

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

IEE SENSING, INC.,
Petitioner,

v.

DELPHI TECHNOLOGIES, INC.,
Patent Owner.

Case IPR2018-00179
Patent 8,500,194 B2

Before HYUN J. JUNG, CARL M. DeFRANCO, and
JAMES J. MAYBERRY, *Administrative Patent Judges*.

JUNG, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–8 of U.S. Patent No. 8,500,194 B2 are unpatentable. Also, based on the entirety of the record, we deny Patent Owner’s Contingent Motion to Amend.

A. Procedural History

IEE Sensing, Inc. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting institution of an *inter partes* review of claims 1–8 of U.S. Patent No. 8,500,194 B2 (Ex. 1001, “the ’194 patent”). Delphi Technologies, Inc. (“Patent Owner”) filed a Preliminary Response (Paper 6). Pursuant to 35 U.S.C. § 314, we instituted an *inter partes* review. Paper 7 (“Dec. to Inst.”). In particular, we determined that Petitioner demonstrated a reasonable likelihood of prevailing on all challenged claims of the ’194 patent on all presented grounds. *Id.* at 2, 10, 19, 21.

After institution, Patent Owner filed a Response (Paper 14, “PO Resp.”), to which Petitioner filed a Reply (Paper 17, “Pet. Reply”). The parties agreed to the filing of a sur-reply by Patent Owner, and we subsequently authorized such filing. Paper 18. Patent Owner then filed a Sur-Reply (Paper 26, “PO Sur-Reply”).

Patent Owner also filed a Contingent Motion to Amend (Paper 13), and Petitioner filed an Opposition to Patent Owner’s Contingent Motion to Amend (Paper 16), to which Patent Owner filed a Reply to the Opposition (Paper 21). The parties also agreed to the filing of a sur-reply by Petitioner,

which we subsequently authorized (Paper 23), and Petitioner thereafter filed a Sur-Reply (Paper 27) to Patent Owner's Reply to the Opposition.

An oral hearing in this proceeding was held on February 12, 2019; a transcript of the hearing is included in the record (Paper 35, "Tr.").

B. Related Proceedings

The parties indicate that there are no related judicial or administrative proceedings. Pet. iii; Paper 5, 2.

C. Evidence Relied Upon

Petitioner identifies the following references as prior art in its asserted grounds of unpatentability:

(1) U.S. Patent Application Publication No. US 2008/0186282 A1, published August 7, 2008 (Ex. 1006, "Nix"); and

(2) U.S. Patent Application Publication No. US 2009/0295199 A1, published December 3, 2009 (Ex. 1007, "Kincaid").

Petitioner proffered a "Declaration of Thomas G. Matheson, Ph.D. in Support of Petitioner's Request for *Inter Partes* Review" (Ex. 1003; Ex. 1014 (Errata for Ex. 1003)) and a "Declaration of Dr. Thomas G. Matheson, Ph.D. in Support of Petitioner's Reply to Patent Owner's Response and Petitioner's Opposition to Patent Owner's Contingent Motion to Amend" (Ex. 1010).

Patent Owner proffered a "Declaration of Scott Andrews in Support of Patent Owner's Preliminary Response" (Ex. 2002), a "Declaration of Scott Andrews in Support of Patent Owner's Response" (Ex. 2009), and a "Declaration of Scott Andrews in Support of Patent Owner's Reply in Support of its Contingent Motion to Amend" (Ex. 2017). Deposition

transcripts for Mr. Andrews (Ex. 1011) and Dr. Matheson (Exs. 2010, 2018) were filed. *See also* Ex. 1012 (Errata for Ex. 2010).

D. Grounds of Unpatentability at Issue

We instituted *inter partes* review on grounds that, under 35 U.S.C. § 103, claims 1–8 are unpatentable over (1) Kincaid in view of Nix and (2) Nix alone. Dec. to Inst. 2, 21.

E. The '194 Patent (Ex. 1001)

The '194 patent issued August 6, 2013, from an application filed October 20, 2010, and claims priority to a provisional application filed November 20, 2009. Ex. 1001, [22], [45], [60], 1:8–11; *see also* Pet. 2 (indicating that the '194 patent was accorded a filing date of November 20, 2009); PO Resp. 3 (indicating that the '194 patent claims priority to a provisional application filed on November 20, 2009).

The '194 patent relates to “seat assemblies using seat heating elements for both seat heating and occupant detection wherein the occupant detection circuit is electrically isolated from the seat heating circuit during occupant sensing.” Ex. 1001, 1:17–21. According to the '194 patent, “[o]ccupant detection systems using a heating element for both seat heating and occupant detection are known.” *Id.* at 1:25–26. Figure 3 of the '194 patent is reproduced below.

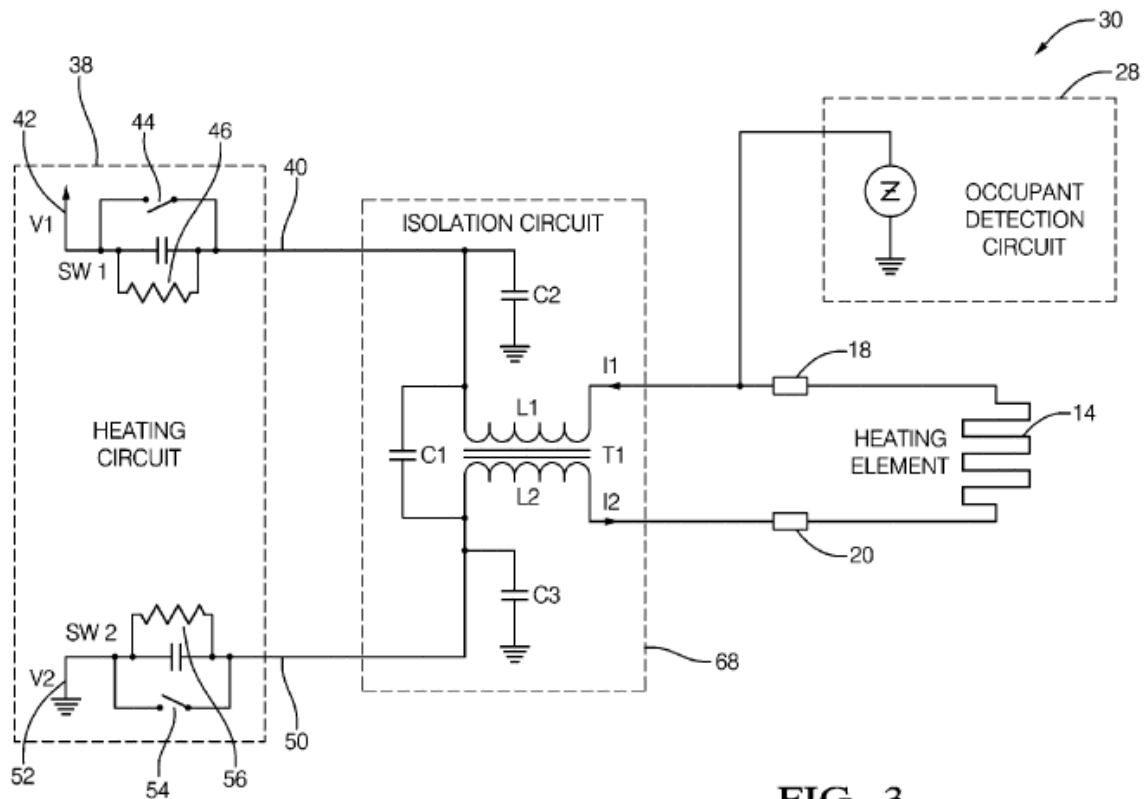


FIG. 3

Figure 3 is a “block diagram of an occupant detection/seat heating system.” *Id.* at 2:66–67. In one embodiment, a seat assembly has a seat cushion providing a seat surface, and heating element 14 is adjacent the seating surface. *Id.* at 3:6–12. Heating circuit 38 applies heating current to heating element 14 when switches 44, 54 are closed. *Id.* at 3:51–55. Occupant detection circuit 28 detects an object or occupant by measuring the field impedance of heating element 14. *Id.* at 3:62–64. Isolation circuit 68 is interposed between heating circuit 38 and heating element 14. *Id.* at 3:38–39.

Isolation circuit 68 is configured to prevent heating circuit 38 from influencing occupant detection circuit 28. *Id.* at 4:29–31. As used in the ’194 patent,

influencing the occupant detection circuit 28 means that the electrical load or impedance of the heating circuit 38 does not combine with the electric impedance of the heating element 14 in a way that would influence the detection of an occupant by the occupant detection circuit 28 by, for example, changing the apparent electric impedance of the heating element 14 measured by the occupant detection circuit 28.

Id. at 4:31–36. In isolation circuit 68, “[s]teady current flows through a first inductor L1 and a second inductor L2, where L1 and L2 are inductively coupled . . . forming a common mode choke T1.” *Id.* at 3:55–58.

F. Illustrative Claim

The ’194 patent has 8 claims, all of which Petitioner challenges. Claims 1, 4, and 8 are independent, and claim 1 is reproduced below.

1. An occupant detection system, comprising:
 - a seat assembly comprising a seat cushion having a seating surface;
 - a heating element adjacent the seating surface, said heating element formed of electrically conductive material;
 - a heating circuit electrically coupled to the heating element, said heating circuit configured to supply an electrical current to the heating element effective to generate heat by the heating element;
 - an occupant detection circuit electrically coupled to the heating element, said occupant detection circuit configured to detect an occupant presence near the heating element; and
 - an isolation circuit interposed between the heating circuit and the heating element, said isolation circuit configured to prevent the heating circuit from influencing the occupant detection circuit, said isolation circuit comprising a common mode choke, wherein the common mode choke comprises a first inductor inductively coupled to a second inductor such that current in the first in¹ inductor induces current in the second

¹ Both parties agree that the “in” in “first in inductor” is a clear typographical error. Paper 13, Claims Appendix ii; Tr. 6:16–23.

inductor, wherein the common mode choke is characterized as a four terminal device.

Ex. 1001, 7:2–24.

II. CLAIM INTERPRETATION

In an *inter partes* review based on a petition filed before November 13, 2018, claim terms in an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b) (2018); *Cuozzo Speed Techs. LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation standard).²

In the Decision to Institute, we determined that no express interpretation was required for any claim term at that stage of the proceeding. Dec. to Inst. 6.

A. *Petitioner’s Proposed Interpretations*

Petitioner proposes interpretations for “common mode choke,” “occupant detection,” and “excitation signal.” Pet. 5–8. Patent Owner disputes Petitioner’s proposed interpretations because (1) “common mode choke” is limited improperly to common mode chokes with four-terminal inductors and (2) “occupant detection” does not appear in the claims and the proposed interpretation is divorced improperly from the proper context of the claims. PO Resp. 25–28. Patent Owner also indicates that express

² A recent amendment to this rule does not apply here because the Petition was filed before November 13, 2018. *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340 (Oct. 11, 2018) (amending 37 C.F.R. § 42.100(b) effective November 13, 2018).

interpretation of “common mode choke” is unnecessary and express interpretation of “excitation signal” is not necessary to resolve the parties’ dispute. *See id.* at 25, 28. Petitioner states that, because the Decision to Institute did not need to construe these terms, it “declines to reargue these proposed constructions.” Pet. Reply 4 n.2 (citing Pet. 5–8; Dec. to Inst. 6); *see also* Tr. 7:13–22 (Petitioner’s counsel agreeing that express interpretations of these terms are not necessary for resolving the parties’ disputes).

We agree with the parties that “common mode choke,” “occupant detection,” and “excitation signal” do not require express interpretation to resolve the parties’ disputes. *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (construing explicitly only those claim terms in controversy and only to the extent necessary to resolve the controversy); *see also Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (applying *Vivid Techs.* in the context of an *inter partes* review).

B. “occupant” and “occupant presence” (claims 1, 2, 4, 6, 8)

Patent Owner proposes interpreting “occupant” to mean “a person present in the seat assembly” and interpreting “occupant presence” to mean “the fact of a person being present in the seat assembly” with support from the specification and declarant testimony. PO Resp. 9–11 (citing Ex. 1001, 1:15–16, 1:29, 1:35–39, 2:6–9, 3:29–32, 3:65–4:1, 4:14–21, 5:34–61, Fig. 1; Ex. 2009 ¶¶ 55–58; Ex. 2012, 1213, 1381). Patent Owner contends that interpretation is necessary to clarify the scope of the claims to “require[] the occupant detection circuit to be a circuit specifically designed to detect the

fact of a person being present in the seat, near the heating element.” *Id.* at 11–12.

Petitioner replies that Patent Owner’s interpretations for “occupant” and “occupant presence” are unnecessary because the claims already require, for example, an “occupant detection circuit configured to detect an occupant presence near the heating element.” Pet. Reply 6.

We agree with Petitioner that interpreting “occupant” and “occupant presence” to include a requirement that the person be “near the heating element” is unnecessary because independent claims 1, 4, and 8 already recite that requirement. Ex. 1001, 7:13–14, 7:41–42, 8:33. Also, we agree with Patent Owner that, if interpretation were necessary, the terms “occupant” and “occupant presence” would include a person being present in the seat. To resolve the parties’ dispute, however, we do not need to determine if the terms are limited to only a person being in the seat. *Vivid Techs.*, 200 F.3d at 803.

C. “occupant detection circuit configured to detect an occupant presence near the heating element” (claims 1 and 4)

Patent Owner proposes interpreting “occupant detection circuit configured to detect an occupant presence near the heating element” to mean “occupant detection circuit specifically designed to detect an occupant presence near the heating element” so that the occupant detection circuit is “specifically designed to detect the fact of a person being present in the seat, near the heating element.” PO Resp. 13. Patent Owner argues its proposed interpretation would not include a circuit that “is designed such that it is merely *capable of* detecting a person at some incidental point in time (*e.g.*, it cannot detect that person unless they take some further action, such as

operating a vehicle control, as in Nix).” *Id.* (emphasis in original). Patent Owner contends that the specification, declarant testimony, and case law support its proposed interpretation. *Id.* at 13–18 (citing Ex. 1001, Abstract, 1:42–44, 3:28–32, 3:62–4:1, 4:22–26, 5:34–61; Ex. 2009 ¶¶ 62–63). Patent Owner also contends that one of ordinary skill in the art “would understand that the interpretation of ‘configured to’ as meaning ‘designed to’ rather than merely ‘capable of’ is correct in light of the specification.” *Id.* at 18–19 (citing Ex. 2009 ¶¶ 64–65; Ex. 2010, 24:7–15, 28:25–29:17, 103:3–105:25). Patent Owner argues that interpretation “is necessary to clarify that mere capability at some incidental point in time is insufficient.” *Id.* at 12 (emphasis in original).

Patent Owner also argues that Petitioner’s implicit interpretation of the phrase as a circuit that is capable of detecting an occupant presence is unreasonably broad because it is “divorced from the context of the specification and is not consistent with the commonly understood meaning of ‘configured to’ or its usage when read in light of the ’194 Patent specification.” *Id.* at 13; *see also id.* at 12 (citing Pet. 22–24; Dec. to Inst. 10; Ex. 1003 ¶ 65), 17–18 (citing case law), 19 (citing Ex. 2010, 103:3–105:25).

Petitioner replies that the proposed interpretation is irrelevant because (1) it does not include the temporal limitations on which Patent Owner relies for distinguishing from Nix, (2) the temporal limitations do not follow from the proposed interpretation, (3) the claims do not recite how or when the occupant detection circuit operates, and (4) the claims do not require any specific occupant detection circuit. Pet. Reply 5–7 (citing PO Resp. 13, 19;

Ex. 1001, 1:25–26; Ex. 1010 ¶¶ 9, 11; Ex. 1011, 19:17–20, 20:5–7, 42:6–12).

Based on our review of the record before us, we interpret “occupant detection circuit configured to detect an occupant presence near the heating element” to mean “occupant detection circuit specifically designed to detect an occupant presence near the heating element.” Ex. 1001, Abstract, 1:25–26, 1:42–44, 3:28–32, 3:62–4:1, 4:22–26, 5:34–61; Ex. 1010 ¶¶ 9, 11; Ex. 1011, 19:17–20, 20:5–7, 42:6–12; Ex. 2009 ¶¶ 62–66; Ex. 2010, 24:7–15, 28:25–29:17, 103:3–105:25).

D. “occupant sensing circuit . . . effective for sensing the presence of an occupant near the heating element” (claim 8)

Patent Owner also proposes interpreting “occupant sensing circuit . . . effective for sensing the presence of an occupant near the heating element” in the same manner as “occupant detection circuit configured to detect an occupant presence near the heating element” because Petitioner’s arguments treat the limitations similarly. PO Resp. 20 (citing Pet. 49–52, 80–83; Ex. 1003 ¶¶ 93, 128; Ex. 2009 ¶ 67). Patent Owner, thus, proposes interpreting the phrase as an “occupant sensing circuit . . . specifically designed to sense the fact of a person being present in the seat, near the heating element.” *Id.* Petitioner replies that “the fact that the same prior art disclosure meets claim language from claim 1 and claim 8 does not make those claims the same.” Pet. Reply 8.

We agree with Petitioner that the mere fact that arguments for the “occupant detection circuit” of claims 1 and 4 are also asserted for the “occupant sensing circuit” of claim 8 does not lead necessarily to the determination that the same interpretation should be applied. The drafter

must have chosen different wording to obtain some different scope. We do not, however, need to determine the exact differences in scope between claims 1, 4, and 8 to resolve the parties' dispute. *Vivid Techs.*, 200 F.3d at 803. Instead, we need only interpret the phrase to encompass, at least, Patent Owner's proposed interpretation for "occupant detection circuit" because the parties' arguments indicate that the scope of the phrases have some overlap and those arguments do not rely on "occupant sensing circuit" having a different scope than "occupant detection circuit." See Pet. 49–52, 80–83; PO Resp. 20.

E. "isolation circuit configured to prevent the heating circuit from influencing the occupant detection circuit" (claims 1, 2, 4, 6)

Patent Owner contends that "influencing the occupant detection circuit" is defined by the '194 patent. PO Resp. 20–21 (citing Ex. 1001, 4:29–38). The '194 patent states that:

As used herein, influencing the occupant detection circuit 28 means that the electrical load or impedance of the heating circuit 38 does not combine with the electric impedance of the heating element 14 in a way that would influence the detection of an occupant by the occupant detection circuit 28 by, *for example*, changing the apparent electric impedance of the heating element 14 measured by the occupant detection circuit 28.

Ex. 1001, 4:29–38 (emphasis added).

Patent Owner argues that the presence of "for example" in its asserted definition does not include influences on detection other than "changing the apparent electric impedance of the heating element 14 measured by the occupant detection circuit 28," as indicated by the specification and the record. PO Resp. 21–22 (citing Dec. on Inst. 12). Patent Owner contends that the record indicates that the "only embodiment for detecting occupant

presence in the '194 Patent is through the measurement of changes to the apparent electric impedance of the heating element.” *Id.* at 22–23 (citing Dec. on Inst. 3; Ex. 1001, 3:62–4:26, 4:29–50, 5:41–61, 6:35–59; Ex. 2009 ¶¶ 68–70; Ex. 2010, 61:18–62:3). Patent Owner, therefore, “proposes to remove the qualifier ‘for example’” so as “to remove any perceived ambiguity” and “read the definition’s intent properly in the context of the specification.” *Id.* at 23–24 (citing Ex. 2009 ¶¶ 68–71).

Petitioner replies that Patent Owner’s proposed interpretation is not supported by the express language of the claims, is not supported by the intrinsic record, was rejected in the Decision to Institute, and attempts to import a limitation into the claims. Pet. Reply 11–14 (citing Dec. to Inst. 6, 11–12; PO Resp. 23–24; Ex. 1001, 1:25–26, 4:30–38, 7:16–189, 7:44–8:2; Ex. 1011, 42:6–12).

Claims 1 and 4 only require an “isolation circuit configured to prevent the heating circuit from influencing the occupant detection circuit.” Ex. 1001, 7:15–18, 7:43–8:2. The claims do not recite explicitly any specific form of influence on the occupant detection circuit. *See id.*; *see also* Ex. 1011, 42:6–12 (Patent Owner’s declarant testifying similarly).

Also, we agree with Petitioner that the claims and specification of the '194 patent are broader than Patent Owner’s arguments. The asserted definition is bracketed by the statements “[f]urther features and advantages of the invention will appear more clearly on a reading of the following detailed description of the preferred embodiment of the invention, which is given by way of *non-limiting example* only . . .” and “[w]hile this invention has been described in terms of the preferred embodiments thereof, it is *not intended to be so limited* . . .” Ex. 1001, 2:54–58, 6:62–65 (emphases

added). These statements taken together with the qualifier “for example” in the asserted definition indicate that the embodiment for detecting occupant presence through the measurement of changes to the apparent electric impedance of the heating element is not the only embodiment within the scope of the ’194 patent. Moreover, the record does not show a clear disavowal of claim scope in the specification or prosecution history. Thus, we determine that the ’194 patent does not provide a special definition for “influencing the occupant detection circuit” in the manner asserted by Patent Owner. We interpret the phrase to mean “electrical load or impedance of the heating circuit does not combine with the electric impedance of the heating element in a way that would influence the detection of an occupant by the occupant detection circuit” and includes, at least, “changing the apparent electric impedance of the heating element measured by the occupant detection circuit.”

Patent Owner also contends that “configured to” should be interpreted similarly as the “configured to” phrase in the previously recited “occupant detection circuit.” PO Resp. 24 (citing Ex. 1001, 4:22–26; 6:36–39; Ex. 2009 ¶¶ 72–73). For the reasons discussed above for the “occupant detection circuit,” we adopt Patent Owner’s interpretation for “configured to,” and thus, interpret “isolation circuit configured to prevent the heating circuit from influencing the occupant detection circuit” to mean an “isolation circuit specifically designed to prevent the heating circuit from influencing the occupant detection circuit.” See PO Resp. 24.

III. CHALLENGE BASED ON KINCAID AND NIX

Petitioner contends that, under 35 U.S.C. § 103(a), claims 1–8 would have been rendered obvious by Kincaid combined with Nix, with citations to the references and declarant testimony. Pet. 2, 9, 52–87. Patent Owner responds to the challenges with citations to the references, its declarant testimony, and other record evidence. PO Resp. 1–28, 45–59; PO Sur-Reply 3–7.

To prevail in its challenge under 35 U.S.C. § 103(a), Petitioner must prove unpatentability by a preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). A claim is unpatentable under 35 U.S.C. § 103(a) 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. *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 ordinary skill in the art; and (4) objective evidence of nonobviousness. *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1996).

For the challenge based on Kincaid and Nix, the parties’ disputes are related to the differences between independent claims 1, 4, and 8 and the prior art, and the level of ordinary skill in the art. The parties do not present arguments regarding objective evidence of nonobviousness and do not direct us to any objective evidence of nonobviousness. Pet. 87 (“Petitioner is unaware of any objective evidence supporting a finding of non-

obviousness.”); PO Resp. *passim*.; Tr. 48:11–13 (Patent Owner’s counsel agreeing that no objective evidence of nonobviousness was presented in the record).

After reviewing the complete record, we conclude that Petitioner has shown by a preponderance of the evidence that Kincaid combined with Nix teach or suggest each limitation of claims 1–8; that a person of ordinary skill in the art would have had a reason to combine Kincaid with Nix; and that a person of ordinary skill in the art would have had a reasonable expectation of success in combining the asserted references.

A. Scope and Content of the Prior Art

1. Nix (Ex. 1006)

Nix provides a “system, apparatus, and method . . . for controlling equipment operable by a plurality of operators.” Ex. 1006 Abstract. Figure 1 of Nix is reproduced below.

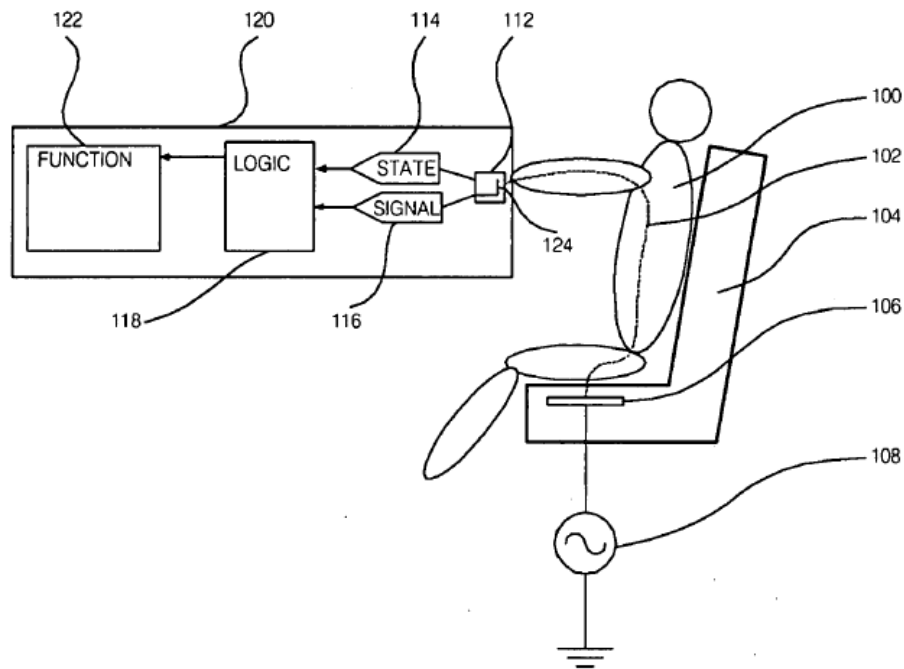


FIG. 1

Figure 1 shows a system “as applied to a seated equipment operator of a vehicle.” *Id.* ¶¶ 21, 30. The system includes signal generator 108, seat 104, operator 100 in seat 104, and equipment 120. *Id.* ¶¶ 12, 30. A signal from signal generator 108 is coupled capacitively with operator 100 via conductive surface 106 in seat 104, and the signal passes through path 102 to element 124 of equipment 120. *Id.* ¶¶ 12, 30, 31. Signal detector 116 detects if a signal consistent with one from signal generator 108 is at element 124 to control a function of equipment 120. *Id.* ¶¶ 12, 31, 33, 35, 36, 44.

In another example, a “heated seat matt can be used for coupling the signal with the operator.” *Id.* ¶ 50. Figure 5 of Nix is reproduced below.

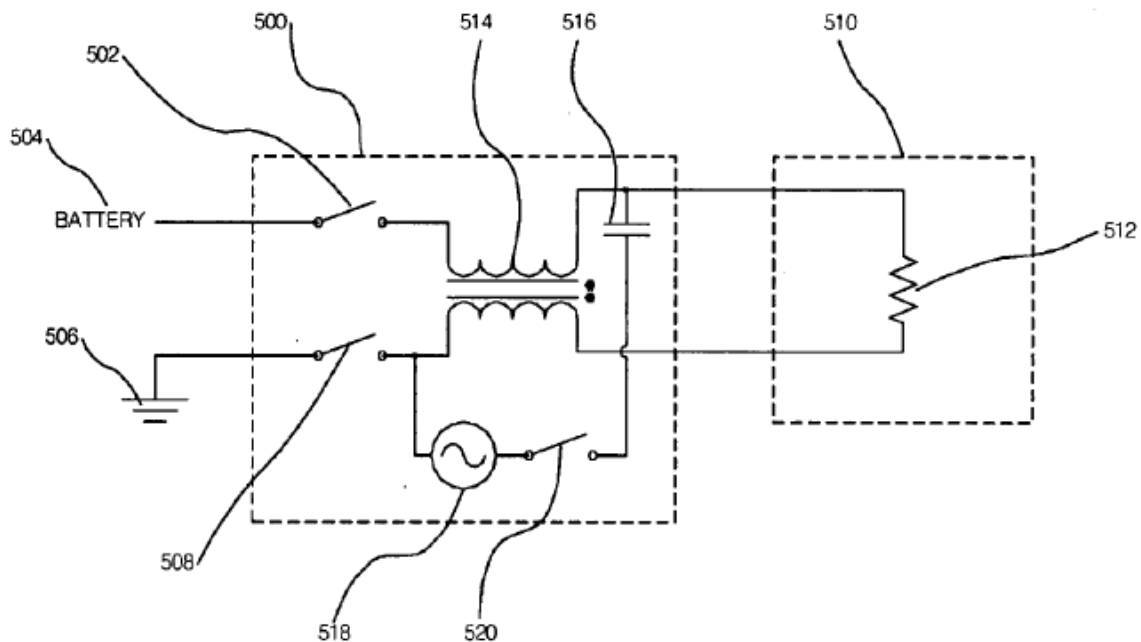


FIG. 5

Figure 5 shows “an example of a signal coupled with a seat heating matt.” *Id.* ¶ 25. “[S]eat heating matt 510 includes resistive heating element 512 wired to seat control module 500.” *Id.* ¶ 51. Switches 502, 508 of seat

control module 500 connect seat heating matt 510 to battery 504 and ground 506, respectively. *Id.*

According to Nix, a heated seat matt has low resistance and “may make it difficult to couple a sufficiently strong signal into the operator” and thus, can cause “relatively high currents” that may result in “undesirable losses,” may require expensive parts in signal generator 108, and “may cause electromagnetic interference problems with other electronic equipment.” *Id.* Nix states that “[i]n order to use the seat heating matt 510 to couple the signal from a signal generator 518 into the operator, a common mode rejection choke 514 is connected in series with the seat heating matt 510” and that “[u]sing the common mode rejection choke 514[,] the entire seat heating matt’s potential can alternate relative to vehicle ground 506, while keeping the resulting alternating current low due to the relatively high impedance of the common mode rejection choke 514 at the operating frequency.” *Id.* ¶ 51.

Nix also states that the “signal generator 518 is connected to the seat heating matt 510 through a capacitor 516 so that the signal generator 518 is not affected by the seat heating being on or off, and switches 502 and 508 being closed or open.” *Id.* ¶ 52.

2. Kincaid (Ex. 1007)

Kincaid relates to a “seat assembly comprising a seat heating element and an occupant detection circuit, wherein the occupant detection circuit is

electrically isolated from the seat heating circuit during occupant sensing.”

Ex. 1007 ¶ 2. Figure 3 of Kincaid is reproduced below.

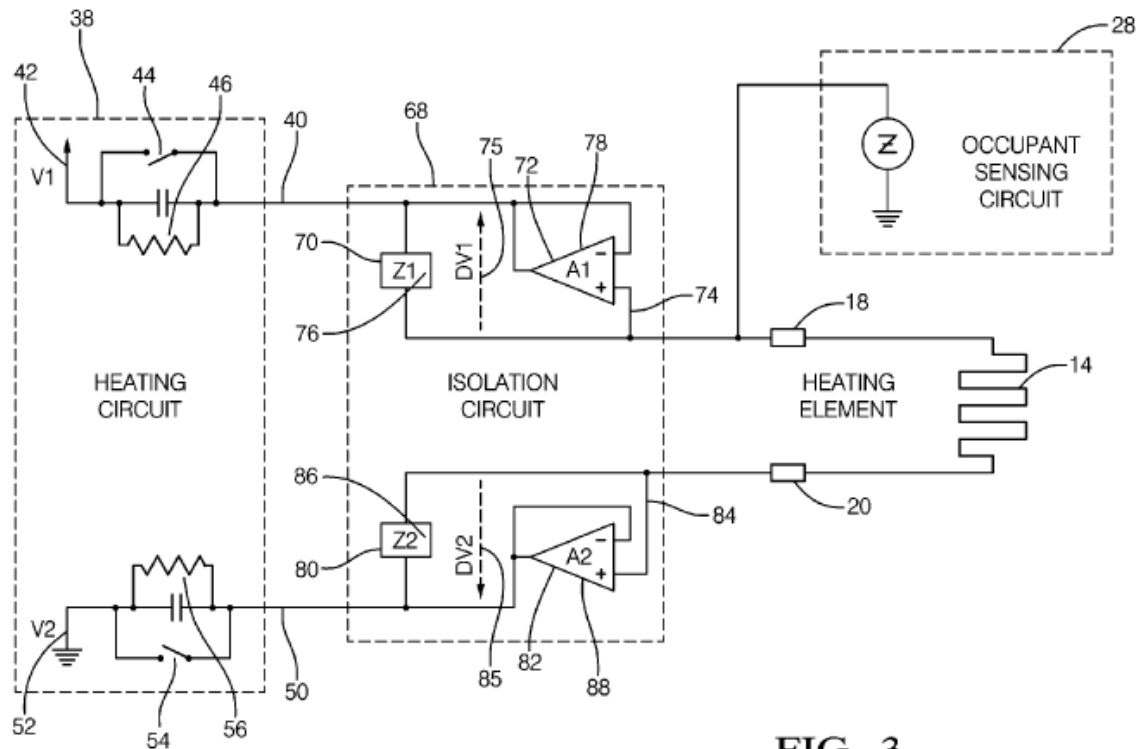


FIG. 3

Figure 3 is a “block diagram of an occupant detection/seat heating system.”

Id. ¶ 11. “A seat assembly includes a seat cushion, a heating element, a heating circuit, a[n] occupant sensing circuit, and an isolation circuit.” *Id.* Abstract, claim 1.

“The seat cushion has a seating surface, [and] the heating element is adjacent the seating surface and is formed of electrically conductive material.” *Id.* Abstract; *see also id.* claim 1. Kincaid states that its Figure 1 “shows seat assembly 10 in a vehicle passenger compartment having seat cushion 12 providing seat surface 24 for supporting an occupant,” that “[a]djacent seating surface 24 is mat 16 having heating element 14 attached to mat 16,” and that the “heating element can be made of any electrically conductive material capable of surviving the stress and strain of being

adjacent a seating surface and providing sufficient resistance to electrical current to generate a quantity of heat effective to warm the seating surface.” *Id.* ¶ 13. “The heating circuit is coupled to the heating element for supplying electrical current to the heating element for generating heat.” *Id.* Abstract; *see also id.* claim 1. Kincaid describes that “[d]uring the heating mode, the heating circuit applies a heating voltage, a source of heating current, to the heating element by closing a heater switch comprising a first heater switch 44 and second heater switch 54.” *Id.* ¶ 14.

The occupant sensing circuit is also coupled to the heating element for sensing the presence of an occupant near the heating element. *Id.* Abstract; *see also id.* claim 1. The isolation circuit is interposed between the heating circuit and the heating element for isolating the heating circuit from the occupant sensing circuit. *Id.* Abstract; *see also id.* claim 1. Kincaid states that “the occupant detection circuit is electrically isolated from the seat heating circuit during occupant sensing,” “the isolation circuit is effective for isolating the heating circuit from the occupant sensing circuit,” “the heating circuit will be suitably isolated from the occupant sensing circuit,” and the “[i]solation of the open-switch impedance is provided for by isolation circuit 68 as shown in FIG. 3”). *Id.* ¶¶ 2, 6, 18.

B. Differences Between the Claimed Subject Matter and the Prior Art

Petitioner contends that “Kincaid discloses the majority of the limitations of claims 1–8 but does not explicitly disclose the use of a common mode choke in the isolation circuit.” Pet. 83; *see also id.* 53–60 (citing Ex. 1003 ¶¶ 95–106; Ex. 1007 Abstract, ¶¶ 11, Fig. 3, claim 1). Petitioner provides for comparison of Figure 3 of the ’194 patent with Figure 3 of Kincaid, which we reproduce below.

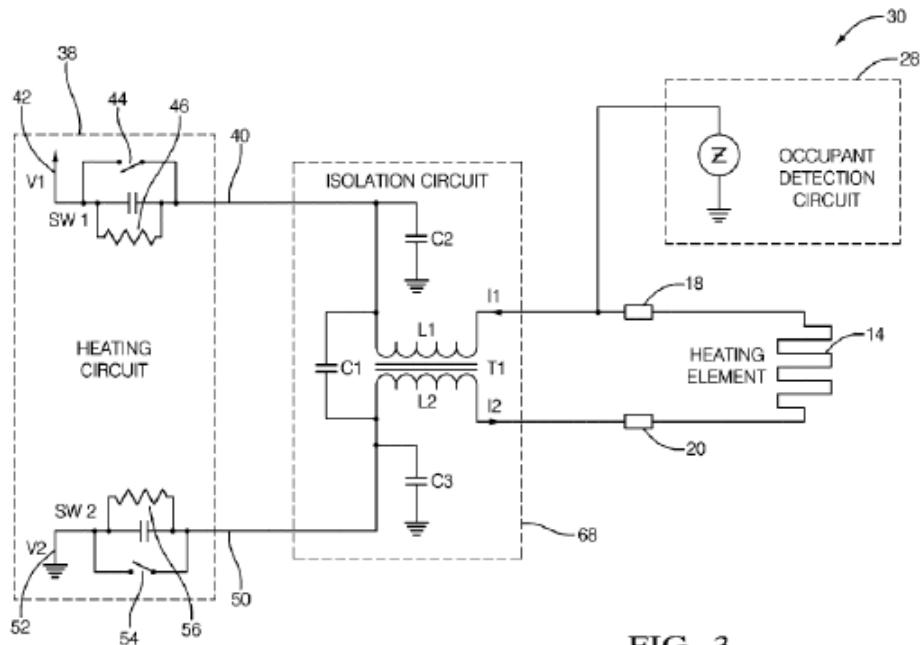


FIG. 3

Ex. 1001, (Fig. 3)

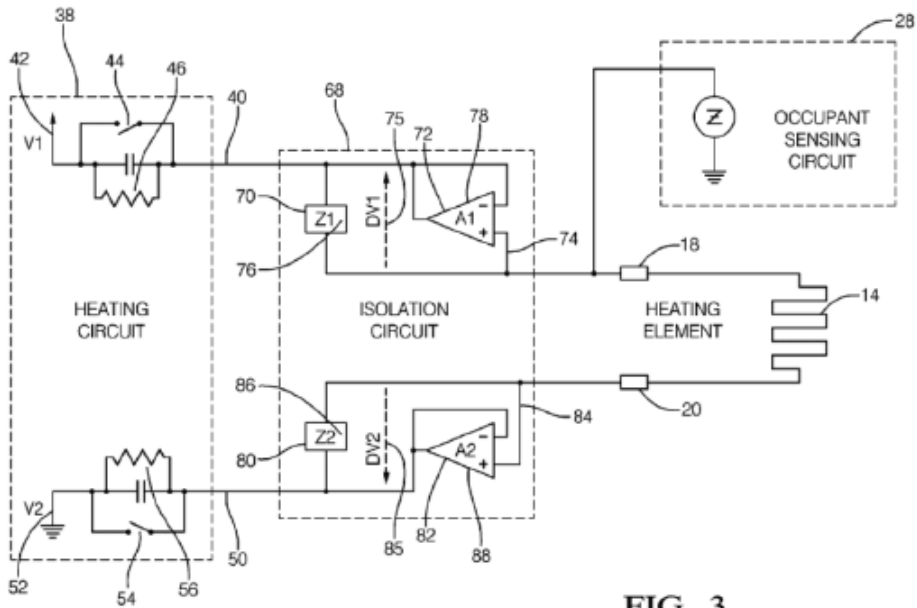


FIG. 3

Ex. 1007, (Fig. 3)

Id. at 56; see also *id.* at 84 (comparing Figs. 1–4 of Kincaid with Figs. 1–4 of the '194 patent).

1. Independent Claim 1

Petitioner argues that Kincaid teaches the preamble “occupant detection system.” Pet. 53 (citing Ex. 1003 ¶¶ 95–98; Ex. 1007, Abstract, ¶ 11). We find that Kincaid states that “FIG. 3 is a block diagram of an occupant detection/seat heating system.” Ex. 1007 ¶ 11. We also find that Kincaid teaches that the “occupant sensing circuit is also coupled to the heating element for sensing the presence of an occupant near the heating element.” *Id.*, Abstract. Thus, we find that Kincaid teaches an “occupant detection system.”

Petitioner also argues that Kincaid teaches “a seat assembly comprising a seat cushion having a seating surface.” Pet. 53–54 (citing Ex. 1003 ¶¶ 95–98; Ex. 1007, claim 1). We find that Kincaid’s claim 1 includes the recitation “a seat assembly, comprising: a seat cushion having a seating surface.” Ex. 1007, claim 1. We also find that Kincaid describes a “seat assembly including a seat cushion,” that the “seat cushion has a seating surface,” and that “FIG. 1 shows seat assembly 10 in a vehicle passenger compartment having seat cushion 12 providing seat surface 24 for supporting an occupant.” *Id.* at Abstract, ¶ 13. We further credit Petitioner’s declarant testimony regarding the seat assembly of claim 1 because the testimony finds support in Kincaid. Ex. 1003 ¶¶ 95–98. We, thus, find that Kincaid teaches “a seat assembly comprising a seat cushion having a seating surface,” as recited by claim 1.

Petitioner contends that Kincaid teaches “a heating element adjacent the seating surface, said heating element formed of electrically conductive material.” Pet. 54 (citing Ex. 1007, claim 1), 55 (citing Ex. 1003 ¶¶ 99–101; Ex. 1007, claim 1). We find that Kincaid’s claim 1 includes the recitation “a

heating element adjacent the seating surface formed of electrically conductive material.” Ex. 1007, claim 1. We also find that Kincaid describes a “seat assembly including a seat cushion,” that the “seat cushion has a seating surface,” that “[a]dherent seating surface 24 is mat 16 having heating element 14 attached to mat 16,” and that the “heating element can be made of any electrically conductive material capable of surviving the stress and strain of being adjacent a seating surface and providing sufficient resistance to electrical current to generate a quantity of heat effective to warm the seating surface.” *Id.* at Abstract, ¶ 13. We further credit Petitioner’s declarant testimony regarding the heating element of claim 1 because it finds support in Kincaid. Ex. 1003 ¶ 99. We, thus, find that Kincaid teaches “a heating element adjacent the seating surface, said heating element formed of electrically conductive material,” as recited by claim 1.

Petitioner argues that Kincaid teaches “a heating circuit electrically coupled to the heating element, said heating circuit configured to supply an electrical current to the heating element effective to generate heat by the heating element.” Pet. 54–57 (citing Ex. 1003 ¶¶ 99–101; Ex. 1007, Fig. 3, claim 1). We find that Kincaid’s claim 1 includes the recitation “a heating circuit coupled to the heating element for supplying an electrical current to the heating element effective for generating heat.” Ex. 1007, claim 1. We also find that Kincaid describes a “heating circuit is coupled to the heating element for supplying electrical current to the heating element for generating heat” and that “[d]uring the heating mode, the heating circuit applies a heating voltage, a source of heating current, to the heating element by closing a heater switch comprising a first heater switch 44 and second heater switch 54.” *Id.* at Abstract, ¶ 14. We additionally find that Figure 3 of

Kincaid depicts “HEATING CIRCUIT” electrically coupled to “HEATING ELEMENT.” We further credit Petitioner’s declarant testimony regarding the heating circuit and heating element of claim 1 because it finds support in Kincaid. Ex. 1003 ¶¶ 99, 101. We, thus, find that Kincaid teaches “a heating circuit electrically coupled to the heating element, said heating circuit configured to supply an electrical current to the heating element effective to generate heat by the heating element,” as recited by claim 1.

Petitioner also argues that Kincaid teaches “an occupant detection circuit electrically coupled to the heating element, said occupant detection circuit configured to detect an occupant presence near the heating element.” Pet. 57–59 (citing Ex. 1003 ¶¶ 102–103; Ex. 1007, Fig. 3, claim 1). We find that Kincaid’s claim 1 includes the recitation “an occupant sensing circuit coupled to the heating element and effective for sensing the presence of an occupant near the heating element.” Ex. 1007, claim 1. We also find that Kincaid describes an “occupant sensing circuit is also coupled to the heating element for sensing the presence of an occupant near the heating element.” *Id.* at Abstract. We additionally find that Figure 3 of Kincaid depicts an “OCCUPANT SENSING CIRCUIT” coupled to a “HEATING ELEMENT.” We further credit Petitioner’s declarant testimony regarding the occupant sensing circuit of claim 1 because it finds support in Kincaid. Ex. 1003 ¶¶ 102, 103. We, thus, find that Kincaid teaches “an occupant detection circuit electrically coupled to the heating element, said occupant detection circuit configured to detect an occupant presence near the heating element,” as recited by claim 1.

Petitioner contends that Kincaid teaches “an isolation circuit interposed between the heating circuit and the heating element, said isolation

circuit configured to prevent the heating circuit from influencing the occupant detection circuit.” Pet. 59–60 (citing Ex. 1003 ¶¶ 104–106; Ex. 1007, Fig. 3, claim 1). We find that Kincaid’s claim 1 includes the recitation “an isolation circuit interposed between the heating circuit and the heating element, said isolation circuit effective for isolating the heating circuit from the occupant sensing circuit.” Ex. 1007, claim 1. We also find that Kincaid describes an “isolation circuit is interposed between the heating circuit and the heating element for isolating the heating circuit from the occupant sensing circuit.” *Id.* at Abstract. We additionally find that Figure 3 of Kincaid shows an “ISOLATION CIRCUIT” between a “HEATING CIRCUIT” and a “HEATING ELEMENT.” We further credit Petitioner’s declarant testimony regarding the isolation circuit of claim 1 because it finds support in Kincaid. Ex. 1003 ¶¶ 104–106. We, thus, find that Kincaid teaches “an isolation circuit interposed between the heating circuit and the heating element, said isolation circuit configured to prevent the heating circuit from influencing the occupant detection circuit,” as recited by claim 1.

Turning to Nix, Petitioner argues that Nix teaches “an isolation circuit interposed between the heating circuit and the heating element, said isolation circuit configured to prevent the heating circuit from influencing the occupant detection circuit.” Pet. 60–61 (citing Ex. 1003 ¶¶ 67–71; Ex. 1006 ¶ 52, Fig. 5). We find that Nix teaches that “[i]n order to use the seat heating matt 510 to couple the signal from a signal generator 518 into the operator, a common mode rejection choke 514 is connected in series with the seat heating matt 510.” Ex. 1006 ¶ 51. We also find that Figure 5 of Nix shows common mode choke 514.

Petitioner’s declarant also testifies that Figure 5 of Nix shows common mode choke 514 between heating circuit 502–508 and heating element 512, that common mode choke 514 provides isolation because of its relatively high impedance, and that common mode choke 514 isolates the occupant detection circuit from the low impedance of the heating circuit to allow signal generator 518 to operate at desired alternating voltage. Ex. 1003 ¶¶ 67, 69–71 (citing Ex. 1006 ¶¶ 50–52, Fig. 5). We credit that testimony because it finds support in Nix. We, thus, find that Nix teaches “an isolation circuit interposed between the heating circuit and the heating element, said isolation circuit configured to prevent the heating circuit from influencing the occupant detection circuit,” as recited by claim 1.

Petitioner also argues that Nix teaches or suggests “said isolation circuit comprising a common mode choke.” Pet. 61 (citing Ex. 1006 ¶ 51), 62 (citing Ex. 1003 ¶¶ 107–112; Ex. 1006 ¶ 51, Fig. 5). We agree, and as discussed above, we find that Nix teaches an isolation circuit that includes common mode choke 514. Ex. 1006 ¶ 52. We, thus, find that Nix teaches “said isolation circuit comprising a common mode choke,” as recited by claim 1. *Id.*

Regarding “wherein the common mode choke comprises a first inductor inductively coupled to a second inductor such that current in the first inductor induces current in the second inductor,” Petitioner contends that a “person having ordinary skill in the art would have recognized . . . that these elements are merely a description of a basic configuration of a common mode choke.” Pet. 61 (citing Ex. 1003 ¶¶ 41, 42, 107–112); see *also id.* at 62–64 (arguing the “language is merely a description of a standard common mode choke” and asserting what the characteristics of a standard

common mode choke are) (citing Ex. 1002, 194; Ex. 1003 ¶¶ 41, 42, 72–77, 107–112; Ex. 1004, 6–7; Ex. 1005, 1–2). Petitioner also contends that the required “configuration is not novel and does not add any limitations over simply saying ‘common mode choke.’” *Id.* at 64 (citing Ex. 1003 ¶¶ 41, 42, 72–77). We credit the testimony of Petitioner’s declarant and find that one of ordinary skill in the art would have understood that Nix teaches or suggests a common mode choke comprising a first inductor inductively coupled to a second inductor so that current in the first inductor induces a current in the second inductor. Ex. 1003 ¶¶ 41, 42, 72–77, 107–112. The testimony finds support in the evidence of record. Ex. 1002, 194; Ex. 1004, 6–7; Ex. 1005, 1–2. We, thus, find that Nix teaches “wherein the common mode choke comprises a first inductor inductively coupled to a second inductor such that current in the first inductor induces current in the second inductor,” as recited by claim 1.

As for “wherein the common mode choke is characterized as a four terminal device,” Petitioner argues that Nix teaches a common mode choke that is depicted in Figure 5 as a four-terminal device. Pet. 64–65 (citing Ex. 1003 ¶¶ 107–112). We find that Nix teaches a common mode choke characterized as a four terminal device. Ex. 1006 ¶ 51 (describing the operation of common mode rejection choke 514), Fig. 5 (depicting common mode rejection choke 514 as a four terminal device). We also credit the testimony of Petitioner’s declarant regarding the common mode choke of claim 1 because it finds support in Nix and the evidence of record. Ex. 1003 ¶¶ 41 (citing Ex. 1004, 6–7; Ex. 1005, 1–2; Ex. 1009, 27, Fig. 4), 72–77 (citing Ex. 1004, 6–7; Ex. 1006 ¶ 51, Fig. 5). We, thus, find that Nix teaches

“wherein the common mode choke is characterized as a four terminal device,” as recited by claim 1.

In view of our findings above, we determine that the combination of Kincaid and Nix teaches or suggests all the limitations of claim 1. Patent Owner does not present arguments or evidence that the combination of Kincaid and Nix fails to teach or suggest the limitations of claim 1. *See generally* PO Resp.; *see also* Pet. Reply 19 (stating that “Patent Owner does not dispute that the combination of Kincaid and Nix teach or disclose all the limitations of claims 1–8”).

2. Dependent Claims 2 and 3

Claim 2 depends from claim 1 and recites “wherein the occupant detection circuit detects an occupant by analyzing an excitation signal output by the occupant detection circuit and the isolation circuit prevents the heating circuit from influencing the occupant detection circuit by preventing the excitation signal from being influenced by the heating circuit.”

Ex. 1001, 7:25–30.

Petitioner states that “Kincaid . . . includes by reference U.S. Patent Publication No. US 2009/0267622, Hansen et al.” Pet. 66 (citing Ex. 1008, “Hansen”); *see also id.* at 70 (citing Ex. 1003 ¶¶ 114–118; Ex. 1007 ¶ 3). Kincaid, at paragraph 3, states that “[f]or example, U.S. patent application Ser. No. 12/150,439, incorporated herein by reference, describes an occupant detector for a vehicle seat assembly that includes an occupant sensing circuit that measures the impedance of an electric field generated by applying an electric signal to the sensor in the seat.” Ex. 1007 ¶ 3. Petitioner argues that Hansen teaches or suggests the limitations of claim 2. Pet. 66–68 (citing Ex. 1008 ¶¶ 2, 4, 6), 70–71 (citing Ex. 1008 ¶ 4).

Petitioner also cites Nix (Pet. 68–69 (citing Ex. 1006 ¶¶ 12, 51, 52), 71 (citing Ex. 1003 ¶¶ 79–83, 114–118; Ex. 1006 ¶¶ 50–52)) and Kincaid (Pet. 68 (citing Ex. 1007 ¶ 18)).

We agree that Kincaid incorporates by reference Hansen. Ex. 1007 ¶ 3 (“For example, U.S. patent application Ser. No. 12/150,439, *incorporated herein by reference*, . . .”) (emphasis added). Hansen is “Appl. No. 12/150,439.” Ex. 1008, [21].

We find that paragraph 4 of Hansen states that “[a]n occupancy detection system includes a signal generator coupled to an electrode” and that “the signal generator configured to output a first signal at a first frequency and a second signal at a second frequency.” *Id.* ¶ 4. We also find that the system includes a “voltage detection circuit . . . configured to measure a first voltage responsive to the first signal at the first frequency and a second voltage responsive to the second signal at the second frequency” and a “control module in communication with the voltage detection circuit [that] is configured to detect a state of occupancy based on the first voltage and the second voltage.” *Id.* Petitioner’s declarant testifies that Hansen’s first and second signals teach the excitation signal and that Hansen’s voltage detection circuit measuring first and second voltages responsive to the signals teaches analyzing an excitation signal. Ex. 1003 ¶¶ 116, 117. We credit the testimony because Hansen supports it. Ex. 1008 ¶ 4. We, thus, find that Kincaid, by incorporating Hansen, teaches “wherein the occupant detection circuit detects an occupant by analyzing an excitation signal output by the occupant detection circuit,” as recited by claim 2.

As discussed above, we find that Kincaid teaches an isolation circuit. Ex. 1007, Abstract (describing an “isolation circuit is interposed between the

heating circuit and the heating element for isolating the heating circuit from the occupant sensing circuit”), Fig. 1 (showing an “ISOLATION CIRCUIT” between a “HEATING CIRCUIT” and a “HEATING ELEMENT”), claim 1 (reciting “an isolation circuit interposed between the heating circuit and the heating element, said isolation circuit effective for isolating the heating circuit from the occupant sensing circuit”); Ex. 1003 ¶¶ 104–106. We additionally find that Kincaid teaches “the occupant detection circuit is electrically isolated from the seat heating circuit during occupant sensing,” “the isolation circuit is effective for isolating the heating circuit from the occupant sensing circuit,” and “the heating circuit will be suitably isolated from the occupant sensing circuit.” Ex. 1007 ¶¶ 2, 6, 18. We, thus, find that Kincaid teaches “wherein . . . the isolation circuit prevents the heating circuit from influencing the occupant detection circuit by preventing the excitation signal from being influenced by the heating circuit.”

Claim 3 depends directly from claim 1 and recites “wherein the common mode choke is configured to induce a second current toward the heater element in response to a first current away from the heater element.” Ex. 1001, 7:31–34. Petitioner argues that one of ordinary skill in the art would have understood that the elements of claim 3 “are merely an obvious description of the basic configuration of a common mode choke.” Pet. 72–73 (citing Ex. 1003 ¶¶ 41–42, 119–121; Ex. 1006, Fig. 5; Ex. 1004, 6–7; Ex. 1005, 1–2).

As discussed above, we find that Nix teaches an isolation circuit that includes a common mode choke. Ex. 1006 ¶ 51 (describing the operation of common mode rejection choke 514), Fig. 5 (depicting common mode rejection choke 514 as a four terminal device). We also credit the testimony

of Petitioner’s declarant regarding claim 3 because it is supported by record evidence. Ex. 1003 ¶¶ 41–42, 119–121; Ex. 1004, 6–7; Ex. 1005, 1–2; Ex. 1006, Fig. 5.

In view of our findings above, we determine that the combination of Kincaid and Nix teaches all the limitations of dependent claims 2 and 3. Patent Owner does not present arguments or evidence that the combination of Kincaid and Nix fails to teach or suggest the limitations of claims 2 and 3. *See also* Pet. Reply 19 (stating that “Patent Owner does not dispute that the combination of Kincaid and Nix teach or disclose all the limitations of claims 1–8”); Tr. 48:8–10 (Patent Owner’s counsel agreeing that arguments specifically for the dependent claims were not presented).

3. Independent Claim 4

Petitioner states that “[c]laim 4 is a reorganization of the claim elements in [] [c]laim 1” and that “the wording of many of the claim limitations are identical to limitations in [c]laim 1.” Pet. 76–77. Petitioner maps its arguments for claim 1 to claim 4. *Id.* at 74–77 (also citing Ex. 1003 ¶¶ 95–112, 122–126). Based on our findings for claim 1 discussed above, Petitioner persuades us that the combination of Kincaid and Nix teaches the limitations of independent claim 4.

In particular, we find that Kincaid teaches an “occupant detection system controller electrically coupled to a heating element formed of electrically conductive material and located adjacent a seating surface of a seat assembly.” Ex. 1007, Abstract (describing a “seat assembly including a seat cushion, heating element, [and] a occupant sensing circuit,” that the “seat cushion has a seating surface,” and “the heating element is adjacent the seating surface and is formed of electrically conductive material”), ¶ 13

(describing that “FIG. 1 shows seat assembly 10 in a vehicle passenger compartment having seat cushion 12 providing seat surface 24 for supporting an occupant,” “[a]djacent seating surface 24 is mat 16 having heating element 14 attached to mat 16,” and the “heating element can be made of any electrically conductive material capable of surviving the stress and strain of being adjacent a seating surface and providing sufficient resistance to electrical current to generate a quantity of heat effective to warm the seating surface”), claim 1 (claiming “a seat assembly, comprising: a seat cushion having a seating surface” and “a heating element adjacent the seating surface formed of electrically conductive material”).

We also find that Kincaid teaches “an occupant detection circuit electrically coupled to the heating element, said occupant detection circuit configured to detect an occupant presence near the heating element,” as recited by claim 4. Ex. 1007, Abstract (describing that the “occupant sensing circuit is also coupled to the heating element for sensing the presence of an occupant near the heating element”), Fig. 3 (depicting an “OCCUPANT SENSING CIRCUIT” coupled to a “HEATING ELEMENT”), claim 1 (reciting “an occupant sensing circuit coupled to the heating element and effective for sensing the presence of an occupant near the heating element”).

We additionally find that Kincaid teaches “an isolation circuit interposed between a heating circuit and the heating element, said isolation circuit configured to prevent the heating circuit from influencing the occupant detection circuit,” as recited by claim 4. Ex. 1007, Abstract (describing that the “isolation circuit is interposed between the heating circuit and the heating element for isolating the heating circuit from the

occupant sensing circuit”), Fig. 3 (showing an “ISOLATION CIRCUIT” between a “HEATING CIRCUIT” and a “HEATING ELEMENT”), claim 1 (reciting “an isolation circuit interposed between the heating circuit and the heating element, said isolation circuit effective for isolating the heating circuit from the occupant sensing circuit”).

Turning to Nix, we find that Nix teaches “said isolation circuit comprising a common mode choke” and “wherein the common mode choke is characterized as a four terminal device.” Ex. 1006 ¶ 51 (describing the operation of common mode rejection choke 514), ¶ 51 (stating that “[i]n order to use the seat heating matt 510 to couple the signal from a signal generator 518 into the operator, a common mode rejection choke 514 is connected in series with the seat heating matt 510”), Fig. 5 (showing common mode choke 514 as a four terminal device).

Based on our findings as discussed above, we determine that the combination of Kincaid and Nix teaches all the limitations of independent claim 4. Patent Owner does not present arguments or evidence that the combination of Kincaid and Nix fails to teach or suggest the limitations of claim 4. Pet. Reply 19 (stating that “Patent Owner does not dispute that the combination of Kincaid and Nix teach or disclose all the limitations of claims 1–8”).

4. Dependent Claims 5–7

Claim 5 depends from claim 4 and recites “wherein the controller further comprises a heating circuit electrically coupled to the heating element, said heating circuit configured to supply an electrical current to the heating element effective to generate heat by the heating element.” Ex. 1001, 8:9–13. For dependent claim 5, Petitioner references its

arguments for claim 1. Pet. 74–78 (also citing Ex. 1003 ¶¶ 95–112, 122–126).

We find that Kincaid teaches the limitations of claim 5. Ex. 1007, Abstract (describing that a “heating circuit is coupled to the heating element for supplying electrical current to the heating element for generating heat”), ¶ 14 (describing that “[d]uring the heating mode, the heating circuit applies a heating voltage, a source of heating current, to the heating element by closing a heater switch comprising a first heater switch 44 and second heater switch 54”), Fig. 3 (depicting “HEATING CIRCUIT” electrically coupled to “HEATING ELEMENT”), claim 1 (claiming “a heating circuit coupled to the heating element for supplying an electrical current to the heating element effective for generating heat”).

Claim 6 depends from claim 5 and recites “wherein the occupant detection circuit detects an occupant by analyzing an excitation signal output by the occupant detection circuit, and the isolation circuit prevents the heating circuit from influencing the occupant detection circuit by preventing the excitation signal from being influenced by the heating circuit.”

Ex. 1001, 8:14–19. Claim 7 depends from claim 6 and recites “wherein the common mode choke is configured to induce a second current toward the heater element in response to a first current away from the heater element.” *Id.* at 8:20–23.

Petitioner refers to its arguments for claims 2 and 3 to assert that dependent claims 6 and 7 are unpatentable. Pet. 78–79 (additionally citing Ex. 1003 ¶¶ 114–121, 125–126). For the reasons discussed regarding claims 2 and 3, we find that Kincaid through its incorporation of Hansen teaches the limitations of dependent claim 6. Ex. 1003 ¶¶ 104–106, 116, 117; Ex. 1007,

Abstract, ¶¶ 2, 3, 6, 18, Fig. 1, claim 1; Ex. 1008, [21], ¶ 4. We also find that Nix teaches a common mode choke and that one of ordinary skill in the art would have understood the limitations of dependent claim 7 to describe such a common mode choke. Ex. 1003 ¶¶ 41–42, 119–121; Ex. 1004, 6–7; Ex. 1005, 1–2; Ex. 1006 ¶ 51 (describing the operation of common mode rejection choke 514), Fig. 5 (depicting common mode rejection choke 514 as a four terminal device).

In view of our findings, we determine that the combination of Kincaid and Nix teaches all the limitations of dependent claims 5–7. Patent Owner does not present arguments or evidence that the combination of Kincaid and Nix fails to teach or suggest the limitations of claims 5–7. Pet. Reply 19 (stating that “Patent Owner does not dispute that the combination of Kincaid and Nix teach or disclose all the limitations of claims 1–8”); Tr. 48:8–10 (Patent Owner’s counsel agreeing that arguments specifically for the dependent claims were not presented).

5. Independent Claim 8

For independent claim 8, Petitioner refers to its arguments for claim 1. Pet. 80–83 (citing additionally Ex. 1003 ¶¶ 95–112, 127–128); *see also id.* at 82 (stating that “[c]laim 8 is a reorganization of the claim elements in [c]laim 1”). Based on our findings above, Petitioner persuades us that the combination of Kincaid and Nix teaches the limitations of claim 8.

Specifically, we find that Kincaid teaches a “seat assembly comprising: a seat cushion having a seating surface,” as recited by claim 8. Ex. 1007, Abstract (describing a “seat assembly including a seat cushion” and that the “seat cushion has a seating surface,”), ¶ 13 (describing that “FIG. 1 shows seat assembly 10 in a vehicle passenger compartment having

seat cushion 12 providing seat surface 24 for supporting an occupant”), claim 1 (claiming “a seat assembly, comprising: a seat cushion having a seating surface”).

We also find that Kincaid teaches “a heating element adjacent the seating surface formed of electrically conductive material” and “a heating circuit coupled to the heating element for supplying an electrical current to the heating element effective for generating heat,” as recited by claim 8. Ex. 1007, Abstract (describing “the heating element is adjacent the seating surface and is formed of electrically conductive material” and the “heating circuit is coupled to the heating element for supplying electrical current to the heating element for generating heat”), ¶ 13 (describing that “[a]djoint seating surface 24 is mat 16 having heating element 14 attached to mat 16,” and the “heating element can be made of any electrically conductive material capable of surviving the stress and strain of being adjacent a seating surface and providing sufficient resistance to electrical current to generate a quantity of heat effective to warm the seating surface”), ¶ 14 (describing that “[d]uring the heating mode, the heating circuit applies a heating voltage, a source of heating current, to the heating element by closing a heater switch comprising a first heater switch 44 and second heater switch 54”), Fig. 3 (depicting “HEATING CIRCUIT” electrically coupled to “HEATING ELEMENT”), claim 1 (claiming “a heating element adjacent the seating surface formed of electrically conductive material” and “a heating circuit coupled to the heating element for supplying an electrical current to the heating element effective for generating heat”).

We further find that Kincaid teaches “an occupant sensing circuit coupled to the heating element and effective for sensing the presence of an

occupant near the heating element.” Ex. 1007, Abstract (describing that the “occupant sensing circuit is also coupled to the heating element for sensing the presence of an occupant near the heating element”), Fig. 3 (depicting an “OCCUPANT SENSING CIRCUIT” coupled to a “HEATING ELEMENT”), claim 1 (reciting “an occupant sensing circuit coupled to the heating element and effective for sensing the presence of an occupant near the heating element”).

We additionally find that Kincaid teaches “an isolation circuit interposed between the heating circuit and the heating element.” Ex. 1007, Abstract (describing that the “isolation circuit is interposed between the heating circuit and the heating element for isolating the heating circuit from the occupant sensing circuit”), Fig. 3 (showing an “ISOLATION CIRCUIT” between a “HEATING CIRCUIT” and a “HEATING ELEMENT”), claim 1 (reciting “an isolation circuit interposed between the heating circuit and the heating element, said isolation circuit effective for isolating the heating circuit from the occupant sensing circuit”).

Claim 8 recites “said isolation circuit including a common mode choke arranged to induce a second current in response to a first current for isolating the heating circuit *from the isolation circuit*.” Ex. 1001, 8:35–38 (emphasis added). Petitioner assumes for its analysis that the recitation was intended to recite “said isolation circuit . . . for isolating the heating circuit *from the occupant detection circuit*,” not the “isolation circuit.” Pet. 82 n.4 (citing Ex. 1003 ¶ 93 n.3). Petitioner also argues that, if the claim was intended as drafted, then the limitation “merely describes obvious characteristics of a common mode choke.” *Id.*

We find that Kincaid teaches an isolation circuit for isolating the heating circuit from the occupant detection circuit. Ex. 1007, Abstract (describing that the “isolation circuit is . . . for isolating the heating circuit from the occupant sensing circuit”), Fig. 3 (showing an “ISOLATION CIRCUIT” between a “HEATING CIRCUIT” and an “OCCUPANT SENSING CIRCUIT”), claim 1 (reciting “said isolation circuit effective for isolating the heating circuit from the occupant sensing circuit”).

We also find that Kincaid teaches the claimed isolation circuit as drafted; that is, an isolation circuit for isolating the heating circuit from the isolation circuit. *See id.* Abstract, Fig. 3, claim 1; *see also id.* ¶ 14 (stating that “it is desired to isolate the open-switch impedance of the heating circuit . . .”), ¶ 18 (describing that “[i]solation of the open-switch impedance is provided for by isolation circuit 68 as shown in FIG. 3”).

Turning to Nix, we find that Nix teaches an “isolation circuit including a common mode choke arranged to induce a second current in response to a first current for isolating the heating circuit from the occupant detection circuit.” Ex. 1006 ¶ 52 (stating that “[i]n order to use the seat heating matt 510 to couple the signal from a signal generator 518 into the operator, a common mode choke 514 is connected in series with the seat heating matt 510”), Fig. 5 (depicting common mode choke 514). We additionally find that record evidence shows that one of ordinary skill in the art would have understood that Nix’s common mode choke 514 is arranged to induce a second current in response to a first current. Ex. 1002, 194; Ex. 1003 ¶¶ 41, 42, 73–77, 108–112; Ex. 1004, 6–7; Ex. 1005, 1–2.

We also find that Nix teaches “wherein the common mode choke comprises a first inductor inductively coupled to a second inductor such that

current in the first inductor induces current in the second inductor.”

Ex. 1006 ¶ 51 (describing the operation of common mode rejection choke 514), Fig. 5 (depicting common mode rejection choke 514 with two inductors). We further find that record evidence shows that one of ordinary skill in the art would have understood that Nix teaches or suggests a common mode choke comprising a first inductor inductively coupled to a second inductor so that current in the first inductor induces a current in the second inductor. Ex. 1002, 194; Ex. 1003 ¶¶ 41, 42, 73–77, 108–112; Ex. 1004, 6–7; Ex. 1005, 1–2.

We additionally find that Nix teaches “wherein the common mode choke is characterized as a four terminal device.” Ex. 1006 ¶ 51 (describing the operation of common mode rejection choke 514), Fig. 5 (depicting common mode rejection choke 514 as a four terminal device). We credit the testimony of Petitioner’s declarant regarding Nix’s common mode choke being a four terminal device because it is supported by the record. Ex. 1003 ¶¶ 41, 42, 73–77, 108–112.

a. Reason for Modifying Kincaid in View of Nix

Petitioner argues that Kincaid and Nix are in the same field and are concerned with the same problem. Pet. 85–86 (citing Ex. 1001, 1:42–44, Fig. 3; Ex. 1003 ¶¶ 129–134; Ex. 1006 Abstract, ¶¶ 12, 50, 51, Fig. 5; Ex. 1007 Title, ¶¶ 2, 3, Fig. 3). We agree that Kincaid and Nix are in the same field and concerned with the same problem. Patent Owner does not provide any arguments disputing this aspect of Petitioner’s arguments.

Petitioner also contends that, like the ’194 patent, Nix uses a common mode choke as part of an isolation circuit “(1) to allow the heating circuit to power the seat heater and (2) to prevent the heating circuit from interfering

with the occupant detection circuit by loading it with a low impedance path to ground or the battery.” *Id.* at 86 (citing Ex. 1001, 4:22–26; Ex. 1003 ¶¶ 129–134; Ex. 1006 ¶ 51). Petitioner, thus, contends that use of a common mode choke for solving the problem of the ’194 patent was known. *Id.* at 86–87 (citing Ex. 1003 ¶¶ 129–134).

Based on our factual findings discussed above, we agree that the use of common mode choke and isolation circuits comprising common mode chokes were known. *See* Ex. 1002, 194; Ex. 1003 ¶¶ 67, 69–71; Ex. 1004, 6–7; Ex. 1005, 1–2; Ex. 1006 ¶¶ 50–52, Fig. 5. As discussed below, the parties dispute whether the problem of the ’194 patent can form the basis of Petitioner’s reason to modify Kincaid in view of Nix.

i. Motivation to Combine from the ’194 Patent

Petitioner asserts that a “person having ordinary skill in the art would have been motivated . . . to combine these disclosures from Nix with the disclosures of Kincaid *to achieve the isolation and reduced interference sought after in the ’194 patent.*” Pet. 65 (citing Ex. 1003 ¶¶ 109, 129–134) (emphasis added); *see also id.* at 87 (“A person having ordinary skill in the art would have been motivated . . . to combine Kincaid and Nix to achieve the improved isolation and reduced interference sought after in the ’194 Patent.”).

Patent Owner responds that Petitioner relies on the ’194 patent’s goal of improved isolation and reduced interference as the motivation for one of ordinary skill in the art to combine Kincaid and Nix, and thus, Petitioner engages in impermissible hindsight reasoning. PO Resp. 45–46 (citing Pet. 87), 58 (citing Pet. 2, 87; Ex. 1003 ¶¶ 122–123); *see also* PO Sur-Reply 3–4 (citing Pet. 85). Patent Owner, thus, contends that Petitioner fails to

provide a rationale for its proposed combination. *Id.* at 49; *see also id.* at 51 (arguing Petitioner fails to carry its burden of providing a rationale for combining the references).

Petitioner replies that one of ordinary skill in the art “would have had ample reason to combine the relevant teachings of Kincaid and Nix.” Pet. Reply 19 (citing Pet. 65, 74, 83–87; Ex. 1003 ¶¶ 41–42, 109, 119–121, 129–134). Petitioner reiterates its analogous art arguments and contends that both references teach using heating elements as part of an occupant detection system and placing an isolation circuit between a heating circuit and occupant detection circuit. *Id.* at 19–20 (citing Pet. 85; Ex. 1006, Abstract, ¶¶ 12, 50, 51, Fig. 5; Ex. 1007 ¶¶ 2, 3, Fig. 3). Petitioner also argues that, although Kincaid uses an active isolation circuit, Nix teaches the benefits of using a common mode choke as an isolation circuit. *Id.* at 20 (citing Pet. 85–86; Ex. 1003 ¶¶ 129–134; Ex. 1006 ¶ 51).

Petitioner also replies that, in its Petition, it asserts that one of ordinary skill in the art would have been motivated to combine Kincaid and Nix “to achieve the isolation and reduced interference.” Pet. Reply 20–21 (citing Pet. 74; Ex. 1003 ¶¶ 41, 42, 119–121, 129–134). Petitioner additionally replies that its proposed combination is not biased by hindsight because the Petition discusses similarities between Kincaid and the ’194 patent and because the motivation to combine is found in the asserted references. *Id.* at 22 (citing PO Resp. 45). Petitioner contends that the discussion of Kincaid in the ’194 patent does not change the status of Kincaid as prior art. *Id.* (citing PO Resp. 46 n.3). Petitioner also contends that paragraph 3 of Kincaid provides motivation for its proposed combination (*id.* at 22 (citing PO Resp. 47)) and points to page 85 of the

Petition where it explains that Kincaid and Nix are concerned with seat heating circuits interfering with an occupant detection circuit (*id.* at 23).

In view of the full record and after reviewing arguments in the Petition, we agree with Patent Owner that Petitioner does not provide a reason for modifying Kincaid with Nix that does not come from the '194 patent. Petitioner refers to pages 65, 74, and 83–87 of its Petition (Pet. Reply 19), and each of those portions contain the reason “to achieve the isolation and reduced interference sought after in the '194 patent” (Pet. 65, 74) or “to achieve the improved isolation and reduced interference sought after in the '194 Patent” (*id.* at 87). Petitioner’s Reply quotes page 74 of its Petition but omits the phrase “to achieve the isolation and reduced interference sought after in the '194 patent.” *Compare* Pet. Reply 20–21 with Pet. 74.

We also agree with Patent Owner that the reason for modifying Kincaid in view of Nix cannot come from the '194 patent. Thus, to any extent Petitioner relies on a reason from the '194 patent to modify Kincaid, we would agree that such reasoning constitutes impermissible hindsight. Thus, Petitioner’s argument that one of ordinary skill in the art would have modified Kincaid in view of Nix “to achieve the improved isolation and reduced interference sought after in the '194 patent” is an insufficient reason for its proposed modification.

ii. Substitution

Petitioner also asserts that the modification of Kincaid in view of Nix “would merely involve substitution of Nix’s known isolation circuit using a common mode choke into Kincaid’s known seat assembly having seat heating and occupant detection” and “would be an obvious substitution of

one type of isolation circuit with an improved isolation circuit that reduces interference.” Pet. 65, 87 (citing Ex. 1003 ¶¶ 109, 129–134). In view of the complete record, Petitioner persuades us that its proposed modification of Kincaid with Nix’s known isolation circuit using a common mode choke represents a substitution of Nix’s known isolation circuit into Kincaid to result in “improved isolation circuit that reduces interference.” Pet. 65, 87.

Patent Owner responds that “Kincaid only performs occupant detection when seat heating is off” and “is concerned with preventing open-switch impedances . . . by using its active isolation circuit” but Nix “uses a common mode choke for the primary purpose of preventing the voltage of the heating circuit, when turned on, from overloading Nix’s signal generator.” PO Resp. 52–54 (citing Ex. 1006 ¶¶ 51, 90, 118, 119; Ex. 1007 ¶¶ 3, 14–18; Ex. 2009 ¶¶ 109, 117, 118; Ex. 2010, 111:15–17, 136:20–22). Patent Owner, thus, argues that, “when the heating circuit is off, the common mode choke of Nix is not isolating the signal generator from anything, let alone the effects of open-switch impedances that would influence operation of the signal generator” and that one of ordinary skill in the art “would not have been motivated to look at, or use, the common mode choke of Nix, which provides its benefit when a seat heating circuit is on.” *Id.* at 54–55 (citing Ex. 2009 ¶ 119). Patent Owner also responds that, when Nix’s seat heating is off, its common mode choke is not acting as a common mode choke and thus, there is “no reason to use the common mode choke of Nix, rather than just two inductors or some other passive isolation solution for the purpose of isolating open-switch impedances.” *Id.* at 55 (citing Ex. 1006, Fig. 5; Ex. 2009 ¶ 120).

Petitioner replies that its proposed combination would have been “an obvious substitution of one type of isolation circuit with an improved isolation circuit that reduces interference;’ and/or ‘the application of well-known methods to solve an old problem.” Pet. Reply 21 (citing Pet. 65, 83; Ex. 1003 ¶¶ 41–44, 109, 129–134). Petitioner also replies that Kincaid and Nix each use isolation circuits when a heating circuit is on and off. *Id.* at 24–25 (citing PO Resp. 50–53; Ex. 1006 ¶ 52; Ex. 1010 ¶ 41; Ex. 1011, 64:15–18).

As for Petitioner’s argument regarding substitution of Kincaid’s isolation circuit with another type that reduces interference, Patent Owner faults Petitioner for failing to explain why Nix’s common mode choke would have been an improvement. PO Sur-Reply 6 (citing Pet. Reply 21). Patent Owner also asserts that Petitioner argues for the first time in its Reply that the modification would have reduced cost and improved reliability. *Id.* (citing Pet. Reply 24, 26). Patent Owner also replies that Nix uses a common mode choke to address a problem different than the one for Kincaid’s isolation circuit. *Id.* at 6–7 (citing Pet. Reply 24–25). In particular, Patent Owner argues that Kincaid is concerned with isolating open switch impedances but Nix’s common mode choke is not used when its seat heating is off. *Id.* at 7. Patent Owner, thus, argues that Nix is not concerned with the impact of open switch impedances on its signal generator. *Id.* (citing PO Resp. 52–55).

As indicated above in our factual findings regarding Nix, the parties do not dispute that Nix’s isolation circuit comprising a common mode choke teaches the isolation circuit of independent claims 1, 4, and 8. Also, in view of the full record, even if Kincaid performs occupant detection only when

seat heating is off, we find that Nix teaches that its “signal generator 518 is connected to the seat heating matt 510 through a capacitor 516 so that the signal generator 518 is not affected by the seat heating being on or off, and switches 502 and 508 being closed or open.” Ex. 1006 ¶ 52. Petitioner’s proposed modification of substituting Kincaid’s isolation circuit with Nix’s known isolation circuit would thus be able to perform occupant detection when seat heating is off.

Moreover, Petitioner’s proposed modification would result in an isolation circuit “configured to prevent the heating circuit from influencing the occupant detection circuit” and “for isolating the heating circuit from the isolation circuit” or “the occupant detection circuit,” as required by the challenged independent claims. Ex. 1001, 7:15–18, 7:44–8:2, 8:34–38; *see also* Pet. 82 n.4 (assuming that claim 8 was intended to recite “said isolation circuit . . . for isolating the heating circuit *from the occupant detection circuit*,” not the “isolation circuit”). The challenged claims do not require expressly that the isolation circuit allow the “occupant detection circuit” operate only when seat heating is on or off.

Patent Owner also responds that, even if Petitioner had presented a reason for modifying Kincaid, one of ordinary skill in the art would have had several options for isolation circuits, as acknowledged by Petitioner’s declarant. PO Resp. 56 (citing Ex. 2010, 145:2–9, 145:12–16; 145:21–22, 146:4). Patent Owner, thus, contends that there is not a finite number of options that would yield predictable results with a reasonable expectation of success and that Petitioner does not provide a rationale for replacing Kincaid’s active isolation circuit with Nix’s passive common mode choke. *Id.* at 56. Patent Owner additionally argues that a single inductor, not a more

expensive common mode choke, would have been sufficient to isolate Nix's open switch impedance. *Id.* at 57 (citing Ex. 2009 ¶ 121).

Petitioner replies that Patent Owner's arguments that there are not a finite number of ways to achieve the isolation sought in the '194 patent are irrelevant because the arguments do not address an argument made by Petitioner. Pet. Reply 25 (citing PO Resp. 56). Patent Owner replies that, "given the plethora of various possible isolating circuits," Petitioner does not provide a reason one of ordinary skill in the art would have "select[ed] Nix's common mode choke" which is "used to address a different problem than Kincaid." PO Sur-Reply 7 (citing PO Resp. 56–57).

In view of the full record, Petitioner persuades us that one of ordinary skill would have substituted Kincaid's isolation circuit with Nix's isolation circuit because Nix's circuit is "an improved isolation circuit that reduces interference." Pet. 65, 87 (citing Ex. 1003 ¶¶ 109, 129–134). Thus, even if there is not a finite number of options that would yield predictable results with a reasonable expectation of success, Petitioner provides a sufficient reason for replacing Kincaid's active isolation circuit with Nix's isolation circuit comprising a passive common mode choke. *See id.*

Patent Owner additionally responds that Petitioner's proposed modification would replace Kincaid's active isolation circuit, the feature that resulted in a patent, with a passive isolation circuit, which one of ordinary skill in the art would understand as a change in the principle of operation of Kincaid. PO Resp. 57–58 (citing Ex. 2009 ¶¶ 122–123; Ex. 2011, 36; Ex. 2010, 138:1–139:2, 147:2–148:11, 150:21–151:2). Patent Owner argues that "[c]ommon mode chokes are typically used for noise suppression" and the "common mode choke of the '194 Patent is not used for noise

suppression at all” but “use for the express purpose of creating a high impedance between the heating circuit and the heating element at the occupant detection signal frequency,” which Patent Owner contends is “not a conventional use of a common mode choke.” *Id.* at 58–59 (citing Ex. 2003, 20, Fig. 4; Ex. 2009 ¶ 124). Patent Owner, thus, asserts that it would not have been obvious to substitute Kincaid’s isolation circuit that prevents heating circuit impedance influencing its occupant detection circuit with Nix’s passive common mode choke used to prevent overloading of its signal generator. *Id.* at 59 (citing Ex. 2009 ¶¶ 125–126).

Petitioner replies that “inserting a high impedance between two circuit blocks is one of the ways to create isolation” and that the common mode choke of Nix is “not limited to suppressing noise.” Pet. Reply 26–27 (citing Ex. 1010 ¶ 56). Patent Owner replies that “Petitioner does not truly dispute that its proposed replacement would alter the principle of operation of Kincaid” because Petitioner and its declarant focus on the rest of Kincaid’s teachings, which are conventional and not part of Kincaid’s principle of operation. PO Sur-Reply 7(citing PO Resp. 57–58; Ex. 1010 ¶ 51). Patent Owner also argues that Petitioner “fails to rebut that the ’194 Patent does not use a common mode choke for its conventional use—noise suppression,” thus failing to show an “application of conventional methods to solve an old problem.” *Id.*

The full record persuades us that common mode chokes not only provide noise suppression but can also create a high impedance between a heating circuit and a heating element. Petitioner’s declarant testifies that the “use of common mode chokes to isolate one portion of circuit from another was well known at the time of the invention.” Ex. 1003 ¶ 41. We credit that

testimony because it is supported by record evidence. *See* Ex. 1009, 32. Moreover, the challenged claims do not exclude expressly an isolation circuit that performs noise suppression and is “configured to prevent the heating circuit from influencing the occupant detection circuit” or is “for isolating the heating circuit from” the occupant detection circuit. Ex. 1001, 7:15–18, 7:44–8:2, 8:34–38; *see also* Pet. 82 n.4 (assuming that claim 8 was intended to recite “said isolation circuit . . . for isolating the heating circuit *from the occupant detection circuit*”).

For the foregoing reasons, the full record persuades us that common mode chokes were known to one of ordinary skill in the art, that common mode chokes were known to be used for isolating circuits, and that Petitioner’s proposed modification of Kincaid to include Nix’s isolation circuit with common mode choke would have been a “substitution of one type of isolation circuit with an improved isolation circuit that reduces interference.” Pet. 65, 87 (citing Ex. 1003 ¶¶ 109, 129–134).

We are further persuaded by the full record that one of ordinary skill in the art would have had a reasonable expectation of success in substituting the isolation circuit of Kincaid with the common mode choke of Nix. *See* Ex. 1003 ¶ 134. Nix itself provides evidence that inserting an isolation circuit with a common mode choke between a heating circuit and a heating element was within ordinary skill. *See, e.g.*, Ex. 1006, Fig. 5.

iii. Motivation to Combine from the References

In our Decision to Institute, we stated that “Petitioner’s asserted rationale for combining Kincaid and Nix is supported by the references themselves.” Dec. to Inst. 20. Kincaid’s paragraph 3 states that “[b]ecause of the sensitivity of the measurements required by the occupant sensing

circuit, it is necessary to isolate the heating current source from the heating element . . . to prevent interference with the occupant sensing circuit.”

Ex. 1007 ¶ 3 (repetition of “from the heating element” omitted).

Patent Owner responds that the Board must apply Petitioner’s obviousness theory and cannot create a motivation to combine from a finding from paragraph 3 of Kincaid. PO Resp. 47 (citing Dec. to Inst. 19–20); *see also* PO Sur-Reply 4 (citing Dec. to Inst. 19–20). Patent Owner contends that Petitioner did not rely on paragraph 3 of Kincaid for supplying a motivation to combine the asserted references. *Id.* at 47–48 (citing Pet. 2; Ex. 1003 ¶¶ 132–134). According to Patent Owner, Petitioner relies on paragraph 3 only for its analogous art analysis, a different inquiry with a different standard of proof than motivation to combine. *Id.* at 48–49 (citing Pet. 65). Patent Owner, thus, contends that Petitioner fails to provide a rationale for its proposed combination. *Id.* at 49; *see also id.* at 51 (arguing Petitioner fails to carry its burden of providing a rationale for combining the references).

Patent Owner also replies that “Petitioner suggests for the first time that the motivation ‘is found in the references themselves.’” PO Sur-reply 5 (discussing Pet. 74; Pet. Reply 19–21). Patent Owner points out that Petitioner does not argue that paragraph 3 of Kincaid provides a motivation but instead relies on a citation to paragraph 3 in its arguments that Kincaid and Nix are concerned with the same problem. *Id.* at 5–6 (citing Pet. Reply 22–23). Patent Owner contends that Petitioner is conflating its analogous art arguments with its asserted motivation to combine. *Id.* at 6 (citing PO Resp. 48–49). Patent Owner also contends that Kincaid would not have motivated one of ordinary skill in the art to replace its active circuit with a passive

circuit because Kincaid's active circuit is effective for isolating its heating circuit. *Id.* According to Patent Owner, Petitioner should point to some indication that Kincaid can be improved to support the argument that paragraph 3 motivates replacing Kincaid's isolation circuit. *Id.*

We agree with Patent Owner that Petitioner relies on paragraph 3 of Kincaid to support its argument that Kincaid is in the same field and concerned with the same problem as the '194 patent. *See* Pet. 85; Dec. to Inst. 19. We also agree with Patent Owner that Petitioner does not rely on Kincaid's paragraph 3 to support its reason to modify Kincaid with Nix.

However, we raised in our Decision to Institute the issue of whether paragraph 3 of Kincaid would have motivated one of ordinary skill in the art to modify Kincaid with the teachings of Nix, because Kincaid's paragraph 3 expressly and plainly provides a reason to isolate the heating circuit from the heating element to prevent interference with the occupant sensing circuit, thereby motivating Petitioner's proposed modification. Dec. to Inst. 19–20; Ex. 1007 ¶ 3 (“Because of the sensitivity of the measurements required by the occupant sensing circuit, it is necessary to isolate the heating current source from the heating element from the heating element to prevent interference with the occupant sensing circuit.”). Because we understood Kincaid as clearly providing a reason for Petitioner's proposed modification at that stage of the proceeding, we indicated that Kincaid's paragraph 3 presents an issue that should be addressed during trial. *See* Dec. to Inst. 20; *see also* 37 C.F.R. § 42.20(d) (stating that the “Board may order briefing on any issue involved in the trial”). Further, because the issue was raised in our Decision to Institute and Patent Owner had an opportunity to respond, which it did (*see* PO Resp. 49–59), Patent Owner could not have been prejudiced

by being made aware of and, as discussed below, responding to an apparent motivation to modify Kincaid in the reference itself.

Patent Owner contends that paragraph 3 of Kincaid would not have motivated one of ordinary skill in the art to combine Kincaid with Nix because it would not have motivated one of ordinary skill in the art to look elsewhere to improve Kincaid. PO Resp. 49 (citing Ex. 2009 ¶¶ 103, 111), 50–51 (citing Ex. 2009 ¶¶ 111, 116, 122). Patent Owner argues that the isolation circuit of Kincaid is already suitable for isolating its heating circuit from its occupant sensing circuit and that Petitioner’s declarant agreed that Kincaid’s active isolation circuit is “clever” and effective for Kincaid’s design goals. *Id.* at 49–50 (citing Ex. 1007 ¶¶ 15, 18, 20, 26; Ex. 2010, 139:3–140:15, 141:22–142:15, 143:5–10, 143:19–24). Patent Owner, thus, argues that Kincaid “does not suggest some unmet need or deficiency that would have motivated a [person of ordinary skill in the art] to modify Kincaid to perform this isolation” and Petitioner does not identify any deficiency that would have motivated seeking a solution elsewhere. *Id.* at 51 (citing Ex. 2009 ¶¶ 109, 111, 122–124).

Petitioner replies that Kincaid need not disparage or criticize its isolation circuit. Pet. Reply 23 (citing PO Resp. 50–51). Petitioner notes that Patent Owner’s declarant described possible improvements to his own system, “even though there was nothing wrong with the base system.” *Id.* at 24 (citing Ex. 1011, 21:1–14).

The full record persuades us that, as indicated by Kincaid, it was known in the art that “it is necessary to isolate the heating current source from the heating element . . . to prevent interference with the occupant sensing circuit.” Ex. 1007 ¶ 3; *see also* Tr. 77:1–4, 77:12–25 (Patent

Owner's counsel also indicating that Kincaid acknowledges and recognizes a need to isolate). As discussed above, we find that Nix teaches a common mode choke and an isolation circuit that contains a common mode choke to isolate a heating circuit from a heating element. Petitioner also persuades us that the isolation circuit of Nix provides "an improved isolation circuit that reduces interference." Pet. 65, 87 (citing Ex. 1003 ¶¶ 109, 129–134); *but see* PO Sur-Reply 6 (disputing that Nix would have been an improvement). The full record, thus, persuades us that Kincaid would have motivated one of ordinary skill in the art to modify Kincaid in the manner asserted by Petitioner.

Also, although Kincaid teaches an active isolation circuit to address the problem identified in paragraph 3, Kincaid does not indicate that its active isolation circuit solution is the only solution or that other solutions cannot be used. Kincaid expressly discusses some disadvantages of transistors and mechanical relays that connect and disconnect a heating element. Ex. 1007 ¶ 4. Those disadvantages, however, do not apply to Nix's isolation circuit.

Thus, for the reasons above, in addition to Petitioner's proposed modification of Kincaid with Nix representing a substitution, we alternatively determine that Kincaid itself would have motivated one of ordinary skill in the art to modify Kincaid with the isolation circuit of Nix. *See* Ex. 1007 ¶ 3. We also determine that one of ordinary skill in the art would have had a reasonable expectation of success in substituting the isolation circuit of Kincaid with the common mode choke of Nix. *See* Ex. 1003 ¶ 134. Nix itself provides evidence that inserting an isolation

circuit with a common mode choke between a heating circuit and a heating element was within ordinary skill. *See, e.g.*, Ex. 1006, Fig. 5.

iv. Other Reasons to Modify

Petitioner also argues that Hansen supports its proposed combination of Kincaid and Nix. Pet. Reply 21 (citing Ex. 1008 ¶¶ 1, 3; Ex. 1010 ¶ 39). Petitioner also replies that the high cost of Kincaid's isolation circuit would have motivated one of ordinary skill in the art to replace it with Nix's common mode choke. Pet. Reply 23–24 (citing PO Resp. 50–51; Ex. 1007 ¶ 19; Ex. 1010 ¶¶ 46–48; Ex. 1011, 14:19–21, 15:13–16, 21:1–14, 24:1–11, 24:13–20). In reply to Patent Owner's arguments that Petitioner's proposed combination changes the principle of operation of Kincaid, Petitioner argues that replacing Kincaid's active isolation circuit with Nix's passive isolation circuit provides numerous benefits that would have motivated one of ordinary skill in the art to make the replacement. Pet. Reply 25–26 (citing PO Resp. 57, 58; Ex. 1010 ¶¶ 50–53; Ex. 2009 ¶¶ 122–123).

Patent Owner replies that Petitioner's reply arguments relying on Hansen and high cost are new. PO Sur-Reply 4 (citing Pet. Reply 21, 23–24). Patent Owner also contends that Petitioner's response to whether the proposed combination changes Kincaid's principle of operation raises another motivation not found in the Petition and is not responsive to Patent Owner's arguments. PO Sur-Reply 4 (citing Pet. Reply 26). Patent Owner also argues that it had no opportunity to rebut these motivations and the new motivations should be disregarded. *Id.* at 4, 5. Patent Owner contends that Petitioner incorrectly asserts that Kincaid and Nix are concerned with the same isolation problem and merely argues that the combination could have

been made, not that the combination would have been made. *Id.* at 5 (citing Pet. Reply 19–20, 22–23).

Because we determine that Petitioner shows that its proposed modification of Kincaid with Nix represents a substitution and would have been motivated by Kincaid itself, we do not need to reach the other asserted reasons to modify Kincaid. We note that the Petition does not present arguments that high cost would have motivated the proposed modification.

C. Level of Ordinary Skill in the Art

Petitioner states that the “level of ordinary skill in the art is evidenced by the references” and set forth in its declarant testimony. Pet. 2 (citing Ex. 1003 ¶¶ 35–39). Petitioner’s declarant opines that the “relevant field for purposes of the ’194 Patent is occupant detection systems and occupant detection circuits.” Ex. 1003 ¶ 35. Petitioner’s declarant also states that “a person of ordinary skill in the art would have: 1) a bachelor’s degree in electronics or electrical engineering or a related discipline, and 2) several years of relevant academic research or industry work experience.” *Id.* ¶ 38.

Patent Owner agrees that the relevant field of the ’194 patent is occupant detection systems and occupant detection circuits. PO Resp. 7. Patent Owner states that one of ordinary skill in the art “would have been a person having a bachelor’s degree in electrical engineering or a related discipline, and approximately two years of experience in the field of automotive electronics, including at least some experience with designing occupant detection systems.” *Id.* (citing Ex. 2009 ¶¶ 48–53).

As shown by the quotes above, the parties agree that the level of ordinary skill in the art includes at least a bachelor’s degree in electrical engineering or a related discipline. See PO Resp. 7 (citing Ex. 2009 ¶¶ 48–

53), 8 (stating that the “parties generally agree [about] a bachelor’s degree in electrical engineering”) (citing Ex. 1003 ¶ 38; Ex. 2009 ¶ 51); Ex. 1003 ¶ 38. Patent Owner, however, disagrees with Petitioner’s asserted level of ordinary skill because “relevant academic research or industry work experience” is unclear. PO Resp. 8 (citing Ex. 1003 ¶ 38; Ex. 2010, 67:22–68:8).

We find Patent Owner’s proposal consistent with the level of ordinary skill in the art reflected by the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995); *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978). We, therefore, find that a person of ordinary skill in the art “would have been a person having a bachelor’s degree in electrical engineering or a related discipline, and approximately two years of experience in the field of automotive electronics, including at least some experience with designing occupant detection systems.” PO Resp. 7.

Any differences regarding additional experience in the parties’ competing proposals for the level of ordinary skill do not affect our analysis of the challenge based on Kincaid and Nix. *See also* Tr. 5:7–10 (Petitioner’s counsel answering “it wouldn’t” to the question “if we did accept Patent Owner’s definition of the level of ordinary skill, would that impact your arguments in any significant way?”).

D. Objective Evidence of Nonobviousness

The parties do not dispute and do not direct us to any objective evidence of nonobviousness. Pet. 87 (“Petitioner is unaware of any objective evidence supporting a finding of non-obviousness.”); PO Resp.

passim.; Tr. 48:11–13 (Patent Owner’s counsel agreeing that no objective evidence of nonobviousness was presented in the record).

E. Weighing the Graham Factors

“Once all relevant facts are found, the ultimate legal determination [of obviousness] involves weighing of the fact findings to conclude whether the claimed combination would have been obvious to an ordinary artisan.”

Arctic Cat Inc. v. Bombardier Recreational Prods. Inc., 876 F.3d 1350, 1361 (Fed. Cir. 2017) (quoting *In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.*, 676 F.3d 1063, 1068–69 (Fed. Cir. 2012)). In Sections III.A, III.B, III.C, and III.D above, based on full record before us, we provide our factual findings regarding (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 ordinary skill in the art, and (4) objective evidence of nonobviousness.

In particular, we find that (1) Kincaid and Nix teach all the limitations of claims 1–8, (2) that one of ordinary skill in the art would have had a reason to modify Kincaid in view of Nix with a reasonable expectation of success, (3) that Patent Owner’s proposed level of ordinary skill in the art is consistent with the prior art of record, and (4) that there is no objective evidence of nonobviousness in the record. Weighing these underlying factual determinations, a preponderance of the evidence in the record persuades us that claims 1–8 of the ’194 patent are unpatentable over Kincaid and Nix. *Cf.* Ex. 1017 (European Patent Office decision revoking a related patent); *see also* Paper 38 (Patent Owner disputing the relevance of the European Patent Office Decision).

IV. CHALLENGE BASED ON NIX

Petitioner contends, with citations to Nix and declarant testimony, that, under 35 U.S.C. § 103(a), claims 1–8 would have been rendered obvious by Nix. Pet. 2, 8–52. Patent Owner responds that Nix does not teach or suggest an “occupant detection circuit configured to detect an occupant presence near the heating element” (claims 1 and 4), an “occupant sensing circuit effective for sensing the presence of an occupant near the heating element” (claim 8), or an “isolation circuit configured to prevent the heating circuit from influencing the occupant detection circuit” (claims 1 and 4). PO Resp. 33–45.

As discussed above for the previous challenge, Petitioner must prove unpatentability by a preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). The parties’ disputes are related to the scope and content of Nix, differences between independent claims 1, 4, and 8 and Nix, and the level of ordinary skill in the art. The parties do not present any arguments regarding objective evidence of nonobviousness and do not direct us to any objective evidence of nonobviousness. Pet. 87 (“Petitioner is unaware of any objective evidence supporting a finding of non-obviousness.”); PO Resp. *passim*.; Tr. 48:11–13 (Patent Owner’s counsel agreeing that no objective evidence of nonobviousness was presented in the record).

After reviewing the complete record, we conclude that Petitioner has shown by a preponderance of the evidence that Nix alone would have rendered obvious claims 1–8.

A. Scope and Content of the Prior Art

We provide our findings regarding Nix above in Section III.A.

B. Differences Between the Claimed Subject Matter and the Prior Art

1. Independent Claim 1

- a. “An occupant detection system, comprising: . . . an occupant detection circuit electrically coupled to the heating element, said occupant detection circuit configured to detect an occupant presence near the heating element”*

Petitioner contends that Nix teaches an “occupant detection system” that comprises “an occupant detection circuit electrically coupled to the heating element” and “configured to detect an occupant presence near the heating element.” Pet. 9–10 (citing Ex. 1006, Abstract, ¶ 15, Figs. 1, 5; claim 22), 11 (citing Ex. 1003 ¶¶ 52–53; Ex. 1006, Abstract, Figs. 1, 5, claim 1), 17–18 (Ex. 1006 ¶¶ 12, 30–31, 51, 52, Figs. 1, 5; claim 22), 18–24 (citing Ex. 1003 ¶¶ 60–66; Ex. 1006 ¶¶ 12, 30, 31, 33, 35, 36, 44, 51, 52, Figs. 1–3, 5). In particular, Petitioner contends that Nix teaches the recited occupant detection circuit because Nix’s signal generator 108, 518 generates a signal that is coupled with operator 100 via conductive surface 106 or heating mat 510 when operator 100 is seated in seat 104, and a signal detector detects the coupled signal through operator 100 to allow or prevent operation of control 112. *See id.* at 17–24.

Patent Owner responds that Nix is not “configured to detect an occupant presence” because, under its proposed interpretation of “configured to,” the asserted “occupant detection circuit must be specifically designed to detect the fact of a person being present in the seat” and not “*merely capable of* being made to detect a signal presence in the event that a person

completes Petitioner’s purported occupant detection ‘circuit.’” PO Resp. 33 (citing Ex. 2009 ¶¶ 55–61, 64–65, 92–96, 100) ; *see also id.* at 28–32 (asserting what Nix teaches). Patent Owner contends that one of ordinary skill in the art “would never have understood Nix to be specifically designed to detect the fact of a person being present because it completely fails to perform that purpose the vast majority of the time (i.e., the entire time that a person is present in the seat and not touching the vehicle control 112 to operate it).” *Id.* at 34 (citing Ex. 2009 ¶¶ 92–95). Patent Owner also contends that “Petitioner is essentially arguing that Nix is *capable of* detecting the presence of a person at some incidental point in time” and “does not contend that Nix is actually designed to detect the fact of a person being present,” as recognized by Petitioner and its declarant. *Id.* at 34–35 (citing Ex. 1003 ¶¶ 51, 53; Ex. 1006, Abstract; Ex. 2010, 88:2–9, 98:3–11).

Patent Owner also responds that one of ordinary skill in the art “would never have understood Nix to be specifically designed to detect the fact of a person being present, because it completely fails to perform that purpose the vast majority of the time.” PO Resp. 34 (citing Ex. 2009 ¶ 92). Patent Owner also argues that Nix is “not designed to detect a person being present in a vehicle seat, let alone a person being present near the heating element,” “assumes a person is present by detecting that the vehicle control has been activated,” and is “only concerned with distinguishing whether it was a driver or passenger who activated the control.” *Id.* (citing Pet. 22–24; Ex. 1003 ¶ 65; Ex. 1006 ¶¶ 11, 13, 33–41; Ex. 2009 ¶ 93). Patent Owner additionally explains, with citations to Nix and its declarant testimony, why a “plain, common-sense reading of Nix” clearly teaches that Petitioner’s asserted occupant detection circuit “is not designed for the purpose of

detecting a person's presence in the seat" because it does not do so a majority of the time and is susceptible to false occupant detections. *Id.* at 35–37 (citing Ex. 1006 ¶¶ 12, 30, 32, Fig. 1; Ex. 2009 ¶¶ 86, 92, 93, 95, 100; Ex. 2010, 95:2–9, 96:23–97:4). Patent Owner additionally responds that Nix is not “configured to detect an occupant presence near the heating element” because in Nix, a person who does not use a vehicle control would not be detected near the heating element, even though the person is near it. PO Resp. 37–38 (citing Ex. 2009 ¶¶ 92–95, 100; Ex. 2010, 88:21–90:9).

Petitioner replies that the recited “occupant detection circuit” “has no temporal limitations” and the “claims say nothing about when or how often the ‘*occupant detection circuit*’ or ‘*occupant sensing circuit*’ must detect an occupant.” Pet. Reply 4–5 (citing PO Resp. 34–35, 37). Petitioner contends that “Patent Owner’s proposed constructions are irrelevant because even the constructions do not actually include the temporal limitations Patent Owner relies on to distinguish Nix.” *Id.* at 5 (citing PO Resp. 9–20). Petitioner also replies that, even accepting that “configured to” means “specifically designed for,” Nix teaches the recited “occupant detection circuit” or “occupant sensing circuit” because Nix “teaches a system that is specifically designed to detect an operator 100 in the seat 104, when the operator 100 touches the control 112.” *Id.* at 9–10 (citing Ex. 1006 ¶¶ 30, 36, Fig. 1; Ex. 1010 ¶ 16) (emphasis in original).

Patent Owner replies that resolution of the parties’ dispute “turns on the proper construction of ‘configured to’” and that apparatus claims, like the challenged claims, “require an occupant detection circuit ‘configured to’ detect when a person is in the seat—not merely ‘capable of’ detection at some point.” PO Sur-Reply 1 (citing Pet. Reply 7–8, 10). Patent Owner

argues that “configured to” “generally means ‘designed’ to achieve the claimed objective rather than just ‘capable of’ serving that purpose.” *Id.* at 1–2 (citing PO Resp. 15–19). Patent Owner also argues that “the entire purpose of the ’194 Patent’s invention is to enhance the *accuracy* and *reliability* of determining when a person is present” (*id.* at 2 (citing PO Resp. 13–15) (emphasis in original)) and that one of ordinary skill in the art “would have known the industry purpose was for vehicle safety” (*id.* (citing PO Resp. 18–19)). Patent Owner contends that Petitioner insufficiently supports “its position that it is sufficient for Nix to only be *capable of* detecting a person in the seat only a small amount of time they are present in the seat.” *Id.*

Patent Owner also replies that Nix’s purported “occupant detection circuit” cannot detect an occupant the “vast majority of the time,” “only exists when the person happens to touch the conductive surface 124 of the control,” and “is only ever ‘capable of’ detecting when a person is in the seat a small part of the time they are present.” PO Sur-Reply 1 (citing PO Resp. 29, 34–36; Ex. 1010 ¶ 16). Patent Owner contends that “occupant presence” is a temporal limitation because it encompasses “*when* a person is present in the seat.” *Id.* at 2. Patent Owner argues that Petitioner’s position that “detecting at some point in time is the same as being ‘designed to’/‘configured to’ detect occupant presence” lacks support. *Id.* (citing PO Resp. 7, 9–10). Patent Owner, thus, argues that one of ordinary skill in the art “would not have understood Petitioner’s amalgamation of components in Nix to constitute a circuit that is specifically designed for the purpose of detecting when a person is in the vehicle seat” because, by design, Nix “is

unable to do so most of the time the person is in the seat.” *Id.* at 3 (citing PO Resp. 33–38) (citing Ex. 2009 ¶¶ 92–95).

The full record persuades us that Petitioner’s asserted occupant detection circuit in Nix is specifically designed to detect operator 100 in the seat 104 near seat heating matt 510, when operator 100 touches control 112. In particular, we find that Nix teaches that its signal generator 108 or 518 generates a signal to be coupled with operator 100 via conductive surface 106, which can be seat heating matt 510. Ex. 1006 ¶¶ 12 (stating that the “conductive surface may be a seat heating matt within a vehicle seat”), 30 (stating that a “signal generated by the signal generator 108 is coupled with the operator 100 via a conductive surface 106 while the operator 100 is seated in seat 104”), 51 (stating that an “exemplary seat heating matt 510 includes a resistive heating element 512 wired to a seat control module 500”).

We also find that, Nix, the signal passes through path 102, which includes operator 100, and when signal detector 116 detects the signal, equipment function 112 is deactivated. *Id.* ¶¶ 12 (stating that the “system may include a seat operatively coupled with the signal generator, wherein the signal detector is configured to detect a signal passing from the signal generator, through the conductive surface and a user to the touch screen”), 30 (stating that the “signal is passed along a path 102 through the posterior portions, e.g., buttocks, thighs and back . . .”), 36 (stating that “[i]f presence of the signal is detected by the signal detector 116 at the control 112, the equipment function 122 is deactivated, thus establishing a lockout of the control 112 to the driver.”), Fig. 1 (showing path 102 through operator 100).

Nix, therefore, teaches or suggests that it is specifically designed so that signal generator 108 or 518 sends a signal through seat heating matt 106 or 510 to detect operator 100 in seat 104 when operator 100 touches control 112. Ex. 1006 ¶¶ 12, 30, 36, 51, Fig. 1. We also credit Petitioner’s declarant testimony regarding the occupant detection circuit because it is supported by our factual findings. Ex. 1003 ¶¶ 51–53, 60, 62–66. We, thus, find that Nix teaches an “occupant detection system” that comprises “an occupant detection circuit electrically coupled to the heating element” and “configured to detect an occupant presence near the heating element,” under Patent Owner’s interpretation of “configured to” as meaning “specifically designed to,” which we adopted above in Section II.C.

Even if Nix is designed only to detect operator 100 via seat heating matt 510 when operator 100 touches control 112, one of ordinary skill in the art would understand that Nix is specifically designed to “to detect an occupant presence near the heating element” when operator 100 touches control 112. Claim 1 does not require explicitly that the occupant detection circuit is designed to detect an occupant under any particular circumstances, conditions, or durations, such as shortly after and all the while an occupant is near the heating element.

Patent Owner further responds that “Nix teaches an entirely separate, actual occupant detection sensor,” and thus, Petitioner’s asserted occupant detection circuit “is not a circuit that is actually designed to detect occupant presence.” PO Resp. 34 (citing Ex. 1006 ¶¶ 15, 44; Ex. 2009 ¶¶ 96–99); *see also id.* at 38–39 (citing Ex. 1006 ¶¶ 15, 43, 44, 52; Ex. 2009 ¶¶ 96–99; Ex. 2010, 106:1–8, 106:20–24); *see also* PO Sur-Reply 3 (arguing that Nix teaches separate “occupant detection sensors” that are “designed for the

purpose of occupant detection”) (citing PO Resp. 38–41). Patent Owner contends that Nix itself does not consider Petitioner’s asserted occupant detection circuit to be such an occupant detection circuit, and argues that Nix’s occupant detection sensors “detect the fact of a person being present in the seat” and work together with Nix’s signal generator. *Id.* at 38–41 (citing Ex. 1006 ¶¶ 15, 43, 44, 52, claims 23, 26; Ex. 2009 ¶¶ 98, 99). Patent Owner also contends that, because Nix teaches and names a separate occupant detection sensor, Petitioner’s asserted occupant detection circuit cannot be an occupant detection circuit because “it is not specifically designed to detect the fact of a person being present in the seat.” *Id.* at 41 (citing Ex. 2009 ¶¶ 96–100). Patent Owner also points out that Petitioner is not relying on the occupant detection sensors of Nix. *Id.* at 39 (citing Ex. 1003, 26 n.2; Ex. 2010, 98:12–21).

Petitioner argues that Nix’s signal generator 108 or 518 teaches or suggests the occupant detection circuit of claim 1. Pet. 9–11, 17–24. Petitioner does not rely on the embodiment that additionally or alternatively includes an “occupant detection sensor.” Petitioner sufficiently shows that one of the many embodiments in Nix teaches or suggests the occupant detection circuit. Petitioner does not need to show that every embodiment of Nix teaches or suggests the claimed occupant detection circuit. Even if we considered Nix’s occupant detection sensor, we would still find that Nix teaches one embodiment that is specifically designed to detect an occupant presence near seat heating mat 510 when operator 100 touches control 112, thereby satisfying the recitation of an “occupant detection system” that comprises “an occupant detection circuit electrically coupled to the heating element” and “configured to detect an occupant presence near the heating

element.” We note that Nix’s “occupant detection sensor” may teach the recited “occupant detection circuit,” but the limited description in Nix is not sufficient to make that determination.

In view of the above, a preponderance of the evidence persuades us that Nix teaches or suggests an “occupant detection system, comprising: . . . an occupant detection circuit electrically coupled to the heating element, said occupant detection circuit configured to detect an occupant presence near the heating element.” Ex. 1001, 7:2, 7:11–14.

b. “a seat assembly comprising a seat cushion having a seating surface”

Petitioner argues that Nix teaches “a seat assembly comprising a seat cushion having a seating surface.” Pet. 10–12 (citing Ex. 1003 ¶¶ 52–53; Ex. 1006 ¶¶ 30, 50, Fig. 1). We find that Nix describes “operator 100 seated in a seat 104,” a “signal generated . . . coupled with the operator 100 via a conductive surface 106 while the operator 100 is seated in seat 104,” and “coupling is capacitive in nature because the conductive element 106 is insulated from the user by . . . the seat cushion.” Ex. 1006 ¶ 30. We also find that Nix describes “conductive surface 106 in the seat 104 . . . located just beneath the seat surface.” *Id.* ¶ 50. We additionally find that Figure 1 of Nix depicts operator 100 in seat 104 that includes conductive element 106. We further credit Petitioner’s declarant testimony regarding this limitation because it is supported by Nix. Ex. 1003 ¶¶ 52–53.

We, thus, find that Nix teaches “a seat assembly comprising a seat cushion having a seating surface,” as recited by claim 1. Patent Owner does not present any arguments that Nix fails to teach or suggest this limitation. *See* PO Resp. 28–45; PO Sur-Reply 1–3.

- c. *“a heating element adjacent the seating surface, said heating element formed of electrically conductive material”*

Petitioner asserts that Nix teaches “a heating element adjacent the seating surface, said heating element formed of electrically conductive material.” Pet. 12–14 (citing Ex. 1003 ¶¶ 54–59; Ex. 1006 ¶¶ 12, 30, 50, 51, Figs. 1, 5). As discussed above in connection with an “occupant detection circuit electrically coupled to the heating element,” we find that Nix states that the “conductive surface may be a seat heating matt within a vehicle seat,” that “the conductive element 106 is insulated from the user by clothing, the seat cushion, etc.,” that “[w]here the vehicle is equipped with heated seats, the heated seat matt can be used for coupling the signal with the operator,” and that an “exemplary seat heating matt 510 includes resistive heating element 512 wired to a seat control module 500.” Ex. 1006 ¶¶ 12, 30, 50, 51. We also credit Petitioner’s declarant testimony regarding the recited heating element because it is supported by Nix. Ex. 1003 ¶¶ 54–56.

We, thus, find that Nix teaches “a heating element adjacent the seating surface, said heating element formed of electrically conductive material,” as recited by claim 1. Patent Owner does not present any arguments that Nix fails to teach or suggest this limitation. See PO Resp. 28–45; PO Sur-Reply 1–3.

- d. *“a heating circuit electrically coupled to the heating element, said heating circuit configured to supply an electrical current to the heating element effective to generate heat by the heating element”*

Petitioner argues that Nix teaches “a heating circuit electrically coupled to the heating element, said heating circuit configured to supply an electrical current to the heating element effective to generate heat by the heating element.” Pet. 14–17 (citing Ex. 1003 ¶¶ 54, 57–59; Ex. 1006 ¶¶ 50, 51, Fig. 5). We find that Nix describes that an “exemplary seat heating matt 510 includes resistive heating element 512 wired to a seat control module 500” and that “control module 500 contains switches 502 and 508 which connect the seat heating matt 510 to a battery 504 and vehicle ground 506, respectively.” Ex. 1006 ¶ 51. We also credit Petitioner’s declarant testimony regarding the heating circuit because it is supported by Nix. Ex. 1003 ¶¶ 54, 58, 59.

We, thus, find that Nix teaches “a heating circuit electrically coupled to the heating element, said heating circuit configured to supply an electrical current to the heating element effective to generate heat by the heating element,” as recited by claim 1. Patent Owner does not present arguments that Nix fails to teach or suggest this limitation. See PO Resp. 28–45; PO Sur-Reply 1–3.

- e. *“an isolation circuit interposed between the heating circuit and the heating element”*

Petitioner argues that Nix teaches “an isolation circuit interposed between the heating circuit and the heating element.” Pet. 25–26 (citing Ex. 1006 ¶¶ 50, 51), 28–29 (citing Ex. 1003 ¶¶ 67–71; Ex. 1006 ¶ 52, Fig. 5). We find that Nix states that “[i]n order to use the seat heating matt 510

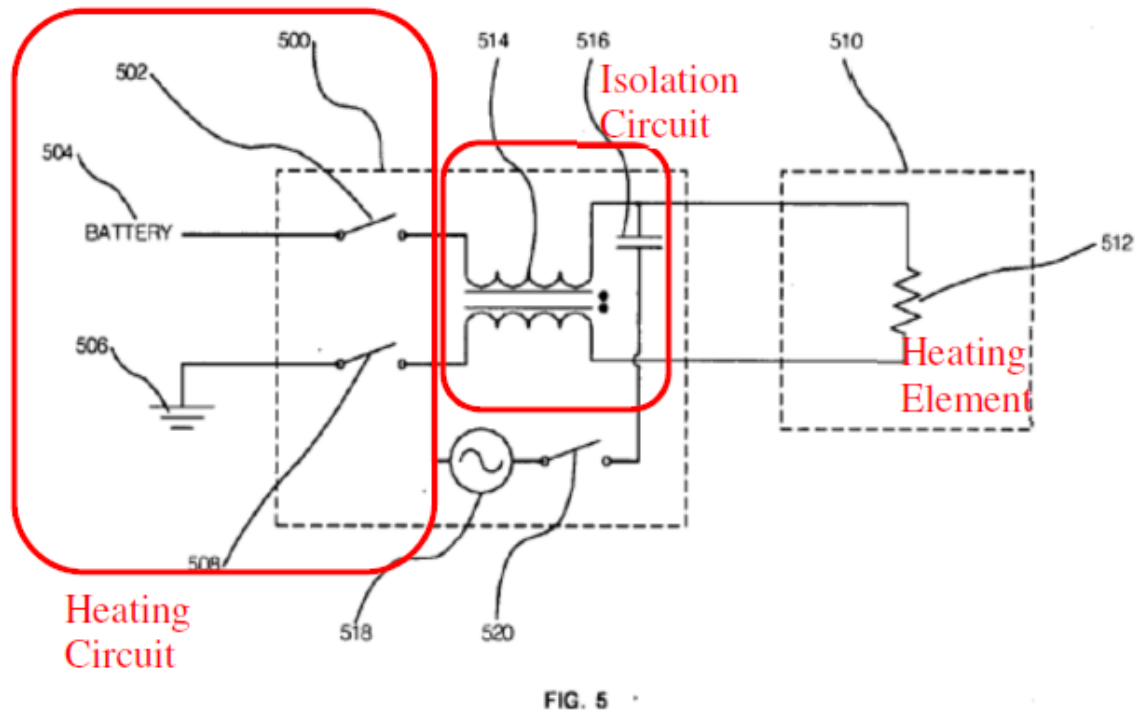
to couple the signal from a signal generator 518 into the operator, a common mode rejection choke 514 is connected in series with the seat heating matt 510” and that “[u]sing the common mode rejection choke 514; the entire seat heating matt's potential can alternate relative to vehicle ground 506, while keeping the resulting alternating current low due to the relatively high impedance of the common mode rejection choke 514 at the operating frequency.” Ex. 1006 ¶ 51. We also find that Nix states that the “signal generator 518 is connected to the seat heating matt 510 through a capacitor 516 so that the signal generator 518 is not affected by the seat heating being on or off, and switches 502 and 508 being closed or open.” *Id.* ¶ 52. We additionally find that Figure 5 shows common mode choke 514 and capacitor 516 between switches 502, 508 and heating element 512. We also credit Petitioner’s declarant testimony regarding the isolation circuit because it is supported by Nix. Ex. 1003 ¶¶ 67–69.

We, thus, find that Nix teaches “an isolation circuit interposed between the heating circuit and the heating element,” as recited by claim 1. Patent Owner does not present arguments that Nix fails to teach or suggest this limitation. See PO Resp. 28–45; PO Sur-Reply 1–3.

f. “said isolation circuit configured to prevent the heating circuit from influencing the occupant detection circuit”

Petitioner argues that Nix teaches “said isolation circuit configured to prevent the heating circuit from influencing the occupant detection circuit,” as recited by claim 1. Pet. 26–30 (citing Ex. 1003 ¶¶ 67–71; Ex. 1006 ¶¶ 50–52, Fig. 5). In particular, Petitioner argues that Nix teaches an “isolation circuit . . . which also includes a common mode rejection choke

514 and a capacitor 516.” *Id.* at 28 (citing Ex. 1003 ¶¶ 67–71; Ex. 1006 ¶ 52, Fig. 5). Petitioner’s annotated Figure 5 of Nix is reproduced below.



Ex. 1006, (Fig. 5, annotated)

Id. at 29. Petitioner’s annotated Figure 5 is Figure 5 of Nix with outlines for the asserted heating circuit and isolation circuit and includes labels for the asserted heating circuit, isolation circuit, and heating element. *Id.*

Petitioner also argues that the “purpose of this isolation circuit is to prevent the problem of the heating circuit influencing the occupant detection circuit,” such as “the problematic low resistance presented by the heating circuit” and “seat heating being on or off.” *Id.* at 29–30 (citing Ex. 1003 ¶¶ 67–71; Ex. 1006 ¶¶ 50–52). Petitioner, thus, argues that “the isolation circuit (which includes capacitor 516 and common mode choke 514) prevents the occupant detection circuit (which includes signal generator

518/108) from being influence[d] by the heating mat/element as required by [claim 1].” *Id.* at 30.

Patent Owner responds that Nix does not teach or suggest an “isolation circuit configured to prevent the heating circuit from influencing the occupant detection circuit,” under its proposed interpretation of “influencing the occupant detection circuit.” PO Resp. 42. Patent Owner explains how the ’194 patent detects the presence of an occupant through field impedance measurements of a heating element. *Id.* at 42–43 (citing Ex. 1001, 3:62–4:21, 5:36–61; Ex. 2009 ¶ 102). Patent Owner, thus, argues that the ’194 patent defines “influencing the occupant detection circuit” because of how the ’194 patent detects occupant presence. *Id.* at 43 (citing Ex. 1001, 3:62–4:50, 5:34–61, 6:35–39; Ex. 2009 ¶ 103).

According to Patent Owner, Petitioner does not contend that Nix operates similarly to the ’194 patent because Petitioner contends that Nix looks for a signal from the signal generator and does not measure changes in the field impedance of a heating element. *Id.* at 43–44 (citing Pet. 22–24; Ex. 1011 ¶¶ 11, 13, 33–41; Ex. 2009 ¶¶ 104–105). Patent Owner argues that Nix does not “prevent the heating circuit from influencing the occupant detection circuit,” under its proposed interpretation. *Id.* at 44 (citing Ex. 2009 ¶¶ 104–106).

Petitioner replies that “claims 1 and 4 have no requirements for how the occupant detection circuit operates, and do not mention measuring impedance.” Pet. Reply 10–11 (citing PO Resp. 43, 45; Ex. 1001, 7:12–14, 7:40–42). Petitioner also replies that Patent Owner imports “measuring impedance” into and narrows the isolation circuit recitation through its proposed interpretation for “influencing the occupant detection circuit.” Pet.

Reply 11–13 (citing Dec. to Inst. 6, 11–12; PO Resp. 23–24). Petitioner notes that Patent Owner’s declarant testified that “‘the particular characteristics’ of the occupant detection/sensing circuit is ‘not something [the ’194 Patent] is claiming.’” *Id.* at 13–14 (citing Ex. 1001, 1:25–26; Ex. 1011, 42:6–12). Petitioner further notes that the recited isolation circuit “does not detect or measure anything.” *Id.* at 14.

Petitioner further replies that “Nix teaches measuring impedance of the heating element” because the capacitive coupling between signal generator 108 and operator 100 involves impedance of the field source. Pet. Reply 14–16 (citing Ex. 1003 ¶¶ 63–66; Ex. 1006 ¶ 30, Fig. 1; Ex. 1010 ¶¶ 27–36). Petitioner, thus, argues that “‘Nix’s detection of the oscillator’s signal that results from this coupling is a binary measurement of the change in inductance of the heating element.’” *Id.* at 16 (quoting Ex. 1010 ¶ 30) (citing also Ex. 2010, 107:15–108:17).

Petitioner also contends that occupant detection systems do not need to measure a specific impedance value and look for impedance changes. *Id.* (citing Ex. 1010 ¶ 31; Ex. 2010, 108:18–109:10). Petitioner points to the ’194 patent’s description of measuring indirectly impedance and binary impedance measurement. *Id.* (citing Ex. 1001, 4:45–50; Ex. 1010 ¶¶ 34, 35). Petitioner also points to Patent Owner’s declarant using such measurements. *Id.* at 16–17 (citing Ex. 1011, 19:17–20, 20:5–7).

Petitioner also replies that, even under Patent Owner’s proposed interpretation of “influencing the occupant detection circuit,” Nix teaches that its common mode choke 514 addresses low resistance when seat heating is on, so that “the electrical load . . . of the heating circuit does not combine with the electric impedance of the heating element in a way that would

influence the detection of an occupant” *Id.* at 17–18 (citing PO Resp. 23–24; Ex. 1006 ¶¶ 50, 52, Fig. 5; Ex. 1003 ¶¶ 69, 70). Petitioner, thus, argues that Nix teaches the recited occupant detection circuit or occupant sensing circuit. *Id.* at 19.

In view of the full record before us, we find that Nix teaches an isolation circuit. Nix teaches that “in this case the low resistance of the heating matt . . . may make it difficult to couple a sufficiently strong signal into the operator.” Ex. 1006 ¶ 50. We find that Nix teaches using common mode choke 514 “[i]n order to use the seat heating matt 510 to couple the signal from a signal generator 518 into the operator” and to “keep[] the resulting alternating current low due to the relatively high impedance of the common mode rejection choke 514 at the operating frequency.” *Id.* ¶ 51. We also find that Nix teaches that “signal generator 518 is connected to the seat heating matt 510 through a capacitor 516 so that the signal generator 518 is not affected by the seat heating being on or off, and switches 502 and 508 being closed or open.” *Id.* ¶ 52. We also credit Petitioner’s declarant testimony regarding the recited isolation circuit. Ex. 1003 ¶¶ 67, 69–71. We, thus, are persuaded that Nix teaches an isolation circuit that includes a common mode choke and a capacitor.

Also, claim 1 requires an “isolation circuit configured to prevent the heating circuit from influencing the occupant detection circuit.” Ex. 1001, 7:16–18. Claim 1 does not expressly require preventing the heating circuit from influencing impedance measurements to detect an occupant. Also, for the reasons above, we are not persuaded to interpret the phrase “influencing the occupant detection circuit,” as proposed by Patent Owner. Even if we were to adopt Patent Owner’s proposed interpretation, Petitioner presents

arguments and evidence that Nix’s isolation circuit addresses low resistance when seat heating is on with is common mode choke 514 and prevents signal generator 158 from being affected by heating being on or off. Pet. Reply 17–18. Based on our findings above, we agree that Nix’s isolation circuit comprising common mode choke and capacitor would “prevent the heating circuit from influencing the occupant detection circuit.” Ex. 1006 ¶¶ 50, 52.

Patent Owner also responds that, even if Nix prevented impedance of its heating circuit from combining with the impedance of its heating element in a way that would influence occupant detection, “Nix’s purported isolation circuit is not specifically *designed* for this purpose” because “Nix does not measure changes in field impedance of the heating element” and “does not include its common mode choke for the purpose of attempting to prevent changes in field impedance caused by the heating circuit.” PO Resp. 44–45 (citing Ex. 2009 ¶¶ 104–105) (emphasis in original).

For the reasons discussed above, we find that Nix teaches that its isolation circuit does “prevent the heating circuit from influencing the occupant detection circuit.” We also find that Nix states that “[i]n order to use the seat heating matt 510 to couple the signal from a signal generator 518 into the operator, a common mode rejection choke 514 *is connected* in series with the seat heating matt 510,” that the “inductivity of one common mode rejection choke 514 *is chosen* such that its AC impedance . . . is sufficiently high so that signal generator 518 can operate at the desired alternating voltage,” and that “[u]sing the common mode rejection choke 514 . . . keep[s] the resulting alternating current low due to the relatively high impedance of the common mode rejection choke 514 at the operating frequency.” Ex. 1006 ¶ 51 (emphases added). In view of these teachings,

we find that Nix’s isolation circuit is “configured” or “specifically designed” “to prevent the heating circuit from influencing the occupant detection circuit.” We, thus, find that Nix teaches the limitations regarding the isolation circuit of claim 1.

- g. *“said isolation circuit comprising a common mode choke, wherein the common mode choke comprises a first inductor inductively coupled to a second inductor such that current in the first inductor induces current in the second inductor, wherein the common mode choke is characterized as a four terminal device”*

Petitioner argues that Nix teaches “said isolation circuit comprising a common mode choke, wherein the common mode choke comprises a first inductor inductively coupled to a second inductor such that current in the first inductor induces current in the second inductor, wherein the common mode choke is characterized as a four terminal device.” Pet. 31–32 (citing Ex. 1003 ¶¶ 41–42, 72–77; Ex. 1006 ¶ 51, Fig. 5). Petitioner also argues that “wherein the common mode choke comprises a first inductor inductively coupled to a second inductor such that current in the first inductor induces current in the second inductor” is “merely a description of a standard common mode choke.” *Id.* at 32 (citing Ex. 1003 ¶¶ 72–77; Ex. 1006 ¶ 51, Fig. 5); *see also id.* at 32–34 (arguing that the limitation would have been recognized as a description of a common mode choke and asserting what the characteristics of a standard common mode choke are) (citing Ex. 1002, 194; Ex. 1003 ¶¶ 41–42, 74–76; Ex. 1004, 6–7; Ex. 1005, 1–2).

We find that Nix teaches that “[i]n order to use the seat heating matt 510 to couple the signal from a signal generator 518 into the operator, a

common mode choke 514 is connected in series with the seat heating matt 510.” Ex. 1006 ¶ 52. We also find that Figure 5 of Nix shows common mode choke 514. We further find that Nix teaches an isolation circuit that includes common mode choke 514. *Id.* We additionally find that Nix teaches a common mode choke characterized as a four terminal device. *Id.* ¶ 51 (describing the operation of common mode rejection choke 514), Fig. 5 (depicting common mode rejection choke 514 as a four terminal device).

We credit the testimony of Petitioner’s declarant regarding these limitations because it finds support in the record. Ex. 1003 ¶¶ 41–42, 72–75, 77. In view of declarant testimony supported by record evidence, we find that one of ordinary skill in the art would have understood that Nix teaches or suggests a common mode choke comprising a first inductor inductively coupled to a second inductor so that current in the first inductor induces a current in the second inductor. Ex. 1002, 194; Ex. 1003 ¶¶ 41–42, 74, 75, 77; Ex. 1004, 6–7; Ex. 1005, 1–2.

We, thus, find that Nix teaches the limitations regarding the common mode choke of claim 1. Patent Owner does not present arguments that Nix fails to teach or suggest these limitations. See PO Resp. 28–59; PO Sur-Reply 1–7.

2. Dependent Claims 2 and 3

Dependent claim 2 recites “wherein the occupant detection circuit detects an occupant by analyzing an excitation signal output by the occupant detection circuit, and the isolation circuit prevents the heating circuit from influencing the occupant detection circuit by preventing the excitation signal from being influenced by the heating circuit.” Petitioner argues that Nix teaches or suggests this limitation. Pet. 35–38 (citing Ex. 1003 ¶¶ 79–83;

Ex. 1006 ¶¶ 10, 12, 30, 31, 51), 39–41 (citing Ex. 1003 ¶¶ 79–83; Ex. 1006 ¶¶ 12, 51, 52). Petitioner also argues that it would have been obvious that “Nix’s signal generator is part of Nix’s occupant detection circuit and outputs an alternating current signal to a heating element” and “the signal output by Nix’s signal generator 108/518 is the excitation signal” of claim 2. *Id.* at 38–39 (citing Ex. 1003 ¶¶ 79–83; Ex. 1006 ¶¶ 10, 12, 30, 51).

We find that Nix teaches that its signal detector 116 is configured to detect a signal through operator 100 from signal generator 108 or 518, and thus teaches “wherein the occupant detection circuit detects an occupant by analyzing an excitation signal output by the occupant detection circuit,” recited by claim 2. Ex. 1006 ¶¶ 12 (stating that the “conductive surface may be a seat heating matt within a vehicle seat”), 30 (stating that the “system may include a seat operatively coupled with the signal generator, wherein the signal detector is configured to detect a signal passing from the signal generator, through the conductive surface and a user to the touch screen,” that a “signal generated by the signal generator 108 is coupled with the operator 100 via a conductive surface 106 while the operator 100 is seated in seat 104,” and that the “signal detector may be configured to detect the signal passing through an operator seated within the seat”), 30 (stating that the “signal is passed along a path 102 through the posterior portions, e.g., buttocks, thighs and back . . .”), 31 (stating that “[s]ignal detector 116 detects whether a signal consistent with the characteristics of the signal generated by signal generator 108 is present at conductive element 124”), 36 (stating that “[i]f presence of the signal is detected by the signal detector 116 at the control 112, the equipment function 122 is deactivated, thus establishing a lockout of the control 112 to the driver”), 51 (stating that an

“exemplary seat heating matt 510 includes a resistive heating element 512 wired to a seat control module 500”), Fig. 1 (showing path 102 through operator 100). We also credit the testimony of Petitioner’s declarant because it is supported by Nix. Ex. 1003 ¶¶ 79–83.

As discussed above for claim 1, we find that Nix’s isolation circuit includes common mode choke 514 and capacitor 516. We also find that Nix teaches that its isolation circuit prevents its heating circuit from influencing its occupant detection circuit by preventing the excitation signal from being influenced by the heating circuit, as required by claim 2. Ex. 1006 ¶ 12 (stating that the “system may include a common mode rejection choke operatively connected between the seat heating matt and a vehicle power supply and ground”), 51 (stating that the “inductivity of one common mode rejection choke 514 is chosen such that its AC impedance . . . is sufficiently high so that signal generator 518 can operate at the desired alternating voltage”), 52 (stating that “signal generator 518 is connected to the seat heating matt 510 through a capacitor 516 so that signal generator 518 is not affected by the seat heating being on or off . . .”). We also credit the testimony of Petitioner’s declarant because it is supported by Nix. Ex. 1003 ¶¶ 79–83.

Dependent claim 3 recites “wherein the common mode choke is configured to induce a second current toward the heater element in response to a first current away from the heater element.” Petitioner contends that one of ordinary skill in the art would have recognized its limitations as characteristics of a common mode choke. Pet. 41–44 (citing Ex. 1003 ¶¶ 41–42, 45, 84–86; Ex. 1004, 6–7; Ex. 1005, 1–2; Ex. 1006, Fig. 5).

As discussed above, we find that Nix teaches an isolation circuit that includes a common mode choke. Ex. 1006 ¶ 51 (describing the operation of common mode rejection choke 514), Fig. 5 (depicting common mode rejection choke 514). We also find that the dot notation in Figure 5 of Nix indicates that the common mode choke is configured to induce a second current toward Nix’s heater element in response to a first current away from the heater element. *Id.* at Fig. 5. We further credit the testimony of Petitioner’s declarant regarding claim 3 because it is supported by record evidence. Ex. 1003 ¶¶ 41–42, 84–86; Ex. 1004, 6–7; Ex. 1005, 1–2; Ex. 1006, Fig. 5.

In view of our findings above, we determine that Nix teaches or suggests all the limitations of claims 2 and 3. Patent Owner does not provide arguments or evidence specifically for the challenged dependent claims. *See* PO Resp. 28–59; PO Sur-Reply 1–7; Tr. 48:8–10 (Patent Owner’s counsel agreeing that arguments specifically for the dependent claims were not presented).

3. Independent Claim 4

Petitioner argues that independent claim 4 “is a reorganization of the claim elements in [] [c]laim 1” and the “wording of many of the claim limitation[s] is identical to limitations in [c]laim 1.” Pet. 46. Petitioner refers to its arguments for claim 1. *Id.* at 43–46 (referring to arguments for claim 1, also citing Ex. 1003 ¶¶ 50–77, 87–89). Petitioner maps elements of claim 4 to elements of claim 1 and cites to paragraphs 50–77 and 87–89 of its declarant testimony. *Id.* at 43–46.

We find that Nix teaches or suggests an “occupant detection system controller electrically coupled to a heating element formed of electrically

conductive material and located adjacent a seating surface of a seat assembly.” Ex. 1006 ¶¶ 12 (stating that the “system may include a seat operatively coupled with the signal generator, wherein the signal detector is configured to detect a signal passing from the signal generator, through the conductive surface and a user to the touch screen” and that the “conductive surface may be a seat heating matt within a vehicle seat”), 30 (stating that a “signal generated by the signal generator 108 is coupled with the operator 100 via a conductive surface 106 while the operator 100 is seated in seat 104” and that “the conductive element 106 is insulated from the user by clothing, the seat cushion, etc.”), 36 (stating that “[i]f presence of the signal is detected by the signal detector 116 at the control 112, the equipment function 122 is deactivated, thus establishing a lockout of the control 112 to the driver.”), 50 (stating that “[w]here the vehicle is equipped with heated seats, the heated seat matt can be used for coupling the signal with the operator”), 51 (stating that an “exemplary seat heating matt 510 includes a resistive heating element 512 wired to a seat control module 500”), Fig. 1 (showing path 102 through operator 100).

We also find that Nix teaches or suggests “an occupant detection circuit electrically coupled to the heating element, said occupant detection circuit configured to detect an occupant presence near the heating element.” Ex. 1006 ¶¶ 12 (stating that the “system may include a seat operatively coupled with the signal generator, wherein the signal detector is configured to detect a signal passing from the signal generator, through the conductive surface and a user to the touch screen”), 30 (stating that a “signal generated by the signal generator 108 is coupled with the operator 100 via a conductive surface 106 while the operator 100 is seated in seat 104”), 36 (stating that

“[i]f presence of the signal is detected by the signal detector 116 at the control 112, the equipment function 122 is deactivated, thus establishing a lockout of the control 112 to the driver”), Fig. 1 (showing path 102 through operator 100), Fig. 5 (showing heating element 512 connected to signal generator 518).

Patent Owner responds that Nix does not teach or suggest an “occupant detection circuit configured to detect an occupant presence near the heating element,” as recited by independent claim 4. PO Resp. 33–42. For the reasons discussed above for a similar limitation in claim 1, a preponderance of the record persuades us that Nix teaches the occupant detection circuit of claim 4.

We additionally find that Nix teaches “an isolation circuit interposed between a heating circuit and the heating element.” Ex. 1006 ¶ 51 (stating that “[i]n order to use the seat heating matt 510 to couple the signal from a signal generator 518 into the operator, a common mode rejection choke 514 is connected in series with the seat heating matt 510” and that “[u]sing the common mode rejection choke 514; the entire seat heating matt's potential can alternate relative to vehicle ground 506, while keeping the resulting alternating current low due to the relatively high impedance of the common mode rejection choke 514 at the operating frequency”), ¶ 52 (stating that the “signal generator 518 is connected to the seat heating matt 510 through a capacitor 516 so that the signal generator 518 is not affected by the seat heating being on or off, and switches 502 and 508 being closed or open”), Fig. 5 (showing common mode choke 514 and capacitor 516 between switches 502, 508 and heating element 512). We also credit Petitioner’s

declarant testimony regarding the isolation circuit because it is supported by Nix. Ex. 1003 ¶¶ 67–69.

We additionally find that Nix teaches “said isolation circuit configured to prevent the heating circuit from influencing the occupant detection circuit.” Ex. 1006 ¶¶ 50 (stating that “in this case the low resistance of the heating matt . . . may make it difficult to couple a sufficiently strong signal into the operator”), 51 (stating that “[i]n order to use the seat heating matt 510 to couple the signal from a signal generator 518 into the operator” and to “keep[] the resulting alternating current low due to the relatively high impedance of the common mode rejection choke 514 at the operating frequency”), 52 (stating that “signal generator 518 is connected to the seat heating matt 510 through a capacitor 516 so that the signal generator 518 is not affected by the seat heating being on or off, and switches 502 and 508 being closed or open”).

Patent Owner responds that Nix does not teach or suggest an “isolation circuit configured to prevent the heating circuit from influencing the occupant detection circuit,” under its proposed interpretation of “influencing the occupant detection circuit.” PO Resp. 42. For the reasons discussed above for a similar limitation in claim 1, a preponderance of the record persuades us that Nix teaches the isolation circuit of claim 4.

We further find that Nix teaches or suggests “said isolation circuit comprising a common mode choke, wherein the common mode choke comprises a first inductor inductively coupled to a second inductor such that current in the first inductor induces current in the second inductor, wherein the common mode choke is characterized as a four terminal device.” Ex. 1006 ¶ 51 (describing the operation of common mode rejection choke

514), ¶ 51 (“In order to use the seat heating matt 510 to couple the signal from a signal generator 518 into the operator, a common mode rejection choke 514 is connected in series with the seat heating matt 510.”), Fig. 5 (depicting common mode choke 514 as a four terminal device). We also credit the testimony of Petitioner’s declarant regarding these limitations because it finds support in evidence of record. Ex. 1003 ¶¶ 41–42, 73–75, 77, 89. In view of declarant testimony supported by record evidence, we find that one of ordinary skill in the art would have understood that Nix teaches or suggests a common mode choke comprising a first inductor inductively coupled to a second inductor so that current in the first inductor induces a current in the second inductor and is a four terminal device. Ex. 1002, 194; Ex. 1003 ¶¶ 41–42, 74, 75, 77; Ex. 1004, 6–7; Ex. 1005, 1–2.

4. Dependent Claims 5–7

Claim 5 depends from independent claim 4 and recites “wherein the controller further comprises a heating circuit electrically coupled to the heating element, said heating circuit configured to supply an electrical current to the heating element effective to generate heat by the heating element.” Petitioner refers to its arguments for claim 1 for dependent claim 5. Pet. 46–47 (also citing Ex. 1003 ¶¶ 54–59, 90, 91).

We find that Nix teaches the limitations of claim 5. Ex. 1006 ¶ 51 (describing that an “exemplary seat heating matt 510 includes resistive heating element 512 wired to a seat control module 500” and that “control module 500 contains switches 502 and 508 which connect the seat heating matt 510 to a battery 504 and vehicle ground 506, respectively”). We also credit Petitioner’s declarant testimony regarding the heating circuit because it is supported by Nix. Ex. 1003 ¶¶ 54, 58, 59, 90, 91.

Claim 6 depends from claim 5 and recites “wherein the occupant detection circuit detects an occupant by analyzing an excitation signal output by the occupant detection circuit, and the isolation circuit prevents the heating circuit from influencing the occupant detection circuit by preventing the excitation signal from being influenced by the heating circuit.”

Petitioner refers to its arguments for claims 1 and 2 for dependent claim 6. Pet. 47–48 (also citing Ex. 1003 ¶¶ 79–83, 90, 91). We find that Nix teaches or suggests the limitations of claim 6. Ex. 1006 ¶¶ 12, 30, 31, 36, 50–52, Figs. 1, 5. We also credit the testimony of Petitioner’s declarant regarding the limitations of claim 6 because it is supported by Nix. Ex. 1003 ¶¶ 79–83, 90, 91.

Claim 7 depends from claim 6 and recites “wherein the common mode choke is configured to induce a second current toward the heater element in response to a first current away from the heater element.” Petitioner refers to its arguments for claim 3 for dependent claim 7. Pet. 48–49 (also citing Ex. 1003 ¶¶ 84–86, 90, 91). For the reasons discussed for claim 3, we find that Nix teaches or suggests the limitations of claim 7. Ex. 1006 ¶ 51 (describing the operation of common mode rejection choke 514), Fig. 5 (depicting common mode rejection choke 514 as a four terminal device). We also credit the testimony of Petitioner’s declarant regarding claim 7 because it is supported by record evidence. Ex. 1003 ¶¶ 41–42, 84–86, 90, 91; Ex. 1004, 6–7; Ex. 1005, 1–2; Ex. 1006, Fig. 5.

In view of our findings, we determine that Nix teaches or suggests all the limitations of claims 5–7. Patent Owner does not provide arguments or evidence specifically for the challenged dependent claims. See PO Resp. 28–59; PO Sur-Reply 1–7; *see also* Pet. Reply 19; Tr. 48:8–10.

5. *Independent Claim 8*

Petitioner argues that independent claim 8 “is a reorganization of the claim elements in [] [c]laim 1” and the “wording of many of the claim limitations are identical to limitations in [c]laim 1.” Pet. 51–52. Petitioner refers to its arguments for claim 1. *Id.* at 49–52 (also citing Ex. 1003 ¶¶ 50–77, 92–93). Petitioner maps elements of claim 8 to elements of claim 1 and cites to paragraphs 50–77 and 92–93 of its declarant testimony. *Id.* at 49–52.

We find that Nix teaches a “seat assembly, comprising: “a seat cushion having a seating surface” and “a heating element adjacent the seating surface formed of electrically conductive material.” Ex. 1006 ¶¶ 12 (stating that the “system may include a seat operatively coupled with the signal generator, wherein the signal detector is configured to detect a signal passing from the signal generator, through the conductive surface and a user to the touch screen” and that the “conductive surface may be a seat heating matt within a vehicle seat”), 30 (describing “operator 100 seated in a seat 104,” a “signal generated . . . coupled with the operator 100 via a conductive surface 106 while the operator 100 is seated in seat 104,” and “coupling is capacitive in nature because the conductive element 106 is insulated from the user by . . . the seat cushion”), 50 (describing “conductive surface 106 in the seat 104 . . . located just beneath the seat surface” and “[w]here the vehicle is equipped with heated seats, the heated seat matt can be used for coupling the signal with the operator”), 51 (stating that an “exemplary seat heating matt 510 includes a resistive heating element 512 wired to a seat control module 500”), Fig. 1 (depicting operator 100 in seat 104 that includes conductive element 106).

We also find that Nix teaches “a heating circuit coupled to the heating element for supplying an electrical current to the heating element effective for generating heat.” Ex. 1006 ¶ 51 (stating that an “exemplary seat heating matt 510 includes resistive heating element 512 wired to a seat control module 500” and that “control module 500 contains switches 502 and 508 which connect the seat heating matt 510 to a battery 504 and vehicle ground 506, respectively”).

We additionally find that Nix teaches or suggests “an occupant sensing circuit coupled to the heating element and effective for sensing the presence of an occupant near the heating element.” Ex. 1006 ¶¶ 12 (stating that the “system may include a seat operatively coupled with the signal generator, wherein the signal detector is configured to detect a signal passing from the signal generator, through the conductive surface and a user to the touch screen” and that the “conductive surface may be a seat heating matt within a vehicle seat”), 30 (stating that a “signal generated by the signal generator 108 is coupled with the operator 100 via a conductive surface 106 while the operator 100 is seated in seat 104” and that the “signal is passed along a path 102 through the posterior portions, e.g., buttocks, thighs and back . . .”), 36 (stating that “[i]f presence of the signal is detected by the signal detector 116 at the control 112, the equipment function 122 is deactivated, thus establishing a lockout of the control 112 to the driver.”), 51 (stating that an “exemplary seat heating matt 510 includes a resistive heating element 512 wired to a seat control module 500”), Fig. 1 (showing path 102 through operator 100).

Patent Owner responds that Nix does not teach or suggest an “occupant sensing circuit . . . effective for sensing the presence of an

occupant near the heating element,” as recited by independent claim 8. PO Resp. 33–42. Patent Owner states that the “parties agree this limitation should be construed in the same manner as the ‘occupant detection circuit configured to detect an occupant presence near the heating element.” PO Resp. 41. Patent Owner, thus, asserts the same reasons discussed above for the “occupant detection circuit” of claims 1 and 4 for the “occupant sensing circuit” of claim 8. *Id.* In particular, Patent Owner argues that the asserted “occupant sensing circuit” of Nix is not designed to sense the presence of an occupant near a heating element and would not detect a person sitting in the seat but not operating control 112. *Id.* at 41–42 (citing Ex. 2009 ¶ 101).

Petitioner replies that this limitation should be treated the same as the “occupant detection circuit configured to . . .” limitation of claim 1. Pet. Reply 8. Petitioner also argues that Nix nevertheless teaches the “occupant sensing circuit” of claim 8. For the reasons discussed for a similar limitation in claim 1, a preponderance of the record persuades us that Nix teaches or suggests the occupant sensing circuit of claim 8.

We further find that Nix teaches “an isolation circuit interposed between the heating circuit and the heating element, said isolation circuit . . . for isolating the heating circuit from the isolation circuit” or “the occupant detection circuit.” Ex. 1006 ¶¶ 50 (stating that “in this case the low resistance of the heating matt . . . may make it difficult to couple a sufficiently strong signal into the operator”), 51 (stating that “[i]n order to use the seat heating matt 510 to couple the signal from a signal generator 518 into the operator, a common mode rejection choke 514 is connected in series with the seat heating matt 510” and that “[u]sing the common mode rejection choke 514; the entire seat heating matt's potential can alternate

relative to vehicle ground 506, while keeping the resulting alternating current low due to the relatively high impedance of the common mode rejection choke 514 at the operating frequency”), 52 (stating that the “signal generator 518 is connected to the seat heating matt 510 through a capacitor 516 so that the signal generator 518 is not affected by the seat heating being on or off, and switches 502 and 508 being closed or open”).

Petitioner assumes for its analysis that the recitation “said isolation circuit . . . for isolating the heating circuit from the isolation circuit” was intended to be “said isolation circuit . . . for isolating the heating circuit from the occupant detection circuit.” Pet. 51 n.3. Petitioner also states that if the claim was intended as drafted, then the limitation “merely describes obvious characteristics of a common mode choke.” *Id.* (citing Ex. 1003 ¶ 93, n.3). Based on the teachings of Nix and declarant testimony, we agree with Petitioner that if claim 8 was intended as drafted, then the limitation “merely describes obvious characteristics of a common mode choke.”

We further find that Nix teaches or suggests “said isolation circuit including a common mode choke arranged to induce a second current in response to a first current,” “wherein the common mode choke comprises a first inductor inductively coupled to a second inductor such that current in the first inductor induces current in the second inductor,” and “wherein the common mode choke is characterized as a four terminal device.” Ex. 1006 ¶ 51 (describing the operation of common mode rejection choke 514 and stating that “[i]n order to use the seat heating matt 510 to couple the signal from a signal generator 518 into the operator, a common mode choke 514 is connected in series with the seat heating matt 510”), Fig. 5 (showing common mode choke 514 as a four terminal device). Evidence of record

also supports our finding. Ex. 1002, 194; Ex. 1003 ¶¶ 41–42, 74, 75, 77; Ex. 1004, 6–7; Ex. 1005, 1–2.

C. Level of Ordinary Skill in the Art

As discussed above in Section III.C., we find Patent Owner’s proposed level of ordinary skill consistent with the level of ordinary skill in the art reflected by the prior art of record. *See Okajima*, 261 F.3d at 1355; *In re GPAC Inc.*, 57 F.3d at 1579; *In re Oelrich*, 579 F.2d at 91. We, thus, find that a person of ordinary skill in the art “would have been a person having a bachelor’s degree in electrical engineering or a related discipline, and approximately two years of experience in the field of automotive electronics, including at least some experience with designing occupant detection systems.” PO Resp. 7–8. Any differences regarding additional experience in the parties’ competing proposals for the level of ordinary skill does not affect our analysis of the challenge based on Nix. *See also* Tr. 5:7–10 (Petitioner’s counsel answering “it wouldn’t” to the question “if we did accept Patent Owner’s definition of the level of ordinary skill, would that impact your arguments in any significant way?”).

D. Objective Evidence of Nonobviousness

The parties do not present arguments regarding, and do not direct us to, any objective evidence of nonobviousness. Pet. 87 (“Petitioner is unaware of any objective evidence supporting a finding of non-obviousness.”); PO Resp. *passim.*; Tr. 48:11–13 (Patent Owner’s counsel agreeing that no objective evidence of nonobviousness was presented in the record).

E. Weighing the Graham Factors

“Once all relevant facts are found, the ultimate legal determination [of obviousness] involves weighing of the fact findings to conclude whether the claimed combination would have been obvious to an ordinary artisan.”

Arctic Cat, 876 F.3d at 1361. In Sections IV.A, IV.B, IV.C, and IV.D, based on full record before us, we provide our factual findings regarding (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 ordinary skill in the art, and (4) objective evidence of nonobviousness.

In particular, we find that (1) Nix teaches or suggests all the limitations of claims 1–8, (2) that Patent Owner’s proposed level of ordinary skill in the art is consistent with the prior art of record, and (3) that there is no objective evidence of nonobviousness in the record. Weighing these underlying factual determinations, a preponderance of the evidence persuades us that claims 1–8 of the ’194 patent are unpatentable over Nix. *Cf.* Ex. 1017 (European Patent Office decision revoking a related patent); *see also* Paper 38 (Patent Owner disputing the relevance of the European Patent Office Decision).

V. CONTINGENT MOTION TO AMEND

Patent Owner filed a Contingent Motion to Amend (Paper 13, “Mot.”). Patent Owner states that, “in the event that the claims are found unpatentable based on [Nix], Patent Owner proposes the amendments relating to substitute claim 9, and its corresponding dependent claims.” Mot. 16. Patent Owner also states that, “[i]n the event that the claims are found unpatentable based on [Kincaid and Nix] (or based on both Grounds 1

and 2), Patent Owner proposes the amendments to substitute claims 12 and 16.” *Id.*

The Federal Circuit stated in *Aqua Products, Inc. v. Matal*, 872 F.3d 1290, 1327 (Fed. Cir. 2017) (“*Aqua Products*”), that the “PTO may not place the burden on the patentee.” *See also* Mot. 4 (stating that “the burden of persuasion to establish that proposed amendments are patentable no longer rests with the patent owner”).

Having determined that claims 1–8 are unpatentable in view of both Nix alone and Kincaid modified by Nix, we turn to Patent Owner’s Contingent Motion to Amend.

A. Proposed Substitute Claims

Patent Owner proposes substitute claim 9 for claim 1. Mot. 3, 5, Claims Appendix i–ii. Proposed substitute claim 9 recites, with underlined material indicating language added to original claim 1 and brackets indicating deletion:

9. (Proposed Substitute for Claim 1) An occupant detection system, comprising:

 a seat assembly comprising a seat cushion having a seating surface;

 a heating element adjacent the seating surface, said heating element formed of electrically conductive material;

 a heating circuit electrically coupled to the heating element, said heating circuit configured to supply an electrical current to the heating element effective to generate heat by the heating element;

 an occupant detection circuit electrically coupled to the heating element, said occupant detection circuit configured to detect an occupant presence near the heating element by measuring an electrical impedance of the heating element; and

 an isolation circuit interposed between the heating circuit and the heating element, said isolation circuit configured to

prevent the heating circuit from influencing the measuring of the electrical impedance by the occupant detection circuit in a way that would influence detection of the occupant presence by the occupant detection circuit, said isolation circuit comprising a common mode choke, wherein the common mode choke comprises a first inductor inductively coupled to a second inductor such that current in the first ~~[[in]]~~ inductor induces current in the second inductor, wherein the common mode choke is characterized as a four terminal device.

For proposed substitute claims 12 and 16, which would replace independent claims 4 and 8, respectively, Patent Owner similarly adds “by measuring an electrical impedance of the heating element.” Mot. 5, Claims Appendix iii, v.

Proposed substitute claim 12 additionally requires the isolation circuit to be configured to prevent the heating circuit from influencing “the measuring of the electrical impedance by the occupant detection circuit in a way that would influence detection of the occupant presence by the occupant detection circuit.” Mot. 5, Claims Appendix iii. Unlike proposed substitute claim 9, proposed substitute claims 12 and 16 further require “one or more capacitors interposed between the heating circuit and the common mode choke” and the “value of each of the first inductor and the second inductor is at least 1 mH.” Mot. 4–5, Claims Appendix iii–iv, v.

Proposed substitute claim 16 also changes “isolation circuit” to “occupant sensing circuit” to correct a typographical error. Mot. 6, Claims Appendix v; *see also id.* at 6 n.2 (stating that “Petitioner and Petitioner’s expert recognized this typographical error and agree with Patent Owner that this . . . limitation should be given the same meaning as the corresponding

‘occupant detection circuit configured to detect . . . ’ limitation in claims 1 and 4”).

Patent Owner states that the “only amendments to dependent claims are to amend the claim dependency.” Mot. 5; *see also id.* at 6 (stating “[p]roposed dependent claims 10 and 11 are identical to dependent claims 2 and 3, except they depend from narrower claim 9 rather than broader claim 1” and “proposed dependent claims 13–15 are identical to dependent claims 5–7, except they depend from narrower claim 12 rather than claim 4”).

B. Requirements Under 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121

“[I]f a patent owner files a motion to amend . . . and that motion meets the requirements of 35 U.S.C. § 316(d) . . . , the Board will proceed to determine whether the substitute claims are unpatentable by a preponderance of the evidence based on the entirety of the record, including any opposition made by the petitioner.” Guidance on Motions to Amend in view of *Aqua Products 2* (Nov. 21, 2017) (https://www.uspto.gov/sites/default/files/documents/guidance_on_motions_to_amend_11_2017.pdf) (“Guidance”). Also, “patent owner still must meet the requirements for a motion to amend under 37 C.F.R. § 42.121.” *Id.*

1. Reasonable Number of Substitute Claims

During an *inter partes* review, “patent owner may file 1 motion to amend the patent” and “[f]or each challenged claim, propose a reasonable number of substitute claims.” 35 U.S.C. § 316(d)(1)(B). Patent Owner filed only one motion to amend (Paper 13) that proposes one substitute claim for each challenged claim. *See* Mot. 6–7 (stating “Patent Owner proposes only

one substitute claim for each challenged claim, where the only amendments to the substitute dependent claims are to amend the claim dependency”).

We, thus, determine that Patent Owner’s Contingent Motion to Amend meets the requirements of 35 U.S.C. § 316(d)(1).

2. Scope of the Proposed Substitute Claims and Written Description Support for the Proposed Substitute Claims

Proposed substitute claims in an *inter partes* review “may not enlarge the scope of the claims of the patent or introduce new matter.” 35 U.S.C. § 316(d)(3); *see* 37 C.F.R. § 42.121(a)(2)(ii). Patent Owner contends that the proposed substitute independent claims are “narrowed because of the addition of one or more narrowing limitations” and “no limitations are removed by the substitute independent claims.” Mot. 5; *see also* Pet. 82 n.4 (noting “isolation circuit” should be “occupant sensing circuit”); Dec. to Inst. 19 (identifying the same error in the claim); Mot. 6 n.2 (noting that Petitioner and Patent Owner agree that the claim contains an error). For the proposed substitute dependent claims, Patent Owner contends they are not enlarged because Patent Owner proposes to amend only their dependency. *Id.*

Pursuant to 37 C.F.R. § 42.121(b), a motion to amend in an *inter partes* review must set forth “[t]he support in the original disclosure of the patent for each claim that is added or amended” and the “[t]he support in an earlier-filed disclosure for each claim for which benefit of the filing date of the earlier filed disclosure is sought.” *See also* Guidance 2 (stating a “motion to amend must set forth written description support and support for the benefit of a filing date in relation to each substitute claim, and respond to grounds of unpatentability involved in the trial.”). In its Contingent Motion

to Amend, Patent Owner provides citations to the as-filed application that it contends provides support for the original claim language and the amended claim language. Mot. 7–15 (citing Ex. 1002, 6–27).

Petitioner responds that the originally filed application does not support the added limitation “one or more capacitors interposed between the heating circuit and the common mode choke,” as recited by proposed substitute claims 12 and 16. Opp. 4. Petitioner contends that the originally filed application discloses capacitors C1, C2, and C3. *Id.* at 4–5 (citing Ex. 1001, Fig. 3; Ex. 1010 ¶ 71). According to Petitioner, one of ordinary skill in the art would have understood “interposed between” to mean “electrically connected between” consistent with its use elsewhere in the ’194 patent, and that capacitors C1, C2, and C3 are not “electrically connected between” the heating circuit and the common mode choke. *Id.* at 5–6 (citing Ex. 1010 ¶¶ 71, 73, 74) (providing annotated Fig. 3 of Ex. 1001 to illustrate “electrically connected between” the heating circuit and common mode choke).

Patent Owner replies that the recited capacitors are described and depicted in the specification. PO Reply to Opp. 6 (citing Ex. 1001, 6:17–21, Figs. 3, 4). Patent Owner also argues that Petitioner recognizes that capacitors C1, C2, and C3 are disclosed but unduly narrows the construction of “interposed between” to mean “in series” with other components. *Id.* at 6–7 (citing Opp. 4–6; Ex. 2017 ¶ 16; Ex. 2018, 23:4–7, 71:19–72:1). Patent Owner asserts that its use of “interposed between” to claim the depicted positions of the capacitors in the figures “should be accorded deference and construed accordingly because it is supported by the examples described in the specification and the figures.” *Id.* at 7. Patent Owner also asserts that its

use of “interposed between” is consistent with its use in the ’194 patent. *Id.* at 8 (citing Ex. 1001, Abstract, 2:18–20, 2:32–33, 2:49–50, 3:38–39, 4:27–29, 7:42–44, 8:34–35, claim 1). Patent Owner further notes that the isolation circuit can include capacitors, as recognized by Petitioner and its declarant, and thus, the capacitors are “interposed between” the heating circuit and heating element, as would be understood by one of ordinary skill in the art. *Id.* (citing Opp. 5; Ex. 2017 ¶¶ 1720; Ex. 2018, 23:4–7; 71:19–72:1).

Petitioner replies that the recited capacitor location is unsupported and that Patent Owner construes “interposed between” overly broadly. Pet. Sur-Reply 2–3 (citing Opp. 3–6; PO Reply to Opp. 8). Petitioner contends that Patent Owner is interpreting the phrase to mean “one or more capacitors with at least one electrical connection to a point in the circuitry between the common mode choke and heating circuit,” which Nix teaches. *Id.* at 3–4 (citing Ex. 1003 ¶ 45; Ex. 1006, Fig. 5). Petitioner also disputes that it interprets “interposed between” as “in series with.” *Id.* at 4 (citing PO Reply to Opp. 6–7; Ex. 2018, 67:9–71:18).

In view of the full record before us, we are satisfied that Patent Owner’s added language “one or more capacitors interposed between the heating circuit and the common mode choke” in proposed substitute claims 12 and 16 has adequate written description support in the original disclosure. Paragraph 23 of the originally filed specification states that “[i]n another embodiment, the isolation circuit includes capacitors C1, C2, and C3 as shown” and these “capacitors improve the alternating current coupling to the ground, thereby improving the effectiveness of common mode choke T1 to offset occupant detection circuit errors.” Ex. 1002 ¶ 23. Figures 3 and 4 show capacitors C1, C2, and C3 electrically connected between a

“HEATING CIRCUIT” and “ISOLATION CIRCUIT.” *Id.* at Figs. 3, 4. In particular, these capacitors are connected at points between the heating circuit and common mode choke T1. *See id.* We, thus, determine that Patent Owner’s Contingent Motion to Amend meets the requirements of 35 U.S.C. § 316(d)(3).

*3. Determination Regarding the Requirements Under
35 U.S.C. § 316(d) and 37 C.F.R. § 42.121*

For the foregoing reasons, we determine that Patent Owner’s Contingent Motion to Amend meets the requirements of 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121.

C. Patentability of Proposed Substitute Claims

Having determined that the Contingent Motion to Amend meets the requirements of 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121, we analyze whether the proposed substitute claims are unpatentable by a preponderance of the evidence based on the entirety of the record.

1. Claim Construction

Patent Owner does not propose any interpretations for any claim term. *Mot. passim*; *PO Reply to Opp. passim*. Petitioner also does not propose any interpretations for any claim term. *Opp. passim*; *Pet. Sur-Reply passim*.

We apply the interpretations determined above in Section II. In particular, we interpret “configured to” to mean “specifically designed to.” We also determine that no other term needs to be interpreted expressly to resolve the parties’ dispute regarding Patent Owner’s Contingent Motion to Amend. *Vivid Techs.*, 200 F.3d at 803.

2. Scope and Content of the Prior Art

Our factual findings regarding Nix and Kincaid are discussed above in Sections III and IV.

3. Differences Between the Proposed Substitute Claims and the Prior Art

a. Proposed Substitute Claim 9

Although the burden of persuasion for a motion to amend is not on Patent Owner, Patent Owner provides reasons that proposed substitute claims 9, 12, and 16 are patentable over Nix and Kincaid in view of Nix. Mot. 16–18. Specifically for proposed substitute claim 9, according to Patent Owner, Nix fails to teach, suggest, or render obvious “an occupant detection circuit configured to detect occupant presence ‘by measuring an electrical impedance of the heating element’” and an isolation circuit “that prevents a heating circuit from ‘influencing the measuring of the electrical impedance by the occupant detection circuit in a way that would influence the detection of the occupant presence by the occupant detection circuit.’” Mot. 16–17. Patent Owner states that “Nix merely detects whether a vehicle control has been operated, and, if so, it then detects whether a signal from a signal generator is present or not for purposes of determining whether to activate certain functions.” *Id.* at 17 (citing Ex. 1006 ¶¶ 13, 14, 16, 31).

Petitioner provides argument and evidence that Nix measures an electrical impedance of its heating element. Opp. 1, 7–10. Patent Owner replies to those arguments (PO Reply to Opp. 2–4), to which Petitioner replies (Pet. Sur-Reply 1–2).

Turning to the combination of Kincaid and Nix, Petitioner argues that “Kincaid expressly discloses an occupant detection/sensing circuit configured to detect an occupant presence near the heating element ‘by

measuring an electrical impedance of the heating element.” Opp. 10–11 (citing Ex. 1007 ¶ 15; Ex. 1010 ¶¶ 63–65). Patent Owner replies that Petitioner’s argument is irrelevant because substitute claim 9 was “proposed only to overcome Ground 1 of the Petition, *i.e.*, the ground based on Nix alone.” PO Reply to Opp. 2 (citing Opp. 10–11).

Regarding the “isolation circuit configured to prevent the heating circuit from influencing the measuring of the electrical impedance by the occupant detection circuit in a way that would influence detection of the occupant presence by the occupant detection circuit,” Petitioner argues that Nix alone and Kincaid combined with Nix teach such an isolation circuit for the same reasons given for the recitation “by measuring an electrical impedance of the heating element.” Opp. 2, 11–12 (citing Pet. 25–34, 45–46, 50–52, 59–65, 57–77, 81–83) (citing also Pet. 65, 74, 83–87 for reasons to combine Kincaid and Nix).

Patent Owner replies that “the proposed amendment is directed to what the isolation circuit is configured to do.” PO Reply to Opp. 5 (responding to Opp. 11–12). Patent Owner argues that the amended language makes clear that the isolation circuit prevents unwanted impedance of the heating element from adversely affecting occupant detection. *Id.* (citing Pet. Reply 10–14; Ex. 2009 ¶¶ 43–45). Patent Owner also argues that the common mode choke of Nix, in contrast, allows the signal generator to operate at a desired voltage. *Id.* at 5–6 (citing Ex. 1003 ¶ 82; Ex. 2009 ¶¶ 104–105).

The entirety of the record persuades us that Kincaid teaches “an occupant detection circuit . . . configured to detect an occupant presence near the heating element by measuring an electrical impedance of the heating

element” and “an isolation circuit . . . configured to prevent the heating circuit from influencing the measuring of the electrical impedance by the occupant detection circuit in a way that would influence detection of the occupant presence by the occupant detection circuit,” as recited by proposed substitute claim 9. We find that Kincaid states that “[w]hile the heater switches are open, the field impedance of heating element 14 is measured by occupant sensing circuit 28 to detect the proximity of an object or occupant near the seating surface.” Ex. 1007 ¶ 15. We also find that the proposed combination of Kincaid and Nix teaches or suggests the isolation circuit of proposed substitute claim 9 for the reasons discussed for the isolation circuit of claim 1.

The remaining recitations of proposed substitute claim 9 are similar to ones in claim 1. See Mot. 5, claims appendix i–ii (indicating that claim 1 has been amended to include only the recitations discussed above). We, thus, find that the combination of Kincaid and Nix teaches or suggests the remaining limitations of proposed substitute claim 9 for the reasons discussed in Section III.

The entirety of the record also persuades us that one of ordinary skill in the art would have modified Kincaid in view of Nix for the reasons discussed in Section III with a reasonable expectation of success.

b. Proposed Substitute Claims 10 and 11

Proposed substitute claims 10 and 11 include recitations that are also in claims 2 and 3. See Mot. 6 (stating that “[p]roposed dependent claims 10 and 11 are identical to dependent claims 2 and 3, except that they depend from narrower claim 9 rather than broader claim 1”), claims appendix ii–iii.

We find that the combination of Kincaid and Nix teaches or suggests the limitations of proposed substitute claims 10 and 11 for the reasons discussed in Section III.

c. Proposed Substitute Claim 12

Proposed substitute claim 12, like proposed substitute claim 9, recites “an occupant detection circuit . . . configured to detect an occupant presence near the heating element by measuring an electrical impedance of the heating element” and “an isolation circuit . . . configured to prevent the heating circuit from influencing the measuring of the electrical impedance by the occupant detection circuit in a way that would influence detection of the occupant presence by the occupant detection circuit.” We find that Kincaid teaches these limitations. Ex. 1007 ¶ 15 (“While the heater switches are open, the field impedance of heating element 14 is measured by occupant sensing circuit 28 to detect the proximity of an object or occupant near the seating surface.”). We also find that the proposed combination of Kincaid and Nix teaches or suggests the isolation circuit of proposed substitute claim 12 for the reasons discussed for the isolation circuit of claims 1 and 4.

Proposed substitute claim 12 also recites “said isolation circuit further comprising one or more capacitors interposed between the heating circuit and the common mode choke.” Mot., claims appendix iii. Petitioner contends that capacitors at the recited locations would render the heating circuit inoperable. Opp. 2 (citing Ex. 1010 ¶¶ 70–74). Petitioner also argues that MuRata teaches capacitors at the recited locations. *Id.* at 2–3 (citing Ex. 1009, 30; Ex. 1010 ¶¶ 78–82).

Patent Owner replies that Petitioner relies on Nix and MuRata, not Nix alone. PO Reply to Opp. 9 (citing Opp. 13). Patent Owner disputes that

MuRata is a printed publication because Petitioner does not provide evidence that it was published and publicly available or evidence about where it came from and when it was retrieved. *Id.* Patent Owner also argues that Petitioner does not explain the relevance of and basis for the date “March 20, 1998.” *Id.*

Petitioner replies that Patent Owner fails to present evidence that MuRata is not a printed publication. Pet. Sur-Reply 4–5 (citing PO Reply to Opp. 9), 6. Petitioner argues that MuRata itself has indications that it was publicly accessible. *Id.* at 5 (citing Ex. 1009, 1, 3), 6–7 (citing Ex. 1009, 2, 35). Petitioner also argues that other sources indicate that MuRata was publicly available. *Id.* at 6–7. Petitioner additionally argues that Patent Owner did not object to MuRata and did not move to exclude MuRata. *Id.* at 6.

The burden is on Petitioner to prove that MuRata is a printed publication. The last page of MuRata states that “[p]roduct specifications in this catalog are as of February 1998” and that the “categories and specifications listed in this catalog are for information only.” Ex. 1009, 35 n.3, n.4. Petitioner contends that, on the first page of the exhibit, MuRata includes “98.3.20,” which means “March 20, 1998.” Pet. Sur-Reply 5 (citing Ex. 1003, 3). Thus, MuRata indicates it is a catalog with product information as of February 1998 and available as of March 20, 1998. It also provides notes to “customers outside Japan” and “customers in Japan” indicating that it was meant to be distributed globally to interested customers and users. Ex. 1009, 35 n.1. It also instructs customers who intend to use the described products in applications requiring “high reliability” to “contact our sales representatives or engineers.” *Id.* n.2. MuRata itself, thus,

indicates that it was meant for users skilled in applying its products to “[t]ransportation equipment (automobiles . . . , etc.).” *Id.* Considering all the indications from MuRata itself, we determine that Petitioner sufficiently shows that MuRata is a printed publication. *See GoPro, Inc. v. Contour IP Holding LLC*, 908 F.3d 690, 694 (Fed. Cir. 2018) (determining that a product catalog distributed at a trade show, was sufficiently accessible to the public within the meaning of 35 U.S.C. § 102(b)); *Orion IP, LLC v. Hyundai Motor America*, 605 F.3d 967, 974–75 (Fed. Cir. 2010) (auto-parts catalog distributed to car dealers qualified as a prior art printed publication because it was accessible to those interested in the business of auto parts before the critical date); *see also* Pet. Sur-Reply 6–7 (providing website address where MuRata is available and asserting that MuRata has been cited in other publications).

Petitioner contends that MuRata teaches capacitors at the recited locations and that capacitors at the recited locations would not render the heating circuit inoperable. Opp. 2–3 (citing Ex. 1009, 30; Ex. 1010 ¶¶ 70–74, 78–82). Petitioner contends that Nix teaches an isolation circuit with capacitor 516. *Id.* at 13–14 (citing Pet. 29; Ex. 1003 ¶¶ 41, 67, 69; Ex. 1006 ¶ 51, Fig. 5). According to Petitioner, its declarant cites MuRata and explains that capacitors are used to suppress common mode noise. *Id.* at 14–16 (citing Ex. 1003 ¶ 41; Ex. 1009, 30). Petitioner also contends that one of ordinary skill in the art would have understood that MuRata’s capacitors “would improve the choke’s rejection of common mode noise signals by increasing the coupling of common mode signals to the metallic casing (effectively to ground).” *Id.* at 16 (citing Ex. 1010 ¶ 79).

Petitioner argues that it would have been obvious to add capacitors to Nix “to provide additional isolation” and to “improve the efficiency of the common mode choke’s ability to provide isolation from the open switch impedances.” *Id.* (citing Ex. 1009, 30; Ex. 1010 ¶ 81); *see also id.* at 17 (providing annotated Fig. 5 of Ex. 1006 to illustrate the proposed modification) (citing Ex. 1003 ¶ 41; Ex. 1010 ¶ 82). Petitioner also argues that the modification of Nix “would involve the application of well-known methods (e.g., adding capacitors) to solve an old problem (e.g., rejection of common mode noise signals and improving the effectiveness of common-mode chokes).” *Id.* at 16. Petitioner argues that the combination of Kincaid and Nix would have rendered obvious “one or more capacitors interposed between the heating circuit and the common mode choke” for the same reasons discussed for Nix alone. *Id.* at 12.

Patent Owner contends that Kincaid in view of Nix fails to teach, suggest, or render obvious “an isolation circuit comprising a common mode choke and ‘one or more capacitors interposed between the heating circuit and the common mode choke’” because they do not “even mention the use of any capacitor between the heating circuit and the common mode choke of the isolation circuit.” Mot. 17–18 (citing also Ex. 2010, 149:18–24). Petitioner, however, relies on Kincaid, Nix, and *MuRata*. *See* Opp. 2–3, 13–18.

Patent Owner also replies that there is “no reason to add the capacitors of *MuRata* to Nix” because *MuRata* “is concerned with eliminating common mode noise,” which is “not a concern in Nix.” PO Reply to Opp. 9. Patent Owner argues that one of ordinary skill in the art “would have had no reason to modify Nix to add capacitors” in the locations asserted by Petitioner and

the addition of capacitors “would aggravate the very problem that Nix is seeking to avoid with its common mode choke.” *Id.* at 9–10 (citing Opp. 17; Ex. 2017 ¶¶ 23–28).

The entirety of the record persuades us by a preponderance of the evidence that isolation circuits with capacitors were known. Ex. 1003 ¶ 41; Ex. 1006 ¶ 52 (describing capacitor 516 prevents signal generator 518 from being affected by switches 502, 508), Fig. 5 (depicting capacitor 516); Ex. 1009, 32; Ex. 1010 ¶ 86. We are also persuaded by a preponderance of the evidence that including “one or more capacitors interposed between the heating circuit and the common mode choke,” as recited by proposed substitute claim 12 was known for the purpose of noise suppression on an AC power supply line. Ex. 1009, 32.

The entirety of the record also persuades us by a preponderance of the evidence that it would have been obvious to add capacitors to Nix to “improve the efficiency of the common mode choke’s ability to provide isolation from the open switch impedances.” *See* Opp. 16 (citing Ex. 1009, 30; Ex. 1010 ¶ 81); Ex. 1010 ¶¶ 77–81, 83–86. We also agree with Petitioner that the proposed modification of Kincaid and Nix with MuRata represents “the application of well-known methods (e.g., adding capacitors) to solve an old problem (e.g., rejection of common mode noise signals and improving the effectiveness of common-mode chokes).” *Id.* at 16. A preponderance of the evidence persuades us that Petitioner’s proposed modification would help minimize the effect of switches being closed or open, as described in Nix. Ex. 1006 ¶ 52.

Although we credit Patent Owner’s declarant testimony regarding Nix alone modified in view of MuRata, the testimony does not address Kincaid

and Nix further modified in view of MuRata. *See* Ex. 2017 ¶¶ 23–28. In particular, it does not address why additional capacitors in Kincaid with Nix’s isolation circuit would not help in isolating the open-switch impedance of Kincaid’s heating circuit from Kincaid’s heating element to prevent the open-switch impedance from affecting electric field impedance measurements. *See* Ex. 1007 ¶ 15. In other words, even if additional capacitors do not help prevent oscillator overload in Nix in view of MuRata as described by Patent Owner’s declarant, additional capacitors in the combination of Kincaid, Nix, and MuRata would help isolate open-switch impedance and improve the effectiveness of a common mode choke, as argued by Petitioner.

As for “wherein the value of each of the first inductor and the second inductor is at least 1 mH,” Petitioner argues that Nix teaches the limitation. *Opp.* 3 (citing Ex. 1006 ¶¶ 50–51; Ex. 1010 ¶¶ 89–92). Petitioner notes that Nix alone and Kincaid combined with Nix teach the isolation circuit. *Id.* at 18 (citing *Pet.* 25–34, 45–46, 50–52, 59–65, 74–77, 81–87). Petitioner contends that the same references teach inductors of at least 1 mH. *Id.*

In particular, Petitioner argues that, “[a]lthough Nix does not expressly disclose the inductance values of its common mode choke,” one of ordinary skill in the art “could have calculated the values based on other disclosures in Nix,” such as having high AC impedance at 50–150kHz, desired voltage at less than 1 Volt, and current in the heating matt of more than 100 mA being deemed relatively high. *Id.* at 19 (citing Ex. 1006 ¶¶ 48, 50, 51; Ex. 1010 ¶ 89). Petitioner’s declarant explains that, using Ohm’s Law and the values disclosed in Nix, one of ordinary skill in the art “would have understood that Nix teaches that its common mode choke has an

impedance of approximately 1 mH to 3 mH.” Ex. 1010 ¶¶ 90–92; *see also* Opp. 19–20 (citing Ex. 1010 ¶¶ 90–92; Ex. 2010, 153:4–24). Petitioner also argues that Patent Owner underestimates the skilled artisan’s ability to calculate inductance based on Nix. *Id.* at 20 (citing Ex. 1010 ¶ 94).

Petitioner states “Kincaid does not disclose specific impedance, frequency, voltage or current values for its occupant detection circuit,” but Petitioner relies on the same calculation summarized above based on Nix. *Id.* at 21 (citing Ex. 1010 ¶ 95).

Patent Owner contends that Kincaid in view of Nix fails to teach, suggest, or render obvious a “value of each of the first and second inductor in the common mode choke hav[ing] a value of ‘at least 1 mH.’” Mot. 17. Patent Owner replies that “Petitioner’s arguments . . . are the result of manipulative calculations that have no basis in Nix.” PO Reply to Opp. 10. Patent Owner argues that Petitioner’s declarant agrees that there is no express teaching. *Id.* (citing Ex. 1010 ¶ 89). Patent Owner also argues that Petitioner “has failed to meet the high standard to establish inherency in its obviousness analysis.” *Id.* at 10–11. Patent Owner further argues that Petitioner’s declarant’s calculations “are entirely speculative,” “should be given no weight,” use arbitrary values of current, do not address the output signal capability of the signal generator, and are “clearly tailored to arrive at a pre-determined conclusion and are not supported by any evidence.” *Id.* at 11 (citing Ex. 1010 ¶¶ 89–91; Ex. 2017 ¶¶ 30–37); *see also id.* at 12 (arguing “Dr. Matheson’s conclusions are cherry-picked to arrive at a desired result”).

Patent Owner asserts that “only very slight adjustments to the numbers” would cause the calculations to fail to meet the 1 mH limitation.

Id. (citing Ex. 2017 ¶¶ 30–33). Patent Owner also argues that Petitioner asserts no rationale for choosing the “appropriate oscillator output and other variables necessary to arrive at the claimed inductances.” *Id.* at 12. Patent Owner concludes that “[n]othing in Nix teaches or suggests that the value of each inductor of the common mode choke be ‘at least 1 mH.’” *Id.* (citing Ex. 2017 ¶¶ 30–36).

We find that Nix teaches that “the signal may be a 50–150 kHz sine wave, which is relatively easy to detect and unlikely to interfere with other vehicle modules or radio reception.” Ex. 1006 ¶ 48. We also find that Nix teaches that “[w]hile an alternating voltage below one Volt against the vehicle ground is enough to be detected at the control 112 by the signal detector 116, such voltage would cause relatively high currents of more than 100 mA in the seat heating matt resulting in undesirable losses.” *Id.* ¶ 50. We further find that Nix teaches that the “inductivity of one common mode rejection choke 514 is chosen such that its AC impedance at the preferred signal frequency of 50–150 kHz is sufficiently high so that signal generator 518 can operate at the desired alternating voltage.” *Id.* ¶ 51. We, thus, agree with Petitioner that Nix teaches an AC frequency of 50–150 kHz, a desired voltage of below 1 Volt, and a current of no more than 100 mA to avoid “undesirable losses.” Opp. 19; Ex. 1006 ¶¶ 48, 50, 51.

Based on these values of frequency, voltage, and current expressly taught in Nix, we determine that one of ordinary skill in the art would have understood Nix to be teaching or suggesting embodiments of its common mode choke with inductance values bounded by Nix’s explicit values for frequency, voltage, and current. We thus determine that one of ordinary skill in the art would have understood that at least one embodiment of Nix’s

common mode choke has inductors of at least 1 mH. *See* Ex. 1010 ¶ 92. We, therefore, find that Nix teaches a common mode choke “wherein the value of each of the first inductor and the second inductor is at least 1 mH,” as recited by proposed substitute claim 12. *See* Ex. 1010 ¶¶ 90, 91. *Cf.* Ex. 1017, 14–15 (European Patent Office decision revoking a related patent with a similar recitation); *see also* Paper 38 (Patent Owner disputing the relevance of the European Patent Office Decision).

The remaining recitations of proposed substitute claim 12 are similar to ones in claim 4. *See* Mot. 5, claims appendix iii–iv (indicating that claim 4 was been amended to include only the recitations discussed above). We, thus, find that the combination of Kincaid, Nix, and MuRata teaches or suggests the remaining limitations of proposed substitute claim 12 for the reasons discussed in Section III. The entirety of the record also persuades us that one of ordinary skill in the art would have combined the references with a reasonable expectation of success. *See* Opp. 16 (citing Ex. 1009, 30; Ex. 1010 ¶ 81); Ex. 1006 ¶ 52; Ex. 1010 ¶¶ 77–81, 83–86.

d. Proposed Substitute Claims 13–15

Proposed substitute claims 13–15 include recitations that are also in claims 5–7. *See* Mot. 6 (stating that “proposed dependent claims 13–15 are identical to dependent claims 5–7, except that they depend from narrower claim 12 rather than claim 4”), claims appendix iv.

We find that the combination of Kincaid, Nix, and MuRata teaches or suggests the limitations of proposed substitute claims 13–15 for the reasons discussed in Section III.

e. Proposed Substitute Claim 16

Proposed substitute claim 16 includes amendments similar to the ones made for proposed substitute claim 12. For the reasons discussed for proposed substitute claim 12, we find that the combination of Kincaid, Nix, and MuRata teaches or suggests the limitations of proposed substitute claim 16. The entirety of the record also persuades us that one of ordinary skill in the art would have combined the references with a reasonable expectation of success for the reasons discussed for proposed substitute claim 12.

Petitioner argues, and we agree, that correcting claim 8 to change “isolation circuit” to “occupant sensing circuit” as proposed in substitute claim 16 does not render the amended claim patentable. Opp. 3, 21.

4. Level of Ordinary Skill in the Art

The record presents no reason that the level of ordinary skill applied to analyzing proposed substitute claims 9–16 should be any different from that applied above in analyzing claims 1–8 of the ’194 patent. Thus, we apply the same level of ordinary skill determined above in Section III.C.

Specifically, we find that a person of ordinary skill in the art “would have been a person having a bachelor’s degree in electrical engineering or a related discipline, and approximately two years of experience in the field of automotive electronics, including at least some experience with designing occupant detection systems.” See PO Resp. 7.

5. Objective Evidence of Nonobviousness

The parties do not dispute and do not direct us to any objective evidence of nonobviousness regarding the proposed substitute claims. See Tr. 48:11–13.

6. *Weighing the Graham Factors*

“Once all relevant facts are found, the ultimate legal determination [of obviousness] involves weighing of the fact findings to conclude whether the claimed combination would have been obvious to an ordinary artisan.”

Arctic Cat, 876 F.3d at 1361. Based on the entirety of the record, we provide above our factual findings regarding (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 ordinary skill in the art, and (4) objective evidence of nonobviousness.

In particular, we find that (1) the combination of Kincaid and Nix teaches or suggests all the limitations of proposed substitute claims 9–11 and the combination of Kincaid, Nix, and MuRata teaches or suggests all the limitations of proposed substitute claims 12–16, (2) that one of ordinary skill in the art would have had a reason to modify the references with a reasonable expectation of success, (3) that Patent Owner’s proposed level of ordinary skill in the art is consistent with the prior art of record, and (4) that there is no objective evidence of nonobviousness in the record. Weighing the underlying factual determinations, we are persuaded by a preponderance of the evidence that proposed substitute claims 9–11 are unpatentable over the combination of Kincaid and Nix, and that proposed substitute claims 12–16 are unpatentable over the combination of Kincaid, Nix, and MuRata. *Cf.* Ex. 1017 (European Patent Office decision revoking a related patent); *see also* Paper 38 (Patent Owner disputing the relevance of the European Patent Office Decision). We, therefore, deny Patent Owner’s Contingent Motion to Amend.

VI. CONCLUSION

For the foregoing reasons, based on the full record before us, we determine that Petitioner has demonstrated, by a preponderance of the evidence, that claims 1–8 of the '194 patent are unpatentable. Also, based on the entirety of the record, we deny Patent Owner's Contingent Motion to Amend.

VII. ORDER

Accordingly, it is:

ORDERED that claims 1–8 of U.S. Patent No. 8,500,194 B2 have been shown, by a preponderance of the evidence, to be unpatentable;

FURTHER ORDERED that Patent Owner's Contingent Motion to Amend is *denied*; and

FURTHER ORDERED that, because this is a Final Written Decision, the parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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Patent 8,500,194 B2

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