

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD. AND
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner,

v.

MANUFACTURING RESOURCES INTERNATIONAL, INC.,
Patent Owner.

IPR2023-00255
Patent 9,629,287 B2

Before JAMESON LEE, JO-ANNE M. KOKOSKI, and MINN CHUNG,
Administrative Patent Judges.

KOKOSKI, *Administrative Patent Judge.*

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively, “Petitioner”) filed a Corrected Petition to institute an *inter partes* review of claims 1, 4, 5, and 8–23 (the “challenged claims”) of U.S. Patent No. 9,629,287 B2 (“the ’287 patent,” Ex. 1001). Paper 9 (“Pet.”). Manufacturing Resources International, Inc. (“Patent Owner”) filed a Preliminary Response. Paper 7 (“Prelim. Resp.”).

Institution of an *inter partes* review is authorized by statute when “the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314 (2018); *see also* 37 C.F.R. § 42.4 (2021). For the reasons discussed below, we determine that Petitioner establishes a reasonable likelihood of prevailing with respect to the unpatentability of at least one claim of the ’287 patent. Accordingly, we institute an *inter partes* review of claims 1, 4, 5, and 8–23 of the ’287 patent.

A. *Real Parties-in-Interest*

Petitioner identifies Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., Samsung SDS Co., Ltd., Samsung SDS America, Inc., Coates Signco Pty Limited, Coates US Inc., and Industrial Enclosure Corporation d/b/a Palmer Digital Group as the real parties-in-interest. Pet. 2. Patent Owner identifies itself as the real party-in-interest. Paper 5, 2 (Mandatory Notice).

B. *Related Matters*

The parties indicate that the ’287 patent is at issue in *Manufacturing Resources, Inc. v. Samsung Electronics Co., Ltd.*, No. 2:22-cv-00320 (E.D. Tex.) and *In re Certain Outdoor and Semi-Outdoor Electronic*

Displays, Products Containing Same, and Components Thereof,
Investigation No. 337-TA-1331 (ITC). Pet. 2; Paper 5, 2. Patent Owner additionally identifies several other *inter partes* reviews that “may be deemed related” to this proceeding. Paper 5, 2.

C. The '287 Patent

The '287 patent relates to cooling systems for electronic displays. Ex. 1001, 1:58–59. The Specification explains that “cooling devices for electronic displays in the past have generally used convective heat dissipation systems that function to cool an entire interior of the display by one or more fans and fins,” and “[b]y itself, this is not adequate in many climates, especially when radiative heat transfer from the sun through a display window becomes a major factor.” *Id.* at 2:3–9. “Additionally, modern applications call for larger displays than previous applications.” *Id.* at 2:11–12. The Specification further explains that, “[w]ith increased heat production from the larger screens and radiative heat transfer from the sun through the display window, more efficient and powerful heat dissipation systems are required.” *Id.* at 2:14–17.

The '287 patent addresses these issues by providing “an isolated gas cooling system and method for cooling an electronic display.” Ex. 1001, 2:37–39. In particular, the Specification teaches that “[t]he gas cooling chamber is preferably a closed loop which includes a first gas chamber comprising a transparent anterior plate and a second gas chamber comprising a cooling plenum.” *Id.* at 2:40–43.

Figure 1 is reproduced below.

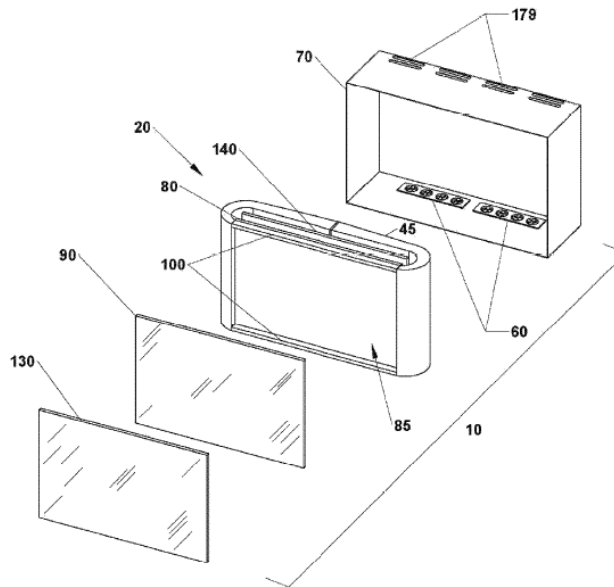


Fig. 1

Figure 1 is an exploded perspective view showing the components of an isolated gas cooling system described in the '287 patent. Ex. 1001, 3:20–22. Gas cooling system 10 includes isolated gas cooling chamber 20 contained within electronic display housing 70, which also includes fan 60 and exhaust 179. *Id.* at 3:51–54, 5:13–16. Electronic display surface 85, spacers 100, and transparent front plate 90 define a narrow first gas chamber 30 (not pictured). *Id.* at 4:36–38. Second transparent front plate 130 is laminated to front plate 90 to prevent breakage of transparent front plate 90. *Id.* at 3:55–57. Cooling chamber 20 surrounds electronic display 80¹ and associated backlight panel 140. *Id.* at 3:57–60. Cooling

¹ The Specification teaches that the described gas cooling system “may be used in conjunction with displays selected from among LCD (including TFT or STN type), light emitting diode (LED), organic light emitting diode (OLED), field emitting display (FED), cathode ray tube (CRT) and plasma displays.” Ex. 1001, 3:36–42.

plenum 45 includes fan 60 positioned at the base of display housing 70. *Id.* at 3:61–64.

Figure 2 is reproduced below.

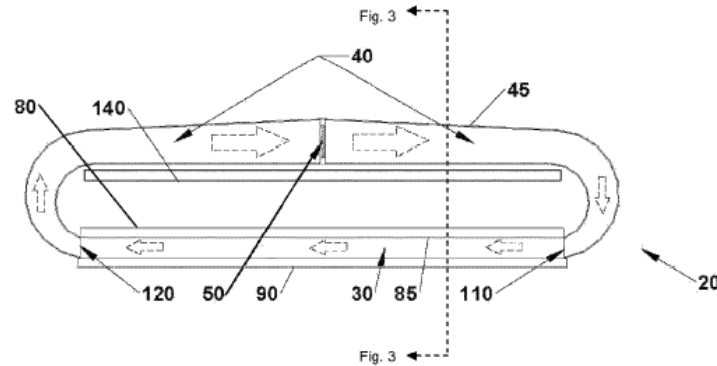


Fig. 2

Figure 2 is a top sectional view of a cooling chamber described in the '287 patent. Ex. 1001, 3:23–24. Cooling chamber 20 comprises a closed loop that includes first gas chamber 30 and rear cooling chamber 40. *Id.* at 4:4–7. Cooling plenum 45 includes cooling chamber fan 50, which propels gas around the closed loop of cooling chamber 20. *Id.* at 4:25–28. First gas chamber 30 is in gaseous communication with cooling plenum 45 through entrance opening 110 and exit opening 120. *Id.* at 4:39–41.

The Specification teaches that, in operation, the gas passes through the first gas chamber, contacts the electronic display surface, and absorbs the heat from the surface of the display. Ex. 1001, 2:51–53. Then, it is directed into the rear cooling plenum. *Id.* at 2:55–57. To cool the gas in the plenum, “an external fan unit may be positioned to provide a flow of ingested air over the external surfaces of the plenum. The heated air in the housing may exit the housing as exhaust.” *Id.* at 2:61–64.

D. Challenged Claims

Petitioner challenges claims 1, 4, 5, and 8–23 of the '287 patent.

Pet. 5. Claims 1, 12, 18, and 21 are independent, illustrative of the claimed subject matter, and reproduced below.

1. An electronic display assembly comprising:
 - an electronic display housing;
 - a gas-containing closed loop gas cooling chamber located within the electronic display housing;
 - an electronic display positioned within the electronic display housing but outside the closed loop gas cooling chamber;
 - and
 - an open loop ambient air pathway through the electronic display housing;wherein the electronic display is coolable by a combination of gas circulation within the closed loop gas cooling chamber and ambient air flow through the open loop ambient air pathway in the electronic display housing.

Ex. 1001, 6:8–21.

12. An electronic display assembly comprising:
 - a housing;
 - a liquid crystal display (LCD) positioned within the housing and having a backlight;wherein the electronic display is coolable by a combination of a closed loop of isolated gas which circulates within the housing and an open loop of ambient air which passes through the housing and along the backlight.

Id. at 7:5–13.

18. An electronic display assembly comprising:
 - a housing;
 - an electronic display positioned within the housing;

- a rear cooling chamber positioned behind the electronic display and containing an electrical component which is electrically connected to the electronic display;
- a front surface on the electronic display which faces an intended viewer and a rear surface on the electronic display which opposes the front surface;
- wherein the front surface of the electronic display is coolable by a closed loop of isolated gas and the rear surface of the electronic display is coolable by an open loop of ambient air.

Id. at 7:35–8:4.

- 21. An electronic display assembly comprising:
 - an electronic display housing;
 - an open loop ambient air pathway through the electronic display housing; and
 - an electronic display positioned within the electronic display housing such that the electronic display is isolated from the closed loop of cooling gas but contactable by ambient air flowing through the open loop ambient air pathway;
- wherein the electronic display is coolable by a combination of closed loop cooling gas circulation within the electronic display housing, and ambient air flow through the open loop ambient air pathway in the electronic display housing.

Id. at 8:13–29.

E. Evidence

Petitioner relies on the evidence listed below (Pet. 4–5, 13–27):

Name	Reference	Date	Exhibit No.
Harris	US 5,748,269	May 5, 1998	1018
Nagashima	US 6,798,655 B2	Sept. 28, 2004	1007
Kitamura	JP H8-54834	Feb. 27, 1996	1017
Marumoto	JP H8-152604	June 11, 1996	1005 (as translated) 1010

Name	Reference	Date	Exhibit No.
Ohta	JP 3118907	Oct. 13, 2000	1004 (as translated) 1009
Yare	GB 2402205A	Dec. 1, 2004	1013
Karppanen	WO 2007/116116 A1	Oct. 18, 2007	1006

Petitioner also relies on the Declaration of Robert Smith-Gillespie (“Smith-Gillespie Declaration,” Ex. 1002). Pet. 6.

F. Asserted Grounds

Petitioner asserts that claims 1, 4, 5, and 8–23 would have been unpatentable based on the following grounds:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
12–23	103 ²	Karppanen
1, 4, 5, 8–12, 14–17, 21–23	103	Nagashima, Karppanen
1, 4, 5, 8–23	103	Ohta, Marumoto
1, 4, 5, 8–83	103	Ohta, Marumoto, Yare
12–20	103	Kitamura, Harris

Pet. 5.

II. ANALYSIS

A. 35 U.S.C. § 325(d)

Patent Owner argues that we should exercise our discretion under 35 U.S.C. § 325(d) to deny institution because “the Office relied upon Karppanen and Yare to reject claims related to the claims of the ’287 Patent” (Prelim. Resp. 6), and because Yare was a primary reference relied upon in a petition for *inter partes* review of U.S. Patent No. 8,854,572 (“the ’572

² The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284 (2011), revised 35 U.S.C. §§ 102 and 103 effective March 16, 2013. Petitioner argues, and Patent Owner does not contest, that the pre-AIA statutory provisions apply to this case. *See* Pet. 13, 14, 16, 18, 19, 22, 25. Accordingly, we apply the pre-AIA versions of §§ 102 and 103.

patent”), which Patent Owner asserts “is a parent of the ’287 patent” (*id.* at 8).

1. Legal Framework

Section 325(d) provides that, in determining whether to institute an *inter partes* review, “the Director may take into account whether, and reject the petition or request because, the same or substantially the same prior art or arguments previously were presented to the Office.” The Board uses a two-part framework for evaluating arguments under § 325(d):

(1) whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office; and

(2) if either condition of first part of the framework is satisfied, whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims.

Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH, IPR2019-01469, Paper 6 at 8 (PTAB Feb. 13, 2020) (precedential) (“*Advanced Bionics*”). In applying this framework, we consider the *Becton, Dickinson*³ factors that address discretion to deny when a petition presents the same or substantially the same prior art or arguments previously presented to the Office, including:

- (a) the similarities and material differences between the asserted art and the prior art involved during examination;
- (b) the cumulative nature of the asserted art and the prior art evaluated during examination;

³ *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 at 17–18 (PTAB Dec. 15, 2017) (precedential as to § III.C.5, first paragraph) (“*Becton, Dickinson*”).

(c) the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection;

(d) the extent of the overlap between the arguments made during examination and the manner in which Petitioner relies on the prior art or Patent Owner distinguishes the prior art;

(e) whether Petitioner has pointed out sufficiently how the Examiner erred in its evaluation of the asserted prior art; and

(f) the extent to which additional evidence and facts presented in the Petition warrant reconsideration of the prior art or arguments.

Becton, Dickinson, Paper 8 at 17–18. Factors (a), (b), and (d), relate to whether the same or substantially the same art or arguments were previously presented to the Office, and factors (c), (e), and (f) relate to whether the petitioner demonstrates that the Office erred in a manner material to the patentability of the claims. *Advanced Bionics*, Paper 6 at 9–11. Only if the same or substantially the same art or arguments were previously presented to the Office do we then consider whether the petitioner has demonstrated a material error by the Office. *Id.*

2. *Family History of the '287 Patent*

The '287 patent issued from application 15/180,968, which is a:

[c]ontinuation of application No. 14/803,848, filed on Jul. 20, 2015, now Pat. No. 9,370,127, which is a continuation of application No. 14/508,767, filed on Oct. 7, 2014, now Pat. No. 9,089,079, which is a continuation of application No. 13/937,777, filed on Jul. 9, 2013, **now Pat. No. 8,854,572**, which is a continuation of application No. 13/605,530, filed on Sep. 6, 2012, now Pat. No. 8,482,695, which is a continuation of application No. 12/620,330, filed on Nov. 17, 2009, now Pat. No. 8,274,622, and a continuation-in-part of application No. 12/234,307, filed on Sep. 19, 2008, now Pat. No. 8,767,165, said application No. 12/620,330, is a continuation-in-part of **application No. 12/234,360**, filed on

Sep. 19, 2008, which is a continuation-in-part of *application No. 12/237,365*, filed on Sep. 24, 2008, now Pat. No. 8,879,042, which is a continuation-in-part of application No. 12/411,925, filed Mar. 26, 2009, now Pat. No. 8,854,595, which is a continuation-in-part of application No. 12/235,200, filed on Sep. 22, 2008, now abandoned, which is a continuation-in-part of application No. 12/556,029, filed on Sep. 9, 2009, now Pat. No. 8,373,841.

Ex. 1001, code (63) (emphases added); *id.* at 1:9–54.

3. *Discussion*

Patent Owner directs us to three prior Office proceedings in which it contends the same art was presented to and considered by the Office: (1) the prosecution of Application No. 12/234,360 (“the ’360 Application”), which Patent Owner characterizes as “a parent of the ’287 Patent” (Prelim. Resp. 6); (2) the prosecution of Application No. 12/237,365 (“the ’365 Application”), which Patent Owner characterizes as “a different parent of the ’287 Patent” (*id.*); and (3) IPR2018-00774 (“the 774 IPR”) directed to the ’572 patent,” which Patent Owner also characterizes as “a parent of the ’287 Patent” (*id.* at 8).

a) Prosecution of the ’360 Application

Patent Owner notes that “US 2009/027940 (‘Karppanen II’), which claims priority to Karppanen . . . , was used in a rejection of a parent of the ’287 Patent, [the ’360 Application].” Prelim. Resp. 6 (citing Ex. 2005). Patent Owner directs us to an Office Action wherein the examiner states that

Karppanen [II] explicitly teaches it is desirable to cool displays (para. 26–27) using an internal sealed fluid (para. 11, 14, 31) cooling the display and electronics and providing a cross heat exchanger (80) through which external ambient air stream flows through second ducts (para. 34, 32) to provide increased cooling (para. 33) while at the same time providing the benefits of a sealed cooling for the electronics (para. 11, 14) preventing

impurities from being introduced therein. Thereby teaching forcing ambient air into the housing of the system and exhausting air out of the housing, all while keeping the ambient air within the second ducts of the heat exchanger and sealed from the sealed cooling gas.

Id. (quoting Ex. 2005, 11–12). Based only on this reference to Karppanen II, Patent Owner argues that Karppanen was used in a rejection of a related application “to reject elements similar to those for which” Karppanen is relied upon by Petitioner in this proceeding. *Id.* at 7.

On this record, Patent Owner has not shown that Karppanen was disclosed or otherwise considered during the prosecution of the ’360 Application. Although the record establishes that *Karppanen II* was considered, Patent Owner does not direct us to any evidence of record that *Karppanen* (as asserted by Petitioner) was considered by the examiner during the prosecution of the ’360 Application. Prelim. Resp. 6. In that regard, Patent Owner asserts that Karppanen II “claims priority” to Karppanen. *Id.* (citing Ex. 2005). The Office Action in which the examiner applies Karppanen II⁴ does not provide any information regarding the familial relationship between Karppanen and Karppanen II. Ex. 2005. Additionally, Patent Owner does not point to any disclosures in Karppanen II that correspond to the disclosures in Karppanen that Petitioner relies on in the Petition. *Id.* Patent Owner’s assertion that Karppanen II “claims priority” to Karppanen is insufficient, by itself, to establish that Karppanen and Karppanen II are the same or substantially the same.

After considering Patent Owner’s arguments and evidence, we determine that denying the Petition under § 325(d) is unwarranted based on

⁴ Karppanen II is not of record in this proceeding.

the Office's consideration of Karppanen II during the prosecution of the '360 Application.

b) Prosecution of the '365 Application

Patent Owner then states that Yare “was used in a rejection of a different parent of the '287 Patent, [the '365 Application].” Prelim. Resp. 6 (citing Ex. 2006). Patent Owner contends that “the Examiner cited Yare for ‘a plenum 70 placed behind the display device 20 and accepting circulating gas (air)’ in combination with other references.” *Id.* Patent Owner asserts that the '365 Application issued as U.S. Patent No. 8,879,042 (“the '042 patent”) with claims similar to those in the '287 patent. *Id.* at 6–7. In particular, Patent Owner highlights the “provide a closed loop for circulating gas” and “first and second gas chambers such that the ambient air does not mix with the circulating gas” elements of claim 1 of the '042 patent. *Id.* at 7.

Patent Owner argues that “[r]eferences considered during a related application are relevant for the child application for § 325(d) purposes.” Prelim. Resp. 7 (citing *Edge Endo, LLC v. Scianamblo*, IPR2018-01321, Paper 15 at 15–16 (PTAB Jan. 14, 2019); *Microsoft Corp. v. Koninklijke Philips N.V.*, IPR2018-00279, Paper 11 at 9–19 (PTAB June 8, 2018)). Therefore, according to Patent Owner, “the Examiner was fully mindful of the prior art’s teachings, yet correctly allowed the claims at issue in this proceeding.” *Id.* at 8.

During prosecution of the '365 Application, the examiner rejected two pending claims “as being unpatentable over Saccomanno et al. (US PGPub 2004/0105159 A1), Savant et al. (US PGPub 2001/0001459 A1), and Viitanen (WO 2005/079129 A1)” and further in view of Yare (referred to as “Densitron”). Ex. 2006, 18–19. The examiner relied on Yare for its disclosure of a plenum 70 placed behind the display device that accepts

circulating gas.” *Id.* at 18. Here, Petitioner contends that the challenged claims would have been obvious over the combined teachings of Ohta, Marumoto, and Yare, arguing that “to the extent that the combination of Ohta and Marumoto does not disclose or suggest a housing for use with a combined open and closed loop cooling system, it would have been obvious to include a housing such as that disclosed by Yare.” Pet. 86. Thus, the combination of Ohta, Marumoto, and Yare, and the unique arguments asserted in the Petition, were not previously presented to the Office. Accordingly, we determine that denying the Petition under § 325(d) is unwarranted based on the Office’s consideration of Yare during prosecution of the ’365 Application.

c) The 774 IPR

Patent Owner also directs us to the petition filed in the 774 IPR, which, Patent Owner asserts, uses Yare as a primary reference to challenge the ’572 patent. Prelim. Resp. 8 (citing Ex. 2008). Specifically, Patent Owner asserts that, in the 774 IPR, “the Board has already ‘determine[d] that Petitioners’ arguments and evidence are not sufficient to show a reasonable likelihood of prevailing with arguments that Yare anticipates claim 1 [of the ’572 patent]’ or ‘that claim 1 [of the ’572 patent] would have been obvious in view of Yare.’” *Id.* (citing Ex. 2008, 12–13). Patent Owner further contends that “the technical reasons the Board rejected Yare [in the 774 IPR] are applicable to the claims here.” *Id.* at 8–9.

In particular, Patent Owner argues that, in the 774 IPR, the Board noted that “claim 1 [of the ’572 patent] defines a single ‘gap’ formed by placing the planar surface adjacent to the rear of the electronic display through which cooling air is forced.” Ex. 2008 at 12. In the Petition’s consideration of Yare, “[t]he first ‘gap’ . . . is purportedly defined by the rear

wall of atmospheric zone 40 and the rear surface of electronic display 20 . . . The second ‘gap’ identifies—the ‘gap’ through which cooling air is forced—is atmospheric zone 40 itself” *Id.* at 13. However, “in claim 1 [of the ’572 Patent], the ‘placing’ and ‘forcing’ steps recite a single gap,” which the Petition does not reconcile. *Id.*

Prelim. Resp. 9 (alterations in original). Patent Owner goes on to state that “[s]imilarly, the claims of the ’287 Patent require such a single gap through which cooling air is forced.” *Id.*

The problem identified by the panel in the 774 IPR does not exist in this proceeding; here, the challenged claims do not include any limitations related to “a single ‘gap’ formed by placing the planar surface adjacent to the rear of the electronic display through which cooling air is forced.” Thus, Yare could meet limitations in the challenged claims of the ’287 patent, even if the panel in the 774 IPR determined that Yare was insufficient to meet claim 1 of the ’572 patent. To that end, here Petitioner asserts Yare, in combination with Ohta and Marumoto, with respect to the “housing” recited in the challenged claims. Pet. 86–87; *see* Ex. 1001, 6:8–21 (claim 1 reciting, *inter alia*, “an electronic display housing” with “a gas-containing closed loop gas cooling chamber located within” and “an open loop ambient air pathway” therethrough), 7:5–13 (claim 12 reciting, *inter alia*, “a housing” and “a liquid crystal display (LCD) positioned within the housing and having a backlight”), 7:35–8:4 (claim 18 reciting, *inter alia*, “a housing” with “an electronic display positioned within”), 8:13–29 (claim 21 reciting, *inter alia*, “an electronic display housing” with “a closed loop of cooling gas adapted for circulation” and “an electronic display” therein). In the 774 IPR, the independent challenged claims do not include limitations directed to a “housing.” Ex. 2008, 3 (reproducing independent claims 1 and 8).

Accordingly, we determine that denying the Petition under § 325(d) is unwarranted based on the Board's consideration of Yare in the 774 IPR.

B. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art (“POSITA”) “would have possessed a bachelor’s degree in a pertinent discipline, such as mechanical engineering, physics, product design, or a related field” and “2–4 years of experience in working with electronic displays and have an understanding of product design issues and failure modes associated with electronic displays.” Pet. 7 (citing Ex. 1002 ¶ 37). In the alternative, Petitioner argues that “a POSITA would have had 5–7 years of experience in the field working with electronic displays and have a similar understanding of product design issues and failure modes associated with electronic displays.” *Id.* (citing Ex. 1002 ¶ 37). At this stage of the proceeding, Patent Owner does not propose a different level of skill in the art, or address Petitioner’s proposed definition.

For purposes of this Decision, and based on the current record, we adopt the uncontested assessment offered by Petitioner.

C. Claim Construction

We construe each claim “in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” 37 C.F.R. § 42.100(b). Under this standard, claim terms are generally given their plain and ordinary meaning as would have been understood by a person of ordinary skill in the art at the time of the invention and in the context of the entire patent disclosure. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc). Only those terms in controversy need to be construed,

and only to the extent necessary to resolve the controversy. *Realtime Data LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019).

Based on the record before us, we determine that no claim term requires express construction for purposes of this Decision.

D. Asserted Obviousness over Karppanen

Petitioner contends that claims 12–23 would have been obvious over Karppanen. Pet. 26–46.

1. Overview of Karppanen

Karppanen “relates to an electronic information board comprising a frame, a flat display element for presenting information and electronic equipment for controlling the display element.” Ex. 1006, 1:3–5. Karppanen explains that “[t]he basic idea of the invention is that the display element and the electronics required for controlling the display are located separately from each other for facilitating the arrangements for temperature control and cooling of the information board.” *Id.* at 3:23–26. Karppanen further explains that, “[a]s a result, the information board has a modular structure, which also facilitates the maintenance and updating of the device.” *Id.* at 3:26–28.

Figure 2 is reproduced below.

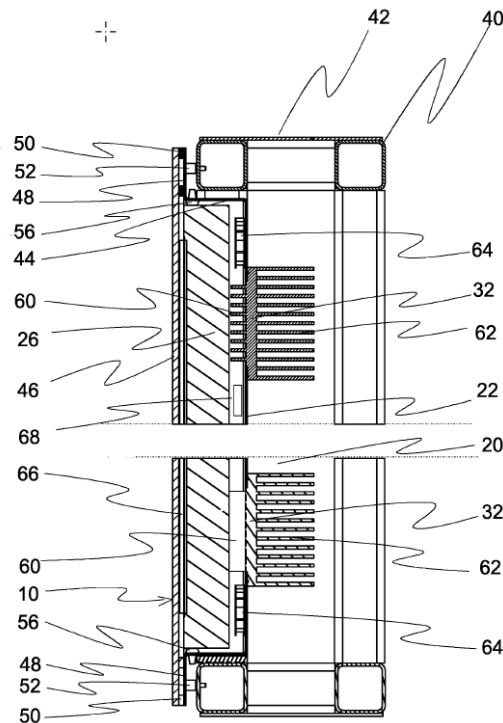


Fig. 2

Figure 2 is a cross-sectional drawing of an electronic information board described in Karppanen. The information board has frame 40 to an edge of which is fastened lining plate 42. Ex. 1006, 7:27–30. Display casing 10 comprises backwall 22, transparent front plate 46, and edge part 44. *Id.* at 7:31–32. Edge part 44 has flange-like fastening collar 48 running in the direction of the front plate and is fastened to the frame by fastening means 52. *Id.* at 7:32–34. Transparent front plate 46 is fastened to the fastening collar of the edge parts by means of sealing elements 50 so that the edge parts of the front plate and the back wall form a closed display casing. *Id.* at 7:35–38. Display element 26 is inside the display casing. *Id.* at 8:4. Cooling elements 32 are in the backwall of the display casing, with first heat transfer part 60 extending to the inside of the display casing, and second heat transfer part 62 extending to cooling space 20 outside the

display casing. *Id.* at 8:13–16. The cooling elements transfer excess thermal energy from the display casing to the cooling space, from which space it is further conducted by air flow produced by cooling fans 36 out of the entire device. *Id.* at 8:19–22.

First cooling element 32 in the upper half of is in the form of cooling fins. Ex. 1006, 9:1–3. Second cooling element 32 in is in the form of a conduction element set against the surface of display element 26. *Id.* at 9:13–16. Karppanen describes that fins, a conduction element, or both, can be used. *Id.* at 9:17–19. Fans 64 on back wall 22 circulate air in the space between display element 26 and the walls of display casing 10. *Id.* at 9:3–5. Ducting 66 is arranged between display casing 10 and display element 26 so that air flow circulating the display element and equalizing the temperatures can be effected by fans 64, which force the air of the inner casing to flow past front plate 46 of the device. *Id.* at 9:5–8.

Karppanen describes that thermal energy is conducted, by air flow produced by the cooling fans, from cooling space 20 thermal energy out of the entire device. Ex. 1006, 9:19–22. In one embodiment, “there are ventilator slots or holes on the opposite sides of the cooling space for enabling air flow from the outside of the information board to the cooling space and from the cooling space back to the outside of the information board.” *Id.* at 4:19–22.

2. *Claim 12*

Petitioner contends that Karppanen teaches all of the elements of independent claim 12. Pet. 26–32. In particular, Petitioner contends that Karppanen teaches “a housing” (weatherproof display and device casings 10 and 12) and “a liquid crystal display (LCD) positioned within the housing” (flat display element 26 can be a TFT LCD display and is positioned in the housing). *Id.* at 26–27 (citing Ex. 1006, code (57), Fig. 2; Ex. 1002 ¶ 108).

With respect to the “liquid crystal display . . . having a backlight” limitation of claim 12, Petitioner asserts that Karppanen teaches “that device 12 contains ‘electronic equipment needed in the control of the display element’ including ‘the power supplies of the background light of the display.’” *Id.* at 27 (citing Ex. 1006, 6:21–26). Petitioner contends that “[a] POSITA would understand ‘background light’ to refer to a backlight in LCD display 26 because a plasma display does not require any ‘background light.’” *Id.* at 28 (citing Ex. 1002 ¶ 112). Petitioner further contends that “a POSITA would understand that an LCD display necessarily includes a backlight because, an LCD stack, alone lacks any light source.” *Id.* (citing Ex. 1002 ¶ 114).

With respect to the “electronic display is coolable by a combination of a closed loop of isolated gas . . . and an open loop of ambient air . . .” limitation of claim 12, Petitioner first contends that Karppanen’s electronic display is placed into a sealed casing, and “is encircled by a closed loop of isolated gas which circulates within the housing.” Pet. 28 (citing Ex. 1006, 7:27–38, 9:3–8; Ex. 1002 ¶ 118). Petitioner contends that fans 64 circulate air in the space between the display element and the wall of the display casing, and ducting 66 directs the circulation of the air around the display element. *Id.* at 28–29 (citing Ex. 1006, 4:32–36, 9:3–8, Fig. 2). Because “[t]his closed loop of air ‘transfer[s] heat from the display casing to the outside of the display casing,’” Petitioner contends that Karppanen “teaches a closed loop that is capable of cooling the electronic display.” *Id.* at 29 (citing Ex. 1006, 3:28–32).

Petitioner contends that “Karppanen also teaches an open loop of ambient air which passes through the housing and along the backlight.” Pet. 29. Petitioner points to cooling space 20 located behind the electronic

display, which is thermally connected to the closed loop “through ‘cooling elements 32, which have a first heat transfer part 60 extending to the inside of the display casing and a second heat transfer part 62 extending to the cooling space 20 outside the display casing.’” *Id.* at 30 (citing Ex. 1006, 8:13–16, Fig. 2). Petitioner asserts that “[h]eat is transferred from the display to the first heat transfer part 60 (which touches the display inside the closed loop), then to a second heat transfer part 62 which is in the open loop of ambient air.” *Id.* (citing Ex. 1006, 8:16–22). As a result, Petitioner contends, the electronic display is capable of being cooled by the open loop of ambient air passing through the housing. *Id.* at 32 (citing Ex. 1006, 8:13–16, 8:29–36; Ex. 1002 ¶ 122).

At this stage of the proceeding, Patent Owner does not address Petitioner’s contentions with respect to claim 12.

Having reviewed Petitioner’s arguments, and the evidence of record, we are persuaded that Petitioner sufficiently establishes, for purposes of institution, that the teachings of Karppanen account for all of the recitation of independent claim 12. *See* Pet. 26–32; Ex. 1002 ¶¶ 102–124.

3. *Claims 13–17*

Petitioner contends that Karppanen teaches or suggests all of the elements of claims 13–17, which directly depend from claim 12. Pet. 32–39. At this stage of the proceeding, Patent Owner does not offer any specific arguments with respect to dependent claims 13–17. Based on the record before us, we are persuaded that Petitioner’s discussion of the particular structures in Karppanen, and the explanations in the Petition and Smith-Gillespie Declaration, sufficiently show that the teachings of Karppanen account for all of the elements of claims 13–17. Pet. 32–39; Ex. 1002 ¶¶ 125–143.

4. *Claim 18*

Petitioner contends that Karppanen teaches all of the elements of independent claim 18. Pet. 39–42. Petitioner contends that Karppanen teaches “a housing” and “the front surface of the electronic display is coolable by a closed loop of isolated gas and rear surface of the electronic display is coolable by an open loop of ambient gas” for the same reasons given for the similar limitations in claim 12. *Id.* at 39, 42. Petitioner contends that Karppanen’s flat display element 26, which can be an LCD and is located within the housing, meets the “an electronic display positioned within the housing” limitation of claim 18. *Id.* at 40.

Petitioner contends that Karppanen teaches “a rear cooling chamber positioned behind the electronic display and containing an electrical component which is electrically connected to the electronic display” because “there is a rear cooling chamber located between the rear surface of the electronic display 26 and the display case back wall 22” and “[i]t would have been obvious to place an electrical component that is electrically connected to the electronic display in the closed loop in order to cool it.” Pet. 40 (citing Ex. 1002 ¶ 153). Petitioner further contends that Karppanen teaches “a front surface on the electronic display which faces an intended viewer and a rear surface on the electronic display which opposes the front surface” because “Karppanen discloses a display element 26 having a front and back surface,” with a transparent front plate on the front surface “that ‘is preferably made of shock-resistant glass.’” *Id.* at 41 (citing Ex. 1006, 4:25–27, Fig. 2). Petitioner also contends that “[a] POSITA would understand that the front surface of the display in Karppanen faces an intended viewer.” *Id.* (citing Ex. 1002 ¶ 158).

At this stage of the proceeding, Patent Owner does not address Petitioner's contentions with respect to claim 18.

Having reviewed Petitioner's arguments, and the evidence of record, we are persuaded that Petitioner sufficiently establishes, for purposes of institution, that the teachings of Karppanen account for all of the recitation of independent claim 18. *See* Pet. 39–42; Ex. 1002 ¶¶ 144–162.

5. *Claims 19 and 20*

Petitioner contends that Karppanen teaches or suggests all of the elements of claims 19 and 20, which directly depend from claim 18. Pet. 42. At this stage of the proceeding, Patent Owner does not offer any specific arguments with respect to dependent claims 19 and 20. Based on the record before us, we are persuaded that Petitioner's discussion of the particular structures in Karppanen, and the explanations in the Petition and Smith-Gillespie Declaration, sufficiently show that the teachings of Karppanen account for all of the elements of claims 19 and 20. Pet. 42; Ex. 1002 ¶¶ 163–168.

6. *Claim 21*

Petitioner contends that Karppanen teaches all of the elements of independent claim 21. Pet. 42–45. For example, Petitioner contends that Karppanen teaches “a closed loop of cooling gas adapted for circulation within the electronic housing” limitation of claim 21 because, “[i]n addition to the closed loop that surrounds the electronic display discussed above [with respect to claim 12], Karppanen also teaches that a closed loop of air can be used to surround the electrical components located in the device casing.” *Id.* at 43 (citing Ex. 1006, 10:20–22). Petitioner contends that “[l]ike the display casing, the device casing is also ‘closed.’” *Id.* (citing Ex. 1006, 6:20–21). According to Petitioner, “[b]y using the same cooling

systems in both the display casing 10 and device casing 12, the cooling ‘air flow circulates as forced past all the components becoming warmed.’” *Id.* (citing Ex. 1006, 10:22–23).

At this stage of the proceeding, Patent Owner does not address Petitioner’s contentions with respect to claim 21.

Having reviewed Petitioner’s arguments, and the evidence of record, we are persuaded that Petitioner sufficiently establishes, for purposes of institution, that the teachings of Karppanen account for all of the limitations of independent claim 21. *See* Pet. 42–45; Ex. 1002 ¶¶ 169–189.

7. *Claims 22 and 23*

Petitioner contends that Karppanen teaches or suggests all of the elements of claims 22 and 23, which depend, directly and indirectly, respectively, from claim 21. Pet. 45–46. At this stage of the proceeding, Patent Owner does not offer any specific arguments with respect to dependent claims 22 and 23. Based on the record before us, we are persuaded that Petitioner’s discussion of the particular structures in Karppanen, and the explanations in the Petition and Smith-Gillespie Declaration, sufficiently show that the teachings of Karppanen account for all of the elements of claims 22 and 23. Pet. 45–46; Ex. 1002 ¶¶ 190–203.

E. Asserted Obviousness over Nagashima and Karppanen

Petitioner contends that claims 1, 4, 5, 8–12, 14–17, and 21–23 would have been obvious over the combined teachings of Nagashima and Karppanen. Pet. 46–64.

1. *Overview of Nagashima*

Nagashima is directed to liquid cooling technology for heat generating elements in “a desk-top type computer integrated or combined with a liquid crystal display (LCD).” Ex. 1007, 1:8–12. In particular,

Nagashima teaches fixing a heat receiving head connected to a tube filled with a cooling medium liquid to at least one heat generating portion of the computer. *Id.* at 2:28–33. Nagashima teaches that “[t]he cooling medium liquid circulating through the tube serves as a heat transferring medium to radiate the heat generated at the heat generating portion through the tube on the chassis surface and the chassis itself.” *Id.* at 2:33–37.

Figure 1 is reproduced below.

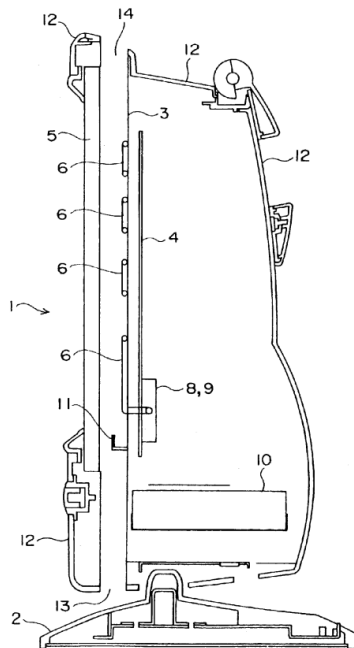


Figure 1 is a section view of an overall configuration for liquid cooling of desk-top type computer described by Nagashima. Ex. 1007, 2:59–61. The desk-top type computer comprises computer body 1 and stand 2. *Id.* at 3:53–55. Within computer body 1, LCD panel 5 is mounted on the front side of main chassis 3, with motherboard 4 disposed on the backside thereof. *Id.* at 3:55–58. CPU 9 and hard disk drive 10 are arranged on the backside of motherboard 4, and heat receiving head 8 is in contact with the heat generating elements. *Id.* at 4:4–10. Tube 6 is secured on the front side of main chassis 3, and circulates the cooling liquid medium to collect heat from

heat receiving head 8. *Id.* at 4:20–22, 4:51–53. Liquid collector 11 is provided to collect any cooling medium liquid that leaks from tube 6. *Id.* at 4:63–5:4. Cover 12 includes air inlet 13 for air-cooling the heat radiating portion of tube 6 and main chassis 3, and air outlet 14 for exhausting the air. *Id.* at 5:13–20.

Figures 6A and 6B are reproduced below.

FIG. 6A

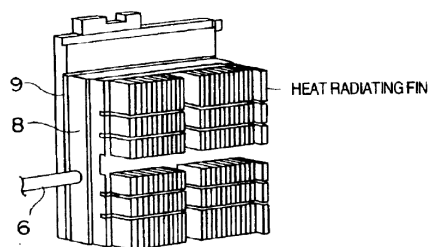
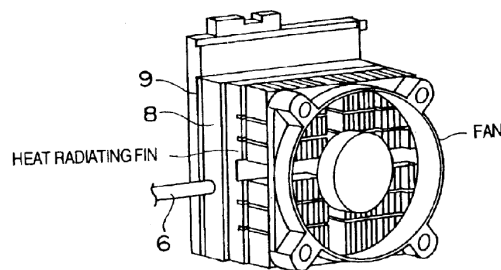


FIG. 6B



Figures 6A on the left and 6B on the right “are views illustrating configuration examples for liquid cooling and air cooling of a CPU” described in Nagashima. Ex. 1007, 3:8–10. Heat receiving head 8 is fixed to CPU 9 to receive the heat generated by CPU 9 and transfer the heat via the liquid cooling medium in tube 6 “to a heat radiating portion on the front side of a main chassis or the back side of an LCD panel” as in Figure 1. *Id.* at 6:64–7:7. A heat radiating fin is provided on heat receiving head 8. *Id.* at 7:7–8.

Nagashima explains that the configurations shown in Figures 6A and 6B are “aim[ed] at radiating by liquid cooling an extra heat that cannot be radiating from the heat radiating fin provided on the heat receiving head.” Ex. 1007, 7:9–12. Nagashima further explains that the fan provided on the radiating fin shown in Figure 6B “realizes the effective and rapid radiation of heat from the heat radiating fin.” *Id.* at 7:16–19. According to Nagashima, “the embodiment shown in FIG. 6 applies liquid cooling and air

cooling in combination to the heat generating source such as the CPU, and it is possible to increase the maximum capacity of heat radiation and improve the heat radiation efficiency.” *Id.* at 7:20–24.

2. *Claim 1*

We have reviewed the arguments and evidence of record thus far and find that, for purposes of institution, Petitioner adequately shows how Nagashima and Karppanen teach or suggest each limitation of claim 1. Pet. 46–55. Petitioner also sufficiently shows that a person of ordinary skill in the art would have had a reason to combine the teachings of Nagashima and Karppanen with a reasonable expectation of success. *Id.* at 64.

For purposes of this Decision and to provide guidance to the parties, we focus our discussion on the specific issue in dispute, namely Patent Owner’s argument that Petitioner does not adequately establish that Nagashima can be modified by or combined with Karppanen. Prelim. Resp. 12–13.

With respect to the “a gas-containing closed loop gas cooling chamber located within the electronic display housing” limitation of claim 1, Petitioner contends that Nagashima’s main chassis 3 and cover 12 are sealed, and “create a closed loop gas cooling chamber within the housing.” *Id.* at 48 (citing Ex. 1007, Fig. 1). Alternatively, Petitioner contends that, to the extent there are any openings in main chassis 3, a POSITA would have been motivated to modify Nagashima to seal the rear cooling chamber in which vital electronic components are located “to prevent dust, dirt and other contaminants from entering.” Pet. 64 (citing Ex. 1002 ¶ 287). Petitioner asserts that “Nagashima recognizes that ambient air traveling through the display may contain such contaminants including ‘dust and dirt.’” *Id.* (citing Ex. 1007, 6:13–16). Petitioner also contends that

“modifying Nagashima with Karppanen’s sealed rear closed loop cooling chamber advantageously constrains the flow of air, and ensures proper circulating of air within the chamber.” *Id.* (citing Ex. 1002 ¶¶ 288–290).

Patent Owner argues that Nagashima does not support Petitioner’s contention that a POSITA would have been motivated to seal the rear cooling chamber to prevent dust and dirt from entering. Prelim. Resp. 12. Patent Owner asserts that “the cited section of Nagashima states only that ‘This allows the air inlet and outlet openings in the lower and upper portions to be narrowed.’” *Id.* (citing Ex. 1007, 6:13–14).

Patent Owner, however, takes the this sentence out of context and ignores the rest of the passage on which Petitioner relies. In discussing the embodiment shown in Nagashima’s Figure 10, in which air ventilating fans are provided to cover the opening between the LCD panel and the main chassis, Nagashima states:

The provision of the fans shown in FIG. 10 can further expedite the movement of air. Further, the provision of the fans enables the transportation of a large volume of cooling air. This allows the air inlet and outlet opening in the lower and upper portions to be narrowed, thus causing the effect of thinning the apparatus and *suppressing the entry of dust and dirt.*

Ex. 1007, 6:11–16 (emphasis added). When read in context and in its entirety, this passage demonstrates that Nagashima recognizes that dust and dirt enters with the ambient air, and that suppressing the amount of dust and dirt is advantageous. On this record, we agree with Petitioner that Nagashima “recognizes that ambient air traveling through the display may contain such contaminants including ‘dust and dirt.’” *See* Pet. 48–49 (citing Ex. 1007, 6:11–16), 65 (citing Ex. 1007, 6:13–16).

Patent Owner also argues that the Smith-Gillespie Declaration is entitled to little weight because it repeats the assertions in the Petition without citing additional supporting evidence or providing any technical reasoning. Prelim. Resp. 12–13. While it is true that the Smith-Gillespie Declaration and the Petition are highly similar, neither are devoid of supporting evidence or reasoning. For the reasons explained herein, we are persuaded that the Petition and the Smith-Gillespie Declaration are sufficiently supported by the disclosures in Nagashima and Karppanen. For the purpose of this Decision, the weight given to the Smith-Gillespie Declaration is not dispositive for any disputed issue.

Having reviewed Petitioner’s and Patent Owner’s arguments and the evidence of record, we are persuaded that Petitioner sufficiently establishes, for purposes of institution, that the combined teachings of Nagashima and Karppanen account for all of the recitations of claim 1, and that a POSITA would have been motivated to combine the teachings as proposed with a reasonable expectation of success. *See* Pet. 46–55, 64; Ex. 1002 ¶¶ 204–229, 287–297.

3. *Claims 4, 5, 8–12, 14–17, and 21–23*

Petitioner contends that Nagashima and Karppanen teach or suggest all of the limitations of claims 4, 5, 8–12, 14–17, and 21–23. Pet. 55–63. At this stage of the proceeding, Patent Owner does not address Petitioner’s specific contentions with respect to these claims.

We have reviewed the arguments and evidence of record thus far and find that, for purposes of institution, Petitioner adequately shows how Nagashima and Karppanen teach or suggest each limitation of claims 4, 5, 8–12, 14–17, and 21–23. Pet. 55–63; Ex. 1002 ¶¶ 230–286. Petitioner also sufficiently shows that a person of ordinary skill in the art would have had a

reason to combine the teachings of Nagashima and Karppanen with a reasonable expectation of success. Pet. 64; Ex. 1002 ¶¶ 287–297.

F. Asserted Obviousness over Ohta and Marumoto

Petitioner contends that claims 1, 4, 5, and 8–23 would have been obvious over the combined teachings of Ohta and Marumoto. Pet. 48–50.

1. Overview of Ohta

Ohta relates to a cooling device for a plasma display panel that is integrally formed with, and able to improve the contrast of, the plasma display panel. Ex. 1004 ¶ 1. In particular, Ohta teaches that the cooling device “has a container that is directly mounted at an appropriate space from the plasma display panel so as to form an airtight container between itself and the plasma display panel, and coolant that either flows in/out of this airtight container or is sealed within the same.” *Id.* ¶ 6.

Figure 3 is reproduced below.

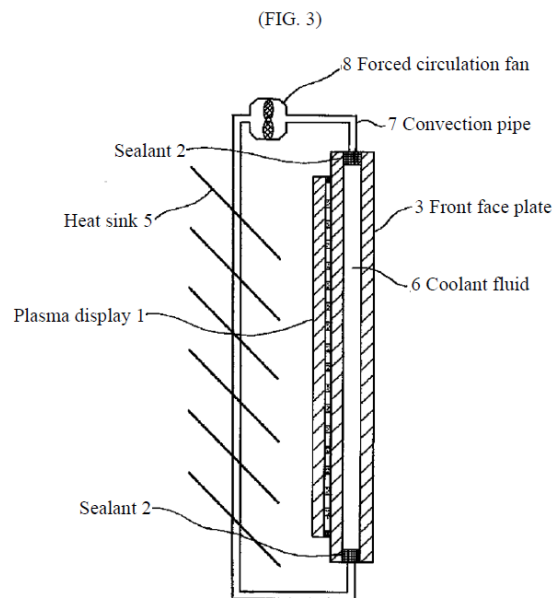


Figure 3 is a lateral cross-section of one embodiment (“embodiment example 3”) of the cooling system described in Ohta. Ex. 1004 ¶ 18. Front face plate 3 (having sufficient permeability to light) is integrated with a

plasma display panel 1 using sealant 2, which also serves as a spacer therebetween the edges, to form an airtight container between front face plate 3 and plasma display panel 1. *Id.* ¶ 19. “The top and bottom ends of the interior of the airtight container formed between first face plate 3 and the display face of the plasma display panel 1 are connected by means of a convection tube 7.” *Id.* Heat sinks 5 and forced circulation fan 8 are formed along the length of convection tube 7. *Id.* The interior of the airtight container formed between front face plate 3 and display panel 1, and convection tube 7, is filled with coolant fluid 6. *Id.* Ohta explains that the activation of forced circulation fan 8 causes cooling fluid 6 to circulate through convection tube 7 and within the interior of the airtight container formed between front face plate 3 and plasma panel 1. *Id.* ¶ 21. In this way, Ohta teaches, the heat from plasma display panel 1 is expelled to the exterior from heat sink 5, thus cooling plasma display panel 1. *Id.*

Figure 5 is reproduced below.

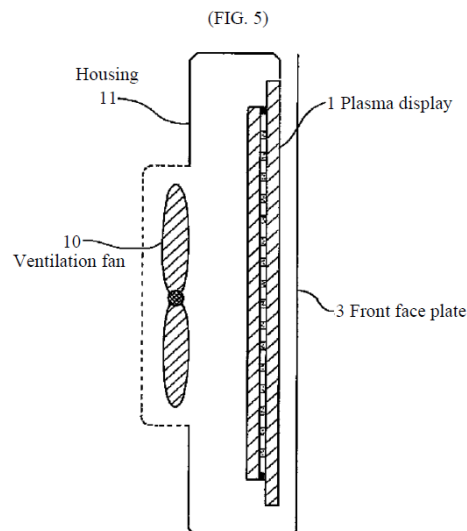


Figure 5 is a lateral cross-section of another embodiment (“embodiment example 5”) of the cooling device described in Ohta. Ex. 1004 ¶ 30. In embodiment example 5, “plasma display panel 1 is incorporated with a

housing 11 having an integrally formed front face plate 3 that maintains an appropriate distance between itself and the display face of the plasma display panel 1. *Id.* ¶ 31. A gap is provided at the bottom end of plasma display panel 1 and housing 11, so that outside air can be blown into the space between plasma display panel 1 and front face plate 3 in housing 11. *Id.* Slits are provided behind ventilation fan 10 for the intake of air. *Id.* Ohta explains that when ventilation fan 10 activates, it sends outside air through housing 11 into the space between front face plate 3 and plasma display panel 1, thus cooling panel display 1 when plasma display panel 1's heat is discharged to the exterior. *Id.* ¶ 33.

2. *Overview of Marumoto*

Marumoto “relates to a heating/cooling system for liquid crystal display panel that makes it possible to use a liquid crystal display panel beyond its operating temperature range.” Ex. 1005 ¶ 1. Marumoto's system includes

a panel heating/cooling plate, which comprises a high heat conductive plate positioned adjacently to the back face of a liquid crystal panel, in the interior of which a channel for heating/cooling material is formed; a temperature sensor that measures the temperature of the liquid crystal panel; and a temperature control component that adjusts the temperature of the heating/cooling material that is passed through the channel in the panel heating/cooling plate in accordance with the detection signal of a temperature sensor.

Id. ¶ 6.

Figure 1 is reproduced below.

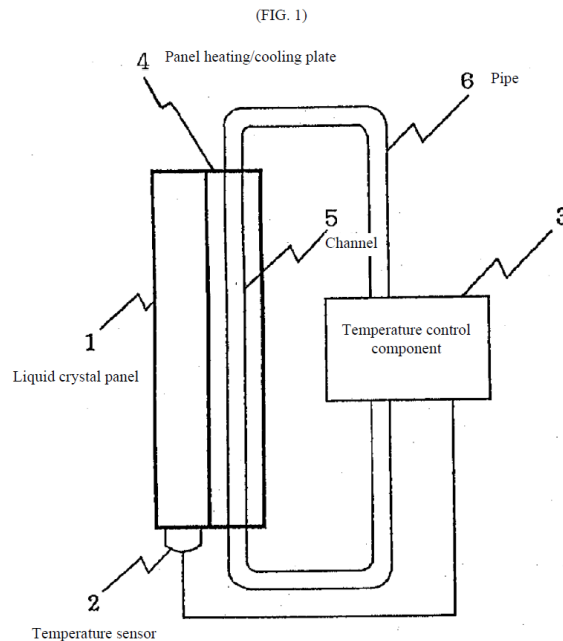


Figure 1 is a schematic drawing of one embodiment of Marumoto's heating/cooling system. Ex. 1005 ¶ 10. Temperature sensor 2 is attached to liquid crystal panel 1 to measure the temperature of the environment in which liquid crystal panel 1 is installed, and supplies that temperature to temperature control component 3. *Id.* Panel heating/cooling plate 4 is bonded to the back face of liquid crystal panel 1. *Id.* ¶ 11. Panel heating/cooling plate 4 comprises a high heat transmission plate, in the interior of which is channel 5. *Id.* The entry of channel 5 is connected to pipe 6, and the exit of channel 5 is connected to temperature control component 3 so that “the heating/cooling material circulates between the panel heating/cooling plate 4 and the temperature control component 3.” *Id.*

In operation, temperature control component 3 responds to the temperature reported by temperature sensor 2, and either raises or lowers the temperature of the heating/cooling material to heat or cool panel heating/cooling plate 4 as required. *Id.* ¶ 13. Marumoto teaches that “this is

achieved by increasing or reducing the gas pressure if the heating/cooling material is a gas,” or by increasing or reducing the fluid temperature if the heating/cooling material is a liquid (such as water). *Id.*

3. *Claim 1*

We have reviewed the arguments and evidence of record thus far and find that, for purposes of institution, Petitioner adequately shows how Ohta and Marumoto teach or suggest each limitation of claim 1. Pet. 65–70. Petitioner also sufficiently shows that a person of ordinary skill in the art would have had a reason to combine Ohta and Marumoto with a reasonable expectation of success. *Id.* at 83–85.

For purposes of this Decision and to provide guidance to the parties, we focus our discussion on the specific issue in dispute, namely Patent Owner’s argument that Petitioner improperly combines two separate embodiments in Ohta with respect to the “an electronic display housing” limitation of claim 1. Prelim. Resp. 13–16.

Petitioner contends that Ohta’s embodiment example 3 “discloses nearly all” of the limitations in claim 1, but does not explicitly disclose a housing. Pet. 65. Petitioner then point to Ohta’s embodiment example 5, in which plasma display panel 1 is incorporated with housing 11. *Id.* (citing Ex. 1004 ¶¶ 30–31). According to Petitioner, “a POSITA would understand that, based on the teaching in ‘embodiment example 5,’ the electronic display and cooling systems taught in Ohta could be included in the same housing.” *Id.* (citing Ex. 1002 ¶ 300). In the alternative, Petitioner contends that “a POSITA would be motivated to contain the display and its accompanying cooling system in a single housing to protect both from the environment during outdoor use and to facilitate easier transfer.” *Id.* (citing Ex. 1002 ¶ 300).

Patent Owner argues that Petitioner improperly “attempt[s] to combine two separate embodiments of Ohta in a way that is directly contrary to the problem Ohta is trying to solve.” Prelim. Resp. 13 (emphasis omitted). Patent Owner notes that, in identifying the problem to be solved by the invention, Ohta states that “[p]rior to now, either no cooling device whatsoever was used in a plasma display panel, or an integrated structure combining a plasma display panel 1, a housing 11, and a cooling fan 10 was used.” *Id.* at 14 (citing Ex. 1004 ¶ 4). Patent Owner argues that Ohta “describes two categories of solutions to the problem of the integrated device:” forming an airtight container that coolant flows in/out of, or mounting the front face panel at an appropriate space the from the plasma display panel and using a fan to ventilate that space. *Id.* (citing Ex. 1004 ¶¶ 6, 7). Patent Owner argues that, by combining embodiment example 5’s housing with embodiment example 3’s cooling system, Petitioner “ignor[es] the problem Ohta identifies—an integrated structure combining a plasma display panel 1, a housing 11, and a cooling fan 10.” *Id.* at 14–15.

We disagree, on this record, with Patent Owner’s characterization of the problem Ohta attempts to solve. Ohta explains that, “[p]rior to now, . . . an integrated structure combining a display panel 1, a housing 11, and a cooling fan 10 was used, as shown in FIG. 6, *with the primary goal of cooling the drive circuit of the plasma display panel* (not shown in drawing).” Ex. 1004 ¶ 4 (emphasis added). Ohta goes on to state:

For this reason, plasma display panels were usually cooled from the back side, *resulting in the problem of being unable to cool the substrate on the display-facing side*. This is particularly an issue in the case of the type of plasma display panel in which almost all display discharge is obtained on the substrate of the display face side, such as AC-driven surface discharge reflection-type plasma display panels.

Id. ¶ 5 (emphasis added). Thus, the problem Ohta is attempting to solve is cooling the display-facing side of a plasma display panel. *See also id.* ¶ 8 (“With the cooling device for plasma display panel of the present invention, cooling can be freely achieved on the display face side as well as on the rear side by using material that is permeable to visible light for both the container that forms the airtight container and for the coolant.”).

We further disagree, on this record, with Patent Owner’s argument that “combining the two example embodiments is improper because it modifies Ohta in a way that it is no longer suited for its intended purpose.” Prelim. Resp. 15–16. Patent Owner argues that “[e]xample embodiment 3 circulates a fluid in a closed system while example embodiment 5 circulates ambient air, which is incompatible with a closed, fluid-filled system.” *Id.* at 16. As we understand it, however, Petitioner does not propose physically combining the cooling systems described Ohta’s embodiment examples 3 and 5; instead, Petitioner proposes containing the system described in embodiment example 3 in a housing, as taught by embodiment example 5. *See, e.g.*, Pet. 65 (“a POSITA would understand that, based on the teaching in ‘embodiment example 5,’ the electronic display and cooling systems taught in Ohta could be included in the same housing”). This understanding is supported by Petitioner’s reliance on forcibly cooled heat sinks 5 in embodiment example 3 to meet the “an open loop ambient air pathway through the electronic display housing” limitation of claim 1. *Id.* at 68–69.

An obviousness analysis “can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR Int’l Co v. Teleflex, Inc.*, 550 U.S. 398, 418 (2007). Moreover, “[a] person of ordinary skill is also a person of ordinary creativity, not an automaton” (*id.* at 421), and “[c]ombining two embodiments disclosed adjacent to each

other in a prior art patent does not require a leap of inventiveness.” *Bos. Sci. Scimed, Inc. v. Cordis Corp.*, 554 F.3d 982, 991 (Fed. Cir. 2009). Against this backdrop, we are persuaded that a POSITA would have understood Ohta to be teaching or suggesting to those skilled in the art that the cooling system in embodiment example 3 could be contained in a housing, as is shown in embodiment example 5. Pet. 65; Ex. 1002 ¶¶ 298–301; *see also In re Fritch*, 972 F.2d 1260, 1264–65 (Fed. Cir. 1992) (noting that a reference stands for all of the specific teachings thereof as well as the inferences one of ordinary skill in the art would have reasonably been expected to draw therefrom).

Accordingly, having reviewed Petitioner’s and Patent Owner’s arguments and the evidence of record, we are persuaded that Petitioner sufficiently establishes, for purposes of institution, that the combined teachings of Ohta and Marumoto account for all of the recitations of claim 1, and that a POSITA would have been motivated to combine the teachings as proposed with a reasonable expectation of success. *See* Pet. 65–70, 83–85; Ex. 1002 ¶¶ 292–318, 405–414.

4. Claims 4, 5, and 8–23

Petitioner contends that Ohta and Marumoto teach or suggest all of the limitations of claims 4, 5, and 8–23. Pet. 70–85. At this stage of the proceeding, Patent Owner does not address Petitioner’s specific contentions with respect to these claims.

We have reviewed the arguments and evidence of record thus far and find that, for purposes of institution, Petitioner adequately shows how Ohta and Marumoto teach or suggest each limitation of claims 4, 5, and 8–23. Pet. 70–83; Ex. 1002 ¶¶ 292–404. Petitioner also sufficiently shows that a person of ordinary skill in the art would have had a reason to combine the

teachings of Ohta and Marumoto with a reasonable expectation of success. Pet. 83–85; Ex. 1002 ¶¶ 405–414.

G. Alleged Obviousness over Ohta, Marumoto, and Yare

Petitioner contends that, “to the extent that the combination of Ohta and Marumoto does not disclose or suggest a housing for use with a combined open and closed loop cooling system, it would have been obvious to include a housing such as that disclosed by Yare.” Pet. 86–87. Patent Owner argues that Petitioner’s contentions with respect to this ground “contain[] the same deficiencies as” Petitioner’s arguments based on Ohta and Marumoto, discussed above (*see supra* Section II.F.3). Prelim. Resp. 16.

Having determined that Petitioner adequately establishes, for purposes of institution, that Ohta and Marumoto disclose or suggest the claimed housing, we decline to address Petitioner’s arguments with respect to the combination of Ohta, Marumoto, and Yare.

H. Alleged Obviousness over Kitamura and Harris

Petitioner contends that claims 12–20 would have been obvious over the combined teachings of Kitamura and Harris, and that a POSITA would have been motivated to combine the teachings as proposed with a reasonable expectation of success. Pet. 87–102; Ex. 1002 ¶¶ 422–475. Patent Owner argues that Petitioner does not provide reasoning as to why a POSITA would have combined Kitamura and Harris. Prelim. Resp. 17–18. Having already determined that Petitioner establishes a reasonable likelihood of establishing that all of the elements of claims 12–20 are taught or suggested by the prior art as discussed above, we need not address this ground in full. We offer the following comments in response to the parties’ arguments and evidence to provide guidance to the parties.

Kitamura “relates to an LED display device in which a screen is provided on the front of the housing, and a plurality of light-emitting diodes and electrical members for control are provided within the housing.”

Ex. 1017 ¶ 1. The housing comprises an inner housing with cooling fins along its exterior, and an outer housing. *Id.* ¶ 10. The cooling fins are positioned in the space between the inner and outer housings. *Id.* Heat generated by the LEDs and electrical members conveys to the cooling fins, radiates into the space between the inner and outer housing, and discharges to the exterior. *Id.*

Harris relates “to an environmentally-sealed, convectively-cooled liquid crystal display (LCD) unit for use with a computer for operation in severe environments.” Ex. 1018, 1:6–9. The environmentally-sealed enclosure houses the LCD screen, and includes a removable rear cover that serves as a integral heat sink for the power supply that is mounted on the internal surface of the cover. *Id.* at 2:8–12. A backlighting device backlights the LCD screen, and a cooling plenum conductively and convectively cools the backlighting unit. *Id.* at 2:12–18. The cooling plenum includes a hollow chamber for air to flow from an air intake passage to an exhaust port. *Id.* at 5:18–23. A fan is mounted in the exhaust port for evacuating the generated heat through the exhaust port. *Id.* at 5:38–40.

Petitioner contends that

[a] POSITA would have been motivated to combine the teachings in Kitamura and Harris and to modify Kitamura by (i) replacing the direct-view LED display with an LCD and (ii) adding an open loop fan to duct 28 to facilitate cooling of the LCD backlight while retaining the close loop around the display and electrical components.

Pet. 99. Petitioner provides several reasons why a POSITA would be motivated to make the proposed modifications, including: (1) the structural similarity between the two electronic display assemblies, in particular Harris’s cooling plenum and Kitamura’s duct (*id.* at 92); (2) a POSITA would have recognized that LED displays, like that in Kitamura, have low resolution and limited applications, and that LCD panels and backlights, like that in Harris, have superior clarity and resolution (*id.* at 100); and (3) Harris suggests this modification, because Harris’s design “satisf[ied] a variety of identified test specifications for ‘vibration, shock, extreme temperature, [and] humid and dusty environments’” (*id.*, citing Ex. 1018, 8:42–9:22).

Patent Owner argues that “the Petition relies on ‘the structural similarity between the two electronic display assemblies, namely, the cooling plenum and the duct 28 in Kimura’ as the motivation to combine” and the Smith-Gillespie Declaration “merely parrots this.” Prelim. Resp. 17 (citing Ex. 1002 ¶ 438). As set forth above, however, structural similarity is only one of several reasons Petitioner offers for why a POSITA would be motivated to combine Kitamura and Harris.⁵ *See* Pet. 99–102 (citing Ex. 1002 ¶¶ 473–475). We have also reviewed the Smith-Gillespie Declaration, and disagree that it “merely parrots” the Petition. Although the Smith-Gillespie Declaration and the Petition are highly similar, Mr. Smith-Gillespie does provide supporting reasoning. *See, e.g.*, Ex. 1002 ¶¶ 472, 473.

Patent Owner also argues that Petitioner’s proposed combination of Kitamura and Harris “is a purely hindsight-driven exercise that relies upon

⁵ We do not express an opinion on the sufficiency of Petitioner’s proposed motivations.

the claim as a road map, which is improper.” Prelim. Resp. 17. In particular, Patent Owner argues that Petitioner’s contention that Kitamura and Harris are structurally similar “does not explain why it would be obvious to integrate two fundamentally different cooling mechanisms.” *Id.* at 17–18. Based on the current record, we find that Patent Owner’s arguments regarding the combination of Kitamura’s closed loop system and Harris’s open loop system have merit. Petitioner’s reasoning with respect to replacing the direct-view LED display with an LCD (superior clarity and resolution, Harris’s suggestion) does not explain why a POSITA would have added an open loop fan to a duct in Kitamura as Petitioner proposes. *See* Pet. 99–101. And because structural similarity alone generally does not constitute an articulated reasoning with rational underpinning as to why a POSITA would combine elements of one reference with another, it at least raises the issue of whether the combination was driven by hindsight. *See, e.g., Microsoft Corp. v. Enfish, LLC*, 662 F. App’x 981, 990 (Fed. Cir. 2016) (unpublished).

We invite the parties to develop these arguments further at trial, to the extent permitted under our rules.

I. Objective Indicia of Nonobviousness

As part of our obviousness analysis, we also consider whether objective indicia of nonobviousness (i.e., secondary considerations) may lead to a conclusion that the challenged claims would not have been obvious. *See, e.g., Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1538–39 (Fed. Cir. 1983) (instructing that evidence of secondary considerations, when present, must always be considered in determining obviousness).

Objective evidence of nonobviousness “is only relevant to the obviousness inquiry ‘if there is a nexus between the claimed invention and

the [objective indicia of nonobviousness].” *In re Affinity Labs of Tex., LLC*, 856 F.3d 883, 901 (Fed. Cir. 2017) (quoting *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1312 (2006)). A “nexus” is a legally and factually sufficient connection between the objective evidence and the claimed invention such that the objective evidence should be considered in the determination of obviousness. *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1332 (Fed. Cir. 2019); *see In re Paulsen*, 30 F.3d 1475, 1482 (Fed. Cir. 1994). A presumption of nexus arises where “the patentee shows that the asserted objective evidence is tied to a specific product and that product ‘embodies the claimed features, and is coextensive with them.’” *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019) (quoting *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1072 (Fed. Cir. 2018) (quoting *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1130 (Fed. Cir. 2000))); *see also Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 723 F.3d 1363, 1372 (Fed. Cir. 2013) (explaining that a “presumption of a nexus” exists where a product is “coextensive” with a patent claim). If, however, the patented invention is only a component of the commercial embodiment, the patentee is not entitled to a presumption of nexus. *Fox Factory*, 944 F.3d at 1374. In addition, “[a] patent claim is not coextensive with a product that includes a ‘critical’ unclaimed feature that is claimed by a different patent and that materially impacts the product’s functionality.” *Id.* at 1375. But, “[a] finding that a presumption of nexus is inappropriate does not end the inquiry into secondary considerations;” rather, “the patent owner is still afforded an opportunity to prove nexus by showing that the evidence of secondary considerations is ‘the direct result of the unique characteristics of the claimed invention.’” *Id.* at 1374 (quoting *In re Huang*, 100 F.3d 125, 140 (Fed. Cir. 1996)). Patent Owner bears the

burden of establishing that a nexus exists between the evidence of secondary considerations and the patented invention. *Id.* at 1373.

Patent Owner argues that “[t]here are multiple indicia of non-obviousness for the ’287 Patent with a nexus to [Patent Owner’s] outdoor and semi-outdoor electronic display products, which practice the ’287 Patent, including at least industry praise, commercial success, long-felt need, unsuccessful attempts by others, and copying.” Prelim. Resp. 18. Specifically, Patent Owner points to an email in which a representative of real-party-in-interest Samsung SDS America “praised [Patent Owner’s] technical achievements.” *Id.* at 20 (citing Ex. 2001). Patent Owner also asserts that “Samsung SDS America even attempted to enter into a ‘Mutual Non-Disclosure Agreement’ with [Patent Owner].” *Id.* (citing Ex. 2002).

Patent Owner argues that such praise “discusses Samsung’s belief that Patent Owner would be a ‘key partner in outdoor enclosures,’ and that Patent Owner’s innovations are both ‘impressive and unique’ and ‘rais[e] the bar for high quality standards.’” Prelim. Resp. 22 (citing Ex. 2001; Ex. 2003). Patent Owner also asserts that “Samsung saw ‘loads of opportunities for collaboration in the outdoor space (smart city, transit, rail, etc.) where we can embrace [Patent Owner’s] technology and blended in with Samsung displays.’” *Id.* (citing Ex. 2001). Patent Owner argues that “[t]his praise is all tied directly to the claimed invention, i.e., systems and products for effectively and efficiently cooling outdoor and semi-outdoor electronic displays,” which “make[s] these outdoor displays possible—through enabling efficient cooling while still protecting sensitive internal components from the elements.” *Id.*

To the extent that there is any praise in the cited evidence, Patent Owner does not tie it to any specific product that embodies, and is

coextensive with, the features claimed in the '287 patent. *See Fox Factory*, 944 F.3d at 1373. Nor does Patent Owner show that the cited evidence is the direct result of the unique characteristics of the invention claimed in the '287 patent. *See id.* at 1374. Patent Owner only generally states that “all of the secondary considerations relate to [Patent Owner’s] products and objective evidence ties directly to the claimed features, i.e., heat transfer systems that enable ‘all weather, outdoor, daylight viewable LCD products.’” Prelim. Resp. 21–22 (citing Ex. 2003). Although the cited evidence does express an interest in outdoor displays, that general category of product does not identify any specific technical feature that has impressed Samsung SDS America. And the challenged claims do not require “all weather, outdoor, daylight viewable LCD products.”

Accordingly, we are not persuaded, on this record, that Patent Owner has shown sufficient nexus between the asserted evidence and any challenged claim.

Patent Owner also asserts that, Petitioner “at least knew of the evidence of industry praise before filing the Petition because it was a Real Party In Interest that praised [Patent Owner’s] patented products.” Prelim. Resp. 18–19 (citing Exs. 2001–2003). For the same reasons discussed above with respect to nexus, the cited evidence (Exs. 2001–2003) is not sufficiently detailed to impose on Petitioner an obligation to address them in the Petition as objective evidence of nonobviousness. Thus, on this record, we decline to impose such an obligation on Petitioner.

J. Conclusion

Based on our consideration of the record before us, and for the reasons shown above, we determine that Petitioner establishes a reasonable likelihood of showing that that (1) Karppanen accounts for all of the

recitations of claims 12–23; (2) the combined teachings of Nagashima and Karppanen account for all of the recitations of claims 1, 4, 5, 8–12, 14–17, and 21–23; and (3) the combined teachings of Ohta and Marumoto account for all of the recitations of claims 1, 4, 5, and 8–23. We also determine that Patent Owner has not shown sufficient nexus between the asserted evidence and any challenged claim, and, thus, has not established that objective indicia of nonobviousness outweigh Petitioner’s evidence of unpatentability. Accordingly, we determine that Petitioner establishes a reasonable likelihood of prevailing in showing that (1) claims 12–23 would have been obvious over Karppanen; (2) claims 1, 4, 5, 8–12, 14–17, and 21–23 would have been obvious over the combined teachings of Nagashima and Karppanen; and (3) claims 1, 4, 5, and 8–23 would have been obvious over the combined teachings of Ohta and Marumoto. Have determined that Petitioner establishes a reasonable likelihood of showing that at least one of the challenged claims is unpatentable as set forth above, we also institute review with respect to Petitioner’s challenge that claims 1, 4, 5, and 8–23 would have been obvious over the combined teachings of Ohta, Marumoto, and Yare, and that claims 12–20 would have been obvious over the combined teachings of Kitamura and Harris. *See* 37 C.F.R. § 42.108(a) (“When instituting inter partes review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.”). Additionally, we decline to exercise our discretion under 35 U.S.C. § 325(d) to deny institution.

III. CONCLUSION

Based on the arguments in the Petition and the Preliminary Response, and the evidence of record, we determine that Petitioner establishes a reasonable likelihood that it will prevail on its challenge to at least one claim

of the '287 patent. Accordingly, we institute an *inter partes* review of all the challenged claims on all the grounds presented in the Petition.

The factual findings set forth in this Decision are preliminary and provided for the sole purpose of deciding whether to institute a review. Any final findings will be based on the full trial record, including any information presented in a timely filed response to the Petition. *See Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1068 (Fed. Cir. 2016) (noting that “there is a significant difference between a petitioner’s burden to establish a ‘reasonable likelihood of success’ at institution, and actually proving invalidity by a preponderance of the evidence at trial”) (quoting 35 U.S.C. § 314(a); comparing *id.*, with § 316(e)).

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that that an *inter partes* review is instituted with respect to all of the grounds asserted in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial, which shall commence on the entry date of this Decision.

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