

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

QUALCOMM INCORPORATED,
Petitioner,

v.

FEDEX CORPORATE SERVICES, INC.,
Patent Owner.

IPR2022-00584
Patent 7,623,033 B2

Before JEAN R. HOMERE, BARBARA A. PARVIS, and
CHRISTOPHER L. OGDEN, *Administrative Patent Judges*.

PARVIS, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
Dismissing Patent Owner's Motion to Exclude
35 U.S.C. § 318(a)

I. INTRODUCTION

We instituted an *inter partes* review of claims 1–25 (“challenged claims”) of U.S. Patent No. 7,623,033 B2 (Ex. 1001, “the ’033 patent”) owned by FedEx Corporate Services, Inc. (“Patent Owner”). Paper 14.¹ We have authority to hear this *inter partes* review under 35 U.S.C. § 6. This Final Written Decision issues pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. We determine that Qualcomm Incorporated (“Petitioner”) proved by a preponderance of the evidence that claims 1–25 of the ’033 patent are unpatentable.

A. Procedural History

Petitioner filed a Petition (Paper 1 (“Pet.”)) requesting *inter partes* review of the challenged claims of the ’033 patent, along with the supporting Declaration of James Olivier, Ph.D. (Ex. 1003). Patent Owner filed a Preliminary Response (Paper 9).² With our authorization, Petitioner filed a Preliminary Reply to the Preliminary Response (Paper 12) relating to whether Petitioner correctly identifies all real parties-in-interest, and Patent Owner filed a Preliminary Sur-reply in response to the Preliminary Reply (Paper 13).

¹ A confidential version of the Institution Decision was entered on October 11, 2022. Because Petitioner is the party that seeks to protect certain of its information as confidential, Petitioner filed as an exhibit a public, redacted version of the Institution Decision (Ex. 1034, “Inst. Dec.”). We refer to only the public, redacted version of the Institution Decision in this Final Written Decision.

² Patent Owner filed confidential and redacted versions of its Preliminary Response as Papers 8 and 9, respectively. Herein we refer to the redacted version of Patent Owner’s Preliminary Response.

The Institution Decision (Paper 14) was entered on October 11, 2022. Inst. Dec. 1. Subsequently, Patent Owner filed a Patent Owner Response (Ex. 1038 (“Resp.”)), along with the supporting Declaration of Vijay K. Madiseti, Ph.D. (Ex. 2201). Petitioner filed a Reply (Paper 47 (“Reply”)). Patent Owner filed a Sur-reply (Ex. 1039 (“Sur-reply”)). Patent Owner also filed a Motion to Exclude certain of Petitioner’s evidence (Paper 62), Petitioner filed an Opposition (Paper 64), and Patent Owner filed a Reply in Support of Patent Owner’s Motion to Exclude (Paper 65). The oral hearing was held on August 7, 2023. A copy of the hearing transcript has been entered into the record as Paper 69 (“Tr.”).³

After the hearing, we authorized the parties to file additional briefing relating to claim construction. Paper 68. With this authorization, Petitioner and Patent Owner simultaneously filed opening claim construction briefs (Paper 71, “Pet. Open. Br.”) and (Paper 70, “PO Open. Br.”), and simultaneously filed responsive claim construction briefs (Paper 74, “Pet. Resp. Br.”) and (Paper 73, “PO Resp. Br.”).

³ Patent Owner filed confidential versions of its Patent Owner Response (Paper 43) and Sur-reply (Paper 56). Petitioner filed a confidential version of its Reply (Paper 46). Because Petitioner is the party that seeks to protect certain of its information as confidential, Petitioner filed as exhibits public, redacted versions of the Patent Owner Response (Ex. 1038) and Sur-reply (Ex. 1039). Petitioner also filed a public, redacted version of its Reply (Paper 47). We refer to only the public, redacted versions of the Patent Owner Response, Reply, and Sur-reply in this Decision.

B. Real Parties in Interest

Section 312(a)(2) requires that the “petition identif[y] all real parties in interest.” Petitioner identifies itself as the real party in interest. Pet. 6. Patent Owner names itself as the real party in interest. Paper 3, 1.

Patent Owner filed a Motion to Terminate this proceeding arguing that Petitioner also should have named Roambee Corp. as a real party in interest. Paper 58. We entered a separate Order Denying Patent Owner’s Motion to Terminate. Paper 78 (“Order MTE”). Because that Order addresses all arguments relating to the real-party-in-interest issue, we do not discuss arguments made in the papers relating to that issue in this Decision.

C. Related Matters

Pursuant to 37 C.F.R. § 42.8(b)(2), the parties inform us that the ’033 patent is involved in the following district court case: *FedEx Corporate Services, Inc. v. Roambee Corp.*, No. 1:21-cv-00175 (D. Del. 2021). Pet. 6; Paper 3, 1.

Petitioner also has contemporaneously filed petitions for review of additional patents as follows: (1) a petition for *inter partes* review of U.S. Patent No. 8,766,797 B2 (IPR2022-00585); (2) a petition for *inter partes* review of U.S. Patent No. 9,182,231 B2 (IPR2022-00586); and (3) a petition for *inter partes* review of U.S. Patent No. 9,974,042 B2 (IPR2022-00587). We denied institution in IPR2022-00587.

D. The ’033 Patent

The ’033 patent is titled “Methods and Systems for Tracking Items Using a Sensor Web.” Ex. 1001, code (54). The ’033 patent relates to systems and methods for tracking items using a context-based sensor web.

Id. at 1:7–10. The '033 patent describes an item tracking system, shown in Figure 1 below.

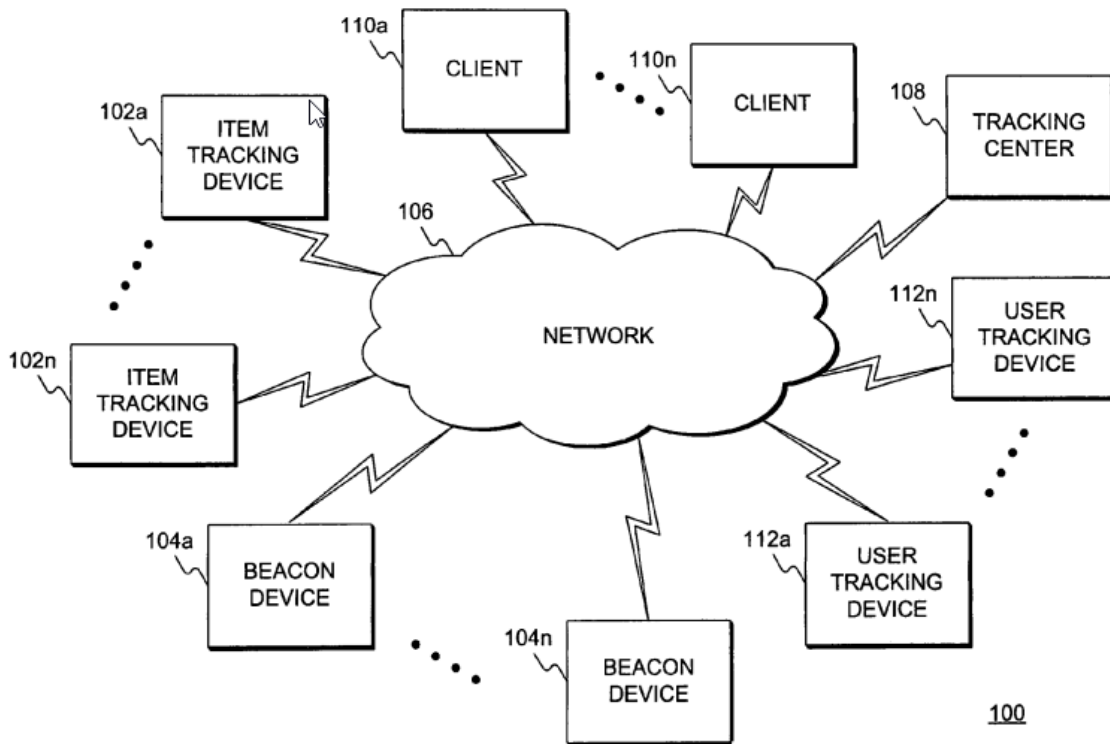


FIG. 1

Figure 1, above, illustrates a block diagram of network environment 100 including tracking devices 102a–102n, beacon devices 104a–104n, network 106, tracking center 108, and clients 110a–110n. *Id.* at 2:30–32, 3:26–31.

Item tracking devices 102a–102n are used in tracking various items, and they may be attached to or included in the items that are to be tracked. *Id.* at 3:46–48. Beacon devices 104a–104n communicate wirelessly to item tracking devices 102a–102n and tracking center 108. *Id.* at 4:24–26. Beacon devices 104a–104n include sensors that measure or detect one or more conditions such as location, temperature, light level, motion, pressure,

humidity, gas level, airflow, vibrations, or other environmental conditions.

Id. at 4:36–40.

Beacon device 104 may periodically determine whether there are any item tracking devices 102 within a certain proximity of beacon device 104.

Id. at 4:44–46. When beacon device 104 determines that one of item tracking devices 102a–102n is within its range, beacon device 104 may store information indicative of an association between the two devices. *Id.* at 4:61–63. “Association information, for example, may include data that indicates that a beacon device’s (104) specific identification number corresponds to an item tracking device’s (102) specific identification number.” *Id.* at 4:64–67.

Tracking center 108 provides a platform for tracking items being delivered to a recipient. *Id.* at 5:17–18. Tracking center 108 receives and stores sensor data from various item tracking devices 102 and/or beacon devices 104. *Id.* at 5:20–22. Tracking center 108 also receives and stores information indicative of associations, such as devices 102 in a truck that are associated with beacon device 104a. *Id.* at 5:27–31. Tracking center 108 also responds to requests for sensor data received from a customer using client 110. *Id.* at 5:35–46.

The system further includes user tracking devices 112 that are similar to beacon devices 104, that communicate to both item tracking devices 104 and tracking center 108. *Id.* at 6:43–45. Instead of being located in places such as a vehicle, user tracking devices 112 are attached to or placed near specific users themselves. *Id.* at 6:45–48.

E. Illustrative Claims

Petitioner challenges claims 1–25 of the '033 patent. Pet. 8. Claims 1, 15, and 25 are the independent claims. Claims 2–14 depend, directly or indirectly, from claim 1. Claims 16–24 depend, directly or indirectly, from claim 15. Independent claims 1 and 15, reproduced below, are illustrative of the claimed subject matter.

1. [1[p]]⁴ A method for tracking items, comprising:

[1[a1]] storing, in memory, first association data reflecting an association between an item tracking device and a beacon device when the item tracking device is within a predetermined range of the beacon device, [1[a2]] wherein the item tracking device corresponds to a first item, [1[a3]] and the beacon device corresponds to an area that contains multiple items including the first item;

[1[b]] detecting sensor data about an environment of the beacon device;

[1[c]] associating the sensor data with a group of items, of the multiple items, that are within the predetermined range of the beacon device; and

[1[d]] periodically transmitting the associated sensor data from the beacon device to a database.

Ex. 1001, 16:2–16.

15. [15[p]]⁵ A system for tracking items, comprising:

[15[a]] at least one item tracking device, the at least one item tracking device corresponding to an item to be tracked;

⁴ Petitioner's designations to reference the elements of claim 1 are set forth in brackets. Pet. 29–39. Herein we refer to the elements of claim 1 using Petitioner's designations.

⁵ Petitioner's designations to reference the elements of claim 15 are set forth in brackets. Pet. 57–58. Herein we refer to the elements of claim 15 using Petitioner's designations.

[15[b1]] at least one beacon device that corresponds to an area that contains multiple items including the item to be tracked, the beacon device comprising:

[15[b2]] a sensor that detects sensor data about an environment of the beacon device;

[15[b3]] memory that stores first association data reflecting an association between the at least one item tracking device and the at least one beacon device; and

[15[b4]] a processor that associates the sensor data with a group of items, of the multiple items, which are within the predetermined range of the beacon device; and

[15[c]] a tracking center operable to periodically receive the associated sensor data from the at least one beacon device.

Ex. 1001, 16:62–17:11.

F. Evidence

Petitioner relies on the patent document references summarized in the table below.

Name	Patent Document	Exhibit
Hashimoto	US 2006/0006987 A1, published January 12, 2006	1005
Lindsay	US 6,982,640 B2, issued January 3, 2006	1006
Lareau	US 6,972,682 B2, issued December 6, 2005	1007

Petitioner relies on the non-patent literature reference summarized below.

Name	Non-Patent Literature Title	Author(s)	Exhibit
Bhuptani	RFID Field Guide: Deploying Radio Frequency Identification Systems (2005).	Manish Bhuptani, Shahram Moradpo	1008

G. Asserted Grounds

Petitioner asserts that the challenged claims of the '033 patent are unpatentable based on the following grounds summarized below (Pet. 8):

Claims Challenged	35 U.S.C. §	Reference(s)/Basis
1–5, 7–19, 21–25	103(a) ⁶	Hashimoto, Bhuptani
6, 12, 20, 24	103(a)	Hashimoto, Bhuptani, Lindsay
14	103(a)	Hashimoto, Bhuptani, Lareau

II. ANALYSIS

A. Motion to Exclude

Patent Owner filed a Motion to Exclude (Paper 62, “MTE”), Petitioner filed an Opposition (Paper 64, “MTE Opp’n”), and Patent Owner filed a Reply (Paper 65, “MTE Reply”). In its Motion to Exclude, Patent Owner moves to exclude Exhibits 1012 and 1013, which Petitioner relies on with respect to motivation to combine. MTE 1–2. Patent Owner also moves to exclude Exhibits 1026 through 1031, which relate to the admissibility of Exhibits 1012 and 1013. MTE 1–2, 6–12. Patent Owner’s Motion to Exclude

⁶ The '033 patent was filed June 16, 2006. Ex. 1001, code (22). Because the challenged claims of the '033 patent have an apparent effective filing date before March 16, 2013, the 35 U.S.C. §§ 102 and 103 provisions of the Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, §§ 3(b)–3(c), 3(n)(1), 125 Stat. 284, 285–87, 293 (2011) do not apply. Our analysis would not change under the AIA versions of §§ 102, 103.

also pertains to Exhibits 1022, 1023, and 2049, but those exhibits relate to the real-party-in-interest issue and are addressed in our Order denying Patent Owner's Motion to Terminate. *See generally* Order MTE.

We do not rely on Exhibits 1012 or 1013 for any determinations or findings herein. When we use the phrase evidence of record or other similar terms or phrases, we are referring to the evidence of record except that evidence that is the subject of Patent Owner's Motion to Exclude, that is Exhibits 1012, 1013, and 1026 through 1031. Accordingly, Patent Owner's Motion to Exclude as to Exhibits 1012, 1013, and 1026 through 1031 is *dismissed* as moot.

B. Patentability: Principles of Law

To prevail in its challenges to the patentability of all claims of the '033 patent, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). "In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable." *Harmonic Inc. v. Avid. Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016); *see also* 35 U.S.C. § 312(a)(3) (2012) (requiring *inter partes* review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim"). That burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015); *see also In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1375–78 (Fed. Cir. 2016) (discussing the burden of proof in *inter partes* review).

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness, i.e., secondary considerations.⁷ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

C. Level of Ordinary Skill in the Art

Petitioner asserts that a person of ordinary skill in the art the time of the invention would have had “at least a bachelor’s degree in electrical engineering, computer engineering, or a related field, and at least two years of experience in design, development, and/or testing of hardware and software used in sensor networks and associated software, or the equivalent, with additional education substituting for experience and vice versa.” Pet. 11 (citing Ex. 1003 ¶ 23). At the institution stage, we adopted Petitioner’s proposal, except we did not adopt the “at least” terminology because we found it too vague. Inst. Dec. 21. Patent Owner does not dispute the qualifications of a person having ordinary skill in the art adopted in the Institution Decision. Resp. 32 n.2.

⁷ Patent Owner does not present objective evidence of nonobviousness.

On the current record, we maintain our finding in our Institution Decision that Petitioner’s contentions that the skilled artisan would have had “*at least* a bachelor’s degree” and “*at least* two years” of experience are too vague as Petitioner’s contentions encompass skill levels beyond the proposal level without a defined limit. At this final stage, therefore, we adopt Petitioner’s proposal except we do not adopt the “at least” terminology above. We determine that with our changes Petitioner’s proposal is consistent with the level of skill reflected in the ’033 patent Specification and the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

D. Claim Construction

We construe the challenged claims by applying the standard used in federal courts, in other words, “the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. [§] 282(b),” which is articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b) (2020). Under this standard, the words of a claim generally are given their “ordinary and customary meaning,” which is the meaning the term would have to a person of ordinary skill at the time of the invention, in the context of the entire patent including the specification. *Phillips*, 415 F.3d at 1312–13. “In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17).

The Petition does not include an explicit construction for any term of the challenged claims. Pet. 19. In the Patent Owner Response, Patent Owner proposes constructions for “association data reflecting an association between [an/the at least one] item tracking device and [a/the at least one] beacon device” recited in independent claims 1, 15, and 25 and “programming change” recited in dependent claim 7. Resp. 30–35. In its Reply, Petitioner disputes Patent Owner’s constructions and argues that no explicit construction of the terms is necessary. Reply 11–14. The parties presented further argument in subsequent papers. We discuss the parties’ disputes below.

I. “an association,” “associating/associates” and Related Claim Phrases

a) The Parties’ Arguments

In its Patent Owner Response, Patent Owner argues “association data reflecting an association between [an/the at least one] item tracking device and [a/the at least one] beacon device” means “data identifying [an/the at least one] item tracking device and [a/the at least one] corresponding beacon device.” Resp. 30–33. Patent Owner argues its proposed construction is supported by the ’033 patent Specification. *Id.* More specifically, Patent Owner argues that the ’033 patent Specification describes that association data reflects an association between two devices by identifying the two devices. *Id.* at 30–31 (citing Ex. 1001, 4:64–67, 9:6–10, 10:64–67, 11:22–26). Patent Owner argues that the ’033 patent Specification describes that the “two identifiers aid look up operations and help organize a database for tracking purposes.” *Id.* at 31 (citing Ex. 1001, 5:17–34, 7:45–55, 12:14–25); *see also id.* (citing Ex. 1001, 3:1–19) (arguing that the ’033 patent

Specification describes that “[a]ssociations between devices can also reduce costs when sensor data is shared across many items.”). Patent Owner also cites as supporting evidence the Declaration testimony of Dr. Madisetti and the deposition testimony of Dr. Olivier. *Id.* at 32–33 (citing Ex. 2201 ¶¶ 61–67; Ex. 2205, 27:6–15, 27:19–21, 28:17–30:10, 31:1–3, 31:5–13).

Patent Owner also argues in its Response that associating sensor data with “a group of items” requires associating sensor data with an item tracking number corresponding to the *item*. *Id.* at 49–50 (citing, e.g., Ex. 1001, 8:46–50). Patent Owner relies on the ’033 patent Specification, the prosecution history, and the testimony of Dr. Madisetti. *Id.* at 49–50 (citing, e.g., Ex. 1001, 3:56–59, 5:35–46, 8:40–50; Ex. 2201 ¶¶ 110–114).

In its Reply, Petitioner argues that the ’033 patent Specification does not use the term “association data” and describes only a non-limiting example of “association information” in which “identifiers of both the beacon and item tracking devices” are stored. Reply 11–12 (Ex. 1001, 4:64–67). Petitioner argues the ’033 patent Specification describes another example in which only “identifiers of the associated item tracking device” are stored on a beacon device. *Id.* at 12 (Ex. 1001, 4:67–5:16; Ex. 2205, 31:1–13). Petitioner also argues Patent Owner’s “construction applied to the beacon device achieves nonsensical results” and Dr. Madisetti “could not or would not articulate what would and would not meet” Patent Owner’s proposed construction. *Id.* (citing Ex. 1024, 57:23–64:21, 73:8–24, 80:8–83:5). Petitioner does not provide a responsive proposed construction and, instead, argues that the “plain-English understanding” would have been

broad and that Patent Owner's proposed construction is "unnecessary." *Id.* at 13.

Petitioner also disputes Patent Owner's argument that associating sensor data with "a group of items" requires associating sensor data with an item tracking number corresponding to the item. Reply 19. Petitioner argues that Patent Owner erroneously adds a requirement to the independent claims. *Id.*

In its Sur-reply, Patent Owner argues that the '033 patent Specification describes only one example and Petitioner's argument takes the '033 patent disclosure out of context. Sur-reply 11–12 (citing Ex. 1001, 4:64–5:4). Patent Owner includes a reproduction with emphasis of the portion of the '033 patent relied on heavily by both parties, which is set forth below. *Id.*

Association information, for example, may include **data that indicates that a beacon device's (104) specific identification number corresponds to an item tracking device's (102) specific identification number.** The beacon device may also periodically send ***such* association information** to tracking center 108 via network 106 (***e.g.***, beacon device 104 may periodically send tracking center 108 information indicative of each of its current associations with item tracking devices 102). *Id.* Patent Owner argues the "second sentence does not identify a different types of association data—it discusses the same '***such*** association information.'" *Id.* at 12 (citing Ex. 1001, 4:64–5:4).

Patent Owner also argues that Petitioner mischaracterizes Dr. Madisetti's testimony. Sur-reply 12–13; *see also* PO Open. Br. 3–4 (arguing Patent Owner's "constructions comport with the extrinsic evidence"). For instance, Patent Owner argues that Petitioner "incorrectly asserts" that

Patent Owner’s “construction ‘achieves non-sensical results’” by relying on Dr. Madisetti’s testimony taken out of context. *Id.* (citing, e.g., Reply 12–13; Ex. 1024, 79:14–24, 80:8–83:5). Patent Owner also argues that deficiencies in Petitioner’s questioning resulted in Dr. Madisetti answering that he could not opine on Petitioner’s hypotheticals. *Id.* at 13. Patent Owner also argues that the ’033 patent Specification “uses ‘data’ and ‘information’ interchangeably.” *Id.* at 14 (citing, e.g., Ex. 1001, 4:64–67, 9:6–10, 10:64–67, 11:22–26).

Regarding Petitioner’s dispute of Patent Owner’s argument that associating data with “a group of items” requires associating data with an item tracking number (Reply 19), Patent Owner argues that its position is supported by the prosecution history. Sur-reply 21–22 (citing, e.g., Ex. 1002, 80–89, 95–98). Patent Owner also argues that Petitioner’s “interpretation . . . makes the claimed ‘group of items’ redundant and meaningless.” *Id.* at 22.

Subsequent to the hearing, we authorized briefing “on whether (1) the term ‘association’ means ‘a correspondence;’ and (2) the term ‘associating/associates’ means ‘causing/causes a correspondence.’” Paper 68, 2–3. We also authorized additional briefing for the parties “to address what is the plain and ordinary meaning of ‘association,’ ‘associating,’ and ‘associates’ in the context of the challenged claims to the extent that the parties disagree with the proposed constructions of the terms herein.” *Id.* at 3.

In its opening post-hearing brief, Petitioner argues “the verbs— ‘associates’ and ‘associating’—refer[] to the act of causing an association.” Pet. Open. Br. 1. Relying on the language of claims 1, 12, 15, and 16,

Petitioner argues that “an ‘association’ is a correspondence.” *Id.* at 1–3.

Petitioner argues that the ’033 patent Specification “uses ‘association’ to mean a correspondence that need not be digital.” *Id.* at 3–5 (citing Ex. 1001, 1:39–42, 4:29–34, 5:5–16, 7:1–8, 8:40–51, 8:63–9:5, 10:16–34). Petitioner argues the prosecution history is consistent. *Id.* at 5–6.

In its opening post-hearing brief, Patent Owner argues “an ‘association’ reflects ‘an identification of a correspondence in data.’” PO Open. Br. 1–2 (citing Resp. 26, 30–33, 49–52; Sur-reply 11–14, 21–22); *see also* PO Resp. Br. 1 (arguing that “*associate/associating*” means “identify/identifying a correspondence in data”). Patent Owner argues “[t]he word ‘associate’ is the verb form of association, and thus means ‘identifying a correspondence in data.’” *Id.* Patent Owner maintains its proposed construction of the larger phrase arguing “‘association data reflecting an association between [an] item tracking device and [a] beacon device’ (claims 1, 15, 25) means ‘data identifying [an] item tracking device and [a] corresponding beacon device.’” *Id.*

For its construction of “association,” Patent Owner relies on the language of claim 25 and argues claims 1 and 15 include similar recitations. *Id.* at 2. Patent Owner also relies disclosures in the ’033 patent Specification that are the same or related to those disclosures relied on in the Response. *Id.* at 2–3 (citing Ex. 1001, 3:55–4:5, 4:57–5:33). Patent Owner also argues that its proposed construction is supported by description in the ’033 patent Specification relating to associating sensor data with items. *Id.* at 3 (Ex. 1001, 3:55–4:5, 5:35–46, 8:40–51); *see also* Resp. 49 (arguing that associating sensor data with items is distinct from associating with item

tracking devices) (citing Ex. 1001, 3:56–59, 5:39–43, 8:40–50). For instance, Patent Owner argues the ’033 patent describes storing “information during shipping ‘that specifies the item tracking number is currently assigned to an identification number for the item tracking device’” and that the “stored correspondence enables users to request sensor data associated with an ‘item tracking number.’” *Id.* (citing Ex. 1001, 3:55–4:5, 5:35–46, 8:40–51). Patent Owner also argues that its proposed construction comports with extrinsic evidence. *Id.* at 3–4 (citing, e.g., Ex. 2201 ¶ 62, Ex. 1024, 72:20–25, 98:1–17, 99:14–100:20, 114:2–21, 117:23–118:19).

In its responsive post-hearing brief, Petitioner maintains that the challenged claims do not require that all associations be digital. Pet. Resp. Br. 1. Petitioner argues that the ’033 patent Specification describes a physical association by describing “that an item tracking device can be associated with an item being shipped by placing the device in or attaching it to packaging associated with the item.” *Id.* at 2 (citing Ex. 1001, 8:40–44). Petitioner also disputes Patent Owner’s arguments relying on the language of claim 25 and Patent Owner’s reliance on the testimony of Dr. Madisetti. *Id.* at 2–5.

In its responsive post-hearing brief, Patent Owner argues that Petitioner “improperly focuses on ‘association’ terms in isolation, failing to consider claim context.” PO Resp. Br. 1. Patent Owner argues the “claims *already recite* that an ‘item tracking device *corresponds* to a first item’ and ‘the beacon device *corresponds* to an area that contains multiple items.’” *Id.* Patent Owner argues “[d]ifferent words presumptively carry different meanings.” *Id.* (citing *SimpleAir, Inc. v. Sony Ericsson Mobile Commc’ns*,

820 F.3d 419, 431 (Fed. Cir. 2016); *Phillips*, 415 F.3d at 1314). Patent Owner also argues using the broader proposed construction (Paper 68, 2), “the associating step does no work and is ready out entirely” and “[t]his approach is ‘highly disfavored.’” *Id.* at 2 (citing *Wasica Fin. GmbH v. Cont’l Auto. Sys.*, 853 F.3d 1272, 1288 n.10 (Fed. Cir. 2017)). Patent Owner also disputes Petitioner’s arguments that the broader proposed construction is consistent with the claim language, the ’033 patent Specification, and the prosecution history. *Id.* at 2–6.

b) *Analysis—Claim Construction “an association,” “associating/associates,” and Related Claim Phrases*

The parties agree that “associating” and “associates” are verb forms of “association.” Pet. Open. Br. 1; PO Open. Br. 1. Below we discuss the construction of “association,” and related terms such as “association data reflecting an association between [an] item tracking device and [a] beacon device” and “group of items.”

We begin with the claim language. *See Allergan Sales, LLC v. Sandoz, Inc.*, 935 F.3d 1370, 1373 (Fed. Cir. 2019) (“[C]laim construction must begin with the words of the claims themselves.”) (quoting *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 457 F.3d 1293, 1301 (Fed. Cir. 2006)).

We start with the term “association.” The dispute between the parties turns on whether the term “association” itself should be construed as limited to an association of digital identification numbers, as described in specific embodiments in the ’033 patent Specification. Importantly, Patent Owner’s claim construction arguments propose to limit the claims to specific disclosures in the ’033 patent Specification. *See, e.g.*, Resp. 30–33, 49–52.

In particular, the Patent Owner argues that the claims should be limited based to the '033 patent Specification disclosure of association information including data that indicates that a beacon device's specific identification number corresponds to an item tracking device's specific identification number and disclosure of an item tracking number that is assigned to an identification number for an item tracking device. Resp. 31, 49 (citing, e.g., Ex. 1001, 4:64–67, 8:46–50).

In its opening post-hearing brief, Patent Owner argues “an ‘association’ reflects ‘an identification of a correspondence in data.’” PO Open. Br. 1–2 (citing Resp. 26, 30–33, 49–52; Sur-reply 11–14, 21–22); *see also* PO Resp. Br. 1 (arguing that “*associate/associating*” means “identify/identifying a correspondence in data”). Petitioner argues that “an ‘association’ is a correspondence.” Pet. Open. Br. 1. Nothing in the claims explicitly requires reflecting “an identification” or two identification numbers, as Patent Owner urges. PO Open. Br. 1–3; Resp. 31. To the contrary, the plain claim language of claim 1 states “first association data reflecting an association between an item tracking *device* and a beacon *device*” (emphases added). Claims 15 and 25 include similar recitations. The term “association *data*” recited in the claims is different than “an identification . . . in data” and “identifying [the] two devices,” proposed by Patent Owner. PO Open. Br. 1–2; PO Resp. Br. 1; Resp. 31.

Furthermore, consistent with Petitioner's arguments, claim 15 recites that “at least one beacon device” comprises “memory” that “stores first association data reflecting an association between the at least one item tracking device and the at least one beacon device.” Locally storing in the

beacon current associations with item tracking devices is consistent with the claim language in not requiring two identifiers. *See, e.g.*, Ex. 1001, 5:12–13.

We turn to “association data reflecting an association between [an] item tracking device and [a] beacon device” recited in claims 1, 15, and 25. Nothing in the claims explicitly requires that “data identifying [an] item tracking device and [a] corresponding beacon device,” as Patent Owner urges. Resp. 30–33; PO Open. Br. 1. To the contrary, as discussed with respect to “association,” the plain claim language of claim 1 states that the association is between two devices, that is “between an item tracking *device* and a beacon *device*” (emphases added). Claims 15 and 25 include similar recitations. The claims do not recite or require identification of the item tracking device *and identification of the corresponding beacon device*. The claims recite only “association data reflecting an association” between the devices.

We turn to “associating the sensor data with a group of items.” Nothing in the claims explicitly limits the claims to the embodiment in which an item tracking number is assigned to an identification number for the item tracking device. Ex. 1001, 8:46–50. To the contrary, the plain claim language of claim 1 states “associating the sensor data with a group of *items*, of the multiple *items*, that are within a predetermined range of the beacon *device*.” Claims 15 and 25 include similar recitations. That the claims recite a different term, that is “item” rather than “item tracking device,” does not require that the “item” must have its own unique identification number. Indeed, the claims recite “device” and “item” and do not recite “identification,” “number,” or any similar term.

Even with respect to claim 25, which recites a processor executing instructions to store, in memory, “first association data” and to perform the step of “associating the sensor data with a group of items, of the multiple items,” the step performed by the processor is broader requiring only storing “data reflecting an association” between two devices. The claim does not limit the type of data to be stored to the identification numbers described in the ’033 patent Specification. Similarly, the step of “associating the sensor data with a group of items” does not limit the claims to performing that associating by storing an identification number for the item that differs from the identification number of the item tracking device.

The Specification also does not support Patent Owner’s position. We turn to Patent Owner’s argument that the ’033 patent Specification describes that association data reflects an association between two devices by identifying the two devices. Resp. 30–31 (citing Ex. 1001, 4:64–67, 9:6–10, 10:64–67, 11:22–26). Patent Owner argues that the ’033 patent Specification describes that the “two identifiers aid look up operations and help organize a database for tracking purposes.” *Id.* at 31 (citing Ex. 1001, 5:17–34, 7:45–55, 12:14–25); *see also id.* (citing Ex. 1001, 3:1–19) (arguing that the ’033 patent Specification describes that “[a]ssociations between devices can also reduce costs when sensor data is shared across many items”).

Patent Owner relies on non-limiting examples in the Specification to support its proposed constructions. For example, in one portion relied on by Patent Owner, the ’033 patent Specification describes “[a]ssociation information, *for example, may* include data that indicates that a beacon device’s (104) specific identification number corresponds to an item tracking

device's (102) specific identification number." Ex. 1001, 4:64–67 (emphasis added), 9:6–10 (stating the same), 10:64–67 (stating the same), 11:22–26 (similarly stating that “association information, *for example, may* include” identification information) (emphasis added). Patent Owner relies on disclosure in the '033 patent Specification regarding tracking center 108 that provides a platform for tracking items being delivered and sharing sensor data to build richer information describing an item being tracked. *Id.* at 3:1–19, 5:17–34, 7:45–55, 12:14–25. The '033 patent Specification describes these as exemplary, non-limiting embodiments. For instance, the '033 patent Specification describes that the item tracking device or beacon “*may*” send association information to tracking center 108. *Id.* at 7:55–59.

Furthermore, the '033 patent also describes “when an activated item tracking device 102 is placed within a predetermined proximity of a beacon device 104, *item tracking device 102 and/or beacon device 104 may locally store information reflecting this association.*” Ex. 1001, 7:47–51. Although claim 1 recites “periodically transmitting the associated sensor data from the beacon to a database,” claim 1 does not further limit “a database” and recites only “a beacon device,” such that claim 1 covers a database that resides in a computer connected to and dedicated to a single beacon device, which would not require two identification numbers. Claim 25 similarly recites “a beacon device” and “a database” without limitation.

We turn to Patent Owner's argument that its proposed constructions are supported by description in the '033 patent Specification relating to associating sensor data with items. PO Open. Br. 3 (Ex. 1001, 3:55–4:5, 5:35–46, 8:40–51); *see also* Resp. 49 (arguing that associating sensor data

with items is distinct from associating with item tracking devices) (citing Ex. 1001, 3:56–59, 5:39–43, 8:40–50). Again, Patent Owner relies on non-limiting examples in the '033 patent Specification. For instance, the '033 patent describes that “[a]n item tracking device 102a *may* store information associated with an item tracking number for a corresponding item” and that “[t]he item tracking number *may* be a FedEx tracking number or similar tracking number.” Ex. 1001, 3:56–59. The '033 patent describes “[e]xemplary triggering parameters *may* include a sensor identification number” or an “item tracking number.” *Id.* at 5:39–43. The '033 patent describes “the courier or other employee *may* cause information to be stored at tracking center 108 that specifies that the item tracking number is currently assigned to an identification number for the item tracking device.” *Id.* at 8:47–50 (emphasis added).

As our reviewing court has explained, “each claim does not necessarily cover every feature disclosed in the specification,” and “it is improper to limit the claim to other, unclaimed features.” *Ventana Med. Sys., Inc. v. BioGenex Labs., Inc.*, 473 F.3d 1173, 1181 (Fed. Cir. 2006). Furthermore, the court “has repeatedly cautioned against limiting the claimed invention to preferred embodiments or specific examples in the specification.” *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1346–47 (Fed. Cir. 2015); *SuperGuide Corp. v. DirecTV Enterprises, Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004) (noting that “it is important not to import into a claim limitations that are not a part of the claim”). “[I]t is the *claims*, not the written description, which define the scope of the patent right.” *Williamson*, 792 F.3d at 1346–47; *see also Phillips*, 415 F.3d at 1312 (noting that “[i]t is

a bedrock principle of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude”). Thus, “a particular embodiment appearing in the written description may not be read into a claim when the claim language is broader than the embodiment.” *SuperGuide*, 358 F.3d at 875.

Importantly, the Specification also includes examples that are contrary to Patent Owner’s argument and suggest a broader interpretation of “association.” For instance, the ’033 patent Specification describes “association” broadly as including a physical association between objects. *See, e.g.*, Ex. 1001, 8:40–44 (describing that the “item tracking device(s) may be activated and *associated* with the item(s) being shipped” and “[f]or example, a courier or other employee of the shipper may turn on an item tracking device 102a and place it in or attach it to packaging associated with the item” (emphasis added)), 9:29–34 (describing that “item tracking device 102a is *associated* with beacon sensor 104a by virtue of being located in a vehicle with beacon sensor 104a”). Furthermore, the ’033 patent describes alternative embodiments of storing and associating digital data that are contrary to Patent Owner’s position. For instance, with respect to Patent Owner’s argument that the claims require storing a beacon device’s specific identification number, the ’033 patent Specification describes “when an activated item tracking device 102 is placed within a predetermined proximity of a beacon device 104, *item tracking device 102 and/or beacon device 104 may locally store information reflecting this association.*” Ex. 1001, 7:47–53. Such local storage within a beacon does not require a beacon identification number in a system having a single beacon.

Additionally, as discussed above with respect to associating item tracking numbers, the '033 patent Specification describes “[a]lternatively, *no item tracking number is associated* with the item tracking device 102a.” *Id.* at 8:50–51.

Petitioner argues that the '033 patent Specification “uses ‘association’ to mean a correspondence that need not be digital.” Pet. Open. Br. 3–5 (citing Ex. 1001, 1:39–42, 4:29–34, 5:5–16, 7:1–8, 8:40–51, 8:63–9:5, 10:16–34); Pet. Resp. Br. 1. Patent Owner disputes Petitioner’s arguments in that regard. *See generally* PO Resp. Br. We agree that the '033 patent Specification uses the term “associated” in a non-digital context and the term itself does not require a digital association. *See, e.g.*, Ex. 1001, 8:40–44 (describing that the “item tracking device(s) may be activated and *associated* with the item(s) being shipped” and “[f]or example, a courier or other employee of the shipper may turn on an item tracking device 102a and place it in or attach it to packaging associated with the item” (emphasis added)). Nonetheless, the claims include computer-related recitations such as “storing, in memory,” “data,” “processor,” “computer-readable medium,” and “database” and we construe the disputed terms in context. Patent Owner does not dispute that Hashimoto describes storing identification numbers of Radio Frequency Identification (RFID) tags or storing sensor data. *See generally* Resp.; Ex. 1005, Figs. 2, 6. The disputes between the parties turns on whether the specific exemplary '033 patent disclosures, including a beacon identification number and an item identification number, are taught by the asserted art. Our discussion herein focuses on interpretation to resolve the disputes between the parties. *See Realtime Data, LLC v. Iancu*, 912 F.3d

1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

We now turn to the prosecution history of the ’033 patent, and discuss portions thereof relevant to the construction of “association.” We recognize that the prosecution history “can often inform the meaning of the claim language by demonstrating how the inventor understood the invention.” *Phillips*, 415 F.3d at 1317. The portions of the prosecution history relied upon by Patent Owner, however, are ambiguous, and do not inform the meaning of the claim language or amount to an unmistakable disclaimer that limits the scope of the claims.

In particular, Patent Owner argues that Applicant explained during prosecution “that Francis interrogated RFIDs near pallets containing items but did not associate sensor data ‘with anything, much less ‘a group of items . . . within the predetermined range.’” PO Resp. Br. 5–6 (citing, e.g., Ex. 1002, 88, 95); Sur-reply 21 (citing Ex. 1002, 80–89, 95–98 (arguing that “the Office allowed the claims after the applicant distinguished a reference that collected location data and an identifier of an RFID attached to a pallet containing items because it did not associate the location data with the items themselves”)); *see also* Resp. 26–27 (arguing that Applicant’s amendments during prosecution “distinguished Francis, explaining Francis did not associate location data ‘with anything much less “a group of items . . . within the predetermined range””). Francis is identified as U.S. Patent No. 6,600,418 B2, which issued July 29, 2003 and is not relied on by Petitioner

as asserted prior art in the instant proceeding. Ex. 1002, 79. Applicant argued that Francis is not an anticipatory reference because Francis describes that “[a]n interrogator attached to a vehicle 110 approaches the pallet and first interrogates the location marker RFID, to identify the location.” *Id.* at 88. Applicant argued “*Francis*’s identified location does not constitute the claimed ‘sensor data.’” *Id.* Applicant’s arguments pertain to Francis’s disclosure of “sensor data” and do not support limiting independent claims 1, 15, and 25 as proposed by Patent Owner. Resp. 49 (citing, e.g., Ex. 1001, 8:40–50); Sur-reply 21; PO Resp. Br. 5–6.

Patent Owner’s contentions regarding arguments made during prosecution are misplaced because the remarks are broader than Patent Owner’s proposed construction. Patent Owner’s arguments relying on the amendment are based on a mischaracterization of the remarks, which attempt to distinguish the prior art as teaching only identifying location, not detecting sensor data and associating that sensor data with a group of items.

The words of a claim generally are given their “ordinary and customary meaning,” which is the meaning the term would have to a person of ordinary skill at the time of the invention, in the context of the entire patent including the specification. *Phillips*, 415 F.3d at 1312–13. We discern no reason based on the prosecution history to interpret the independent claims as having the narrow limitations Patent Owner proposes.

We turn to Patent Owner’s argument that the “claims *already recite* that an ‘item tracking device *corresponds* to a first item’ and ‘the beacon device *corresponds* to an area that contains multiple items.’” PO Resp. Br. 1. Patent Owner argues “[d]ifferent words presumptively carry different

meanings.” *Id.* (citing *SimpleAir*, 820 F.3d at 431; *Phillips*, 415 F.3d at 1314). Here, that presumption has been rebutted. We agree with Petitioner’s analysis that the claims use the terms “association” and its various forms interchangeably with “correspondence” and its various forms. Pet. Open. Br. 3. Also, the ’033 patent uses the terms “association” and “correspondence” interchangeably and to mean the same thing. For instance, the ’033 patent Specification describes “*associating* a bar code with packages to be delivered” and that the “package may have a bar code *corresponding* to a tracking number for that package.” Ex. 1001, 1:39–42 (emphases added). The ’033 patent Specification also describes that a courier may place an item tracking device in or attach it to “packaging *associated* with a *corresponding* item.” *Id.* at 8:40–44. The ’033 patent Specification additionally describes a user finding “temperature information that *corresponds* to item tracking device 102a” because “beacon device 104a can sense temperature and is *associated* with item tracking device 102a.” *Id.* at 9:20–36 (emphasis added). The ’033 patent Specification further describes that “item tracking device 102a is *associated* with beacon sensor 104a by virtue of being located in a vehicle with beacon sensor 104a” and that beacon device 104 may detect the “corresponding item,” which is “in or very nearby the vehicle.” *Id.* at 8:63–9:5, 9:29–34 (emphases added).

We turn to Patent Owner’s argument that using the broader proposed construction (Paper 68, 2), “the associating step does no work and is read out entirely” and “[t]his approach is ‘highly disfavored.’” PO Resp. Br. 2 (citing *Wasica Fin.*, 853 F.3d at 1288 n.10). Patent Owner mischaracterizes the proposed construction. *Id.* That “an association” means “a correspondence”

does not read out claim recitations, including “periodically transmitting the associated sensor data from the beacon device to a database” recited in claims 1 and 25. The independent claims do not require that the “associated sensor data” be limited to just one of the exemplary disclosures in the ’033 patent Specification in which an item tracking number is assigned to an identification number for the item tracking device. Ex. 1001, 8:48–50. The ’033 patent Specification describes the beacon device periodically sending sensor data, such as temperature (*id.* at 5:22–27) and the beacon device reporting its associations with item tracking devices (*id.* at 4:67–5:16). The ’033 patent describes “[a]lternatively, no item tracking number is associated with the item tracking device.” *Id.* at 8:50–51.

Patent Owner cites to the testimony of Dr. Madisetti and Dr. Olivier in support of its arguments throughout its papers. *See, e.g.*, Resp. 30–33 (relying on Dr. Madisetti’s testimony as support for Patent Owner’s proposed construction as consistent with the understanding of one of ordinary skill in the art); Sur-reply 12–13 (arguing Petitioner mischaracterizes Dr. Madisetti’s deposition testimony); *see also* PO Open. Br. 3–4 (arguing Patent Owner’s “constructions comport with the extrinsic evidence”). We have reviewed the testimony Patent Owner cites (*see, e.g.*, Ex. 2201 ¶¶ 62–67; Ex. 1024), but we give it little, if any, weight as to claim construction issues in light of the clear disclosure of the intrinsic evidence. *See Wi-LAN, Inc. v. Apple Inc.*, 811 F.3d 455, 462 (Fed. Cir. 2016) (finding extrinsic evidence “is generally of less significance than the intrinsic record” in matters of claim construction); *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed. Cir. 1996) (finding that when “an analysis of the

intrinsic evidence alone will resolve any ambiguity in a disputed claim term[,] . . . it is improper to rely on extrinsic evidence”).

Moreover, “extrinsic evidence may be used only to assist in the proper understanding of the disputed limitation; it may not be used to vary, contradict, expand, or limit the claim language from how it is defined, even by implication, in the specification or file history.” *Bell Atl. Network Servs. v. Covad Commc’ns Grp.*, 262 F.3d 1258, 1269 (Fed. Cir. 2001). Our reviewing court also has explained that “extrinsic evidence consisting of expert reports and testimony is generated at the time of and for the purpose of litigation and thus can suffer from bias that is not present in intrinsic evidence.” *Phillips*, 415 F.3d at 1318.

For the reasons given, we construe “an association” as “a correspondence,” consistent with Petitioner’s proposed claim construction. Pet. Open. Br. 3. Likewise, we determine that “associating” means “causing a correspondence” and “associates” means “causes a correspondence.” *Id.* We do not adopt Patent Owner’s proposal that “association data reflecting an association between [an/the at least one] item tracking device and [a/the at least one] beacon device” means “data identifying [an/the at least one] item tracking device and [a/the at least one] corresponding beacon device.” Resp. 30–33. We also do not adopt Patent Owner’s proposal that associating data with “a group of items” requires associating data with an item tracking number for each item in the group in addition to associating data with an identification number for the item tracking device. *Id.* at 49 (citing, e.g., Ex. 1001, 8:46–50). For the avoidance of doubt, we further do not adopt Patent Owner’s proposal that the claims should be limited to the ’033 patent

Specification disclosures discussed above. *Id.* at 31, 49. We determine that remaining claim terms recited in independent claims 1, 15, and 25 have their plain and ordinary meaning and, except as discussed herein, no express construction is needed. *See Realtime Data*, 912 F.3d at 1375 (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs.*, 200 F.3d at 803)).

2. “programming change”

As indicated above, the Petition does not include an explicit construction for any term of the challenged claims. Pet. 19. The Petition states that claim terms are given “their ‘ordinary and customary meaning.’” *Id.*

Patent Owner argues that the term “programming change” recited in claim 7 means “change in function.” Resp. 33. Patent Owner relies on the ’033 patent Specification. *Id.* (citing Ex. 1001, 5:57–6:9, 8:25–39, 10:3–15). Patent Owner argues that “altered programming” must alter “how the beacon device will behave moving forward” and quotes the ’033 patent disclosure as follows: “the system ‘alter[s] the programming of beacon device 104a to check the temperature more frequently.’” *Id.* at 34 (citing Ex. 1001, 6:5–7, 10:3–15). Patent Owner also relies on extrinsic evidence, including the testimony of Dr. Madisetti and technical and English dictionary definitions. *Id.* (citing Ex. 2201 ¶ 70; Ex. 2203, 6–9; Ex. 2204, 3–4).

Petitioner disputes Patent Owner’s proposed construction and argument. Reply 13–14. Petitioner argues that Patent Owner relies on one example in the ’033 patent Specification and Patent Owner’s extrinsic

evidence shows that “programming change” is broader than “change in function.” *Id.* Petitioner does not propose a construction and, instead, maintains that “programming change” should be given its ordinary and customary meaning. *Id.*; Pet. 19.

In its Sur-reply, Patent Owner maintains that the extrinsic evidence supports its position. Sur-reply 14–15. Patent Owner argues that Petitioner’s position is “that a programming change simply changes what information a tag delivers (a freshness date).” *Id.* at 15. Patent Owner argues that changing the freshness date is not a programming change. *Id.*

In determining the meaning of the “programming change,” “we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy*, 469 F.3d at 1014. Claim 7 depends from claim 1, but neither party relies on the language of claim 1 with respect to the construction of “programming change.” Claim 7 recites “programming change” so Patent Owner’s construction, which is “change in function” results in “programming” meaning “function.” We discern no reason based on the record before us to rewrite the claim language in that manner. Also, claim 7 further recites “wherein the transmitted sensor data triggers a programming change for *at least one of the item tracking device and the beacon device.*” Thus, the “programming change” may be for just the “the item tracking device.” Patent Owner’s argument based on the specific example of a programming change for the beacon device (Resp. 34 (citing Ex. 1001, 6:5–7, 10:3–15)) excludes the recitation of “at least one of *the item tracking device and beacon device.*”

The '033 patent Specification describes that tracking center 108 “may alter the programming of beacon device 104a to check temperature more frequently” in response to an alarm or alert. Ex. 1001, 6:5–7, 10:3–15 (stating the same). The '033 patent Specification also describes that “[p]rogramming of the aforementioned devices [that is item tracking devices and beacon devices] *may* be altered, for example, by storing new or modified instructions in a memory (not shown) located at the respective device.” Ex. 1001, 5:57–65 (emphasis added). The '033 patent also describes that “an organization may require specific programming (dictating, for example, the manner in which a device detects environmental conditions) for item tracking devices 102 that are to be associated with items to be sent to recipients.” *Id.* at 8:25–39. The '033 patent disclosures support that a “programming change” is not limited to a “change in function,” as Patent Owner proposes (Resp. 33–34), but instead includes “storing new or modified instructions in a memory (not shown) located at the respective device,” which more broadly includes instructions in addition to those that change the function of the device. Ex. 1001, 5:57–65.

Patent Owner submits the testimony of Dr. Madisetti in support of its arguments. *See, e.g.*, Ex. 2201 ¶¶ 68–71. We have reviewed the testimony Patent Owner submits, but we give it little, if any, weight as to claim construction issues in light of the clear disclosure of the intrinsic evidence. *See Wi-LAN*, 811 F.3d at 462 (Fed. Cir. 2016) (finding extrinsic evidence “is generally of less significance than the intrinsic record” in matters of claim construction); *Vitronics*, 90 F.3d at 1583 (finding that when “an analysis of

the intrinsic evidence alone will resolve any ambiguity in a disputed claim term[,] . . . it is improper to rely on extrinsic evidence”).

Based on the complete record now before us, we agree with Petitioner. Patent Owner’s proposed construction is too narrow in that it limits the claims to one embodiment and is contrary to the intrinsic and extrinsic evidence, including that Patent Owner’s proposed construction requires excluding a recitation in claim 7. We perform our analyses herein using the ordinary and customary meaning of the term “programming change” and determine no explicit construction of the term is necessary.

E. Unpatentability of Claims 1–5, 7–19, and 21–25 under 35 U.S.C. § 103(a) as Obvious over Hashimoto and Bhuptani

Petitioner asserts that claims 1–5, 7–19, and 21–25 are unpatentable as obvious over Hashimoto and Bhuptani. Pet. 8. Patent Owner disputes Petitioner’s showing. *See* Resp. 36–53. We begin with summaries of Hashimoto and Bhuptani and then we turn to the parties’ dispute.

1. Hashimoto

Hashimoto is titled “Radio IC [Integrated Circuit] Tag Reader Writer, Radio IC Tag System, and Radio ID Tag Data Writing Method.” Ex. 1005, code (54). Hashimoto relates to providing a RFID tag that is capable of measuring or monitoring conditions around a commodity to which the RFID tag is attached. *Id.* ¶¶ 4, 5. Figure 1, below, illustrates a temperature monitoring system.

FIG.1

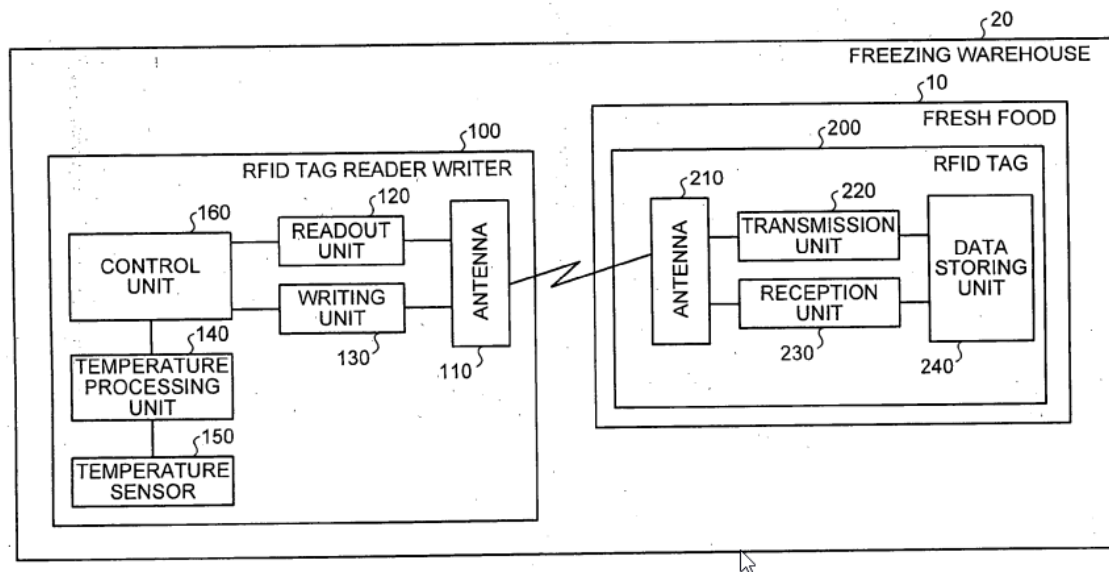


Figure 1, above, illustrates a functional block diagram of a temperature monitoring system including RFID tag reader writer 100, freezing warehouse 20 in which fresh food 10 is stored, and RFID tag 200 that is attached to fresh food 10 and that monitors temperature of fresh food 10. *Id.* ¶¶ 14, 35.

RFID tag reader writer 100 is an apparatus that reads out data from RFID tag 200 and writes data in the RFID tag 200 using a radio. *Id.* ¶ 36. RFID tag reader writer 100 includes antenna 110, readout unit 120, writing unit 130, temperature processing unit 140, temperature sensor 150, and control unit 160. *Id.* Temperature processing unit 140 periodically measures temperature in freezing warehouse 20 using temperature sensor 150 and instructs writing unit 130 to write the measured temperature in RFID tag 200. *Id.* ¶ 41. RFID tag 200 is a radio IC tag, which stores information on fresh food 10 to which the RFID tag 200 is attached, and includes antenna

210, transmitting unit 220, receiving unit 230, and data storing unit 240. *Id.* ¶ 44.

Hashimoto describes another embodiment of a temperature monitoring system having host PC (personal computer) 300 that receives temperature measured by RFID tag reader writer 500 and instructs RFID tag reader writer 500 to write the temperature in RFID tag 200. *Id.* ¶ 62, Fig. 5. Host PC 300 is connected to RFID tag reader writer 500 by a network. *Id.* RFID tag reader writer 500 is like RFID tag reader writer 100 in that RFID tag reader writer 500 includes antenna 110, readout unit 120, and writing unit 130. *Id.* ¶ 63. RFID tag reader writer 500 includes temperature processing unit 440 that measures temperature in freezing warehouse 20 using temperature sensor 450, which is set near fresh food 10. *Id.* ¶¶ 57, 59, 63, Figs. 4, 5. RFID tag reader writer 500 includes communication unit 570 that receives data to be written in RFID tag 200 from host PC 300 and transmits temperature to host PC 300. *Id.* ¶¶ 62–63.

2. *Bhuptani*

Bhuptani is titled “RFID Field Guide: Deploying Radio Frequency Identification Systems.” Ex. 1008, 1. Bhuptani relates to RFID deployment including sourcing and production involved in applying RFID tags to an item in production. *Id.* at 19. Bhuptani describes using RFID technology to track movement of production through a supply chain. *Id.* at 42. Bhuptani describes tracking and locating materiel and supplies using the U.S. Department of Defense (DoD) worldwide RFID infrastructure and network. *Id.* at 225. As the RFID tagged shipments travel through the DoD supply chain, the RFID tag identification (ID) number is automatically collected by

RFID interrogators. *Id.* The RFID tag IDs are automatically associated with the interrogator's ID and location and all three data elements are automatically routed to the appropriate server. *Id.*

3. *Independent Claim 1*

a) *Reasoning to Combine*

(1) *Petitioner's Contentions*

With respect to reasoning to combine, relying on the testimony of Dr. Olivier, Petitioner argues the following:

A POSITA would have understood the importance of tracking fresh food from its place of origin to its ultimate destination, through one or more warehouses and multiple transportation channels. EX1003, ¶73. To understand how to implement Hashimoto's monitoring system through an entire supply chain, a POSITA would have been motivated to use Bhuptani's RFID deployment details in Hashimoto's system and method to improve monitoring of fresh food across the supply chain. *Id.* Specifically, Bhuptani describes RFID capabilities that a POSITA would have understood could be used as food products are transported from a point of origin to destination. EX1008, 42/292, 62/292, 224/292; EX1003, ¶73.

Pet. 24.

Petitioner argues "Hashimoto teaches that variations of its system can be implemented in freezing warehouses" or "in vehicles." Pet. 26 (citing Ex. 1005 ¶¶ 35, 122; Fig. 14); *see also id.* at 24 ("Hashimoto teaches tracking and monitoring fresh food products across 'plural means of transportation'" (quoting Ex. 1005 ¶ 124)). Petitioner argues a person having ordinary skill in the art "would have been motivated to look for examples of supply chain implementations" and Bhuptani describes itself as providing "real-life examples of RFID deployments" and "tips for making an RFID

deployment successful.” *Id.* at 25 (citing, e.g., Ex. 1008, 19). Relying on the testimony of Dr. Olivier, Petitioner argues in light of Bhuptani that a person having ordinary skill in the art would have been “motivated to combine aspects of Hashimoto’s freezing warehouse-based system with Hashimoto’s vehicle-mounted system to ensure that the environmental conditions of food was maintained no matter the location of the food.” *Id.* at 26 (citing Ex. 1003 ¶ 76).

Relying on the testimony of Dr. Olivier, Petitioner also argues the following:

Bhuptani explains that RFID tags are used for environment sensing and monitoring and for tracking items across a supply chain. EX1008, 34/292, 42/292, 62/292. For example, Bhuptani describes tracking the location and monitoring the environmental conditions of items during shipping to know where the shipments are at any point in time and to ensure that the items arrive at their destination without spoiling. *Id.*, 44/292, 225/292. A POSITA would have also been motivated to implement Bhuptani’s use of the tag ID as a tracking number in Hashimoto’s system to allow a user to find an item at any point in the supply chain. EX1003, ¶¶74, 77. This is the same use case described in Hashimoto. EX1005, [0122], [0124]. A POSITA would have been motivated to reference Bhuptani to understand additional details about deploying RFID systems when seeking to deploy a system like that described in Hashimoto. EX1003, ¶¶73, 75, 78.

Pet. 25–26. Petitioner further argues a person having ordinary skill in the art “would have implemented Bhuptani’s description of how the DoD system associated the tag ID with the reader ID and sent the information to a server for storage in a database.” *Id.* at 24 (citing Ex. 1003 ¶ 74).

Petitioner argues “Bhuptani also describes the standardization efforts for RFID.” *Id.* at 27 (citing Ex. 1008, 83–97). Dr. Olivier testifies “RFID technology was standardized . . . making it simple to combine aspects of various implementations in a predictable manner.” Ex. 1003 ¶ 78 (citing Ex. 1008, 83–97).

(2) *Patent Owner’s Contentions*

Patent Owner disputes Petitioner’s proposed combination making three arguments. First, Patent Owner argues the “Hashimoto has already solved the problem that serves as the bases” for Petitioner’s rationale to combine. Resp. 41–43; *see also* Sur-reply 16–17; Ex. 2201 ¶¶ 91–97. Patent Owner, more specifically, argues that Hashimoto describes a “distributed” solution for “monitoring conditions across the supply chain” involving “stor[ing] historical data on the tag itself” and reading that data when a “tag arrives at a checkpoint or destination.” Resp. 43 (citing Ex. 1005 ¶¶ 48, 50–52, 71–155, Figs. 2–3, 19; Ex. 1003 ¶ 95); *see also* Ex. 2201 ¶¶ 94–95.

Second, Patent Owner argues a person having ordinary skill in the art would not have been motivated to make Petitioner’s proposed combination because implementing Petitioner’s proposed changes “for the Bhuptani combination would have required integrating complex server infrastructure and communication systems that would have been unnecessary in Hashimoto.” Resp. 43–44; Sur-reply 17. Dr. Madisetti testifies as follows:

Further undermining their failed obviousness proposal, implementing its proposed changes for the Bhuptani combination would require integrating complex server infrastructure and communication systems that would be completely unnecessary in Hashimoto. For example, tag readers would need to incorporate means to communicate with servers

throughout the supply chain and overcome issues related to signal interference in diverse environments. Bhuptani, 45, 71. Bhuptani's solution requires "middleware" software to bridge RFID components (tags and tag readers) and "host applications" at the server level, features that are absent from Hashimoto. Bhuptani 72, 74-75; *see generally* Hashimoto. Those required host applications may need further modification to interface with middleware. Bhuptani, 75. In comparison with Hashimoto's simple approach to store data on RFID tags, this sort of needless complexity demonstrates that a person skilled in the art would not have been motivated to make the Petition's proposed combination.

Ex. 2201 ¶ 96.

Third, Patent Owner argues that the Petition does not explain how a person having ordinary skill in the art would have modified Hashimoto to include Bhuptani's teachings and extensive modifications would have been required. Resp. 44 (citing, e.g., Ex. 2201 ¶ 97); *see also* Sur-reply 17–18. Dr. Madisetti testifies that Petitioner asserts that the elements of Figure 6 "remain unchanged," but "Figure 6 does not include any servers or show how its components would communicate with servers while in warehouses or vehicles." Ex. 2201 ¶ 97. Dr. Madisetti also testifies that Petitioner does not explain "how 'RFID tags are coupled with satellite and GPS technology' to enable direct tag-to-tracking center transmissions." *Id.* (citing Pet. 29; Ex. 1003 ¶ 82).

In addition to the above, Patent Owner argues in its Sur-reply that Petitioner presents a new argument in its Reply, specifically "that Bhuptani provides 'suitable options for tracking items through an entire supply chain.'" Sur-reply 16, 18–19 (citing, e.g., Reply, 15). Patent Owner also disputes that Bhuptani provides a suitable option. *Id.* at 18–19.

(3) *Analysis—Reasoning to Combine*

We find that the Petition’s reasoning that a person having ordinary skill in the art would have been motivated to use “Bhuptani’s RFID deployment details” with Hashimoto’s teachings, including embodiments in which the host PC stores data (*see, e.g.*, Ex. 1005, Fig. 6) and embodiments in which plural means of transportation are used (*see, e.g., id.* at Fig. 13) has a rational underpinning. More specifically, Bhuptani provides “additional details about deploying RFID systems.” Pet. 25–26. Patent Owner’s first argument and Dr. Madisetti’s testimony that Hashimoto already describes a different, “distributed” solution for the problem identified by Petitioner (Resp. 41–43; Sur-reply 16–17; Ex. 2201 ¶¶ 94–95) do not address that Hashimoto itself describes different embodiments, including embodiments in which the host PC stores data.

In particular, Hashimoto describes a “fourth embodiment” shown in Figure 6 in which “host PC 310 includes a data storing unit 311.” Ex. 1005 ¶¶ 66–67.

FIG.6

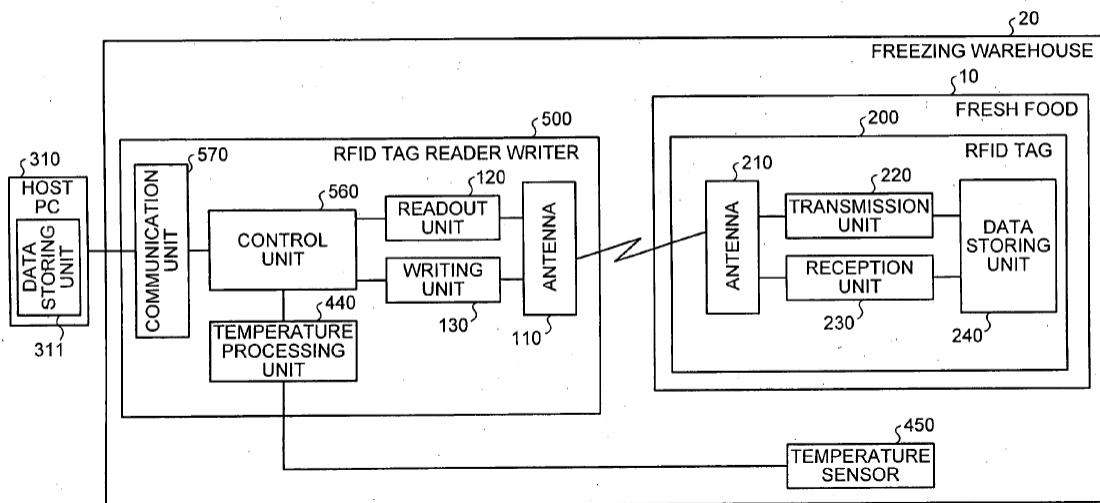


Figure 6 of Hashimoto, above, is a functional block diagram of a temperature monitoring system according to a fourth embodiment, which includes among other things host PC 310 having data storing unit 311. Ex. 1005 ¶ 19, 66, 67. Hashimoto describes that “[t]he data storing unit 311 stores temperature of fresh food 10 using the same data structure as the data storing unit 240 shown” in Figure 2. *Id.* ¶ 68. Hashimoto describes that the host PC “is connected to the RFID tag reader writer by a network.” *Id.* ¶ 62 (emphasis added). Hashimoto describes that “in the fourth embodiment, temperature is managed using the host PC 310 instead of an RFID tag.” *Id.* ¶ 70 (emphasis added). We find that Hashimoto’s teaching of host PC 310 is contrary to Patent Owner’s arguments and Dr. Madisetti’s testimony that Hashimoto is limited to “distributed” technology (Resp. 42–43; Sur-reply 16–17; Ex. 2201 ¶¶ 94–95) and, instead, is consistent with Dr. Olivier’s testimony that a person having ordinary skill in the art would have combined Hashimoto’s teachings with Bhuptani’s teaching of sending the information

to a server for storage in a database. Ex. 1003 ¶ 74. As discussed below, Bhuptani itself describes benefits of applying its teachings.

We turn to Patent Owner’s second argument and Dr. Madisetti’s related testimony that a person having ordinary skill in the art would not have been motivated to make Petitioner’s proposed combination because implementing Petitioner’s proposed changes “for the Bhuptani combination would have required integrating complex server infrastructure and communication systems that would have been unnecessary in Hashimoto.” Resp. 43–44; Sur-reply 17; Ex. 2201 ¶ 96. Dr. Madisetti’s testimony cites Bhuptani as supporting evidence. Ex. 2201 ¶ 96 (citing Ex. 1008, 45, 71–72, 74–75). Bhuptani describes software components executed in the tag, the reader, and the host computer. *See, e.g.*, Ex. 1008, 72. On this record, Petitioner has provided sufficient evidence to show that implementing Hashimoto’s monitoring system in Bhuptani’s supply chain environment would not be “uniquely challenging or difficult for one of ordinary skill in the art” at the time of the invention. *Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007) (citing *KSR*, 550 U.S. at 418).

We find that the mere fact that Hashimoto also describes a different type of supply chain tracking does not render Bhuptani’s teachings unnecessary, as Patent Owner argues. Even to the extent Hashimoto’s technology is simple and Bhuptani’s technology is complex, that different types of supply chain tracking offer different advantages or disadvantages does not preclude a conclusion of obviousness. *In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004) (noting that “case law does not require that a particular combination must be the preferred, or the most desirable,

combination described in the prior art in order to provide [the] motivation for the current invention”). Furthermore, we find that Bhuptani describes additional details relating to implementing a tracking and monitoring system across a supply chain and that a person having ordinary skill in the art would have been motivated to look to Bhuptani, particularly with respect to embodiments in Hashimoto describing using host PC 310 to manage temperature and using plural means of transportation. Ex. 1005 ¶¶ 66–68, 70, 124, Figs. 6, 13, 14.

We turn to Patent Owner’s third argument and Dr. Madiseti’s related testimony that the Petition does not explain how a person having ordinary skill in the art would have modified Hashimoto to include Bhuptani’s teachings and extensive modifications would have been required. Pet. 44; Ex. 2201 ¶ 97; Sur-reply 17–18. We disagree with Patent Owner. Petitioner provides detailed explanations of how a person having ordinary skill in the art would have modified Hashimoto to include Bhuptani’s teachings. *See, e.g.*, Pet. 24–29, 31–39. We do not find the proposed modifications extensive. To the extent the proposed combination includes any complexity, we are not persuaded that it undermines Petitioner’s showing.

We also do not find Petitioner’s arguments regarding Figure 6 to render Petitioner’s arguments deficient. For instance, Petitioner argues “[w]hether the system is implemented in a warehouse or on a vehicle, the elements of the system—a plurality of tags each attached to an item of fresh food, a tag reader writer, a host PC, and a temperature sensor—remain unchanged.” Pet. 28 (citing Ex. 1003 ¶ 80). Petitioner, however, explains that its proposed combination

also would include Bhuptani's description of how the DoD system associated a tag ID with a reader ID and sent the association information to a server for storage in a database to ensure that food can be tracked and monitored through the supply chain to verify that satisfactory conditions, like temperature, have been maintained throughout or, if not, so that any unsatisfactory conditions (like a temperature exceeding a threshold) are identified through raising alarms so that any harm caused by the unsatisfactory conditions can be mitigated.

Id. at 28–29 (citing Ex. 1003 ¶ 81). Petitioner explains that a person having ordinary skill in the art “would have implemented Bhuptani’s description of how the DoD system associated the tag ID with the reader ID and sent the information to a server for storage in a database.” *Id.* at 24 (citing Ex. 1003 ¶ 74). Petitioner argues “[k]eeping this information in a database would allow a user of the monitoring system to identify the location of the fresh food at any given time as well as ensure that a user of the system could recognize any deviations from desired environmental conditions of the food throughout the supply chain.” *Id.* Contrary to Patent Owner’s arguments and Dr. Madisetti’s testimony that the explanation in the Petition is deficient, we find that Petitioner provides detailed explanations identifying specific teachings in Bhuptani, such as Bhuptani’s description of the DoD system automatically associating a tag ID with a reader ID and sending the association information to a DOD server for storage in a database (Ex. 1008, 225), to support that a person having ordinary skill in the art would have combined with Hashimoto’s teachings.

We also are persuaded by Petitioner’s other arguments and Dr. Olivier’s supporting testimony. For instance, we are persuaded by Petitioner’s argument and Dr. Olivier’s testimony that in light of Bhuptani, a

person having ordinary skill in the art would have been “motivated to combine aspects of Hashimoto’s freezing warehouse-based system with Hashimoto’s vehicle-mounted system to ensure that the environmental conditions of food was maintained no matter the location of the food.” Pet. 26 (citing Ex. 1003 ¶ 76). Although Hashimoto describes embodiments in which plural means of transportation are used (*see, e.g.*, Ex. 1005, Fig. 13), Bhuptani describes applying its technology for “[s]upply chain integration” to create a “more *efficient* workflow and *error-free* process.” Ex. 1008, 42 (emphases added). Bhuptani also describes that RFID technology “is an *ideal* enabler to help track the movement of products through the links in the supply chain, inspect and analyze the data collected from RFID tags, act upon the data, and potentially add or associate more useful data to the tags that can be used at the next link in the chain.” *Id.* (emphasis added). Bhuptani describes that because of its system “DoD logistics operators can see the arrival and departure of shipments at any of” over 800 locations and “if there is a crucial requirement to locate a specific item at any of the nodes, the logistics operator can query the TAV [Total Asset Visibility] system to find all the locations where the item is located.” *Id.* at 225. Consistent with Petitioner’s arguments and Dr. Olivier’s testimony, Bhuptani describes that RFID technology “can be integrated with devices that sense and monitor various environmental conditions.” *Id.* at 34.

Also consistent with Petitioner’s arguments and Dr. Olivier’s testimony, Bhuptani provides further reasons for a person having ordinary skill in the art to look to Bhuptani. For instance, Bhuptani describes that it provides “real-life examples of RFID deployments” and “tips for making an

RFID deployment *successful*.” Ex. 1008, 19 (emphasis added). Furthermore, contrary to Patent Owner’s argument and Dr. Madisetti’s testimony regarding complexity, Bhuptani describes additional details including implementation of unique identifiers (UIDs), anti-collusion software, and the operation of Savi’s technology for tracking items in the Department of Defense (DoD) supply chain. *Id.* at 73, 170, 225–226. Thus, Bhuptani’s disclosure is consistent with its introduction that Bhuptani provides the details needed for a person having ordinary skill in the art to deploy its technology.

Furthermore, Petitioner provides detailed argument showing that a person having ordinary skill in the art would have had a reasonable expectation of success. *See, e.g.*, Pet. 26–27. Patent Owner does not dispute Petitioner’s showing in that regard.

After considering Patent Owner’s arguments and evidence, including the testimony of Dr. Madisetti, we agree with Petitioner’s contentions and we credit and afford significant weight to the testimony of Dr. Olivier because Petitioner’s contentions and Dr. Olivier’s testimony are consistent with the evidence of record. Further, we find Dr. Madisetti’s testimony is unsupported and contradicted by the evidence of record at least for the same reasons given with respect to Patent Owner’s arguments above.

After considering the contentions and the evidence of record, we are persuaded that Petitioner has articulated reasoning with a rational underpinning as to why one of ordinary skill in the art would have combined the teachings of Hashimoto and Bhuptani in the manner recited in claim 1. We also are persuaded Petitioner has shown a person having ordinary skill in

the art would have had a reasonable expectation of success. We determine that Petitioner's arguments and evidence are not undermined by Patent Owner's arguments and evidence.⁸

b) *Element 1[p]: “[a] method for tracking items, comprising”*

Relying on the testimony of Dr. Olivier, Petitioner contends that the combination of Hashimoto and Bhuptani teaches the preamble. Pet. 29 (citing Ex. 1003 ¶¶ 83–100). Petitioner provides an annotated version of Figure 6 of Hashimoto, which is reproduced below.

FIG.6

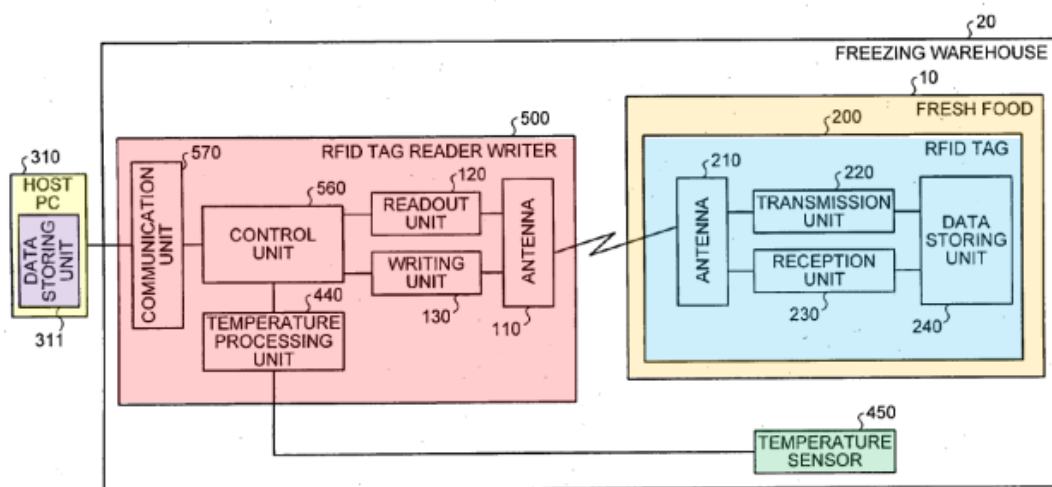


Figure 6, above, is an annotated version of a functional block diagram of a temperature monitoring system including RFID tag reader writer 500 with Petitioner's red highlighting, RFID tag 200 with Petitioner's blue highlighting attached to item of fresh food 10 with Petitioner's orange

⁸ Patent Owner has not maintained arguments made in its Preliminary Response disputing Petitioner's rationale to combine. Based on the complete record now before us, we maintain our analysis of those arguments in the Institution Decision. *See* Inst. Dec. § III.D.3.a.

highlighting, temperature sensor 450 with Petitioner’s green highlighting, host PC 310 with Petitioner’s yellow highlighting, and data storing unit 311 with Petitioner’s purple highlighting. Pet. 19, 29; Ex. 1003 ¶ 83; Ex. 1005 ¶¶ 66–68, Fig. 6.

As Petitioner explains (Pet. 30), Hashimoto describes that functional units carrying out the same roles as the respective units shown in other figures, specifically, Figures 1, 4, and 5, are denoted by identical reference numerals and the detailed explanation of the functional units with respect to those other figures applies to Figure 6. Ex. 1005 ¶¶ 56, 61, 66. Figure 1 of Hashimoto is reproduced in the summary of Hashimoto above and functional units in Figure 6 that carry out the same roles as respective units shown in Figure 1 are discussed in the summary of Hashimoto. *See* § II.E.1.

Petitioner contends that Hashimoto’s “system tracks, and is used to perform the steps of a method for tracking the environmental conditions—e.g., temperature—of the fresh food items during storage and transport.” Pet. 30 (citing Ex. 1005 ¶¶ 5, 11, 35, 121; Ex. 1003 ¶ 83). Petitioner also contends that the combination of Hashimoto and Bhuptani “tracks the position of the fresh food items between various points—e.g., in a warehouse, on a truck—in a supply chain, at least by associating measured environmental data with respective tag reader writers 500 that are associated with such points.” *Id.* (citing Ex. 1003 ¶ 83).

Patent Owner does not dispute Petitioner’s arguments or evidence regarding the preamble. Petitioner’s contentions are supported by the cited portions of the asserted art. After consideration of the contentions and the evidence of record, we determine that Petitioner has shown that the asserted

art teaches the preamble of claim 1, regardless of whether the preamble is limiting.

c) Element 1[a]

Element 1[a] is reproduced below.

[1[a1]] storing, in memory, first association data reflecting an association between an item tracking device and a beacon device when the item tracking device is within a predetermined range of the beacon device, [1[a2]] wherein the item tracking device corresponds to a first item, [1[a3]] and the beacon device corresponds to an area that contains multiple items including the first item.

Ex. 1001, 16:3–9.

Relying on the testimony of Dr. Olivier, Petitioner contends that the combination of Hashimoto and Bhuptani teaches element 1[a]. Pet. 31–36 (citing Ex. 1003 ¶¶ 84–93). Based on the explanation in the Petition with respect to element 1[a] (*id.*), in connection with our analysis of element 1[a], we consider Petitioner’s contentions set forth with respect to “Motivation to Combine” and “Modification of Hashimoto in view of Bhuptani” (Pet. 24–29), which are discussed above (*see* § II.E.3.a). Petitioner contends that element 1[a1] is taught based on Hashimoto’s teaching of storing data including the tag’s Unique Identifier (UID) in host PC 310 using the data structure in Figure 2 and Bhuptani’s teaching of collecting the tag’s ID number and automatically associating it with the ID of the reader. Pet. 31–34 (citing, e.g., Ex. 1005 ¶¶ 67–68, 71, 97, Fig. 2, Ex. 1008, 73, 225; Ex. 1003 ¶¶ 86–88, 91).

Consistent with Petitioner’s contentions, Hashimoto describes in the fourth embodiment “host PC 310 includes a data storing unit 311” and “[t]he

data storing unit 311 stores temperature of the fresh food 10 using the same data structure as the data storing unit 240 shown in FIG. 2.” Ex. 1005 ¶¶ 67–68. Figure 2 illustrates that data is associated with “TAG ADDRESS UID.” *Id.* at Fig. 2; *see also id.* ¶ 48 (describing that “data storing unit 240 is for storing information concerning the fresh food 10” including “a tag address (UID) for identifying the RFID tag 200”). Hashimoto describes “[i]n the first to the fourth embodiments, the temperature monitoring system using *one RFID tag reader writer* is explained.” *Id.* ¶ 71 (emphasis added).

Bhuptani’s teachings further support Petitioner’s arguments. Bhuptani describes “[a]s the RFID tagged shipments travel through the DoD supply chain, the RFID tag identification (ID) number is automatically collected by Savi’s^[9] RFID interrogators” and “[t]he RFID tag IDs are automatically associated with the interrogator’s ID and location and all three data elements are automatically routed to the appropriate DoD TAV server.” Ex. 1008, 225.

Petitioner provides further contentions for element 1[a1] to show that the association data is stored when the RFID tag is within a predetermined range of the RFID tag reader writer. Pet. 31, 34–35 (citing, e.g., Ex. 1005 ¶¶ 37, 45, Fig. 6; Ex. 1008, 66, 68; Ex. 1003 ¶¶ 89–90). Dr. Olivier testifies that a person having ordinary skill in the art would have known “that for the antenna on the tag reader writer and the antenna on the tag to communicate

⁹ Bhuptani describes that Savi Technology provides the DoD with RFID transponder tags, readers, and associated hardware and software. Ex. 1008, 223.

with one another, the tag reader writer and tag must be within a predetermined range from each other.” Ex. 1003 ¶ 90.

For element 1[a2], Petitioner relies on Hashimoto’s disclosure that “tag 200 is a radio IC tag, which stores information on *the fresh food 10 to which the RFID tag 200 is attached.*” Pet. 35 (quoting Ex. 1005 ¶ 44).

For element 1[a3], Petitioner contends Hashimoto’s “tag reader writer (‘the beacon device’) is installed in freezing warehouse 20 (‘an area that contains multiple items’)” and the area “contains multiple items of fresh food (‘the first item’).” *Id.* (citing Ex. 1003 ¶ 93). Petitioner also relies on Hashimoto’s disclosure that “[a]lthough only one piece of fresh food 10[] and one RFID tag 200 is shown ... there may be many different items of fresh foods each attached with an RFID tag.” *Id.* (quoting Ex. 1005 ¶ 35). Petitioner further points to Hashimoto’s embodiment of a truck carrying multiple items. *Id.* (citing Ex. 1005 ¶ 122, Fig. 13).

Patent Owner’s dispute regarding element 1[a] is premised on its proposed narrow claim interpretations, including Patent Owner’s narrow interpretation of “association data reflecting an association between [an/the at least one] item tracking device and [a/the at least one] beacon device.” Resp. 36–41; Sur-reply 15–16; *see also* PO Resp. Br. 6–7 (arguing that “Hashimoto does not disclose association data and there is no motivation to combine it with Bhuptani”). For instance, Patent Owner argues the Petition is deficient because “as properly construed” claim 1 “require[s] storing in memory ‘data identifying an item tracking device *and a corresponding beacon device.*’” Pet. 37. Petitioner argues that association data is not needed in the first through fourth embodiments of Hashimoto. *See, e.g.,*

Resp. 38. Patent Owner, however, assumes in its argument that its proposed construction is correct. For the reasons provided *supra* (see Section II.D.1), we decline to adopt Patent Owner’s proposed constructions.

Using the correct construction, Hashimoto describes that “host PC 310 includes a data storing unit 311” and “[t]he data storing unit 311 stores temperature of the fresh food 10 using the same data structure as the data storing unit 240 shown in FIG. 2.” Ex. 1005 ¶¶ 67–68. Figure 6 is reproduced below.

FIG.6

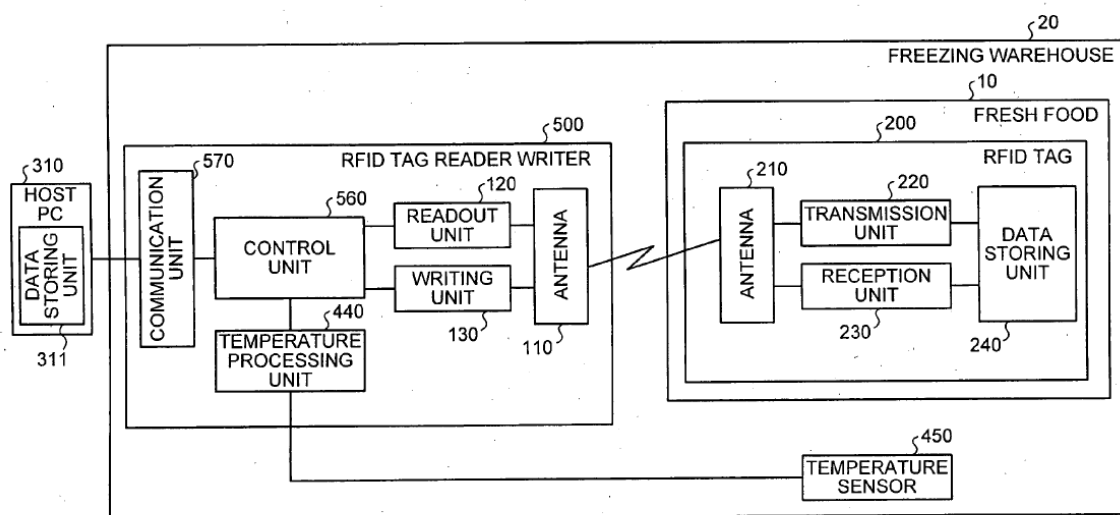


Figure 6 of Hashimoto, above, illustrates a functional block diagram of a system structure of a temperature monitoring system in freezing warehouse 20 having host PC 310 connected to RFID tag reader writer 500, which communicates with RFID tag 200 attached to fresh food 10. Ex. 1005 ¶ 66, Fig. 6. Figure 6 illustrates host PC 310 communicating with communication unit 570 of RFID tag reader writer 500 (*id.* at Fig. 6), which Petitioner relies on for teaching the beacon. Pet. 31. Figure 2 illustrates storing a “TAG

ADDRESS UID.” Ex. 1005, Fig. 2; *see also id.* ¶ 48 (describing that “data storing unit 240 is for storing information concerning the fresh food 10” and storing “a tag address (UID) for identifying the RFID tag 200”).

Hashimoto describes that Figure 6 “is a functional block diagram of a system structure of the temperature monitoring system according to the fourth embodiment.” *Id.* ¶ 66. Hashimoto describes “[i]n the first to the fourth embodiments, the temperature monitoring system using *one RFID tag reader writer* is explained.” *Id.* ¶ 71 (emphasis added). Figure 6 of Hashimoto describes that the host PC “is connected to the RFID tag reader writer by a network.” *Id.* ¶ 62. Figure 6, thus, illustrates a single host PC 310 connected to one RFID tag reader writer 500 via a network that interfaces with communication unit 570. *Id.* at Fig. 6. The association data is stored when the RFID tag is within a predetermined range of the RFID tag reader writer. Ex. 1005 ¶¶ 37 (describing data transmission by antenna 110), 45 (describing data transmission by antenna 210), Fig. 6 (illustrating antenna 210 in RFID tag 200); Ex. 1008, 66 (describing the “reach” of the “field” of an RFID tag when activated by a reader), 68 (describing frequency ranges used in RFID systems). Host PC 310 stores identifying information for RFID tags within the range of just one RFID tag reader writer 500, so those stored TAG ADDRESS (UID)s are association data because they reflect an association between the RFID tags within range of the one beacon device. We, therefore, find that the storing of TAG ADDRESS UIDs by host PC 310 connected to RFID tag reader writer 500 teaches element 1[a]. Ex. 1005 ¶¶ 48, 67–68, Figs. 2, 6.

Patent Owner also argues that element 1[a] is not taught even under the broader construction because “the surrounding claim language requires that the claimed associations identify correspondences in data.” PO Open. Br. 5. Patent Owner then makes arguments similar to those made with respect to claim construction (*id.* at 5–7), which are not persuasive for the reasons given above. *See* § II.D.1. For instance, claim 1 lacks of any recitation of “identify” or any similar term in claim 1.

With respect to a supply chain environment having more than one tag reader writer, we find that the combination of Hashimoto and Bhuptani teaches element 1[a] using both the correct construction and using Patent Owner’s proposed constructions. In particular, Bhuptani describes “[a]s the RFID tagged shipments travel through the DoD supply chain, the *RFID tag identification (ID) number* is automatically collected by Savi’s^[10] RFID interrogators” and “[t]he RFID tag IDs are automatically *associated with the interrogator’s ID* and location and all three data elements are automatically routed to the appropriate *DoD TAV server*.” Ex. 1008, 225 (emphases added).

As discussed above, Patent Owner argues “an ‘association’ reflects ‘an identification of a correspondence in data.’” PO Open. Br. 1–2 (citing Resp. 26, 30–33, 49–52; Sur-reply 11–14, 21–22). Patent Owner’s argues the larger phrase, that is “‘association data reflecting an association between [an] item tracking device and [a] beacon device’ (claims 1, 15, 25) means

¹⁰ Bhuptani describes that Savi Technology provides the DoD with RFID transponder tags, readers, and associated hardware and software. Ex. 1008, 223.

‘data identifying [an] item tracking device and [a] corresponding beacon device.’” *Id.* In the quote above, Bhuptani describes storing both the beacon identification number (interrogator’s ID) and the tracking device number (RFID tag identification (ID) in the DoD TAV server. Ex. 1008, 225.

Bhuptani, therefore, teaches “an identification of a correspondence in data” and “data identifying [an] item tracking device and [a] corresponding beacon device,” which are Patent Owner’s proposed constructions. Thus, even if we were to adopt Patent Owner’s proposed constructions, the combination of Hashimoto and Bhuptani teaches element 1[a] based on those constructions, that is, Patent Owner’s construction for “association” and Patent Owner’s construction for “association data reflecting an association between [an] item tracking device and [a] beacon device.”¹¹ Patent Owner does not argue that Bhuptani is deficient but, instead, relies on its arguments that a person having ordinary skill in the art would not have made the proposed combination, which we find do not undermine Petitioner’s showing for the reasons given above. *See* § II.E.3.a.

Dr. Madisetti’s testimony (*see, e.g.*, Ex. 2201 ¶¶ 76–90) also is premised on Patent Owner’s narrow claim constructions and is not

¹¹ Although Patent Owner’s constructions are too narrow and we decline to adopt them (*see* Section II.D.1), for completeness, we provide analysis of Petitioner’s alternative arguments showing that the combination of Hashimoto and Bhuptani meet the disputed limitation even using Patent Owner’s constructions. Reply 14–15; *see also* Pet. 33–34 (arguing Bhuptani’s additional disclosures also teach element 1[a]). We agree with Petitioner that Patent Owner “does not dispute that, under its construction [of the larger phrase], Hashimoto-Bhuptani disclose the claimed storing association data.” Reply 14.

consistent with the evidence of record for the same reasons given herein. Dr. Madisetti's testimony also is based on Hashimoto alone. With respect to Bhuptani, Dr. Madisetti relies on his testimony that a person having ordinary skill in the art would not have made Petitioner's proposed combination. *See, e.g.,* Ex. 2201 ¶¶ 76–97.

In summary, Petitioner's contentions for element 1[a] are supported by the cited portions of the asserted art. Also, we determine that Petitioner has articulated reasoning with a rational underpinning as to why one of ordinary skill in the art would have combined the teachings of Hashimoto and Bhuptani in the manner recited in claim 1. We also find that Petitioner has established a person having ordinary skill in the art would have had a reasonable expectation of success. We further determine that Patent Owner's arguments do not undermine Petitioner's showing. After consideration of the contentions and the evidence of record, we determine that Petitioner has shown that the combination of Hashimoto and Bhuptani teaches element 1[a].

d) Element 1[b]: “detecting sensor data about an environment of the beacon device”

Relying on the testimony of Dr. Olivier, Petitioner contends that Hashimoto teaches element 1[b]. Pet. 36 (citing Ex. 1003 ¶ 94). Petitioner relies on Hashimoto's disclosure that its “temperature sensor ‘is arranged near the fresh food’ and ‘measures temperature in the freezing warehouse.’” *Id.* (quoting Ex. 1005 ¶ 59).

Patent Owner does not dispute Petitioner's arguments or evidence regarding element 1[b]. Petitioner's contentions are supported by the cited

portions of the asserted art. After considering the contentions and the evidence of record, we determine that Petitioner has shown that the asserted art teaches the element 1[b].

e) Element 1[c]: “associating the sensor data with a group of items, of the multiple items, that are within the predetermined range of the beacon device; and”

Relying on the testimony of Dr. Olivier, Petitioner contends that the combination of Hashimoto and Bhuptani teaches element 1[c]. Pet. 36–39 (citing Ex. 1003 ¶¶ 95–98). Petitioner relies on Hashimoto’s freezing warehouse-based system and vehicle-mounted system and cites to “Section IX.A.3 above,” which is the portion of the Petition entitled “Motivation to Combine.” Pet. 36–38. Based on the explanation in the Petition with respect to element 1[c] (*id.*), we consider Petitioner’s contentions set forth with respect to “Motivation to Combine” and “Modification of Hashimoto in view of Bhuptani.” Pet. 24–29.

Dr. Olivier testifies with respect to the freezing warehouse that a person having ordinary skill in the art “would have understood that the host PC associates the temperature measured by the one tag reader writer with groups of items within communications range of the tag reader writer when it instructs the tag reader writer to write the temperature to the tag.” Ex. 1003 ¶ 96. Dr. Olivier testifies with respect to transporting food that a person having ordinary skill in the art “would have been motivated to associate temperature data with multiple items within range of a tag reader writer on a vehicle to monitor the temperature of fresh food, like tuna fish, when the food is transported to and from the freezing warehouse.” *Id.* ¶ 98.

Patent Owner's dispute regarding element 1[c] is premised on an implicit, narrow interpretation of "associating the sensor data with a group of items." Resp. 49–52; Sur-reply 21–22, PO Resp. Br. 7. For the reasons provided *supra* (see Section II.D.1), we determine that "associating" means "causing a correspondence." We decline to adopt Patent Owner's implicit, narrow interpretation for the reasons given above. See Section II.D.1. Dr. Madisetti's testimony is substantially the same as Patent Owner's argument and is not consistent with the evidence of record for the same reasons given herein.

Patent Owner argues that element 1[c] is not taught even under the broader construction because "the surrounding claim language requires that the claimed associations identify correspondences in data." PO Open. Br. 5. Patent Owner then makes the same arguments it made with respect to claim construction (*id.* at 5–7), which are not persuasive for the reasons given above. See § II.D.1. Dr. Madisetti's testimony (see, e.g., Ex. 2201 ¶¶ 108–117) also is premised on Patent Owner's narrow claim constructions and is not consistent with the evidence of record for the same reasons given herein. Dr. Madisetti's testimony also is based on Hashimoto alone as, with respect to Bhuptani, Dr. Madisetti relies on his testimony that a person having ordinary skill in the art would not have made Petitioner's proposed combination. See, e.g., Ex. 2201 ¶¶ 91–97, 108–117.

Petitioner's arguments and Dr. Olivier's testimony are consistent with the evidence of record. For instance, Hashimoto describes that "an RFID tag 200 [] is attached to the fresh food 10." Ex. 1005 ¶ 35. Hashimoto describes "there may be many different items of fresh foods *each attached with an*

RFID tag.” Id. (emphasis added). Thus, each item of fresh food has an attached RFID tag. Hashimoto describes that the RFID tag reader writer “measures temperature using temperature sensor 450.” *Id.* ¶ 57. Hashimoto describes that the host PC “is a computer that receives temperature measured by the RFID tag reader writer” and “instructs” the RFID tag reader writer “to write the temperature in the RFID tag 200.” *Id.* ¶ 62.

Figure 2 of Hashimoto is reproduced below.

FIG.2

TAG ADDRESS(UID)	
MANUFACTURING TIME INFORMATION	
MANUFACTURING PLACE INFORMATION	
STORING PLACE INFORMATION	
WAREHOUSING TIME INFORMATION	
PRESENT NUMBER OF PIECES OF TEMPERATURE INFORMATION	
MEASUREMENT TIME INFORMATION ₁	TEMPERATURE INFORMATION ₁
MEASUREMENT TIME INFORMATION ₂	TEMPERATURE INFORMATION ₂
⋮	⋮
MEASUREMENT TIME INFORMATION _n	TEMPERATURE INFORMATION _n

TEMPERATURE INFORMATION STORING STARTING ADDRESS →

Figure 2 of Hashimoto, above, illustrates a data structure of a data storing unit 240, which includes among other things “a tag address (UID) for identifying RFID tag 200” and “a present number of pieces of temperature information” presently stored with “measurement time information.” *Id.*

¶¶ 15, 48. As can be seen from Figure 2 of Hashimoto, sensor data, that is measured temperature, is stored associated with “TAG ADDRESS(UID),” which identifies RFID tag 200 and *each* item of fresh food has an RFID tag 200 attached. *Id.* ¶¶ 35, 48, Fig. 2.

We also find that Petitioner’s arguments and Dr. Olivier’s testimony are consistent with and supported by Hashimoto’s disclosures relating to the on-vehicle vibration monitoring system, in which vibration information captured by vibration sensors is recorded in an information storing unit and an RFID tag attached to each item of food, for example, a melon, being transported. *Id.* ¶¶ 122–128, 130, 132, Figs. 13, 15. Figure 13 is reproduced below.

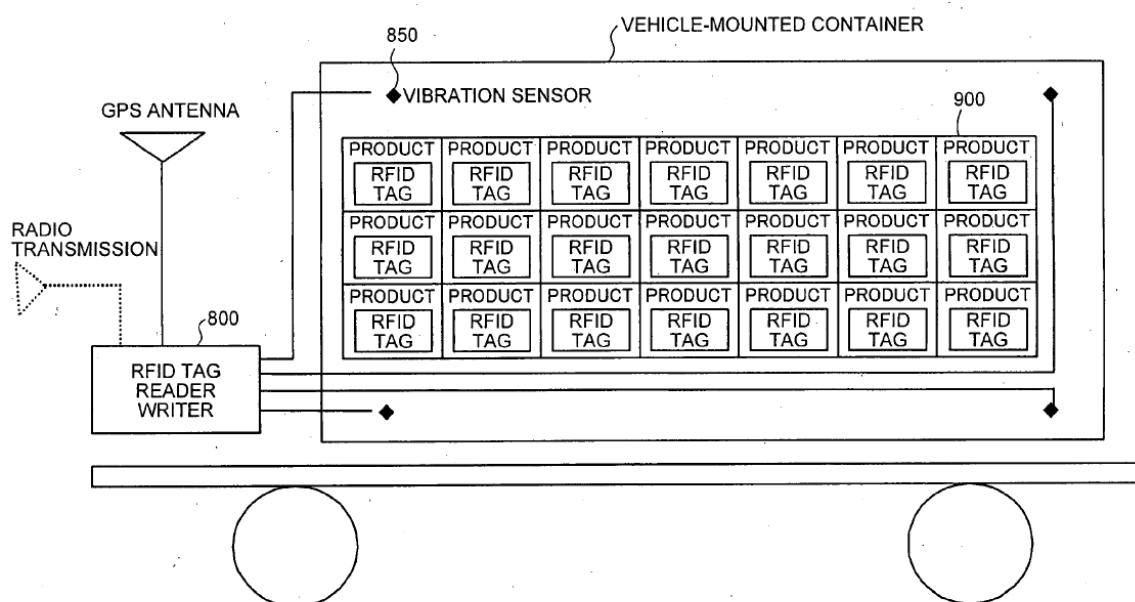


Figure 13 of Hashimoto, above, is a diagram illustrating an on-vehicle vibration monitoring system, having vibration sensors 850 arranged in four places in a vehicle-mounted container and RFID tag reader/writer that 800 that receives information from vibration sensors 850. *Id.* ¶¶ 26, 126, Fig. 13. Hashimoto describes that an RFID tag is “attached to a melon” and the on-vehicle vibration monitoring system “monitors vibration amounts of melons in plural boxes attached with RFID tags” that are “transported by a vehicle-mounted container.” *Id.* ¶ 130, Figs. 13, 15.

Although element 1[c] is taught by Hashimoto, we find that Bhuptani provides further support for Petitioner’s contentions. For instance, Bhuptani describes that its system is used “track and locate materiel and supplies moving through the vast, complex, and multi-national end to end supply chain.” Ex. 1008, 225. Bhuptani describes using “linear and two-dimensional barcodes, optical memory cards, active RFID tags, and GPS systems to track” shipments of “*pallets*” and “*containers*” through “over 800 checkpoints in more than 45 countries.” *Id.* Bhuptani describes “[a]s set tracking begins with the aggregation of *item data to case contents, to pallet configuration to visibility inside the shipping container to ship units in a truck, plane or ship.*” *Id.* Thus, Bhuptani describes tracking item data. Bhuptani further describes that “RFID technology can be integrated with devices that sense and monitor various environmental conditions.” *Id.* at 62. As discussed above, we find that Petitioner has articulated reasoning with a rational underpinning as to why one of ordinary skill in the art would have made the proposed combination, which is not undermined by Patent Owner’s arguments. *See* § II.E.3.a.

In summary, Petitioner's contentions for element 1[c] are supported by the cited portions of the asserted art. Also, we determine that Petitioner has articulated reasoning with a rational underpinning as to why one of ordinary skill in the art would have combined the teachings of Hashimoto and Bhuptani in the manner recited in claim 1. We also find that Petitioner has established a person having ordinary skill in the art would have had a reasonable expectation of success. We further determine that Patent Owner's arguments do not undermine Petitioner's showing. After consideration of the contentions and the evidence of record, we determine that Petitioner has shown that the combination of Hashimoto and Bhuptani teaches element 1[c].

f) Element 1[d]: "periodically transmitting the associated sensor data from the beacon device to a database."

Relying on the testimony of Dr. Olivier, Petitioner contends that Hashimoto teaches element 1[d]. Pet. 39–41 (citing Ex. 1003 ¶¶ 99–100). Petitioner relies on Hashimoto's disclosure (Pet. 39) that "[t]he temperature processing unit 140 periodically measures temperature in the freezing warehouse 20 using the temperature sensor 150 and instructs the writing unit 130 to write the measured temperature in the RFID tag 200." Ex. 1005 ¶ 41. Petitioner also relies on Hashimoto's disclosure of transferring measured temperature to the host PC and the host PC storing temperature data. Pet. 39 (citing Ex. 1005 ¶¶ 41, 60, 63, 67–68, Fig. 2; Ex. 1003 ¶¶ 99–100).

Patent Owner does not dispute Petitioner's arguments or evidence regarding element 1[d]. Petitioner's contentions are supported by the cited portions of the asserted art. After considering the contentions and the

evidence of record, we determine that Petitioner has shown that the asserted art teaches element 1[d].

g) Conclusion

After considering the contentions and the evidence of record in the complete record now before us, we determine that Petitioner has shown that the combination of Hashimoto and Bhuptani teaches all recitations in claim 1. Also, we are persuaded that Petitioner has articulated reasoning with a rational underpinning as to why one of ordinary skill in the art would have combined the teachings of Hashimoto and Bhuptani in the manner recited in claim 1. We also are persuaded that Petitioner has demonstrated that such person would have had a reasonable expectation of success.

Accordingly, based on the complete record now before us, we conclude that Petitioner has established by a preponderance of the evidence that claim 1 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Hashimoto and Bhuptani.

4. Independent Claim 15

The disputes between the parties regarding claim 15 center on the recitation “memory that stores first association data reflecting an association between the at least one item tracking device and the at least one beacon device,” which Petitioner designates element 15[b3] and “a processor that associates the sensor data with a group of items, of the multiple items, which are within the predetermined range of the beacon device,” which Petitioner designates and element 15[b4]. Pet. 57–58. Claim 1 includes similar recitations, which are elements 1[a] and 1[c], respectively. For the reasons given above (*see* II.E.3.c), we find that Hashimoto alone and the

combination of Hashimoto and Bhuptani teaches element 1[a] using the correct construction and the combination of Hashimoto and Bhuptani teaches element 1[a] using all Patent Owner’s proposed constructions. For the reasons given above (*see* II.E.3.e), we find that Hashimoto teaches element 1[c] using the correct construction and for the reasons discussed with respect to Petitioner’s rationale to combine (*see* II.E.3.a), the combination of Hashimoto and Bhuptani provides further teachings relating to element 1[c].

With respect to claim 1, Petitioner relies Hashimoto’s data storing unit 311 in host PC 310 and Bhuptani’s description of storing the data in the DoD TAV server. Pet. 31–35. Claim 15 recites that “at least one beacon device” comprises the “memory” that “stores first association data reflecting an association between the at least one item tracking device and the at least one beacon device.” Claim 15 also recites that “at least one beacon device” comprises the “processor that associates the sensor data with a group of items.” Thus, claim 15 differs from claim 1 in that claim 15 requires that a memory and processor in a beacon device perform the storing and associating.

In the Petition, for element 15[b3], Petitioner argues that the tag reader writer and host PC store association data and the control unit in the tag reader writer performs exchange of data to cause the tag reader writer to function. Pet. 57–58 (citing Ex. 1005 ¶¶ 43, 67, 68, Figs. 2, 6; Ex. 1003 ¶¶ 133–134). Petitioner also argues a “POSITA would have understood that the control unit has memory because it exchanges data.” *Id.* at 58 (citing

Ex. 1003 ¶ 134). The Petition also includes the statement “*See* Limitation 1[a1].” *Id.*

For element 15[b4], Petitioner argues “Hashimoto describes a control unit in the tag reader writer that controls the tag reader writer” and a “POSITA would have understood that the control unit is a processor that includes instructions to cause the tag reader writer to function.” *Id.* (citing Ex. 1005 ¶ 43; Ex. 1003 ¶ 135). Petitioner also argues the “tag reader writer (‘beacon device’) associates the sensor data with a group of fresh food within range of the tag reader writer.” *Id.* (citing Ex. 1005 ¶¶ 67–68, Figs. 2, 6; Ex. 1003 ¶ 136). The Petition also includes the statement “*See* Limitation 1[c].” *Id.*

Patent Owner disputes Petitioner’s showing for element 15[b3]. Resp. 45–48. In particular, Patent Owner argues that Hashimoto does not disclose that its data structure is stored on the tag reader writer and Petitioner does not cite evidence supporting its position. *Id.* Patent Owner also argues that Petitioner “does not argue that it would have been obvious to store the data structure of Fig. 2 on Hashimoto’s tag reader writer instead of the tag or host PC, whether considering Hashimoto alone or in view of Bhuptani” and Petitioner cannot raise such arguments in its Reply. *Id.* at 48–49.

Patent Owner disputes Petitioner’s showing for element 15[b4]. Resp. 52–53. In particular, Patent Owner argues that Petitioner “never points to any ‘processor’ on the ‘tag reader writer’ that ‘associates the sensor data with a group of items,’” as claimed.” *Id.* at 52.

In the Reply, for element 15[b3], Petitioner argues that Hashimoto’s tag reader writer necessarily includes memory that stores association data

and must include a processor that associates sensor data with a group of items. Reply 16, 20. Petitioner also argues the Petition does not lack evidentiary support because “Petitioner identified the control unit in the tag reader writer as having memory because it exchanges data.” *Id.* at 16, 18 (citing, e.g., Ex. 1005 ¶ 43; Ex. 1003 ¶ 134; Pet. 57–58). Petitioner argues “Hashimoto’s paragraph [0043] describes that exchange of data as being between the functional units described in paragraphs [0036–[0042].” *Id.* at 18 (citing, e.g., Ex. 1005 ¶¶ 36–44, 63, Fig. 6).

Petitioner also argues in its Reply the following:

Further, as explained in the Petition and as also confirmed by Dr. Madisetti’s testimony on the point, in the Hashimoto-Bhuptani system, the tag reader writer collects the ID numbers of the tags within range of the tag reader writer. EX1008, 225/292; Pet., 33. The tag reader writer then automatically associates the tag’s ID number with the reader’s ID number and then routes the information to a server. EX1008, 225/292; Pet., 33. A POSITA would have understood that when the tag reader writer automatically associates the tag’s ID number with the reader’s ID number, it must store that association, at least temporarily, before routing the information to a server. EX1003, ¶¶ 86, 91, 134.

Reply 18–19.

For element 15[b4], in its Reply, Petitioner points to its “citation to Hashimoto’s control unit” and argues that Hashimoto describes “that ‘control unit 106 is a processing unit that controls the entire RFID tag reader writer.’” *Id.* at 20 n.6. Petitioner also refers to its argument in the Petition that “[a] POSITA would have understood that the control unit is a processor than includes instructions to cause the tag reader writer to function.” *Id.* at 21 (citing Pet. 58).

In the Sur-reply, for element 15[b3], Patent Owner argues Petitioner “shifts arguments to assert that Hashimoto’s reader writer necessarily stores tag identifiers because it transmits them to a PC, which allegedly teaches storing association data on the beacon device” and the “Board should not consider [Petitioner’s] untimely arguments.” Sur-reply 19–20 (citing Reply 16–19). For element 15[b4], Patent Owner states it “agrees that Hashimoto’s ‘control unit’ is a processor.” Sur-reply 22. Patent Owner maintains its dispute based on its proposed claim interpretation. *Id.* at 22–23.

For the reasons provided *supra* (see Section II.D.1), we determine that “an association” means “a correspondence.” Also, as we noted, the parties agree that “associating” and “associates” are verb forms of “association.” Pet. Open. Br. 1; PO Open. Br. 1.

We start with element 15[b3]. We agree with Petitioner’s argument and credit and give significant weight to the testimony of Dr. Olivier that the tag reader writer stores association data because “the control unit in the tag reader writer performs exchange of data to cause the tag reader writer to function.” Pet. 57–58; Ex. 1003 ¶¶ 133–134. Dr. Olivier testifies as follows: “Additionally, the tag reader writer includes a control unit. *Id.*, [0043]. The control unit performs exchange of data to cause the tag reader writer to function. *Id.* A POSITA would know that the control unit has memory because it exchanges data. See Limitation 1[a1]; Section VIII.A.3.b.” Ex. 1003 ¶ 134. We find Dr. Olivier’s testimony consistent with the evidence of record and give it significant weight.

Figure 6 of Hashimoto is reproduced below.

FIG.6

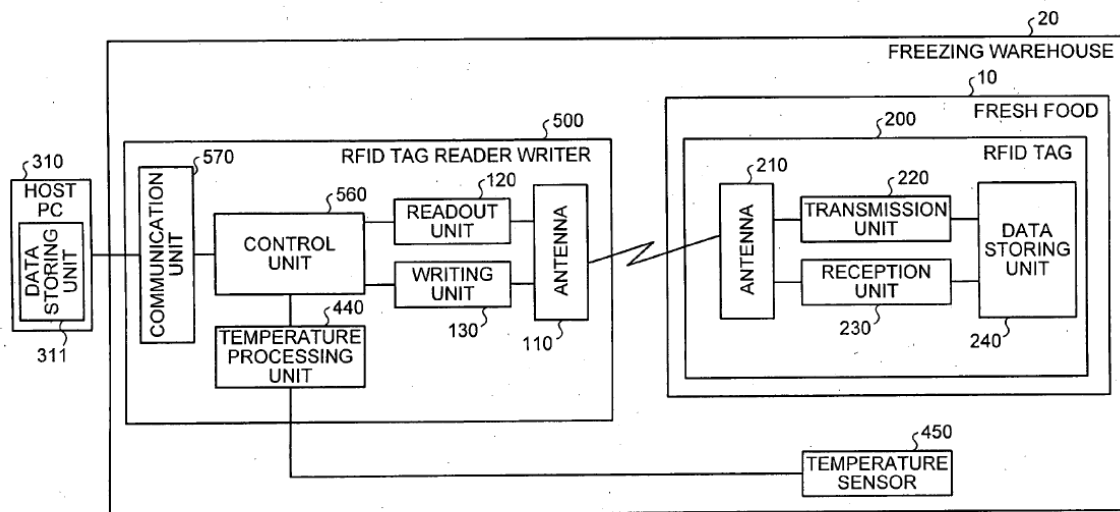


Figure 6 of Hashimoto illustrates a functional block diagram of a system structure of a temperature monitoring system in freezing warehouse 20 having host PC 310 connected to RFID tag reader writer 500, which communicates with RFID tag 200 attached to fresh food 10. Ex. 1005 ¶ 66, Fig. 6. Figure 6 illustrates RFID tag reader writer having control unit 560, which is connected to host PC 310 via communication unit 570. *Id.* at Fig. 6. Figure 6 also illustrates that control unit 560 is connected to RFID tag 200 via antenna 110 in RFID tag reader writer 500 and antenna 210 in RFID tag 200. *Id.* Hashimoto describes the control unit as “a processing unit that controls the entire RFID tag reader writer” and the control unit “performs exchange and the like of data among the respective functional units.” *Id.* ¶ 43, ¶ 63 (describing “control unit 560 that controls the entire RFID tag reader writer 500,” receives data from the host PC, and transmits data to the RFID tag).

As we discussed with respect to claim 1 (*see* § II.E.3.c), using the correct construction of “association,” in an environment having only one RFID tag reader writer 500, RFID tag reader writer 500 may not have an identifier. We, therefore, find that receiving the TAG ADDRESS UID from host PC 310 communicating with communication unit 570 of RFID tag reader writer 500 and transmitting that data for writing to RFID tag 200 via the writing unit teaches element 15[b3]. Ex. 1005 ¶¶ 48, 62–63, 67–68, Figs. 2, 6. We further find that Hashimoto teaches storing temporarily that data. Hashimoto describes that “[t]he writing unit is a processing unit that *transmits a data writing request to the RFID tag 200 together with the data to be written*” and that “the writing unit 130 requests writing of data *designating a tag address, a storage address of data, and data length.*” *Id.* ¶ 39 (emphases added).

With respect to a supply chain environment having more than one tag reader writer, as we discussed with respect to claim 1 (*see* § II.E.3.c), we find that the combination of Hashimoto and Bhuptani teaches element 1[a] using both the correct construction and even using Patent Owner’s proposed constructions. In particular, Bhuptani describes “[a]s the RFID tagged shipments travel through the DoD supply chain, the RFID tag identification (ID) number is automatically collected by Savi’s[] RFID interrogators” and “[t]he RFID tag IDs are automatically associated with the interrogator’s ID and location and all three data elements are automatically routed to the appropriate DoD TAV server.” Ex. 1008, 225 (emphases added). Dr. Olivier testifies that a person having ordinary skill in the art “would have implemented Bhuptani’s description of how the DoD system *associated the*

tag ID with the reader ID and sent the information to a server for storage in a database.” Ex. 1003 ¶ 74 (emphasis added), ¶ 81 (testifying that the proposed combination would have included “Bhuptani’s description of how the DoD system associated a tag ID with a reader ID and sent *the association information* to a server” (emphasis added)). We find that the combination of Hashimoto and Bhuptani teaches element 15[b3] using both the correct construction and even using Patent Owner’s proposed constructions.

We turn to Patent Owner’s arguments disputing Petitioner’s showing for element 15[b3]. Resp. 45–48. We start with Patent Owner’s argument that Hashimoto does not disclose that its data structure is stored on the tag reader writer and Petitioner does not cite evidence supporting its position. *Id.* (citing Ex. 2201 ¶¶ 98–107).

Dr. Olivier testifies as follows: “Additionally, the tag reader writer includes a control unit. *Id.*, [0043]. The control unit performs exchange of data to cause the tag reader writer to function. *Id.* A POSITA would know that the control unit has memory because it exchanges data. *See* Limitation 1[a1]; Section VIII.A.3.b.” Ex. 1003 ¶ 134. We find Dr. Olivier’s testimony consistent with the evidence of record and give it significant weight over the weight of the testimony of Dr. Madisetti.

Dr. Madisetti testifies that Hashimoto does not teach storing the data structure of Figure 2 on the tag reader writer and that Dr. Olivier’s testimony lacks evidentiary support (Ex. 2201 ¶¶ 98–107), but Hashimoto need not store the entirety of Figure 2 on the tag reader writer to meet element 15[b3] using the correct construction. We find that Dr. Olivier’s testimony is

consistent with the evidence of record. Hashimoto describes RFID tag reader writer 500 receiving the TAG ADDRESS UID from host PC 310 communicating with communication unit 570 of RFID tag reader writer 500 and RFID tag reader writer 500 transmitting that data (that is the TAG ADDRESS UID) for writing to RFID tag 200 via the writing unit. Ex. 1005 ¶¶ 48, 62–63, 67–68, Figs. 2, 6. Hashimoto describes that “[t]he writing unit is a processing unit that transmits *a data writing request* to the RFID tag 200 *together with the data to be written*” and that “the writing unit 130 requests writing of data *designating a tag address, a storage address of data, and data length.*” *Id.* ¶ 39 (emphases added). In our view, Hashimoto’s teachings provide the needed evidentiary support. *See Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1356, 1361 n.3 (Fed. Cir. 2008) (“What a prior art reference discloses or teaches is determined from the perspective of one of ordinary skill in the art.”); *In re Hedges*, 783 F.2d 1038, 1041 (Fed. Cir. 1986) (noting that when evaluating claims for obviousness, “the prior art as a whole must be considered”).

Also, contrary to Patent Owner’s argument and Dr. Madisetti’s testimony that Hashimoto and Bhuptani do not disclose or render this element obvious, Bhuptani describes “[a]s the RFID tagged shipments travel through the DoD supply chain, the RFID tag identification (ID) number is automatically collected by Savi’s[] RFID interrogators” and “[t]he RFID tag IDs are automatically associated with the interrogator’s ID and location and all three data elements are automatically routed to the appropriate DoD TAV server.” Ex. 1008, 225 (emphases added). Patent Owner’s argument and Dr. Madisetti’s testimony are based solely on the Petition lacking a

rationale to combine the teachings of Hashimoto and Bhuptani (*see, e.g.*, Tr. 35:3–36:18; Ex. 2201 ¶¶ 98–107), which we do not find consistent with the argument and evidence based on the complete record now before us for the reasons given with respect to claim 1. *See* § II.E.3.a. Indeed, Patent Owner’s counsel stated during the hearing that “page 225 [of Bhuptani] discloses that the interrogator associates reader/writer and a tag.” Tr. 35:6–7.¹²

We turn to Patent Owner’s argument that Petitioner “does not argue that it would have been obvious to store the data structure of Fig. 2 on Hashimoto’s tag reader writer instead of the tag or host PC, whether considering Hashimoto alone or in view of Bhuptani” and Petitioner cannot raise such arguments in its Reply. Resp. 48–49; Ex. 2201 ¶ 106. We also consider Patent Owner’s argument in the Sur-reply that Petitioner “shifts arguments to assert that Hashimoto’s reader writer necessarily stores tag identifiers because it transmits them to a PC, which allegedly teaches storing association data on the beacon device” and the “Board should not consider [Petitioner’s] untimely arguments.” Sur-reply 19–20 (citing Reply, 16–19).

We determine Patent Owner’s arguments do not undermine Petitioner’s showing. For instance, the Petition includes the statements “*See* Limitation 1[a1]” and “*See* Limitation 1[c].” Pet. 58. Petitioner’s reference to claim 1 and its arguments and evidence showing that the combination of Hashimoto and Bhuptani teaches similar recitations in claim 1 contradicts

¹² We find that inherency arguments made by Petitioner are not needed for our conclusions herein. We find that the asserted prior art teaches the disputed recitations. We, however, agree with Petitioner that exchanging data between a PC and a tag requires memory in the tag reader writer. *See, e.g.*, Reply 16–18.

Patent Owner's arguments. We find Petitioner shows that claim 15 is taught by Hashimoto and Bhuptani in part by referring to very similar limitations in claim 1 and accounting for all differences between claims 1 and 15.

Also, we determine Petitioner's responsive argument and evidence are not improper. *See* 37 C.F.R. § 42.23(b). We find the citations to evidence in Petitioner's Reply simply provide further details to support that Petitioner's argument in the Petition and Dr. Olivier's Declaration testimony are correct regarding the understanding of a person of ordinary skill in the art reading Hashimoto and Bhuptani as a whole. The Petition and Dr. Olivier's testimony in his Declaration (Ex. 1003) set forth the disclosures of Hashimoto and Bhuptani that Petitioner relies on in full and include a detailed element-by-element analysis identifying the portions of Hashimoto and Bhuptani that teach the elements of claims 1 and 15. Petitioner's Reply does no more than fairly and directly respond to Patent Owner's Response and Dr. Madisetti's testimony. *See* 37 C.F.R. § 42.23(b); *see also Belden Inc., v. Berk-Tek LLC*, 805 F.3d 1064, 1078–80 (Fed. Cir. 2015) (holding that the Board may rely on new evidence submitted with a reply because the evidence was legitimately responsive to patent owner's arguments and not needed for a prima facie case of obviousness).

We turn to the parties' arguments and evidence for element 15[b4]. We agree with Petitioner's argument and credit and give significant weight to the testimony of Dr. Olivier that "Hashimoto describes a control unit in the tag reader writer that controls the tag reader writer" and a "POSITA would have understood that the control unit is a processor that includes instructions to cause the tag reader writer to function." Pet. 58 (citing

Ex. 1005 ¶ 43; Ex. 1003 ¶ 135). As discussed above, Figure 6 illustrates RFID tag reader writer having control unit 560, which is connected to host PC 310 via communication unit 570. Ex. 1005, Fig. 6. Hashimoto describes the control unit as “a processing unit that controls the entire RFID tag reader writer” and the control unit “performs exchange and the like of data among the respective functional units.” *Id.* ¶ 43, ¶ 63 (describing “control unit 560 that controls the entire RFID tag reader writer 500,” receives data from the host PC, and transmits data to the RFID tag).

We turn to Patent Owner’s argument that Petitioner “never points to any ‘processor’ on the ‘tag reader writer’ that ‘associates the sensor data with a group of items,’ as claimed.” Resp. 52; Ex. 2201 ¶¶ 118–120. Patent Owner’s argument is contradicted by the express disclosure of Hashimoto. Indeed, Patent Owner states it “agrees that Hashimoto’s ‘control unit’ is a processor.” Sur-reply 22. Dr. Madisetti’s testimony (Ex. 2201 ¶¶ 118–120) is conclusory and not consistent with the evidence of record. We, therefore, give Dr. Madisetti’s testimony (*id.*) little or no weight. *See* 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”). With respect to Patent Owner’s dispute and Dr. Madisetti’s testimony based on Patent Owner’s proposed claim interpretation (Sur-reply 22–23; Ex. 2201 ¶ 119), we find that Patent Owner’s argument does not undermine Petitioner’s showing for the same reasons discussed with respect to claim 1. *See* § II.E.3.

With respect to remaining recitations in claim 15, Petitioner contends that claim 15 is similar to the method of claim 1 and relies upon a similar analysis and prior art teachings to show that claim 15 is unpatentable. Pet.

56–58. Patent Owner does not further argue claim 15 separately. *See generally* Resp. For the reasons given herein with respect to claim 15 and with respect to claim 1, we find that Patent Owner’s arguments and evidence do not undermine Petitioner’s showing. *See supra* Section II.E.3.

After consideration of the contentions and the evidence of record in the complete record now before us, we determine that Petitioner has shown that the combination of Hashimoto and Bhuptani teaches all recitations in claim 15. Also, we are persuaded that Petitioner has articulated reasoning with a rational underpinning as to why one of ordinary skill in the art would have combined the teachings of Hashimoto and Bhuptani in the manner recited in claim 15. We also are persuaded that Petitioner has demonstrated that such person would have had a reasonable expectation of success.

Accordingly, based on the complete record now before us, we conclude that Petitioner has established by a preponderance of the evidence that claim 15 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Hashimoto and Bhuptani.

5. *Independent Claim 25*

Claim 25 recites “[a] computer-readable medium containing instructions, which, when executed by a processor, cause the processor to perform a method for tracking items, the method comprising.” Ex. 1001, 18:15–17. Petitioner contends that claim 25 is substantially similar to the method of claim 1 and relies upon a substantially similar analysis to show that claim 25 is unpatentable. Pet. 61–64.

Patent Owner does not argue claim 25 separately. *See generally* Resp. For the reasons given with respect to claim 1, we find that Patent Owner’s

arguments and evidence do not undermine Petitioner's showing. *See supra* Section II.E.3.

After considering the contentions and the evidence in the complete record now before us, we determine that Petitioner has shown that the combination of Hashimoto and Bhuptani teaches all recitations in claim 25. Also, we are persuaded that Petitioner has articulated reasoning with a rational underpinning as to why one of ordinary skill in the art would have combined the teachings of Hashimoto and Bhuptani in the manner recited in the claim. We also are persuaded that Petitioner has demonstrated that such person would have had a reasonable expectation of success.

Accordingly, based on the complete record now before us, we conclude that Petitioner has established by a preponderance of the evidence that claim 25 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Hashimoto and Bhuptani.

6. *Dependent Claims 2 and 16*

Claim 2 depends directly from claim 1 and recites “associating the item tracking device with another beacon device if the item tracking device is within a predetermined range of said another beacon device.” Ex. 1001, 16:17–20. Claim 16, which depends directly from claim 15, includes a similar recitation, which is acknowledged by Dr. Madiseti (Ex. 2201 ¶ 127). For the reasons discussed with respect to claim 1, we find that the combination of Hashimoto and Bhuptani teaches “first association data reflecting an association between an item tracking device and a beacon device when the item tracking device is within a predetermined range of the beacon device.” *See supra* Section II.E.3.c.

Regarding performing the associating for “another beacon device” recited in claim 2, Petitioner argues that “Hashimoto describes that products are delivered to a destination using multiple transportation channels, such as air, rail, and truck” and that “Hashimoto-Bhuptani would include a tag reader writer on a vehicle of one transportation channel,” for communicating with tags on the vehicle. Pet. 41 (citing, e.g., Ex. 1005 ¶¶ 124, 10–131, Fig. 13). Petitioner argues “[a]dditionally, a POSITA would have understood from Bhuptani that a monitoring system could be deployed across the entire supply chain and would have been motivated to combine aspects of Hashimoto’s freezing warehouse-based system with Hashimoto’s vehicle-mounted system to ensure that the environmental conditions of food was maintained no matter the location of the food.” *Id.* at 42 (citing Ex. 1003 ¶¶ 101–102). Petitioner argues “a POSITA would have understood that when the vehicle mounted container is moved from, for example, an airplane to a truck, the tag reader writer of the truck will have to interrogate the tags using the anti-collision command to identify the tags within range.” *Id.* (citing Ex. 1003 ¶¶ 103–104). Petitioner argues “[i]n this way, Hashimoto’s tags on the vehicle-mounted container (‘item tracking device’) become associated with a second tag reader writer (‘another beacon device’) so that the tag can exchange information with the second tag reader writer.” *Id.* at 43 (citing Ex. 1003 ¶¶ 103–104).

Patent Owner argues that Hashimoto alone does not disclose the recitation in claim 2. Patent Owner relies on its arguments that a person having ordinary skill in the art would not have made the proposed combination of Hashimoto and Bhuptani. Resp. 53–55. Dr. Madiseti’s

testimony similarly argues Hashimoto's embodiment relating to tracking conditions on trucks is limited to a distributed approach that does not address Bhuptani's teachings or storing data in a central server. Ex. 2201 ¶¶ 121–126. As we discussed above with respect to claim 1 (*see* § II.E.3.a), we find that Patent Owner's arguments and Dr. Madisetti's testimony regarding reasoning to combine do not undermine Petitioner's showing.

In its Reply, Petitioner argues "PO's assertion that Hashimoto and Bhuptani fail to render obvious claims 2 and 16 relies on the same flawed logic as PO's assertions related to the independent claims—specifically that Hashimoto does not disclose storing association data and that a POSITA would not have been motivated to combine Hashimoto and Bhuptani." Reply 21. We agree that Patent Owner's arguments for claim 2 are the same as those for claim 1 and are not persuasive for the same reasons given above.

After considering the contentions and the evidence in the complete record now before us, we determine that Petitioner has shown that the combination of Hashimoto and Bhuptani teaches the further recitation in claim 2. For the reasons given, we are not persuaded that Patent Owner's arguments undermine Petitioner's showing. As discussed above, upon consideration of the parties' arguments and evidence, we are persuaded by Petitioner's showing for claim 1.

The parties each rely on the same contentions for claim 16. *See, e.g.*, Pet. 59; Resp. 55. Our analysis for claim 16 is the same as that for claim 2.

Accordingly, based on the complete record now before us, we conclude that Petitioner has established by a preponderance of the evidence

that claims 2 and 16 are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Hashimoto and Bhuptani.

7. *Dependent Claims 4, 5, 18, and 19*

Claim 4 depends directly from claim 1 and recites “wherein the transmitted sensor data triggers an alarm.” Ex. 1001, 16:25–26. Claim 5 depends from claim 4 and recites “wherein triggering the alarm comprises sending a notification to a tracking center in response to a predetermined condition.” *Id.* at 16:27–29. Claims 18 and 19, which depend directly or indirectly from claim 15, includes similar recitations. Dr. Madiseti acknowledges that claims 5 and 19 “recite similar subject matter.” Ex. 2201 ¶ 134. For claim 4, Petitioner argues that “Hashimoto describes setting a temperature threshold and triggering an alarm if the temperature exceeds the threshold.” Pet. 44 (citing Ex. 1005 ¶¶ 83–86, Fig. 9); Ex. 1003 ¶ 106).

For claim 5, Petitioner argues the following:

“[A] threshold temperature is set in an RFID tag in advance as a threshold value.” EX1005, [0084]. The threshold temperature (“predetermined condition”) is either a maximum temperature and/or a minimum temperature. *Id.*, [0088], FIG. 10. The tag reader writer reads the threshold temperature from the tag and compares the threshold temperature with the temperature from the sensor. *Id.*, [0085]. When the measured temperature exceeds the threshold temperature, the temperature is written in the tag as an alarm. *Id.*, [0083], [0086]. In addition to writing an alarm to the tag, the result of the comparison “may be notified to the host PC” or “the host PC may be caused to immediately recognize occurrence of abnormality in fresh food attached with the RFID tag.” *Id.*, [0087].

Pet. 44–45. Petitioner argues that a person having ordinary skill in the art “would have understood the host PC to be a tracking center because it

receives and stores information associated with several items and tags.” *Id.* at 45 (citing Ex. 1005 ¶¶ 67, 70, 74; Ex. 1003 ¶¶ 107–109).

Dr. Olivier testifies in support of Petitioner. Specifically, Dr. Olivier testifies in Hashimoto the “result of the comparison can comprise sending a notification to a tracking center, the host PC, in response to a predetermined condition, the threshold reached.” Ex. 1003 ¶ 108. Dr. Olivier’s Declaration testimony quotes as supporting evidence Hashimoto’s teaching that “the host PC may be notified . . . every time the comparison is performed, or the *host PC may be caused to immediately recognize occurrence of abnormality in fresh food attached with the RFID tag.*” *Id.* (quoting Ex. 1005 ¶ 87). Dr. Olivier’s Declaration testimony quotes as supporting evidence Hashimoto’s teaching that “[a]s described above, in the fourth embodiment, *temperature information is managed using the host PC 310* instead of an RFID tag.” *Id.* (quoting Ex. 1005 ¶ 70).

Patent Owner disputes Petitioner’s showing for claim 5, but not for claim 4. In particular, for claim 5, Patent Owner argues that “Hashimoto discloses that the alleged notification is always sent to the host PC” and, therefore, Hashimoto does not teach sending the notification “in response to a predetermined condition.” Resp. 55. Dr. Madisetti testifies that a result is sent “*every time*” a temperature is compared to a threshold. Ex. 2201 ¶¶ 128–131. With respect to Hashimoto’s teaching that “the host PC may be caused to immediately recognize the occurrence of abnormality” (Ex. 1005 ¶ 87), Patent Owner argues the teaching “does not relate to sending a notification to the host PC.” Resp. 56. Patent Owner argues “[i]t instead

relates to how the host PC processes information to ‘recognize’ abnormalities.” *Id.* (citing Ex. 1005 ¶ 87; Ex. 2201 ¶ 132).

Dr. Madisetti testifies as follows:

Paragraph [0087] also discloses that the host PC may independently recognize an “abnormality in fresh food attached with the RFID tag,” but this abnormality has nothing to do with the “alarm” of paragraphs [0083]–[0085] and it does not disclose sending a notification in response to a predetermined condition. *Id.* Here, Hashimoto discloses that the PC makes a determination about an “abnormality,” but it describes no notification related to that determination. *Id.* Determining an abnormality at the host PC is irrelevant to the claim limitation of “sending a notification to a tracking center in response to a predetermined condition.”

Ex. 2201 ¶ 132.

In its Reply, Petitioner argues that Hashimoto’s disclosure of “the host PC may be caused to immediately recognize occurrence of abnormality” is the second of two alternatives that meets claim 5. Reply 22. Petitioner also argues that Patent Owner rewrites Hashimoto’s disclosure. *Id.* at 23.

In its Sur-reply, Patent Owner argues that the second option “relates to PC software that processes information and in no way indicates that a notification was sent in response to the alleged ‘alarm.’” Sur-reply 24 (citing Resp. 56–57; Ex. 2201 ¶ 132). Patent Owner argues that Petitioner “stretches the phrase ‘may be caused to . . . recognize . . . abnormalit[ies]’ to specifically mean that Hashimoto sends a notification to the PC in response to writing the result of a temperature comparison to an RFID tag and that this notification causes the PC to recognize a high temperature event. *Id.*

We find that the evidence of record is consistent with Petitioner’s arguments. For instance, Figure 9 of Hashimoto is below.

FIG.9

TEMPERATURE THRESHOLD		OPERATION
HIGH TEMPERATURE SIDE	> +25°C	INFORM BY ALARM WHEN TEMPERATURE RISES TO +26°C OR MORE

Figure 9 is a diagram of an example of a temperature threshold stored by an RFID tag. Ex. 1005 ¶ 22. As shown in Figure 9, Hashimoto describes a “TEMPERATURE THRESHOLD,” which when met results in forming “BY ALARM.” Ex. 1005, Fig. 9. Indeed, Hashimoto refers to the threshold as an “alarm judgment value.” *Id.* ¶ 84.

Hashimoto describes in operation, Hashimoto’s RFID tag reader writer reads the threshold temperature from the RFID tag and compares the threshold temperature with a value of the sensor. *Id.* ¶ 85. Hashimoto describes “when temperature exceeds the threshold temperature, the temperature is written in the RFID tag.” *Id.* ¶ 86. Hashimoto describes the following:

Note that a result of comparison with the threshold temperature may be notified to the host PC every time the comparison is performed, or the host PC may be caused to immediately recognize occurrence of abnormality in fresh food attached with the RFID tag. In addition, the threshold temperature stored in the RFID tag may be stored on the sensor side.

Ex. 1005 ¶ 87.

After considering Patent Owner’s arguments and evidence, including the testimony of Dr. Madisetti, we credit and afford significant weight to Dr. Olivier’s testimony regarding the understanding a person having ordinary

skill would have had of Hashimoto. Hashimoto describes that “the host PC may be caused to immediately recognize occurrence of abnormality” in the same sentence as its description that “a result of comparison with the threshold temperature may be notified to the host PC every time the comparison is performed.” Ex. 1005 ¶ 87. The sentence does not relate to only processing software by a PC because the sentence states that “the host PC *may be caused to* immediately recognize.” *Id.* (emphasis added). The sentence is in a portion of Hashimoto that relates to Figure 9. *Id.* ¶¶ 83–87. Figure 9 describes its operation as “INFORM BY ALARM.” *Id.* at Fig. 9. Hashimoto describes a “fourth embodiment” in which “host PC 310 includes a data storing unit 311.” Ex. 1005 ¶ 67. Hashimoto describes that “in the fourth embodiment, temperature is managed using the host PC 310 instead of an RFID tag.” *Id.* ¶ 70. We do not find that Hashimoto discloses “the host PC may be caused to immediately recognize occurrence of abnormality” independent of or not related to its other disclosures involving informing or notifying of the alarm. To the contrary, we find Hashimoto’s disclosures consistent with Petitioner’s arguments and Dr. Olivier’s testimony.

For the reasons given, after considering the contentions and the evidence in the complete record now before us, we determine that Petitioner has shown that the combination of Hashimoto and Bhuptani teaches the further recitations in claims 4 and 5. For the reasons given, we are not persuaded that Patent Owner’s arguments undermine Petitioner’s showing. As discussed above, upon consideration of the parties’ arguments and evidence, we are persuaded by Petitioner’s showing for claim 1.

The parties each rely on the same contentions for claims 18 and 19. *See, e.g.*, Pet. 59–60; Resp. 57. Our analysis for claims 18 and 19 is the same as that for claims 4 and 5.

Accordingly, based on the complete record now before us, we conclude that Petitioner has established by a preponderance of the evidence that claims 4, 5, 18, and 19 are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Hashimoto and Bhuptani.

8. *Dependent Claim 7*

Claim 7 depends directly from claim 1 and recites “wherein the transmitted sensor data triggers a programming change for at least one of the item tracking device and the beacon device.” Petitioner relies on Hashimoto’s teaching of the tag reader writer writing the result of a comparison to the tag when the temperature exceeds the temperature threshold. Pet. 45 (citing Ex. 1005 ¶¶ 48, 85, 91, Fig. 2; Ex. 1003 ¶ 110). Petitioner also relies on Hashimoto’s description of “a process by which when the temperature of the freezing warehouse exceeds a threshold temperature, the freshness date of the fresh food to which the tag is attached is reduced.” *Id.* at 46 (citing Ex. 1005 ¶¶ 116–117; Ex. 1003 ¶ 110).

Patent Owner’s dispute and Dr. Madisetti’s testimony regarding dependent claim 7 are premised on Patent Owner’s proposed interpretation of “programming change.” Resp. 36–41, 57–58; Ex. 2201 ¶¶ 135–140. For the reasons provided *supra* (see Section II.D.2), we decline to adopt Patent Owner’s proposed interpretation.

We agree with Petitioner’s argument in its Reply (Reply 24), however, that even using Patent Owner’s construction, Hashimoto’s

disclosure of changing the freshness date meets claim 7. Patent Owner argues in its Sur-reply for a narrower construction, i.e., that claim 7 requires a change in “**how** a computer receives, stores, processes, and/or delivers information.” Sur-reply 25. Patent Owner’s argument is belatedly presented and not consistent with the intrinsic evidence. In particular, the ’033 patent Specification describes altering the programming of beacon device 104a “to check the temperature more frequently.” Ex. 1001, 6:5–7. That does not change how the beacon device checks the temperature. The same process for checking temperature is used, except the temperature is checked more often. Nonetheless, applying Patent Owner’s Sur-reply construction, we find that Hashimoto discloses a change in processing, in particular, changing the freshness date of food (Ex. 1005 ¶¶ 116–117), as well as a change in storing and delivering information, that is storing the alarm in memory and delivering the new freshness date when the tag is read (*id.* ¶¶ 48, 85, 91, Fig. 2).

After considering the contentions and the evidence in the complete record now before us, we determine that Petitioner has shown that the combination of Hashimoto and Bhuptani teaches the further recitation in claim 7. For the reasons given, we are not persuaded that Patent Owner’s arguments undermine Petitioner’s showing. As discussed above, upon considering the parties’ arguments and evidence, we are persuaded by Petitioner’s showing for claim 1.

Accordingly, based on the complete record now before us, we conclude that Petitioner has established by a preponderance of the evidence

that claim 7 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Hashimoto and Bhuptani.

9. *Dependent Claim 13*

Claim 13 depends directly from claim 1 and recites “disassociating the item tracking device from the beacon device when the item tracking device is outside the predetermined range; and updating the memory to reflect the disassociation.” Ex. 1001, 16:54–58. Relying on the testimony of Dr. Olivier, Petitioner argues the following:

[A] POSITA would have been motivated to implement Hashimoto’s system with the ability to track the current location of a package, at least to allow a user to understand the location of the package within the supply chain. *Id.* In such an implementation, when a tag shifts from being within range of a first tag reader writer (a first value of the associated item’s current location), leaves the range of the first tag reader, and enters the range of a second tag reader writer (a second value of the associated item’s current location), it would have been desirable and predictable for the system to disassociate the current location of the tag from the first reader writer (e.g., to allow the current location of the tag to be associated with the second reader writer). *Id.*

Pet. 53 (citing Ex. 1003 ¶ 122).

Patent Owner argues that Hashimoto alone does not disclose the recitation in claim 13. Resp. 59–61; Sur-reply 25–27. Patent Owner does not dispute that Bhuptani teaches the recitations in claim 13, but instead, Patent Owner relies on its arguments that a person having ordinary skill in the art would not have made the proposed combination of Hashimoto and Bhuptani. Resp. 53–55. As we discussed above with respect to claim 1 (*see* § II.E.3.a), we are not persuaded by Patent Owner’s arguments in that regard. Dr.

Madisetti's testimony (Ex. 2201 ¶¶ 141–144) is substantially the same as Patent Owner's argument and is not consistent with the evidence of record for the same reasons.

We agree with Petitioner's argument in its Reply that Patent Owner improperly narrows claim 13 to require that updating memory be deleting identification information. Reply 24. We agree with Petitioner (*id.*) that Patent Owner's argument that disassociation would render Hashimoto inoperable is not consistent with Hashimoto's teachings.

Consistent with Petitioner's arguments in its Petition, Bhuptani describes "[a]s the RFID tagged shipments travel through the DoD supply chain, the RFID tag identification (ID) number is automatically collected by Savi's RFID interrogators" and "[t]he RFID tag IDs are automatically associated with the interrogator's ID *and location* and all three data elements are automatically routed to the appropriate DoD TAV server." Ex. 1008, 225 (emphasis added). Bhuptani describes that its network tracks and locates materials and supplies. *Id.*

After considering the contentions and the evidence in the complete record now before us, we determine that Petitioner has shown that the combination of Hashimoto and Bhuptani teaches the further recitations in claim 13. For the reasons given, we are not persuaded that Patent Owner's arguments undermine Petitioner's showing. As discussed above, upon consideration of the parties' arguments and evidence, we are persuaded by Petitioner's showing for claim 1.

Accordingly, based on the complete record now before us, we conclude that Petitioner has established by a preponderance of the evidence

that claim 13 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Hashimoto and Bhuptani.

10. Dependent Claims 3, 8–12, 14, 17, and 21–24

Petitioner contends that dependent claims 3, 8–12, 14, 17, and 21–24 are unpatentable as obvious over the combination of Hashimoto and Bhuptani. Pet. 43–44, 46–51, 54–55, 59–61. In addition to relying on its contentions for the independent claims, Petitioner provides a detailed analysis explaining where the asserted art teaches the limitations in claims 3, 8–12, 14, 17, and 21–24. *Id.* Patent Owner does not separately dispute Petitioner’s contentions for claims 3, 8–12, 14, 17, and 21–24. Resp. 61. We discuss highlights of Petitioner’s analysis below.

We start with Petitioner’s contentions for claims 3 and 17. Claim 3 further recites “wherein the sensor data includes at least one of location information, temperature information, humidity information, light level information, pressure information, photo information, and video information.” The further recitation in claim 17 is the same. Petitioner relies on Hashimoto’s teachings of temperature sensors, vibration sensors, and other sensors including humidity sensors and shock sensors. Pet. 43 (citing, e.g., Ex. 1005 ¶¶ 42, 59, 123, 126, 155). Hashimoto’s teachings are consistent with Petitioner’s contentions. Ex. 1005 ¶ 42 (describing “temperature sensor 150”), ¶ 59 (describing measuring temperature in freezing warehouse 20 using temperature sensor 450), ¶ 123 (describing that the quality of melons declines “due to damage caused by vibration, shock, or the like”), ¶ 126 (describing that “vibration sensors 850 are arranged in four places in the vehicle-mounted container to grasp vibration/shock

information”), ¶ 155 (describing that in the described embodiments “the temperature sensor, the GPS sensor, and the vibration sensor are used as sensors,” but the embodiments can be applied to “other sensors like a humidity sensors, an acceleration sensor, a shock sensor, a water quality sensor, and an ion sensor”).

We turn to Petitioner’s contentions for claim 8. Claim 8 further recites “further comprising: associating an item tracking number with the item tracking device.” Petitioner relies on the teachings of Hashimoto and Bhuptani, as well as the testimony of Dr. Olivier. Pet. 46 (citing Ex. 1005 ¶¶ 48, 68, Fig. 2; Ex. 1008, 170, 225; Ex. 1003 ¶¶ 111–112). Bhuptani describes item tracking numbers. In particular, Bhuptani describes that the DoD had a “plan to *identify separate items* through a *Unique ID (UID)* method for each *part*” and “an official policy” was issued “mandating UID as a requirement.” Ex. 1008, 170 (emphases added). According to Bhuptani, the policy was aimed at addressing a lack of “complete and reliable information about [the DoD’s] *assets*.” *Id.* (emphasis added). Importantly, Bhuptani describes creating “a *single unique number (UID)* for each item” by combining an “enterprise identifier” of “the enterprise that created the item” and serial number that uniquely identifier “the *item* within a given enterprise.” *Id.* (emphases added). Bhuptani describes that a “*Unique Identifier (UID)* is a set of *data* for *tangible assets* that is globally *unique* and unambiguous, ensures data integrity, and supports multiple applications.” *Id.* (emphases added). Bhuptani’s item tracking number is described in connection with “Automatic Identification Technologies” and, more specifically “barcode” technologies. *Id.*

We find that Bhuptani teaches associating its item tracking numbers with item tracking devices. For instance, Bhuptani describes that its system is used “track and locate *materiel and supplies* moving through the vast, complex, and multi-national end to end supply chain.” Ex. 1008, 225 (emphases added). Bhuptani describes using “linear and two-dimensional barcodes, optical memory cards, active RFID tags, and GPS systems” for tracking. *Id.* Bhuptani specifically refers to “item data” in connection with this tracking. In particular, Bhuptani describes that “[a]s set tracking begins with the aggregation of *item data to case contents, to pallet configuration to visibility inside the shipping container to ship units in a truck, plane or ship.*” *Id.* (emphases added). Bhuptani further describes that as “the RFID tagged shipments travel through the DoD supply chain, the RFID tag identification (ID) number is automatically collected by Savi’s RFID interrogators,” the “RFID tag IDs are automatically associated with the interrogator’s ID and location,” and “all three data elements are automatically routed to the appropriate DoD TAV server.” *Id.* Bhuptani also describes because of “this automatic and near real time data collection” a “logistics operator can query the TAV system” to “locate a *specific item* at any of the nodes.” *Id.* (emphases added). As discussed above, we find that Petitioner has articulated reasoning with a rational underpinning as to why one of ordinary skill in the art would have made the proposed combination, which is not undermined by Patent Owner’s arguments. *See* § II.E.3.a.

We turn to Petitioner’s contentions for claims 9 and 21. Claim 9 further recites “wherein the area that contains the multiple items is a vehicle used to deliver the multiple items.” The further recitation in claim 21 is the

same. Petitioner relies on Hashimoto's teachings of delivering products using multiple transportation channels, such as air, rail, and truck and, more specifically, including a tag reader on a vehicle having multiple items. Pet. 46–47 (citing Ex. 1005 ¶¶ 124, 130–131, Figs. 13, 14). Hashimoto's teachings are consistent with Petitioner's contentions. Ex. 1005 ¶ 124 (describing that “plural means of transportation are used”), ¶ 130 (describing that a melon is “transported by a vehicle-mounted container”), Fig. 13 (illustrating a diagram for explaining an on-vehicle vibration monitoring system), Fig. 14 (illustrating a diagram of means of transportation and routes).

We turn to Petitioner's contentions for claims 10 and 22. Claim 10 further recites “wherein the area that contains the [m]ultiple items is a storage facility used to store the multiple items.” The further recitation in claim 22 is the same. Petitioner relies on Hashimoto's teaching of a freezing warehouse. *See, e.g.*, Pet. 47 (citing Ex. 1005 ¶ 35; Ex. 1003 ¶ 114). Hashimoto describes “freezing warehouse 20 in which fresh food 10, like tune fish is stored.” Ex. 1005 ¶ 35. Hashimoto describes “there may be many different items of fresh foods each attached with an RFID tag.” *Id.*

We turn to Petitioner's contentions for claims 11 and 23. Claim 11 further recites “wherein the area that contains the multiple items [i]s a container used to hold the multiple items.” The further recitation in claim 23 is the same. Petitioner references its contentions regarding reasoning to combine and the proposed combination. Pet. 48 (citing Pet. 24–29). Petitioner argues “Hashimoto describes that products are delivered to a destination using multiple transportation channels, such as air, rail, and

truck.” Pet. 48 (citing Ex. 1005 ¶ 124, Fig. 14). Petitioner also argues “Hashimoto-Bhuptani would include a tag reader writer on a vehicle of one transportation channel,” which would have communicated with tags when the tags are attached to products in a vehicle-mounted container on the vehicle. *Id.* (citing Ex. 1005 ¶¶ 125, 130, Fig. 13). As we discussed with respect to element 1[c] (*see* § II.E.3.e), Hashimoto describes that an RFID tag is “attached to a melon” and the on-vehicle vibration monitoring system “monitors vibration amounts of melons in plural boxes attached with RFID tags” that are “transported by a vehicle-mounted *container*.” Ex. 1005 ¶ 130, Figs. 13, 15 (emphasis added). Figure 13 shows “VEHICLE-MOUNTED *CONTAINER*.” *Id.* at Fig. 13 (emphasis added).

We turn to Petitioner’s contentions for claims 12 and 24. Claim 12 further recites “storing second association data reflecting an association between the item tracking device and a user tracking device when the item tracking device is within a predetermined range of the user tracking device, wherein the user tracking device corresponds to a courier responsible for delivering the first item.” Claim 24 includes a similar further recitation. Petitioner points to Bhuptani’s handheld scanners for the “user tracking device.” Pet. 49–50 (citing Ex. 1008, 66, 225, 226, Ex. 1005 ¶ 149; Ex. 1003 ¶ 116). For teaching “a courier responsible for delivering the first item,” Petitioner relies on Hashimoto’s teaching of a truck service and Bhuptani’s teaching of tracking a product through a supply chain. *Id.* at 49 (Ex. 1005 ¶¶ 124, 153; Ex. 1008, 42; Ex. 1003 ¶ 118). Petitioner has articulated reasoning with a rational underpinning as to why one of ordinary skill in the art would have made the proposed combination. *Id.* at 49–50. Bhuptani

describes that deployed units receive kits that contain “handheld interrogators to read RFID tags.” Ex. 1008, 226. Hashimoto describes “when a truck service is used, it is possible to manage time of loading on and unloading from the truck, a general road and an expressway, and statistic information for each carrier and to take a quality measure for the next time accurately.” Ex. 1005 ¶ 153.

We turn to Petitioner’s contentions for claim 14. Petitioner relies on Bhuptani’s disclosure “that the RFID tags in the DoD supply chain are enabled with satellite and GPS technology.” Pet. 54 (citing Ex. 1008, 225). Petitioner also articulates reasoning with a rational underpinning as to why one of ordinary skill in the art would have made the proposed combination. *Id.* at 54–55 (citing Ex. 1003 ¶¶ 126–128).

Patent Owner does not offer separate arguments for dependent claims 3, 8–12, 14, 17, and 21–24 or contest Petitioner’s analysis. Resp. 61. We agree with all Petitioner’s obviousness assertions for dependent claims 3, 8–12, 14, 17, and 21–24.

We already have discussed the parties’ arguments and Patent Owner’s dispute regarding independent claim 1. After considering the arguments and the evidence of record based on the complete record now before us, Petitioner has proved, by a preponderance of the evidence, that claims 3, 8–12, 14, 17, and 21–24 are unpatentable under 35 U.S.C. § 103(a) over the combination of Hashimoto and Bhuptani.

F. Unpatentability of Claims 6, 12, 20, and 24 under 35 U.S.C. § 103(a) as Obvious over Hashimoto, Bhuptani, and Lindsay

Petitioner contends that claims 6, 12, 20, and 24 are unpatentable as obvious over the combination of Hashimoto, Bhuptani, and Lindsay. Pet. 8. We begin with an overview of Lindsay. We then turn to Petitioner's contentions.

1. Lindsay

Lindsay is titled "RFID System and Method for Tracking Food Freshness." Ex. 1006, code (54). Lindsay relates to food storage and a system and method for tracking the freshness or expiration dates of food products. *Id.* at 1:7–9. Lindsay describes its system integrated with a computer system shown in Figure 2 below. *Id.* at 4:60–62.

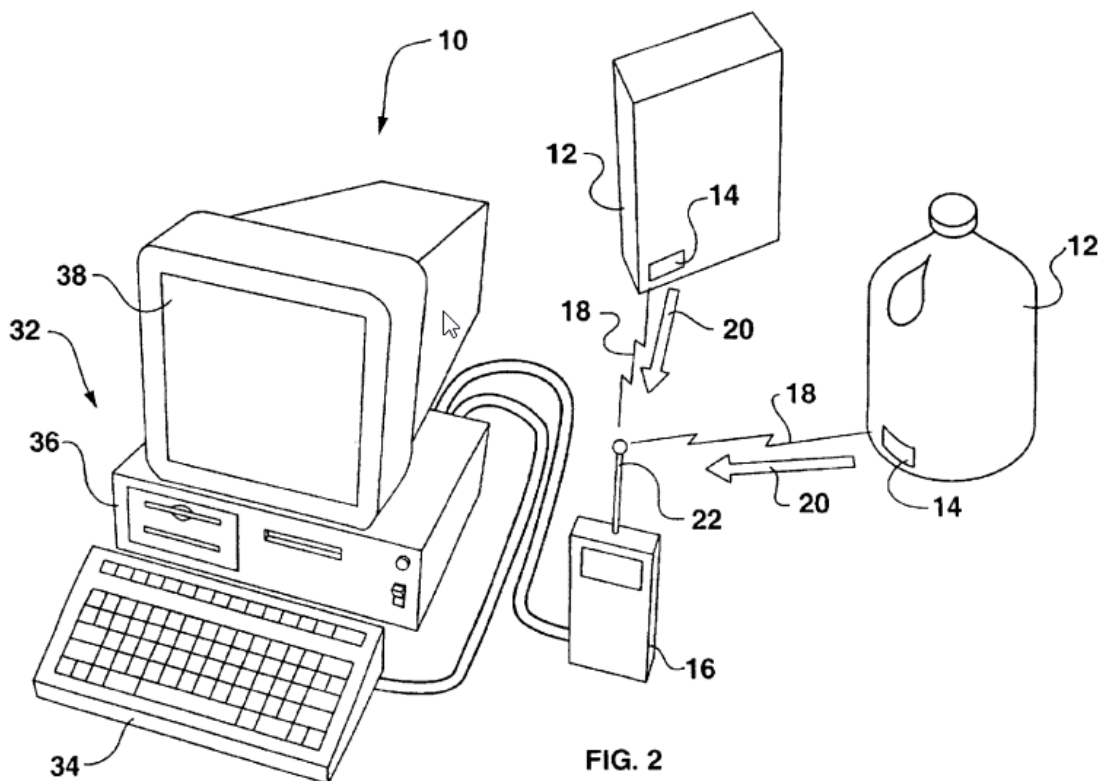


Figure 2, above, is a graphic illustration of system 10 integrated with computer system 32. *Id.* at 4:60–62, 5:11–12, 9:1–4.

Each of food products 12 is provided with smart tag 14. *Id.* at 5:13–14. Tag 14 transmits pulse 20 of coded food product information in response to electronic “trigger” signal 18 from scanner 16. *Id.* at 5:13–17. Scanner 16 may have a microprocessor, display 24, and data entry keypad 30. *Id.* at 9:6–9. Computer system 32 incorporates monitor 38, central processing unit (CPU) 36, and keyboard 34. *Id.* at 9:4–7.

2. Claim 6

Claim 6 depends from dependent claim 4. Dependent claim 4 depends directly from claim 1 and recites “wherein the transmitted sensor data triggers an alarm.” Dependent claim 6 recites “wherein triggering the alarm comprises sending a notification to a user tracking device in response to a predetermined condition.”

For claim 4, Petitioner contends “Hashimoto describes setting a temperature threshold and triggering an alarm if the temperature exceeds the threshold.” Pet. 44 (citing Ex. 1005 ¶¶ 83–86, Fig. 9; Ex. 1003 ¶ 106). For claim 6, Petitioner relies on Lindsay’s teachings of scanner 16 visually displaying the freshness or expiration date and including a visual or audible alarm if the food product has expired. *Id.* at 70–71 (citing Ex. 1006, 6:18–20, 8:58–65, 11:13–26, Fig. 2). Petitioner also relies on Hashimoto’s teachings of quality judging unit 830 judging whether items experience certain vibrations during transport and, if so, instructing an inspector to perform an appearance audit and tasting inspection. *Id.* at 71 (citing, e.g., Ex. 1005 ¶¶ 147–152; Ex. 1003 ¶¶ 164–165).

Petitioner also provides contentions regarding reasoning to combine the teachings of Hashimoto, Bhuptani, and Lindsay. For instance, Petitioner contends the following:

A POSITA would have been motivated to include a handheld tag reader (or reader writer), similar to Lindsay's handheld scanner, to interact with the Hashimoto-Bhuptani tags and alert a user of the scanner when an environmental condition (e.g., temperature or vibration) exceeds a predetermined threshold. EX1003, ¶155. Doing so would have predictably achieved the benefits Lindsay describes with the Hashimoto-Bhuptani monitoring system. *Id.* Specifically, Lindsay identifies that its system facilitates food product storage by providing information on the freshness and expiration dates of food to users of personal scanners. EX1006, 2:15-19, 8:44-46, 11:35-47; EX1003, ¶156.

Pet. 65–66. Petitioner provides further contentions in support of its reasoning to combine including additional details regarding desirability and benefits, as well as arguments and evidence demonstrating a reasonable expectation of success. *Id.* at 66–68 (citing, e.g., Ex. 1003 ¶¶ 157–161).

Patent Owner does not offer separate arguments for dependent claim 6 or contest Petitioner's analysis. Resp. 61. We already have discussed the parties' arguments and Patent Owner's dispute regarding independent claim 1. After considering the contentions and the evidence based on the complete record now before us, we determine that Petitioner has shown that the combination of Hashimoto, Bhuptani, and Lindsay teaches all recitations in claim 6. Also, we are persuaded that Petitioner has articulated reasoning with a rational underpinning as to why one of ordinary skill in the art would have combined the teachings of Hashimoto, Bhuptani, and Lindsay in the manner recited in claim 6. We also are persuaded that Petitioner has

demonstrated that such person would have had a reasonable expectation of success.

Accordingly, based on the complete record now before us, we conclude that Petitioner has established by a preponderance of the evidence that claim 6 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Hashimoto, Bhuptani, and Lindsay.

3. *Claim 12*

After considering the contentions and the evidence based on the complete record now before us, we conclude that Petitioner has established by a preponderance of the evidence that claim 12 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Hashimoto and Bhuptani. *See* § II.E.10. Based on the complete record now before us, we find Petitioner's additional assertions regarding obviousness over Hashimoto, Bhuptani, and Lindsay provide additional support that claim 12 is unpatentable.

Patent Owner does not offer separate arguments for dependent claim 12 or contest Petitioner's analysis. Resp. 61. We already have discussed the parties' arguments and Patent Owner's dispute regarding independent claim 1.

Accordingly, based on the complete record now before us, we conclude that Petitioner has established by a preponderance of the evidence that claim 12 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Hashimoto, Bhuptani, and Lindsay.

4. *Dependent Claims 20 and 24*

Claim 20 depends from claim 18, which depends from claim 15. Claim 24 depends directly from claim 15. The further recitations in claims 20 and 24 are similar to the further recitations in claims 6 and 12. For claims 20 and 24, Petitioner relies on its arguments for claims 6 and 12. Pet. 73. Patent Owner does not offer separate arguments for dependent claims 20 and 24 or contest Petitioner's analysis. Resp. 61.

For the reasons given with respect to claims 6 and 12, based on the complete record now before us, we conclude that Petitioner has established by a preponderance of the evidence that claims 20 and 24 are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Hashimoto, Bhuptani, and Lindsay.

G. *Unpatentability of Claim 14 under 35 U.S.C. § 103(a) over Hashimoto, Bhuptani, and Lareau*

Petitioner contends that claim 14 is unpatentable as obvious over the combination of Hashimoto, Bhuptani, and Lareau. Pet. 8. We begin with an overview of Lareau. We then turn to Petitioner's contentions.

1. *Lareau*

Lareau is titled "Monitoring and Tracking of Assets by Utilizing Wireless Communications." Ex. 1007, code (54). Lareau relates to systems, devices, methods, and programs for monitoring and tracking assets by using wireless communications. *Id.* at 1:23–26. Lareau describes that coupled to each asset is a wireless RFID tag. *Id.* at 6:32–33. Lareau describes that "each tag is configured to wirelessly communicate with other tags and any RMSs [remote monitoring stations] within a determined proximity." *Id.* at 6:33–36.

2. *Claim 14*

Dependent claim 14 recites “wherein the sensor data [i]s transmitted directly from the item tracking device to the database.” Petitioner relies on Lareau’s disclosure of tags that communicate directly with a remote monitoring station. Pet. 74–75, 79 (citing, e.g., Ex. 1007, 6:30–50, 7:24–29, 15:4–13, Fig. 2). Petitioner also contends that Lareau teaches that the “information communicated from the tag includes sensor data like temperature, air pressure, vibration, humidity, and radiation.” *Id.* at 79 (citing Ex. 1007, 9:1–7).

Petitioner also provides contentions regarding reasoning to combine the teachings of Hashimoto, Bhuptani, and Lareau. For instance, Petitioner relies on Lareau’s teaching that it provides a low-cost solution for locating an asset across a supply chain. *Id.* at 74–76 (citing, e.g., Ex. 1007, 2:39–47, 4:47–52). Petitioner also contends “[i]t would have been obvious to a POSITA to implement the tag-based communication of Lareau in Hashimoto-Bhuptani’s warehouse and truck monitoring systems to extend the range of each tag.” *Id.* at 77 (citing Ex. 1003 ¶ 176).

Patent Owner does not offer separate arguments for dependent claim 14 or contest Petitioner’s analysis. Resp. 62. We already have discussed the parties’ arguments and Patent Owner’s dispute regarding independent claim 1. After consideration of the contentions and the evidence based on the complete record now before us, we determine that Petitioner has shown that the combination of Hashimoto, Bhuptani, and Lareau teaches all recitations in claim 14. Also, we are persuaded that Petitioner has articulated reasoning with a rational underpinning as to why one of ordinary skill in the art would

have combined the teachings of Hashimoto, Bhuptani, and Lareau in the manner recited in claim 14. We also are persuaded that Petitioner has demonstrated that such person would have had a reasonable expectation of success.

Accordingly, based on the complete record now before us, we conclude that Petitioner has established by a preponderance of the evidence that claim 14 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Hashimoto, Bhuptani, and Lareau.

III. CONCLUSION

The outcome for the challenged claims is set forth below.¹³ In summary:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatent- able	Claims Not Shown Unpatent- able
1–5, 7–19, 21–25	103(a)	Hashimoto, Bhuptani	1–5, 7–19, 21–25	

¹³ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. §§ 42.8(a)(3), (b)(2).

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatent- able	Claims Not Shown Unpatent- able
6, 12, 20, 24	103(a)	Hashimoto, Bhuptani, Lindsay	6, 12, 20, 24	
14	103(a)	Hashimoto, Bhuptani, Lareau	14	
Overall Outcome			1–25	

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1–25 of the '033 patent have been proven to be unpatentable;

FURTHER ORDERED that with respect to Patent Owner's Motion to Exclude the request to exclude Exhibits 1012, 1013, 1026 through 1031 is *dismissed* as moot; and

FURTHER ORDERED that because this is a Final Written Decision, 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 7,623,033 B2

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