherwise occur is stopped for the remainder of the transmission interval in response to detecting a change in the sensed condition within the predetermined range.” Ex. 2002, 8. Patent Owner’s proposed construction is different than the district court construction. Consequently, we analyze Patent Owner’s proposed construction not that of the district court.

¶ 16). Petitioner supports this argument with reference to the Specification. *Id.* (citing Ex. 1001, 3:36–38).

In the Sur-reply, Patent Owner contends that “[t]he word ‘suspend’ is used consistently in the ’887 Patent to describe the prevention of a transmission that would otherwise have occurred during a transmission interval.” Sur-reply 8 (quoting Ex. 1001, 11:3–15, 11:50–12:3). Patent Owner further contends that “[t]he suspensions disclosed in the ’887 Patent are within the context of preventing a transmission which would otherwise occur during a transmission interval from being transmitted, and are unrelated to periods during which no transmission is scheduled to occur.” *Id.* at 8–9 (quoting Ex. 1001, 11:8–14, 11:37–41, 11:56–57).

For the following reasons, we do not adopt Patent Owner’s proposed construction.

We first look to the language of claim 1. In order to understand “suspended” in the wherein clause at issue, we examine that clause in the context of the immediately preceding clause because the “transmission” that is “suspended” in the second wherein clause refers to the transmission in the immediately preceding clause. Claim 1 reads, in part, as follows:

wherein the transceiver is configured to transmit a most recent reading of the indicator stored in the memory during a period of a transmission interval in response to detecting a change in the sensed condition outside a predetermined range and wherein transmission of the most recent reading of the indicator stored in the memory during the period of the transmission interval is suspended in response to detecting a change in the sensed condition within the predetermined range.

Ex. 1001, 14:63–15:4, Cert. of Correction at p. 14.

The first wherein clause recites that the transceiver is configured to transmit a most recent reading “in response to detecting a change in the

sensed condition outside a predetermined range.” Patent Owner’s proposed construction of the second wherein clause replaces the word “suspended” with “that would otherwise occur is stopped.” PO Resp. 8–9 (“emphasis omitted”). This phrase is not part of claim 1. Nonetheless, adopting Patent Owner’s proposed construction could potentially render the second wherein clause superfluous because the first wherein clause does not require transmission of the most recent reading to occur when the change is within the predetermined range. Consequently, the language of claim 1 does not require or suggest Patent Owner’s proposed construction.

We now turn to the Specification. The Specification provides five examples pertinent to our analysis of “suspended.”

First, the Specification describes that “information may be transmitted in response . . . to a sensed condition being outside a predetermined range or limit . . . Transmission during an interval may be suspended in response to an externally received control signal.” Ex. 1001, 2:20–26. In this example, a control signal suspends transmission that may occur when the sensed condition is not “within a predetermined range.”

Second, the Specification describes the transceiver “communicat[ing] the information during the transmission period in response to a triggering event such” as detecting whether a flag has been set. Ex. 1001, 10:63–65. Flags “may be set in response to detecting or identifying a change in the sensed condition beyond a limit.” *Id.* at 10:65–67. Further, “processor 214 may control the transceiver 216 to suspend the transmission of information, notwithstanding a flag being set identifying a transmission may be pending.” *Id.* at 11:8–11. In this example, the processor controls the transceiver to suspend transmission even though a flag is set to initiate transmission.

Third, the Specification describes, a “counter. . . may count[] a number of polling intervals when a change has been detected, such as when a flag has been set” and “[w]hen the count reaches a maximum or limit[,] [t]he transceiver may be controlled to suspend the transmission of information [during the] transmission period, until the counter reaches a set limit.” Ex. 1001, 11:53–58. In this example, the transceiver is controlled to suspend transmission until the counter reaches a limit.

Fourth, the Specification describes that “information may be communicated in response to a comparison that identifies a change in the sensed condition outside a band limit, or a reading of the indicator beyond a limit. Similarly, a transmission of information may be suspended for periods of a transmission for which no change in the indicator has been identified.” Ex. 1001, 3:32–37. In this example, the transmission is described as suspended when no change has been identified.

Fifth, the Specification describes that “transceiver 216 may transmit information only during a transmission period in which a current difference D_i exceeds the difference limit D_l , and may not transmit during intervals in which the current difference D_i does not exceed the difference limit D_l .” Ex. 1001, 11:37–41. This example appears similar to the fourth example without using the term “suspended” but describes that the transceiver “may not transmit” when the current difference does not exceed the difference limit.

The first three examples use “suspended” in the context of a controller taking action to stop a transmission that would have occurred because, for example, a flag was set. These examples appear to align with Patent Owner’s proposed construction. The fourth and fifth examples suggest a

broader use of suspended. Both examples describe not transmitting information when there is no change in an indicator or when a current difference does not exceed a limit. The fourth example describes the “transmission is suspended” and the fifth example describes that the transceiver “may not transmit.” Thus, in a circumstance where there is either no change in an indicator or when a current limit is not exceeded, the Specification describes these similar situations alternatively as “suspended” and “may not transmit.”

For these reasons, in order to resolve the present controversy, we determine that the plain and ordinary meaning of “suspended”, as used in the challenged claims, encompasses both where a transmission that would otherwise occur is suspended by an action such as overriding a flag and where a transmission is not made because there is no change in an indicator or a change does not exceed a limit.

Upon review the parties’ respective contentions, we determine that no other express constructions of any other claim term is required for this decision. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’”) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

D. Ground 1: Alleged Obviousness of Claims 1, 3–8, and 18 over Kates-711

1. Kates-711 (Ex. 1004)

Kates-711 is titled “Portable Monitoring Unit.” Ex. 1004, code (54). Kates-711 discloses “a sensor system that provides sensor information to a portable monitoring unit . . . for alerting building or complex management,

or other responsible parties, to a potential problem detected by the sensor system.” *Id.* at 1:65–2:2.

Figure 2 of Kates-711 is reproduced below:

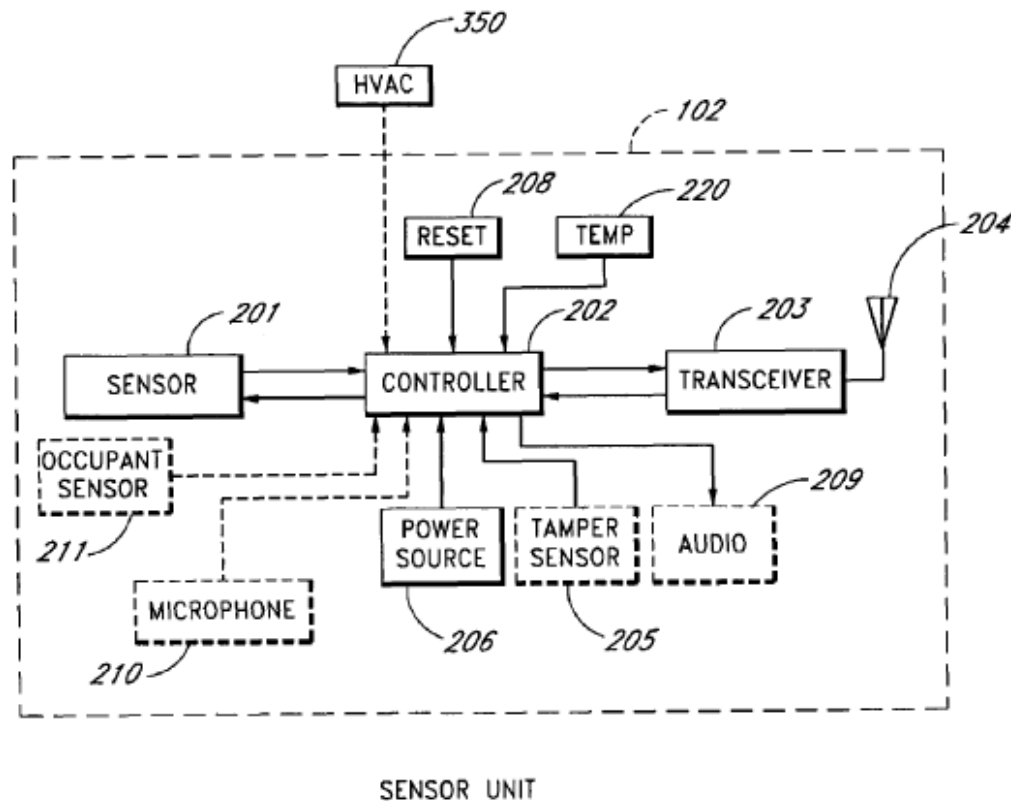


Figure 2 “is a block diagram of the sensor unit 102” shown in Figure 1 of Kates-711. Ex. 1004, 12:47. In sensor unit 102, “one or more sensors 201 and transceiver 203 are provided to a controller 202.” *Id.* at 12:48–49. Controller 202 “is a conventional programmable microcontroller.” *Id.* at 12:63–64. In various embodiments, sensor 201 can be “a thermistor,” “a humidity sensor,” “a water level sensor, a water temperature sensor, a carbon monoxide sensor, a moisture sensor, a water flow sensor, natural gas sensor, propane sensor, etc.” *Id.* at 13:2–7.

2. *Claim 1*

Petitioner provides a limitation-by-limitation analysis of independent claim 1, mapping each claim limitation to Kates-711. Pet. 16–36.

Patent Owner argues that Kates-711 does not “disclose a ‘transmission interval’” or that transmission “is suspended” as required by limitation [1.e].” PO Resp. 14, 17.

With this background, we now analyze the parties’ respective contentions.⁹

[1.pre] A wireless automation device, comprising:

Petitioner contends that Kates-711 “discloses a wireless ‘sensor unit’ that detects and communicates data about anomalous conditions.” Pet. 19 (citing Ex. 1004, 5:30–33, 7:45–48, 12:47–51). Petitioner further contends that Kates-711’s sensor unit “is an automation device because, e.g., it automatically detects and communicates an ‘anomalous’ condition as part of a larger system for process control based on sensing and reacting to potentially dangerous building conditions.” *Id.* (citing Ex. 1004, 1:6–11, 4:35–48, 7:45–48, 16:36–17:44); *see also id.* at 20–22 (citing Ex. 1002 ¶¶ 66–68; Ex. 1004, 4:35–42, 5:30–33, 6:6–19, 7:45–48, 12:47–51, 16:56–17:2, Fig. 2).

Patent Owner does not address the preamble. *See generally* PO Resp.

We reviewed the evidence cited by Petitioner and find that Kates-711 teaches the subject matter of the preamble. Therefore, we need not address whether the preamble is limiting.

⁹ For ease of reference, we utilize Petitioner’s claim annotations. *See* Pet. x–xi.

[1.a] a transceiver operable to wirelessly communicate packets of information over a wireless network;

Petitioner contends that Kates-711 “discloses that the sensor unit includes a ‘transceiver’ that wirelessly communicates ‘network communication packets’ over a wireless network.” Pet. 22 (citing Ex. 1002 ¶¶ 70–72); *see also id.* at 23–24 (citing Ex. 1004, 5:21–25, 6:29–30, 11:30–34, 12:26–30, 12:47–51, Figs. 2, 5).

Patent Owner does not address this limitation. *See generally* PO Resp.

We reviewed the evidence cited by Petitioner and find that Kates-711 teaches this limitation.

[1.b] a sensor operable to generate a indicator for a sensed condition;

Petitioner contends that Kates-711 “discloses the sensor unit including ‘sensor 201,’ which generates sensor data including a sensor ‘reading.’” Pet. 24 (citing Ex. 1002 ¶¶ 74–76); *see also id.* at 25–27 (citing Ex. 1004, 7:13–23, 12:47–51, 12:66–13:9, 13:7–23, 15:50–16:7, 21:1–5, Fig. 2).

Patent Owner does not address this limitation. *See generally* PO Resp.

We reviewed the evidence cited by Petitioner and find that Kates-711 teaches this limitation.

[1.c] a controller configured to poll the sensor at a polling interval to read the indicator during a current period of the polling interval and to selectively operate the transceiver to communicate information associated with the reading of the indicator;

Petitioner first refers to its contentions for the preamble and limitation 1.b. Pet. 27. Petitioner provides the following annotated version of Kates-711’s Figure 7:

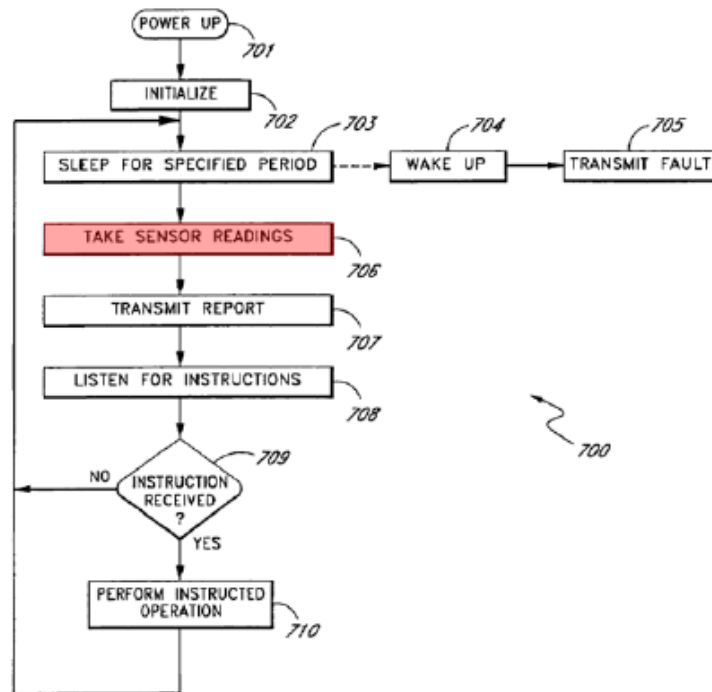


FIG. 7

Figure 7 “is a flow chart showing operation of a sensor unit that provides periodic monitoring.” Ex. 1004, 6:33–34. Petitioner annotates Figure 7 by highlighting block 706 in red which contains the text “Take Sensor Readings.” Pet. 29.

Petitioner contends that the sensor unit of Kates-711 “includes a ‘controller’ that provides control information to the sensor.” Pet. 27 (citing Ex. 1004, 12:47–51). Petitioner further contends that “the controller powers up the sensor to take a sensor reading” and “evaluates the sensor data, and if the sensor data is ‘deemed to be anomalous,’ the controller powers up and operates the transceiver to communicate the sensor data and related information, such as the sensor unit’s ID code.” *Id.* (citing Ex. 1004, 5:18–23, 7:60–8:12, 13:7–23, 15:50–16:7). According to Petitioner, “[b]ecause both the reading and the associated ID code information are transmitted, this element is met regardless of how it is interpreted.” *Id.* at 27–28 (citing Ex.

1002 ¶¶ 77–79); *see also id.* at 28–30 (citing Ex. 1004, 5:18–23, 12:47–51, 13:7–23, 13:57–14:5, 15:50–16:7, Figs. 2, 7).

Patent Owner does not address this limitation. *See generally* PO Resp.

We reviewed the evidence cited by Petitioner and find that Kates-711 teaches this limitation.

[1.d] a memory, the controller storing a reading of the indicator during the current period in the memory, where the memory stores at least one prior reading of the indicator made during a prior period of the polling interval;

Petitioner contends that Kates-711’s “controller is a conventional programmable microcontroller, and that the controller calculates values such as ‘a time weighted average’ based on ‘recent sensor readings’ and ‘less recent sensor readings.’” Pet. 30 (citing Ex. 1004, 12:62–64, 19:64–20:9, 21:1–16). Petitioner further contends that the “[s]ensor readings are taken once per period of the periodic monitoring, so the ‘less recent’ sensor readings are from periods of periodic monitoring prior to the ‘recent’ sensor readings.” *Id.* (citing Ex. 1004, 15:50–16:7). Petitioner further contends that “Kates-711 . . . discloses that the sensor unit includes a processor such as a Xilinx FPGA, which as understood or found obvious by a [person of ordinary skill in the art] would have used memory.” *Id.* (citing Ex. 1002 ¶¶ 81–83, Ex. 1004, 12:62–66) *id.* at 18 (“Kates-711 also teaches implementing the controller as a conventional programmable microcontroller or a XILINX FPGA; a [person of ordinary skill in the art] would have understood, and at least found obvious, both to include and/or use memory.” (citing Ex. 1002 ¶¶ 63–64; Ex. 1004, 12:61–66; Ex. 1041, 4:9–35; Ex. 1042, 1:9–22, 1:62–2:14)).

According to Petitioner, Kates-711 calculates an average of readings:

from a current period and from prior periods, and assigning different weights to those readings, using a processor . . . not only renders obvious but affirmatively discloses, this limitation because a [person of ordinary skill in the art] would have understood that a memory is used by the sensor unit for storage and retrieval of sensor data for use by the processor in those calculations during later periodic monitoring cycles.

Pet. 30–31 (citing Ex. 1002 ¶ 84); *see also id.* at 31 (citing Ex. 1004, 12:62–66, 15:50–16:7, 19:64–20:9).

Patent Owner does not address this limitation. *See generally* PO Resp.

We reviewed the evidence cited by Petitioner and find that Kates-711 teaches this limitation.

[1.e] wherein the transceiver is configured to transmit a most recent reading of the indicator stored in the memory during a period of a transmission interval in response to detecting a change in the sensed condition outside a predetermined range and wherein transmission of the most recent reading of the indicator stored in the memory during the period of the transmission interval is suspended in response to detecting a change in the sensed condition within the predetermined range.

Petitioner refers to its contentions for limitations 1.pre–1.d. Pet. 32. Petitioner contends that Kates-711 “discloses that during each period of ‘periodic monitoring,’ the sensor unit takes a sensor reading and enters a ‘report block 707’ for reporting the sensor reading to a monitoring computer.” *Id.* (citing Ex. 1004, 15:50–16:4).

Petitioner provides the following annotated version of Kates-711's Figure 7:

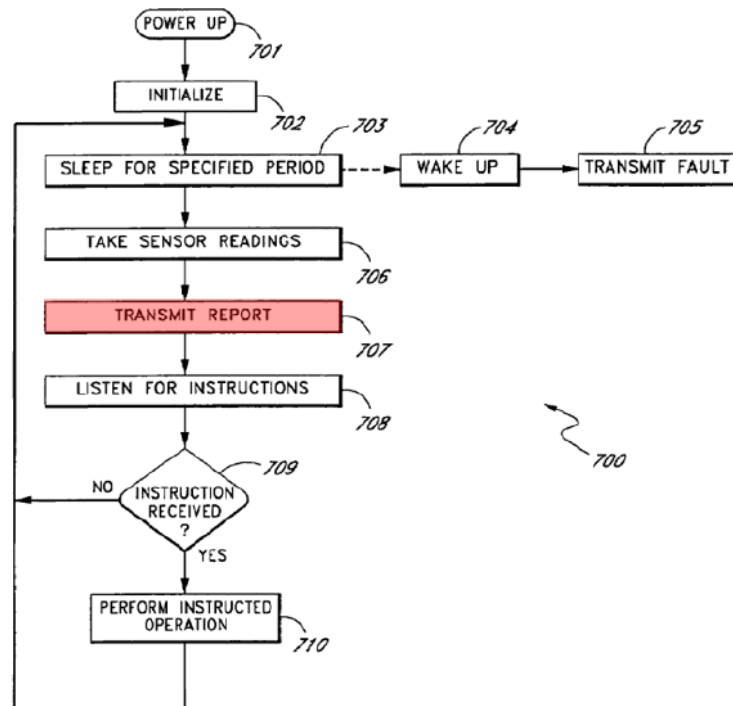


FIG. 7

Pet. 34. Figure 7 “is a flow chart showing one embodiment of operation of the sensor unit 102 wherein periodic monitoring is provided.” Ex. 1004, 15:50–52. Petitioner annotates Figure 7 by highlighting block 707 in red. Pet. 34. Block 77 contains the text “Transmit Report.” Ex. 1004, Fig. 7.

Petitioner further contends that Kates-711’s “sensor unit conserves power by not transmitting data that falls within a normal range: when the controller receives sensor data from the sensor . . . the controller evaluates the sensor data to determine if the sensor data should be transmitted.” Pet. 32 (citing Ex. 1002 ¶¶ 85–87; Ex. 1004, 13:8–23). Petitioner further contends that if the received sensor data is outside “predetermined” thresholds (*id.* at 33 (citing Ex. 1004, 13:16–23, 20:9–49), “the data is deemed . . . ‘sufficiently anomalous’ and ‘necessary’ to transmit, and

transmission occurs.” *Id.* at 32 (citing Ex. 1004, 4:39–42, 5:12–16, 13:8–23). Petitioner further contends that if the sensor data is within the predetermined thresholds, “then transmission of the sensor data is suspended ‘by not transmitting data that falls within a normal range.’” *Id.* (citing Ex. 1004, 13:8–23); *see also id.* at 34–36 (citing Ex. 1004, 4:6–9, 4:39–42, 5:12–17, 13:8–23, 15:50–16:4, 20:9–49).

Patent Owner argues that the plain and ordinary meaning of “‘transmission interval’ is . . . the space of time between successive transmission periods.” PO Resp. 16 (citing Ex. 2006 ¶ 46). Patent Owner then contends that “the ‘report block 707’ is not ‘a space of time between events or states,’ and is therefore not a ‘transmission interval.’” *Id.*

Patent Owner further contends that Petitioner’s “reliance on the disclosure ‘report block 707’ in Kates-711 . . . fails to satisfy the ‘transmission interval’ requirement” because “[t]he ‘report block 707’ only performs the step of transmitting the sensor report.” PO Resp. 16 (citing Ex. 2006 ¶ 50). According to Patent Owner, “[t]his step is not periodic and not an interval” and “[n]or does ‘report block 707’ occur within a periodic interval other than the period in which the sensor measurement is taken, i.e., within the ‘polling interval.’” *Id.* Patent Owner further contends that Petitioner “does not explain how the ‘report block 707’ could be a ‘transmission interval,’ let alone an interval that is separate from the identified ‘polling interval’ in which the ‘report block 707’ is contained.” *Id.*

Petitioner replies “the ’887 specification discloses “transmission intervals that include transmission periods.” Pet. Reply 2–3 (citing Ex. 1001, 9:27–30, 10:59–63, Fig. 4; Ex. 1052 ¶ 10). Petitioner contends that

Kates-711 “disclose[s] a process of ‘periodic monitoring’ during which the system periodically performs a process in which it ‘enters a block 706 where the sensor unit 102 takes a sensor reading from the sensor[s] 201’ and subsequently sends the sensor data “to the monitoring computer 113 in report block 707.” *Id.* at 9 (citing Ex. 1004 15:50–16:4; Pet. 32). Petitioner contends that “[e]ach of the periodic intervals of ‘periodic monitoring’ is a [1.e] ‘transmission interval,’ during which there is a [1.e] ‘transmission period that includes a ‘report block.’” *Id.* Petitioner further argues that Kates-711 “explicitly disclose[s] that ‘the sensor unit 102 reports [sensor] readings at **regular intervals**.’” *Id.* (citing Ex. 1004, 18:56–57; Pet. 22, 27) (second alteration in original). Petitioner further contends that these teachings “disclose the claimed ‘transmission period’ within a ‘transmission interval.” *Id.*; *see also id.* at 10 (“the Petition explains that the ‘report block 707’ occurs during an ‘interval’ (which Kates-711 . . . call[s] a period’) of ‘periodic reporting’”). According to Petitioner, “[b]ecause this ‘report block 707’ occurs at each interval of periodic reporting, Kates-711 . . . disclose[s] a period of time including the ‘report block’ (i.e., [1.e] transmission period) that repeats in each interval ([1.e] transmission interval) of periodic reporting.” *Id.* at 11 (citing Ex. 1052 ¶ 23).

Petitioner next contends that if Patent Owner is contending that “the polling and transmission periods must be separate, then as cited in the Petition, ‘report block 707’ and ‘block 706’ are separate, periodic blocks that each occur at different, non-overlapping times.” Pet. Reply 11 (citing Pet. 32–35; Ex. 1004, 15:50–16:4). Petitioner further contends that if Patent Owner is contending “that there have to be distinct periodic transmission and polling intervals, then Kates-711 . . . disclose[s] transmission intervals that

start at different times: transmission intervals that begin at each ‘report block’ 707, and polling intervals that begin at each sensor reading block 706.” *Id.* (citing Pet. 22, 32, 24–29).

In the Sur-reply, Patent Owner argues that Kates-711 does not disclose the recited “transmission interval” because it “only describe[s] ‘periodic monitoring’ or ‘sensing intervals’” not “a space between successive transmission periods.” Sur-reply 12. Patent Owner further argues that “Petitioner’s reliance on blocks within the ‘sensing’ periods of Kates-711 . . . where the sensed data is transmitted if it falls outside of a predetermined threshold is misplaced” because “[e]ach block represents an event occurring in a loop without reference to whether that event occurs during a period of a transmission interval (or a polling interval).” *Id.* at 13. Patent Owner next argues that Petitioner’s argument that blocks 706 and 707 in Kates-711’s Figure 7 correspond to the polling period and transmission period because they “are separate blocks is conclusory and does not account for either a polling interval or a transmission interval.” *Id.* Patent Owner next argues that “Petitioner’s argument that the polling intervals and transmission intervals start at different times because they start with the block 706 and 707 . . . does not account for a transmission interval in which the transmission is suspended.” *Id.* According to Patent Owner, “[u]nder Petitioner’s reasoning, each transmission interval would be limited to each repetition of block 707 in the loop without consideration of whether the transmission was suspended or not” while in the ’887 patent, “a single transmission interval may cover multiple polling intervals.” *Id.* at 14 (citing Ex. 2006 ¶ 33).

For the following reasons, we find that Kates-711 discloses a transmission interval.

In the Patent Owner Response and Sur-reply, Patent Owner argued that “the ‘transmission interval’ is the space of time between successive transmission periods.” PO Resp. 16; Sur-reply 12 (arguing Kates-711 does not “describe a space of time between successive transmission periods.”). At the oral hearing, Patent Owner argued that “transmission interval” as shown in the Specification encompasses “from the end of one [transmission] period and then includes the next period and ends at the end of that. So it’s an end-to-end.” Tr. 77:6–8; *see also id.* at 78:6–10.

Figure 4 of the ’887 patent reproduced below:

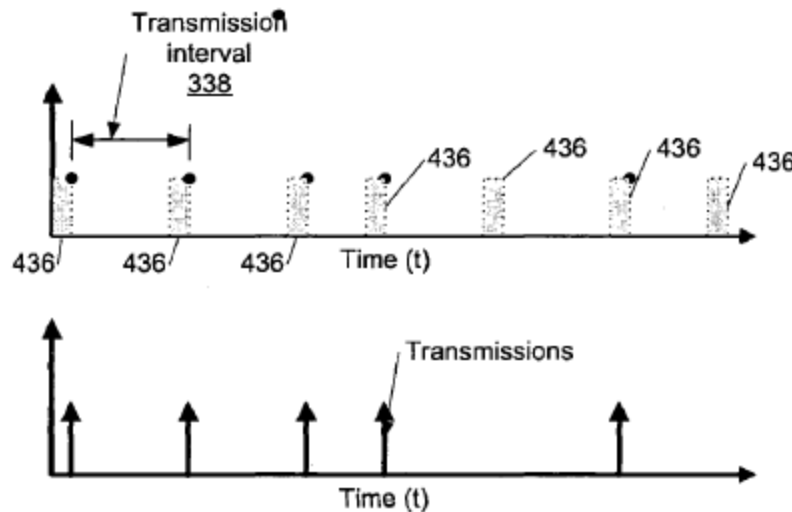


Figure 4

Figure 4 “illustrates a timing chart for the transmission of information for a device configured for dynamic value reporting.” Ex. 1001, 2:48–50. The Specification of the ’887 patent provides that “interval 338 may be considered a time beginning at the start of a period 336 and ending at the start of the next consecutive interval 338.” *Id.* at 9:28–30. Patent Owner’s argument that a transmission interval is the space of time between

transmission periods is unsupported by the Specification which teaches that a transmission interval encompasses at least one transmission period. *Id.* at Fig. 4.

Patent Owner argues that Kates's report block 707 does not correspond to the recited "transmission interval" because it "is not 'a space of time between events or states.'" PO Resp. 16. Because this argument is based on an incorrect interpretation of "transmission interval," the argument is unavailing. Further, to the extent that any of Patent Owner's other arguments are based on its incorrect interpretation of "transmission interval," those arguments are unavailing.

Limitation 1(e) requires a "transceiver configured to transmit a most recent reading of the indicator stored in the memory during a period of a transmission interval in response to detecting a change in the sensed condition outside a predetermined range." Ex. 1001, 14:63–67. This limitation also requires that "during the period of the transmission interval" the transmission "is suspended in response to detecting a change in the sensed condition within the predetermined range." *Id.* at 14:67–15:4. Petitioner, therefore, must show that Kates-711 discloses a transceiver configured to transmit information or suspend transmission of the information during a "period" within a "transmission interval."

For the recited "transmission interval," Petitioner contends that Kates's "periodic intervals of 'periodic monitoring' is a [1.e] 'transmission interval,' during which there is a [1.e] 'transmission period' that includes a 'report block.'" Pet. Reply 9. We agree with Petitioner for the following reasons.

Kates describes the process shown in Figure 7 as follows:

FIG. 7 is a flowchart showing one embodiment of operation of the sensor unit 102 wherein periodic monitoring is provided. In FIG. 7, a power up block 701 is followed by an initialization block 702. After initialization, the sensor unit 102 enters a low-power sleep mode. If a fault occurs during the sleep mode (e.g., the tamper sensor is activated), then the process enters a wake-up block 704 followed by a transmit fault block 705. If no fault occurs during the sleep period, then when the specified sleep period has expired, the process enters a block 706 where the sensor unit 102 takes a sensor reading from the sensor(s) 201. The sensor data is subsequently sent to the monitoring computer 13 in a report block 707. After reporting, the sensor unit 102 enters a listen block 708 where the sensor unit 102 listens for a relatively short period of time for instructions from monitoring computer 708. If an instruction is received, then the sensor unit 102 performs the instructions, otherwise, the process returns to the sleep block 703.

Ex. 1004, 15:50–65.

Based on this description of Figure 7, we find that Kates’s report block 707 corresponds to the recited “a period of the transmission interval” because it is a period of time when “sensor data is . . . sent to the monitoring computer.” Ex. 1004, 15:61. Further, block 707 is within an interval of “periodic monitoring” i.e., the process loop shown in Figure 7 beginning at block 703 and comprising steps 703, 706, 707, 708, 709, 710 and back to block 703. *See also* Ex. 1052 ¶ 22 (Dr. Neikirk testifying “each of [Kates’s] periodic intervals during which the ‘periodic monitoring’ process occurs is a ‘transmission interval’ . . . and the report block’ that occurs within this process is a transmission period.” (citations omitted)).

Patent Owner’s primary contention is that “Petitioner’s argument . . . does not account for a transmission interval in which the transmission is suspended” and that “[u]nder Petitioner’s reasoning, each transmission interval would be limited to each repetition of block 707 in the loop without

consideration of whether the transmission was suspended or not.” Sur-reply 13–14. At the oral hearing, Patent Owner argued that Petitioner’s “identified transmission period or period of a transmission interval as the claim says, it’s here when you’re going to transmit, but it leaves out that last wherein clause because this block doesn’t exist anymore when you’re not going to transmit. You don’t enter into it at all.” Tr. 90:3–6. This argument is unavailing for the following reasons.

Patent Owner does not cite to any portion of Kates-711 that would support a finding that the process shown in Figure 7 does not enter report block 707 when transmission is suspended. PO Resp. 14–17; Sur-reply 11–14. Our review of Kates-711 indicates that Kates-711 does not teach that report block 707 does not exist or is not entered when transmission is suspended. Rather, block 707 is part of a loop when transmission may or may not occur depending on whether the sensed data is anomalous. Ex. 1004, 13:14–23, 15:60–62. We note that Mr. De La Iglesia does not testify that the process shown in Figure 7 does not enter report block 707 if transmission is suspended in Kates-711. *See* Ex. 2006 ¶¶ 48–50. Thus, Patent Owner’s argument on this point is unsupported attorney argument.

Nonetheless, we find that the argument is contrary to the disclosure of Kates because Figure 7 shows steps 708, 709, and 710 subsequent to report block 707. Ex. 1004, 15:62–67, Fig. 7. Patent Owner conceded at the oral hearing that the progression of steps in the loop shown in Figure 7 does not stop if transmission is suspended during report block 707. Tr. 100:12–18.

Apart from its argument that Kates-711 does not disclose a “transmission interval,” Patent Owner also argues that Kates-711 does not disclose that “transmission of the most recent reading of the indicator . . . is

suspended” because it only “describe[s] refraining from transmission.” PO Resp. 17. According to Patent Owner, Kates-711 “only describe[s] making a decision to transmit or not-to-transmit.” *Id.* (citing Ex. 1004, 14:4–16); *see also id.* at 18 (“Simple forbearance is not ‘stopping’ a ‘transmission . . . that would otherwise occur.’” (citing Ex. 2006 ¶ 52)) (alterations in original).

Petitioner replies that transmission occurs during each periodic report block 706 “if the data is deemed ‘sufficiently anomalous.’” Pet. Reply 13 (citing Ex. 1002 ¶¶ 88–89; Ex. 1004, 4:39–42, 5:12–16, 13:8–23). Petitioner contends that “[b]ecause the determination of whether to transmit occurs during each interval of ‘periodic monitoring,’ . . . this ‘report block’ occurs periodically” and “[s]uch periodic transmission that would otherwise occur, however, is suspended or stopped . . . when the sensor data falls within a normal range,’ at least until the next transmission cycle.” *Id.* at 14 (citing Ex. 1002 ¶¶ 88–89; Ex. 1004, 13:8–23, 15:50–16:4; Ex. 1052 ¶ 30).

Petitioner next contends that “[t]o the extent PO argues that suspending requires suspending the transmission to occur ‘during the period of the transmission interval’ or that the transmission is ‘pending’ before suspension . . . that argument improperly reads in a requirement that is disclosed in only one embodiment of the specification and relies on PO’s improper construction of ‘transmission interval.’” Pet. Reply 15. Petitioner further contends that “even under PO’s exacting demand for disclosure of a specific ‘transmission period,’ the determination of whether to suspend occurs during the ‘report block’ 707 because this block occurs after the device ‘takes a sensor reading’ at block 706—only then can the processor determine whether to suspend ‘normal’ data.” *Id.* at 16 (citing Ex. 1004, 13:14–19, 15:57–62; Ex. 1052 ¶ 34).

In the Sur-reply, Patent Owner argues that “Petitioner does not contend that Kates-711 . . . disclose[s] ‘suspending’ a transmission that would otherwise have been made during the period of the transmission interval.” Sur-reply 15. Patent Owner reiterates its argument that Kates-711’s disclosure of not transmitting data that falls within a normal range does not meet the requirement of claim 1 that the transmission is suspended. *Id.*

As discussed above in our claim construction analysis, we determine that “suspended” encompasses both stopping a transmission that would otherwise occur such as overriding a flag and not making a transmission when there is no change in an indicator or the indicator is within a limit. Kates-711 discloses “not transmitting data that falls within a normal range” and transmitting data that is “outside the threshold” such as “a high threshold, a low threshold, or a high-low threshold.” Ex. 1004, 13:14–19. Based on this disclosure, we find that Kates-711 discloses “wherein transmission of the most recent reading of the indicator . . . is suspended in response to detecting a [change] in the sensed condition within the predetermined range.”

Based on our review of Petitioner’s contentions and evidence and for the foregoing reasons, we find that Kates-711 teaches this limitation.

Summary of Claim 1

For all the foregoing reasons, we determine that Petitioner establishes by a preponderance of the evidence that claim 1 is unpatentable over Kates-711.

3. *Claim 3*

Claim 3 depends from claim 1 and recites “where an upper limit and a lower limit of the predetermined range may be varied.” Ex. 1001, 15:10–12.

Petitioner contends that Kates-711’s “sensor unit has an ‘adjustable-threshold’ calculated by using, *e.g.*, an average of a number of sensor measurements.” Pet. 36 (citing Ex. 1004, 19:64–20:9). Petitioner further contends that the thresholds are defined as “high,” “low,” “high-low,” or “inner range.” *Id.* (citing Ex. 1004, 16:16–23, 20:20–49). According to Petitioner, “[a]djusting the limits of such thresholds—*e.g.*, a ‘high-low’ or ‘inner range’ threshold—not only renders obvious but affirmatively discloses, changing one or both of the upper limit and the lower limit of the threshold.” *Id.* (citing Ex. 1002 ¶¶ 91–93; Ex. 1004, 1:46–54, 3:62–67, 24:7–16).

Patent Owner does not address claim 3. *See generally* PO Resp.

We reviewed the evidence cited by Petitioner and find that Kates-711 teaches the subject matter of claim 3.

For the foregoing reasons, we determine that Petitioner establishes by a preponderance of the evidence that claim 3 is unpatentable over Kates-711.

4. *Claim 4*

Claim 4 depends from claim 1 and recites “where the upper limit and lower limit may be varied according to an analysis of the most current reading of the indicator and the at least one prior reading of the indicator.” Ex. 1001, 15:13–16.

Petitioner relies on its contentions for claim 3. Pet. 37. Petitioner further contends Kates-711’s “upper and lower limit of the predetermined range are automatically varied based on *e.g.*, an ‘average value of the sensor

reading’ over the current and prior readings of the indicator—disclosing this element.” *Id.* (citing Ex. 1002 ¶¶ 94–96; Ex. 1004, 19:64–20:9).

Patent Owner does not address claim 4. *See generally* PO Resp.

We reviewed the evidence cited by Petitioner and find that Kates-711 teaches the subject matter of claim 4.

For the foregoing reasons, we determine that Petitioner establishes by a preponderance of the evidence that claim 4 is unpatentable over Kates-711.

5. Claim 5

Claim 5 depends from claim 1 and recites “where the transceiver is configured to transmit the most recent reading of the indicator stored in the memory during a period of the transmission interval in response to detecting a sensed condition beyond a band limit.” Ex. 1001, 15:17–21.

Petitioner argues that the ’887 patent teaches “using a ‘band limit’ to detect an ‘extreme condition’ based on a ‘difference’ between sensor values using different limits.” Pet. 38 n.10 (citing Ex. 1001, 3:32–35, 10:23–30; Ex. 1002 ¶ 99). Petitioner relies on its contentions for claim 3 and in particular the disclosure of “an ‘inner range threshold’ that has upper and lower limits based on either a value or rate of change.” *Id.* at 38. Petitioner further contends that Kates-711 “discloses a band limit because the thresholds are used to issue ‘alerts’ when a sensor value changes.” *Id.* (citing Ex. 1004, 20:20–49). Petitioner contends that “Kates-711 teaches using a rate-of-change threshold to trigger a ‘warning’ or ‘alarm; based on ‘high,’ ‘medium,’ or ‘low’ changes in sensor readings” and according to Petitioner an ordinarily skilled artisan “would have understood that detecting whether a sensed condition that falls outside of both upper and lower limits

of an inner range threshold discloses detecting a sensed condition beyond a band limit.” *Id.* (citing Ex. 1002 ¶¶ 97–99).

Patent Owner does not address claim 5. *See generally* PO Resp.

We reviewed the evidence cited by Petitioner and find that Kates-711 teaches the subject matter of claim 5.

For the foregoing reasons, we determine that Petitioner establishes by a preponderance of the evidence that claim 5 is unpatentable over Kates-711.

6. *Claim 6*

Claim 6 depends from claim 5 and recites “where an upper band limit and lower band limit may be varied.” Ex. 1001, 15:22–23.

Petitioner contends that “Kates-711 discloses this claim for the same reasons discussed for [claim 3] (which recites similar limitations with respect to ‘upper’ and ‘lower’ limits rather than ‘band’ limits) and [claim 5] (which recites a band limit).” Pet. 39 (citing Ex. 1002 ¶¶ 100–102).

Patent Owner does not address claim 6. *See generally* PO Resp.

We reviewed the evidence cited by Petitioner and find that Kates-711 teaches the subject matter of claim 6.

For the foregoing reasons, we determine that Petitioner establishes by a preponderance of the evidence that claim 6 is unpatentable over Kates-711.

7. *Claim 7*

Claim 7 depends from claim 5 and recites “where the upper band limit and lower band limit may be varied according to an analysis of the most current reading of the indicator and the at least one prior reading of the indicator.” Ex. 1001, 15:24–27.

Petitioner contends that “Kates-711 discloses this claim for the same reasons as discussed for [claim 4] (which recites similar limitations with

respect to ‘upper’ and ‘lower’ limits rather than ‘band’ limits) and [claim 5] (which recites a band limit).” Pet. 39 (citing Ex. 1002 ¶¶ 103–105).

Patent Owner does not address claim 7. *See generally* PO Resp.

We reviewed the evidence cited by Petitioner and find that Kates-711 teaches the subject matter of claim 7.

For the foregoing reasons, we determine that Petitioner establishes by a preponderance of the evidence that claim 7 is unpatentable over Kates-711.

8. *Claim 8*

Claim 8 depends from claim 1 and recites “where the transceiver is configured to transmit the most recent reading of the indicator stored in the memory in response to an externally-received transmission control signal received over the wireless network.” Ex. 1001, 15:28–32.

Petitioner contends that Kates-711 “discloses that a device’s sensor unit performs measurements using a ‘combination[]’ of both periodic measurements and measurements in response to external commands from, e.g., computer 113; measurements in response to external commands meet this element.” Pet. 40 (citing Ex. 1002 ¶¶ 106–108; reproducing Ex. 1004, Figure 1 with annotations by Petitioner) (alterations in original); *id.* at 40–41 (quoting Ex. 1004, 4:56–64, 5:12–17, 6:57–63, 8:23–29, 13:26–28).

Patent Owner does not address claim 8. *See generally* PO Resp.

We reviewed the evidence cited by Petitioner and find that Kates-711 teaches the subject matter of claim 8.

For the foregoing reasons, we determine that Petitioner establishes by a preponderance of the evidence that claim 8 is unpatentable over Kates-711.

9. *Claim 18*

Claim 18 depends from claim 1 and recites “where the sensor is configured to sense an environmental condition.” Ex. 1001, 16:24–25.

Petitioner relies on its contentions for limitation [1.b]. Pet. 41. Petitioner further contends that Kates-711 “discloses that the sensor is configured to sense environmental conditions such as smoke, temperature, or humidity.” *Id.* (citing Ex. 1002 ¶¶ 109–111; Ex. 1004, 12:66–13:7).

Patent Owner does not address claim 18. *See generally* PO Resp.

We reviewed the evidence cited by Petitioner and find that Kates-711 teaches the subject matter of claim 18.

For the foregoing reasons, we determine that Petitioner establishes by a preponderance of the evidence that claim 18 is unpatentable over Kates-711.

E. Ground 2: Alleged Obviousness of Claims 1, 3–8, and 18 over Kates-711 and Hitt

Petitioner contends that “Hitt provides explicit teachings of a memory storing information.” Pet. 42. For this alternative challenge, Petitioner relies on Hitt for the “memory” recited in limitation [1.d], [1.e], and claim 5. *Id.*

Patent Owner does not address this challenge. *See generally* PO Resp.

We begin with a summary of Hitt and then analyze Petitioner’s contentions.

1. *Hitt (Ex. 1005)*

Hitt is titled “Distributed Environmental Control in a Wireless Sensor System.” Ex. 1005, code (54). Hitt discloses a method of providing environmental monitoring and control that “includes providing a network of

wireless nodes, the wireless nodes include an array of sensor nodes and an array of actuator nodes, each wireless node including a wireless transceiver, a processor and one of a sensor device or an actuator device.” *Id.* ¶ 27. Hitt discloses that “the processor receives the data related to the sensor or actuator” or the data may be stored in a memory and retrieved from the memory by the processor. *Id.* ¶ 67.

2. *Analysis*

Motivation to Combine and Reasonable Expectation of Success

Petitioner contends that “[w]hile Kates-711’s teachings not only render obvious but also disclose the ‘memory’ elements ([1.d]-[1.e], [5]), Hitt provides explicit teachings of a memory storing information as claimed.” Pet. 42. Petitioner further contends that Hitt’s memory 155 “stores instructions for execution by processor 156 and also stores periodically sampled sensor data for retrieval by the processor for processing and/or transmission.” *Id.* at 43 (citing Ex. 1002 ¶ 112; Ex. 1005 ¶¶ 65, 67–68). According to Petitioner, an ordinarily skilled artisan “would have been motivated to modify Kates-711’s sensor units with Hitt’s teachings of ‘memory’ to achieve the beneficial and predictable result of utilizing a memory to securely store sensor readings.” *Id.* (citing Ex. 1002 ¶ 114). Petitioner argues that an ordinarily skilled artisan would have been further motivated to modify Kates-711 “by storing these sensor values in memory as taught by Hitt to improve reliability” in light of Hitt’s teaching that “storage of sensor values in memory . . . ensur[es] that the values are available for calculations and not unintentionally lost or erased, *e.g.*, due to power outages or interruptions.” *Id.* at 44–45 (citing Ex. 1002 ¶ 116; Ex. 1005 ¶¶ 67–68).

Petitioner next contends that an ordinarily skilled artisan would have had a reasonable expectation of success because Kates-711 “discloses that its controller may be a ‘conventional programmable microcontroller’; such microcontrollers were well-understood to commonly use a memory to, *e.g.*, track data variables used for control applications.” Pet. 45 (citing Ex. 1002 ¶ 117).

We have reviewed Petitioner’s evidence and contentions and find that Petitioner establishes that an ordinarily skilled artisan would have been motivated to modify Kates-711 with the teachings of Hitt and would have had a reasonable expectation of success. Ex. 1002 ¶¶ 112–117.

3. *Claim 1*

For limitation 1[d], Petitioner contends that “Hitt explicitly discloses a ‘memory’ for storing periodically sampled sensor data, which is aggregated in the memory for processing and transmission.” Pet. 46 (citing Ex. 1005 ¶¶ 67–68). According to Petitioner, an ordinarily skilled artisan “would have been motivated to modify Kates-711 with this teaching to advantageously allow the sensor device to track prior sensor readings to, *e.g.*, effectuate Kate-711’s teachings of performing calculations using current and prior sensor readings” and “would have found it obvious to utilize a memory to securely store readings from a current period and prior readings from prior periods.” *Id.* (citing Ex. 1002 ¶¶ 118–120).

We have reviewed Petitioner’s evidence and arguments and find that the combination of Kates-711 and Hitt teaches limitation [1.d].

For limitation [1.e], Petitioner contends that Hitt’s disclosure of “periodically sampl[ing] the sensor’ and “aggregate[ing] [the sensor data] into a local memory for processing and/or transmission” corresponds to the

requirement of limitation [1.e] of “a most recent reading of the indicator stored in the memory and retrieved from the memory for processing and/or transmission.” Pet. 46 (citing Ex. 1002 ¶¶ 121–123; Ex. 1005 ¶¶ 46, 49, 67–68, Fig. 2A) (alterations in original). Petitioner further contends that “[e]ach successive sensor data sampled and stored in memory is a most recent reading stored in the memory.” *Id.* (citing Ex. 1002 ¶ 123). Petitioner further contends that an ordinarily skilled artisan “would have been motivated to modify Kates-711 with Hitt’s teachings of aggregating sensor data in the memory for processing and transmission to yield a system in which the most recent reading of the indicator is stored in memory before transmission (*e.g.*, when it represents an anomalous condition).” *Id.* at 46–47.

We have reviewed Petitioner’s evidence and arguments and find that the combination of Kates-711 and Hitt teaches limitation [1.e].

For the foregoing reasons, Petitioner establishes by a preponderance of the evidence that claim 1 is unpatentable over the combination of Kates-711 and Hitt.

4. *Claims 5 and 8*

For claims 5 and 8, Petitioner relies on its contentions for limitations [1.d] and [1.e]. Pet. 47.

We have reviewed Petitioner’s evidence and arguments and find that the combination of Kates-711 and Hitt teaches the subject matter of claims 5 and 8.

For the foregoing reasons, Petitioner establishes by a preponderance of the evidence that claim 5 and claim 8 are unpatentable over the combination of Kates-711 and Hitt.

5. *Claims 3, 4, 6, and 7*

Petitioner argues that these dependent claims are rendered obvious with the addition of Hitt to Kates-711 described above. Pet. 47.

For the reasons discussed above and in connection with Ground 1, we determine that Petitioner establishes that claims 3, 4, 6, and 7 are unpatentable over the combination of Kates-711 and Hitt.

F. Grounds 3 and 4: Alleged Obviousness of Claims 1, 3–8, 14, 15, and 18 over Kates-711 and Littrell and Kates-711, Hitt, and Littrell

Petitioner contends that Claims 1, 3–8, 14, 15, and 18 are unpatentable over Kates-711 and Littrell and Kates-711, Hitt, and Littrell. Pet. 47. Patent Owner does not address Grounds 3 and 4. *See generally* PO Resp.

We begin with a brief overview of Littrell and then analyze Petitioner’s contentions.

1. *Littrell (Ex. 1006)*

Littrell is titled “Methods and Apparatus for Providing Alarm Notification.” Ex. 1006, code (54). Littrell is directed to “[a] method for indicating an alarm condition in an industrial process includes measuring a parameter of the industrial process that varies over time.” *Id.* at code (57).

Littrell discloses sensing an “operating characteristic subject to an alarm condition.” Ex. 1006 ¶ 14. “A data acquisition system 16 receives data from one or more sensors 14” and may be “networked in some configurations to a computer 18.” *Id.* Computer 18 “compris[es] decision support software or firmware 22, which in turn includes a step change rule module 24” that “is configured to track a ‘normal variation of a parameter.’” *Id.* ¶¶ 14–15. If a sudden change in the parameter occurs, decision support

software 22 “instruct[s] computer 18 to raise an alarm condition.” *Id.* ¶ 15. Step change rule module 24 “provides an upper and lower bound for each parameter tracked by one or more sensors.” *Id.*

Littrell discloses that “a parameter measurement 102 is latched by latch 104 at suitable intervals, e.g., once every four seconds, or at any other interval suitable for observing and monitoring the industrial process.” Ex. 1006 ¶ 30. “Latch 104 feeds a FIFO (first-in, first-out) buffer 106, which holds predetermined numbers of values of the latched parameter” such as “the last 20 latched values of the parameter.” *Id.*

2. Analysis

Motivation to Combine and Reasonable Expectation of Success

Petitioner argues that “Kates-711 teaches various processes that imply the use of timing data associated with sensed conditions” but “leaves it to a [person of ordinary skill in the art] the details of how such timing data is acquired.” Pet. 52 (citing Ex. 1002 ¶ 133). Petitioner points to Kates-711’s disclosure that its “monitoring computer ‘maintains a history of humidity readings for various sensor units’” and its disclosure of various thresholds and adjustment of thresholds. *Id.* (citing Ex. 1004, 17:63–67). Based on this, Petitioner argues that an ordinarily skilled artisan “would have been motivated to modify Kates-711 with Littrell.” *Id.* at 53 (citing Ex. 1002 ¶ 133).

Petitioner contends that “Littrell teaches time-stamping sensor data and making this time-stamp information available to computers networked to the sensors and their data acquisition systems” and that it also “teaches that parameters and their associated upper and lower limits are tracked and analyzed based on times.” Pet. 53 (citing Ex. 1006 ¶¶ 14, 15, 29, 31, 32, 34–

38, Fig. 3). According to Petitioner, an ordinarily skilled artisan “would have been motivated to modify Kates-711’s time history teachings with Littrell’s teaching of communicating timing data to facilitate computing ‘time’ averages, establishing ‘time’ histories, and making determinations related to ‘when’ conditions occur.” *Id.* (citing Ex. 1002 ¶ 134). Petitioner also argues that “it was understood in the art that storing timing data representative of the time when the sensor data was read was most useful for providing accurate and exact records for the histories used in Kates-711.” *Id.* (citing Ex. 1002 ¶ 134; Ex. 1008 ¶¶ 19, 60).

Petitioner next contends that “Littrell provides additional mathematical details for implementing the type of thresholds taught by Kates-711.” Pet. 54 (citing Ex. 1002 ¶ 135; Ex. 1006 ¶¶ 15–28). According to Petitioner, an ordinarily skilled artisan would have been additionally motivated “to modify Kates-711 to use Littrell’s particular formula (or obvious variations thereof), to advantageously effectuate Kates-711’s adjustable thresholds and calculate upper and lower limits on a time-based average.” *Id.* (citing Ex. 1002 ¶ 135); *see also id.* at 55 (arguing that applying Littrell’s specific formula for adjusting threshold to Kates-711’s known device would yield the predictable result of varying the thresholds of Kates-711 according to Littrell’s formula).

Petitioner also contends that an ordinarily skilled artisan “would have had a reasonable expectation of success in applying Littrell’s teachings of timing data and adjustable thresholds to Kates-711’s sensor system (alone or in view of Hitt, which further teaches storing the data in memory) which makes use of time-related functions and calculations and adjusts thresholds.” Pet. 55. According to Petitioner, an ordinarily skilled artisan “would have

found it obvious and straightforward to store and transmit the timing data and to implement Littrell’s exemplary equations.” *Id.* (citing Ex. 1002 ¶ 137).

We have reviewed Petitioner’s evidence and contentions and find that Petitioner establishes that an ordinarily skilled artisan would have been motivated to modify Kates-711 and/or Hitt with the teachings of Littrell and would have had a reasonable expectation of success. Ex. 1002 ¶¶ 127–137.

3. *Claims 1, 3–8, and 18*

Petitioner contends that “Littrell discloses communicating information associated with the reading” of the indicator in claim 1.¹⁰ Pet. 56 (emphasis omitted). Petitioner contends that “Littrell teaches that sensor data are time-stamped and that the time stamped information is further made available to computers networked to the sensors and their data acquisition systems—disclosing that the time-stamp information associated with a sensor reading is also communicated.” *Id.* (citing Ex. 1002 ¶¶ 138–139; Ex. 1006 ¶¶ 14, 15, 29, 31, 32). According to Petitioner, an ordinarily skilled artisan would have been motivated to combine Kates-711 and Littrell “to advantageously effectuate Kates-711’s time-based processes using accurate time representations of the sensor data, yielding a system in which Littrell’s time stamp information is communicated along with readings of the indicator from Kates-711’s sensor to, *e.g.*, facilitate more accurate analysis of that data” and thereby rendering claims 1, 3–8 and 18 obvious. *Id.* at 56–57 (citing Ex. 1002 ¶¶ 140, 141).

¹⁰ Petitioner refers to limitation [1.e] which appears to be a typographical error because the claim language quoted by Petitioner appears in limitation [1.c]. Ex. 1001, 14:53–57, p. 15 (Cert. of Correction dated June 29, 2010).

We have reviewed Petitioner’s evidence and arguments and find that the combinations of Kates-711 and Littrell and Kates-711, Hitt, and Littrell both teach limitation [1.e].

For the foregoing reasons, Petitioner establishes by a preponderance of the evidence that claim 1 is unpatentable over the combinations of Kates-711 and Littrell and Kates-711, Hitt, and Littrell as well as claim 3–8 and 18 which depend from claim 1.¹¹

4. *Claims 14 and 15*

For claim 14, Petitioner contends that “Littrell discloses storing and transmitting timestamps of parameter measurements” and that Littrell’s “time stamp information is maintained with its associated measurement when the sensor data is taken by sensor 14 and acquired by data acquisition system 16.” Pet. 58 (citing Ex. 1006 ¶¶ 14, 32, Fig. 2). Petitioner further contends that “[t]he time stamp is stored with the measurement because it is then transmitted with the sensor data to computer 18 for analysis.” *Id.* (citing Ex. 1006 ¶¶ 15, 30, 32, Fig. 1). According to Petitioner, “[w]hen the computer detects an alarm condition, the time stamp is logged.” *Id.* at 58–59 (citing Ex. 1002 ¶¶ 146–149; Ex. 1006 ¶ 32).

Petitioner further contends that an ordinarily skilled artisan “would have been motivated to modify Kates-711 in view of Hitt with this teaching to store and transmit timing data, which provides accurate time representations of the sensor data to effectuate Kates-711’s timing-based procedures.” Pet. 59 (citing Ex. 1002 ¶ 150).

¹¹ Petitioner submits additional alternative contentions why Littrell discloses the subject matter of claims 3–7. Pet. 57. Given our determination that claims 3–7 are unpatentable over Kates-711 and Littrell and Kates-711, Hitt, and Littrell, we do not reach these alternative contentions for claims 3–7.

We have reviewed Petitioner’s contentions and evidence and find that the combinations of Kates-711 and Littrell and Kates-711, Hitt, and Littrell both teach the subject matter of claim 14. Ex. 1002 ¶¶ 146–150; Ex. 1006 ¶¶ 30, 32).

For the foregoing reasons, Petitioner establishes by a preponderance of the evidence that claim 14 is unpatentable over the combinations of Kates-711 and Littrell and Kates-711, Hitt, and Littrell.

For claim 15, Petitioner relies on its contentions for limitation [1.e] and claim 14. Pet. 60. Petitioner contends that “[i]n addition to Kates-711’s teachings of transmitting recent and prior readings . . . Littrell discloses transmitting timestamps of parameter measurements. *Id.* at 60–61 (citing Ex. 1006 ¶¶ 14, 15, 32). According to Petitioner, an ordinarily skilled artisan “would have been motivated to modify Kates-711 with this teaching to transmit the timing data and provide accurate time representations of the sensor data to effectuate Kates-711’s timing-based processes.” *Id.* at 61 (citing Ex. 1002 ¶¶ 151–153).

We have reviewed Petitioner’s contentions and evidence and find that the combinations of Kates-711 and Littrell and Kates-711, Hitt, and Littrell both teach the subject matter of claim 15. Ex. 1002 ¶¶ 151–153; Ex. 1006 ¶¶ 14, 15, 32).

For the foregoing reasons, Petitioner establishes by a preponderance of the evidence that claim 14 is unpatentable over the combinations of Kates-711 and Littrell and Kates-711, Hitt, and Littrell.

G. Grounds 5–12

Petitioner submits these alternative challenges in the event that Patent Owner contends that the ’887 patent is entitled to a priority date earlier than

its filing date of April 14, 2006. Pet. 61. Patent Owner does not argue for an earlier priority date. *See generally* PO Resp.

As discussed above, we have addressed all challenged claims based on Grounds 1 through 4, and, we need not and do not decide whether Petitioner has shown by a preponderance of the evidence that the challenged claims also would have been unpatentable over any of these alternate challenges. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (holding that a petitioner “is entitled to a final written decision addressing all of the claims it has challenged”); *see also* 35 U.S.C. § 318(a); *Cf. In re Gleave*, 560 F.3d 1331, 1338 (Fed. Cir. 2009) (not reaching other grounds of unpatentability after affirming the anticipation ground); *see also Beloit Corp. v. Valmet Oy*, 742 F.2d 1421, 1423 (Fed. Cir. 1984) (holding that once a dispositive issue is decided, there is no need to decide other issues).

III. CONCLUSION¹²

Weighing the competing evidence and testimony, we determine that Petitioner establishes by a preponderance of the evidence that claims 1, 3–8, 14, 15, and 18 of the ’887 patent are unpatentable.

¹² Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 3–8, 18	103	Kates-711	1, 3–8, 18	
1, 3–8, 18	103	Kates-711, Hitt	1, 3–8, 18	
1, 3–8, 14, 15, 18	103	Kates-711, Littrell	1, 3–8, 14, 15, 18	
1, 3–8, 14, 15, 18	103	Kates-711, Hitt, Littrell	1, 3–8, 14, 15, 18	
1, 3–8, 18 ¹³	103	Kates-505		
1, 3–8, 18 ¹⁴	103	Kates-505, Hitt		
1, 3–8, 14, 15, 18 ¹⁵	103	Kates-505, Littrell		
1, 3–8, 14, 15, 18 ¹⁶	103	Kates-505, Hitt, Littrell		
1, 3–8, 18 ¹⁷	103	Kates-505, Mueller		

¹³ We do not reach this ground because we determine these claims to be unpatentable in light of Kates-711, Kates-711 and Hitt, Kates-711 and Littrell, and Kates-711, Hitt, and Littrell.

¹⁴ We do not reach this ground because we determine these claims to be unpatentable in light of Kates-711, Kates-711 and Hitt, Kates-711 and Littrell, and Kates-711, Hitt, and Littrell.

¹⁵ We do not reach this ground because we determine these claims to be unpatentable in light of Kates-711, Kates-711 and Hitt, Kates-711 and Littrell, and Kates-711, Hitt, and Littrell.

¹⁶ We do not reach this ground because we determine these claims to be unpatentable in light of Kates-711, Kates-711 and Hitt, Kates-711 and Littrell, and Kates-711, Hitt, and Littrell.

¹⁷ We do not reach this ground because we determine these claims to be unpatentable in light of Kates-711, Kates-711 and Hitt, Kates-711 and Littrell, and Kates-711, Hitt, and Littrell.

1, 3–8, 18 ¹⁸	103	Kates-505,Mueller, Hitt		
1, 3–8, 14, 15, 18 ¹⁹	103	Kate-505, Mueller, Littrell		
1, 3–8, 14, 15, 18 ²⁰	103	Kates-505, Mueller, Hitt, Littrell		
Overall Outcome			1, 3–8, 14, 15, 18	

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1, 3–8, 14, 15, and 18 of the '887 patent have been shown by a preponderance of the evidence to be unpatentable;

FURTHER ORDERED that a copy of this Final Written Decision shall also be entered in IPR2024-00131; and

FURTHER ORDERED that any party seeking judicial review must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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¹⁸ We do not reach this ground because we determine these claims to be unpatentable in light of Kates-711, Kates-711 and Hitt, Kates-711 and Littrell, and Kates-711, Hitt, and Littrell.

¹⁹ We do not reach this ground because we determine these claims to be unpatentable in light of Kates-711, Kates-711 and Hitt, Kates-711 and Littrell, and Kates-711, Hitt, and Littrell.

²⁰ We do not reach this ground because we determine these claims to be unpatentable in light of Kates-711, Kates-711 and Hitt, Kates-711 and Littrell, and Kates-711, Hitt, and Littrell.

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