

**UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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

Petitioners,

v.

MANUFACTURING RESOURCES INTERNATIONAL, INC.

Patent Owner

Title: SYSTEM FOR USING CONSTRICTED CONVECTION
WITH CLOSED LOOP COOLING SYSTEM AS THE
CONVECTION PLATE

U.S. Patent No. 9,629,287

Inter Partes Review No. IPR 2023-00255

**PETITIONERS' REPLY TO
PATENT OWNER'S RESPONSE**

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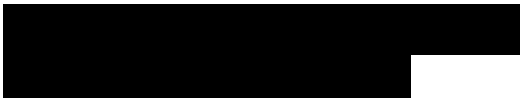
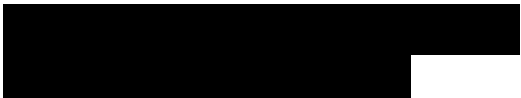


TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	RELATED ITC PROCEEDING	1
III.	CLAIM CONSTRUCTION	2
IV.	GROUND 1: KARPPANEN	2
A.	Karppanen Discloses a “Closed Loop” of “Isolated Gas”	2
B.	Karppanen Discloses an “Open Loop of Ambient Air . . . Along the Backlight”	4
C.	Karppanen Discloses “One or More Electronic Components for Driving the LCD Positioned Within the Rear Cooling Chamber”	5
D.	Karppanen Discloses “Substantially Perpendicular” Closed and Open Loop Airflow	6
V.	GROUND 2: NAGASHIMA IN VIEW OF KARPPANEN	6
A.	Nagashima Alone or in Combination Discloses a “Closed Loop” of “Isolated Gas”	6
B.	Nagashima Alone or in Combination Discloses “Coolable by a Combination”	8
C.	Nagashima Alone or in Combination Discloses “Substantially Perpendicular” Airflow	10
D.	A POSITA Would Have Been Motivated To Combine Nagashima with Karppanen	11



VI. GROUNDS 3–4: OHTA IN COMBINATION WITH MARUMOTO
AND YARE.....12

A. Ohta Alone or in Combination Renders Obvious a Housing.....12

B. Ohta Alone or in Combination Renders Obvious a “Closed
Loop” of “Isolated Gas” 13

C. Ohta Alone or in Combination Teaches an “Open Loop ...
Along the Backlight” 15

D. Ohta Alone or in Combination Renders Obvious “Electronic
Components” 16

E. Ohta Alone or in Combination Discloses an “Intended
Direction” 17

F. A POSITA Would Have Been Motivated To Combine Ohta
with Marumoto, or Marumoto and Yare 18

VII. GROUND 5: KITAMURA IN COMBINATION WITH HARRIS 19

VIII. THERE ARE NO SECONDARY CONSIDERATIONS 22

A. Long Felt Need, Failure, and Copying.....23

B. Commercial Success.....24

C. Industry Praise and Licensing 26

IX. CONCLUSION.....27

TABLE OF AUTHORITIES

	Page(s)
Cases	
<i>ABT Sys., LLC v. Emerson Elec. Co.</i> , 797 F.3d 1350 (Fed. Cir. 2015)	23
<i>In re Bigio</i> , 381 F.3d 1320 (Fed. Cir. 2004)	11
<i>In re Clay</i> , 966 F.2d 656 (Fed. Cir. 1992)	11
<i>Fox Factory, Inc. v. SRAM, LLC</i> , 944 F.3d 1366 (Fed. Cir. 2019)	24, 25
<i>Intel Corp. v. PACT XPP Schweiz AG</i> , 61 F.4th 1373 (Fed. Cir. 2023)	12
<i>Iron Grip Barbell Co., Inc. v. USA Sports, Inc.</i> , 392 F.3d 1317 (Fed. Cir. 2004)	24
<i>Ormco Corp. v. Align Tech., Inc.</i> , 463 F.3d 1299 (Fed. Cir. 2006)	23, 26
<i>Ruiz v. A.B. Chance Co.</i> , 357 F.3d 1270 (Fed. Cir. 2004)	18
<i>Shoes by Firebug LLC v. Stride Rite Children’s Grp., LLC</i> , 962 F.3d 1362 (Fed. Cir. 2020)	27

TABLE OF EXHIBITS

Exhibit	Description
1001	U.S. Patent 9,629,287 B2 to Dunn (“the ’287 patent”)
1002	Declaration of Robert Smith-Gillespie
1003	Curriculum Vitae of Robert Smith-Gillespie
1004	Certified Translation of Japanese Patent No. 3118907 to Ohta (“Ohta”)
1005	Certified Translation of Japanese Unexamined Patent Publication H8-152604 to Marumoto (“Marumoto”)
1006	International Patent Application No. PCT/FI2006/050145 with Publication No. WO2007116116A1 to Karppanen et al. (“Karppanen”)
1007	U.S. Patent No. 6,798,655 to Nagashima et al. (“Nagashima”)
1008	“Exhibit 22: Infringement Claim Chart for Samsung OH-Series Outdoor Display Products,” produced by Manufacturing Resources International, Inc. in In re Certain Outdoor and Semi-Outdoor Electronic Displays, Products Containing Same, and Components Thereof, Investigation No. 337-TA-1331
1009	Japanese Patent No. 3118907 to Ohta (“Ohta”)
1010	Japanese Unexamined Patent Publication H8-152604 to Marumoto (“Marumoto”)
1011	Claim Construction Order (D.I. 153) dated October 3, 2018 in

Exhibit	Description
	<i>Manufacturing Resources Int’l, Inc. v. Civiq Smartscapes, LLC, et al.</i> , Civil Action No. 17-269-RGA (D. Del.)
1012	Memorandum Opinion (D.I. 150) dated September 27, 2018 in <i>Manufacturing Resources Int’l, Inc. v. Civiq Smartscapes, LLC, et al.</i> , Civil Action No. 17-269-RGA (D. Del.)
1013	United Kingdom Patent Application No. GB 2402205A to Yare (“Yare”)
1014	File history for U.S. Patent Application No. 15/180,968
1015	Japanese Patent Application No. 2001-209126 A to Fujimori (“Fujimori”)
1016	Japanese Unexamined Patent Application Publication No. H8-54834 to Kitamura (“Kitamura”)
1017	Certified Translation of Japanese Unexamined Application Publication No. H8-54834 to Kitamura (“Kitamura”)
1018	U.S. Patent 5,748,269 to Harris, et al. (“Harris”)
1019	U.S. Patent No. 5,991,153 to Heady, et al. (“Heady”)
1020	Excerpts from the File History of U.S. Application No. 14,508,767
1021	U.S. Patent No. 6,825,828 (“Burke”)
1022	E. Fred Schubert & Jong Kyu Kim, <i>Solid-State Light Sources Getting</i>

Exhibit	Description
	<i>Smart</i> , 308 <i>Science</i> 1274 (2005) (“Schubert”)
1023	Military Handbook: Reliability Prediction of Electronic Equipment, DEPARTMENT OF DEFENSE, MIL-HDBK-217F (1991) (“MIL-HDBK-217F”)
1024	Allan Webber, <i>Calculating Useful Lifetimes of Embedded Processors</i> , TEXAS INSTRUMENTS INCORPORATED, SPRABX4 (Nov. 2014) (“Webber”)
1025	LIAN-TUU YEH & RICHARD C. CHU, THERMAL MANAGEMENT OF MICROELECTRONIC EQUIPMENT: HEAT TRANSFER THEORY, ANALYSIS METHODS, AND DESIGN PRACTICES (Dereje Agonafer ed., 2002) (“Yeh & Chu”)
1026	ALLAN W. SCOTT, COOLING OF ELECTRONIC EQUIPMENT (John Wiley & Sons, 1974) (“Scott”)
1027	DAVE S. STEINBERG, COOLING TECHNIQUES FOR ELECTRONIC EQUIPMENT (John Wiley & Sons, 1980) (“Steinberg”)
1028	U.S. Patent No. 6,504,713 (“Pandolfi”)
1029	U.S. Patent No. 4,327,803 (“Mullejeans”)
1030	U.S. Patent No. 5,002,118 (“Olmstead”)
1031	U.S. Patent No. 6,244,333 to Bergh et al. (“Bergh”)
1032	Memorandum Opinion (D.I. 181) dated March, 5, 2019 in

Exhibit	Description
	<i>Manufacturing Resources Int’l, Inc. v. Civiq Smartscales, LLC, et al.</i> , Civil Action No. 17-269-RGA (D. Del.)
1033	Redline of Corrected Petition
1034	Claim Construction Order (Order No. 13) dated May 15, 2023 in <i>In the Matter of Certain Outdoor and Semi-Outdoor Electronic Displays, Products Containing Same, And Components Thereof</i> , Inv. No. 337-TA-1331 (U.S.I.T.C.)
1035	Supplemental Certification of Translation Accuracy by Marie Cochrane for Certified Translation of Japanese Patent No. 3118907 to Ohta (“Ohta”) (Ex. 1004)
1036	Supplemental Certification of Translation Accuracy by Marie Cochrane for Certified Translation of Japanese Unexamined Patent Publication H8-152604 to Marumoto (“Marumoto”) (Ex. 1005)
1037	Supplemental Certification of Translation Accuracy by Marie Cochrane for Certified Translation of Japanese Unexamined Application Publication No. H8-54834 to Kitamura (“Kitamura”) (Ex. 1017)
1038	Supplemental Certification of Translation Accuracy by Dan McCourt for Certified Translation of Japanese Patent No. 3118907 to Ohta (“Ohta”) (Ex. 1004)
1039	Supplemental Certification of Translation Accuracy by Dan McCourt for Certified Translation of Japanese Unexamined Patent Publication

Exhibit	Description
	H8-152604 to Marumoto (“Marumoto”) (Ex. 1005)
1040	Supplemental Certification of Translation Accuracy by Dan McCourt for Certified Translation of Japanese Unexamined Application Publication No. H8-54834 to Kitamura (“Kitamura”) (Ex. 1017)
1041	Declaration of Srikanth K. Reddy in Support of Motion for <i>Pro Hac Vice</i> Admission Under 37 C.F.R. § 42.10(c)
1041	Corrected Declaration of Srikanth K. Reddy in Support of Motion for <i>Pro Hac Vice</i> Admission Under 37 C.F.R. § 42.10(c)
1042	Final Initial Determination on Violation of Section 337 in <i>Certain Outdoor and Semi-Outdoor Electronic Displays, Products Containing Same, and Components Thereof</i> , Investigation No. 337-TA-1331 [CONFIDENTIAL]
1043	December 13, 2023 Deposition of Himanshu Pokharna
1044	Excerpt of Day 3 Hearing Testimony in Investigation No. 337-TA-1331 [CONFIDENTIAL]
1045	Excerpt of Day 1 Hearing Testimony in Investigation No. 337-TA-1331
1046	Samsung Outdoor display OHA, OHB series Brochure, <i>available at</i> https://displaysolutions.samsung.com/pdf/brochure/7924/Samsung_OH_A_OHB_series_Brochure_220310_Web.pdf

Exhibit	Description
1047	Excerpt of Day 5 Hearing Testimony in Investigation No. 337-TA-1331
1048	https://lg-mri.com/boldvu-outdoor-lcd-displays/
1049	Excerpt of October 24, 2018 Deposition Transcript of William Dunn [CONFIDENTIAL]

I. INTRODUCTION

As set forth in the Corrected Petition (“Pet”), the Challenged Claims are obvious. Karppanen, Nagashima, Ohta, and Kitamura disclose electronic display assemblies positioned within housings that employ open and closed loop airflows to cool a display. These references, alone and in combination with secondary references, render obvious the Challenged Claims 1–23.

In view of the strong showing of obviousness, MRI in its Patent Owner Response (“POR”) resorts to unduly narrow claim interpretations, misconstructions of the prior art, and weak secondary considerations arguments that lack nexus to the Challenged Claims. These arguments all fail, and the Challenged Claims should be found unpatentable.

II. RELATED ITC PROCEEDING

On November 13, 2023, Administrative Law Judge Monica Bhattacharyya issued a Final Initial Determination on Violation of Section 337 in related matter *Certain Outdoor and Semi-Outdoor Electronic Displays, Products Containing Same, and Components Thereof*, Inv. No. 337-TA-1331 (“ITC proceeding”). Ex. 1042. Although the ALJ held that Karppanen (Ex. 1006) does not render claim 12 of the ’287 patent obvious by clear and convincing evidence, the ALJ nonetheless found that Karppanen discloses a closed loop of isolated gas—a finding which contravenes MRI’s primary argument in this proceeding. *See id.*, 237–45. The ALJ

credited testimony from Mr. Smith-Gillespie (*see id.*, 244–45), who also submitted a declaration in this proceeding (Ex. 1002). Further, the ALJ concluded that MRI’s alleged evidence of secondary considerations—repeated again in this proceeding—is “not entitled to significant weight.” *Id.*, 288; *see also id.*, 288–99.

No party presented argument during the ITC evidentiary hearing based on: (1) Nagashima (Ex. 1007) and Karppanen [Ground 2]; (2) Ohta (Ex. 1004) and Marumoto (Ex. 1005) [Ground 3], Ohta, Marumoto, and Yare (Ex. 1013) [Ground 4]; or (3) Kitamura (Ex. 1017) and Harris (Ex. 1018) [Ground 5].

III. CLAIM CONSTRUCTION

Samsung’s proposed constructions should be adopted for the reasons discussed in the Corrected Petition (*see Pet.*, 9–12). MRI nominally argues that “between” and “open loop of ambient air which passes through the housing and along the backlight” should be accorded their ordinary meaning, but relies on the ALJ’s construction of “closed loop” as “a gas pathway forming a complete loop, within a display housing.” *See* POR, 8–10; *see also* Ex. 1034, 30–31, 42–54, Ex. 1042, 39 & n.8. The Challenged Claims are invalid under any proposed construction.

IV. GROUND 1: KARPPANEN

A. Karppanen Discloses a “Closed Loop” of “Isolated Gas”

MRI argues that Karppanen does not disclose a “closed loop” of “isolated gas,” or one that is “essentially isolated from external air” under Samsung’s

proposed construction, because MRI alleges it is “silent” as to an “IP rating” and “whether dust and water can enter the system.” POR, 10–13. MRI is incorrect.

First, there is no basis, other than conclusory expert testimony, to equate an IP rating with this limitation. *See* POR, 11–12. Though MRI’s expert, Dr. Pokharna, opines that an enclosure must be rated IP55 to be “substantially free from contaminates and/or particulate” (Ex. 2024, ¶92), he acknowledged that entirely *open loop* systems (i.e., the antithesis of “closed loop” systems) in the prior art, which use filters to keep out dust and contaminants, have been rated IP56 (Ex. 1047, 1279:12–16). Accordingly, a POSITA would not distinguish a closed loop from an open loop based on an IP rating, and Karppanen’s omission of an IP rating for its display casing is irrelevant.

Second, MRI ignores Karppanen’s relevant disclosures. Karppanen’s electronic information board is “suitable for installation outdoors” (Ex. 1006, 3:8–15) and explains how the display and device casings are protected. The display is placed into a “closed display casing” made “weatherproof” using “sealing elements.” *Id.*, 6:17–24, 4:6–8, 7:35–38. Meanwhile, the ventilator slots (through which ambient air flows) “can be provided with filters in order to prevent the access of impurities to the ventilation space,” located between the display and device casings, indicating that dust and contaminants should not enter. *Id.*, 7:19–21. Thus, a POSITA would have understood that the display casing is “essentially isolated”

from the external air in the cooling space and substantially free of dust or contaminates. Ex. 1002, ¶118.

Notably, the ALJ found that Karppanen discloses a “closed loop of isolated gas” finding Mr. Smith-Gillespie’s testimony “persuasive and supported by Karppanen’s disclosure.” Ex. 1042, 244–45.

B. Karppanen Discloses an “Open Loop of Ambient Air . . . Along the Backlight”

MRI argues that Karppanen does not render obvious an “open loop of ambient air . . . along the backlight.” POR, 13–17. Under the proper construction of this limitation, MRI is incorrect.

This limitation does not require the ambient air to contact a surface of the backlight, as confirmed by the prosecution history. Pet., 11–12; Ex. 1002, ¶¶75–76. MRI argues that “Samsung’s assertion renders the entire phrase ‘which passes through the housing and along the backlight’ superfluous.” POR, 16. But MRI has no support for its contention that “[i]n thermal communication with’ merely recites the same physical phenomena of ‘coolable.’” *Id.* In particular, MRI omits that Samsung’s proposed construction is “in thermal communication with, *the backlight*,” and that the specification distinguishes between a “backlight” and an “electronic display.” *See, e.g.*, Ex. 1001, Fig. 2, 4:64–5:6 (discussing “electronic display 80” and “backlight 140”); Fig. 3E (showing ambient airflow between “backlight” and “electronic display”).

The ALJ found that Samsung had not shown by clear and convincing evidence that Karppanen discloses this limitation, but did not adopt Samsung's proposed construction. Ex. 1042, 241–42. MRI does not dispute that Karppanen discloses this limitation under Samsung's construction. *See* POR 13–17.

C. Karppanen Discloses “One or More Electronic Components for Driving the LCD Positioned Within the Rear Cooling Chamber”

MRI and its expert's argument that Karppanen does not disclose claim 15 is based in part on an improper reading of limitations into the claim. MRI argues that “[t]he ‘rear cooling chamber’ is a portion of the closed loop cooling chamber that passes behind the LCD,” citing to claim 14 in support. POR, 17–18; Ex. 2024, ¶104; Ex. 1043, 26:8–17. Claim 15, however, *depends solely from claim 12*, and *neither claim includes any requirement that the “rear cooling chamber” contain the “closed loop” of gas*. Ex. 1043, 23:4–6.

Regardless, Karppanen teaches or suggests including an electronic component for driving the LCD in its display casing, which contains a “closed loop.” Ex. 1002, ¶¶135–37. MRI does not address Mr. Smith-Gillespie's testimony that a POSITA would have expected the driver for the backlight to be located in the display casing and in the rear chamber to avoid obstructing the display image. *See* POR, 17–19; Ex. 1002, ¶137. And contrary to MRI's suggestion, the claim does not require that *all* driving components be located in the rear cooling chamber.

D. Karppanen Discloses “Substantially Perpendicular” Closed and Open Loop Airflow

MRI mistakenly contends that Karppanen is silent regarding the orientation of the closed loop airflow, and that if anything, it is parallel to the open loop airflow. POR, 19–20. But MRI admits Karppanen discloses “horizontal flow ducts 72” for the open loop. *See* POR, 19; Ex. 1006, 11:2, Fig. 3. Dr. Pokharna also conceded that the intended direction of the ambient airflow is horizontal across the cooling space behind the display. Ex. 1043, 28:23–29:2.

The closed loop in the display casing encircles the display. *See* Ex. 1006, 4:32–36, 9:3–8; Pet., 28–29. Such airflow along the front and rear surfaces of the display is in the vertical direction, perpendicular to the horizontal ambient airflow. Pet., 37.

Moreover, Karppanen states that while the open loop “flow ducts” are depicted “in a horizontal position,” they may also be formed “in a vertical or oblique position.” Ex. 1006, 11:13–15. In this orientation, the closed loop air flowing on the top and bottom display surfaces also satisfies this limitation.

V. GROUND 2: NAGASHIMA IN VIEW OF KARPPANEN

A. Nagashima Alone or in Combination Discloses a “Closed Loop” of “Isolated Gas”

Citing alleged vents at the bottom of Figure 1, MRI contends that the “context” of Nagashima as an “all-in-one” PC reflects that it lacks a “closed loop” of “isolated gas.” POR, 21–24. MRI also argues that a POSITA would not be

motivated to modify Nagashima because Karppanen allegedly does not disclose this limitation; and a POSITA would not have been motivated to use Karppanen's solutions in a PC. *Id.*, 24. MRI is incorrect.

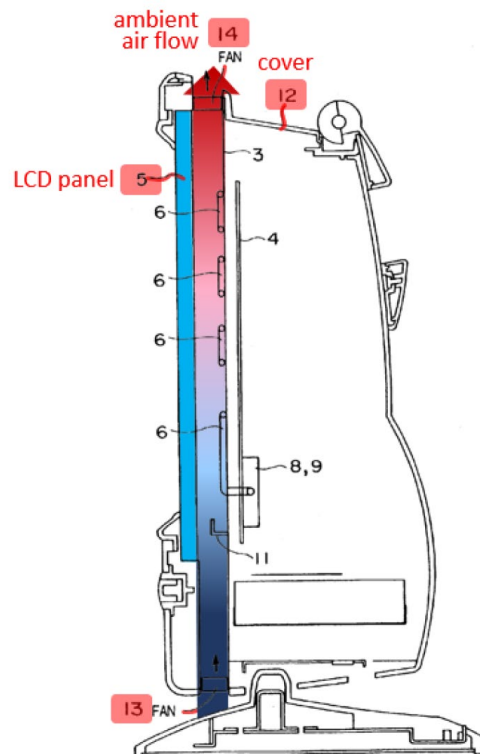
First, Nagashima discloses a closed loop of isolated gas. Pet., 48–51; Ex. 1002, ¶¶212–19; Ex. 1007, Figs. 1 & 2. There is no evidence the small opening shown in Figure 1 prevents the formation of a closed loop, or that air enters or exits the rear chamber. Ex. 1002, ¶217. Rather, gas within the cooling chamber immediately behind LCD mother board 4 is essentially isolated from the open loop ambient air by the main chassis 3 and cover 12, which are sufficiently sealed so that dust and contaminants cannot enter the chamber. Ex. 1002, ¶¶230, 212–15; Ex. 1007, Figs. 1 & 2.

Second, even if Nagashima's main chassis 3 and cover 12 include openings that permit gas and dust to enter, it would have been obvious to a POSITA to alter those openings to prevent entry of contaminants. Pet., 64. Indeed, as the Board noted, Nagashima discloses “suppressing the entry of dust and dirt” as advantageous. Paper 11 (Institution Decision), 28; Ex. 1007, 6:11–16. Further, a POSITA would have been motivated to combine Nagashima and Karppanen to seal any openings based on Karppanen's disclosure for the reasons set forth in the Corrected Petition and below (*infra* V.D). Pet., 64; Ex. 1002, ¶¶216, 287–91.

B. Nagashima Alone or in Combination Discloses “Coolable by a Combination”

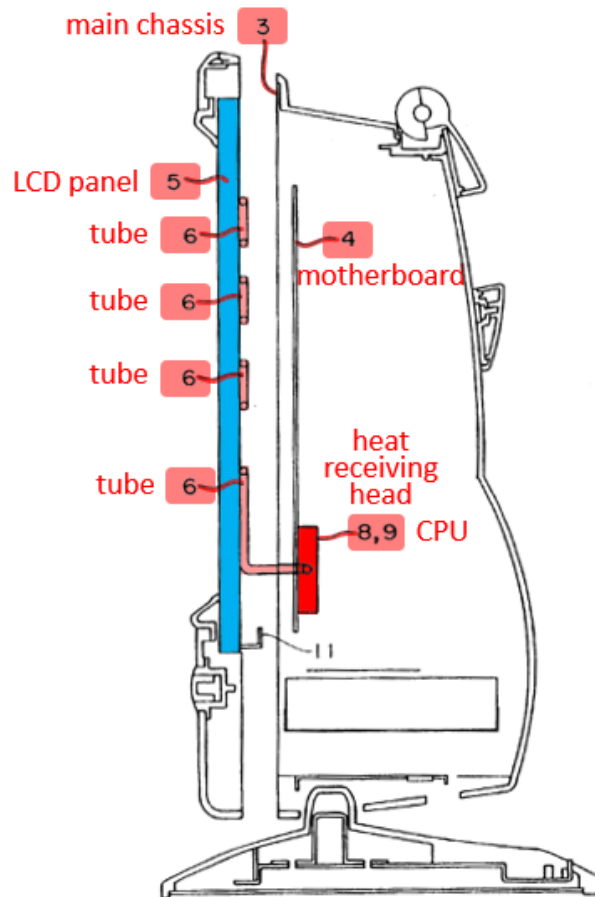
MRI contends that Nagashima does not disclose or render obvious the requirement of claims 1, 12, and 21 that the LCD be “coolable by a combination” of both the open and closed loops. POR, 24–25. MRI argues that there is no evidence that tubes ever cool the rear surface of Nagashima’s display. *Id.*, 25. MRI, however, incorrectly assumes the tubes contain liquid that is warmer than the LCD.

In Nagashima, ambient air flows through a “chimney” between LCD panel 5 and main chassis 3 shown in Figure 10 (annotated below) and an “air ventilation fan” can be added to cool the display and the liquid in the tubes.



Ex. 1007, Fig. 10 (annotated), 5:13–22, 5:61–63, 6:4–13; Ex. 1002, ¶¶225–29.

Although MRI contends there is no evidence that tube 6 is in conductive thermal communication with the rear cooling chamber formed by main chassis 3 and rear cover 12, that is precisely what is demonstrated by Figures 10 and 4:



Ex. 1002, ¶¶226, 229; Ex. 1007, Fig. 4 (annotated). Critically, Dr. Pokharna conceded that when the open loop fan is added to the “chimney,” “ambient air is then flowing over the tube that’s connected between the LCD and the main chassis.” Ex. 1043, 38:18–39:12. There is thus no evidence to support the proposition from MRI and Dr. Pokharna that the liquid in the tubes is warmer than the LCD. Rather, by circulating air and cooling the liquid in the tubes, Nagashima’s closed loop cools

the display. Pet., 54–55. Likewise, heat from the LCD can be transferred to the liquid in the tubes and then radiated by the fan and fins on the heat receiving head. Ex. 1002, ¶226.

C. Nagashima Alone or in Combination Discloses “Substantially Perpendicular” Airflow

Relying upon Dr. Pokharna’s declaration (Ex. 2024, ¶¶122–26), MRI argues that Nagashima does not disclose closed loop airflow “substantially perpendicular” to the “intended direction” of the open loop airflow (POR, 26). However, at deposition, Dr. Pokharna conceded that “in Figure 10 in Nagashima, it’s teaching that the ambient airflow located between the LCD display and the main chassis moves *in a vertical direction*,” and that to a POSITA this also was “the intended direction taught in Nagashima” Ex. 1043, 40:8–19 (emphasis added). Dr. Pokharna also acknowledged that “there are limited ways in which the air can flow.” *Id.*, 40:23–43:11.

Nagashima’s closed loop air flows substantially in a horizontal direction as a result of the fan regardless whether the fan is forcing air into, or drawing air out of, the fin. Pet., 56. Thus, Nagashima’s open loop vertical airflow is substantially perpendicular to the closed loop airflow. Ex. 1002, ¶232.

D. A POSITA Would Have Been Motivated To Combine Nagashima with Karppanen

MRI argues that Nagashima and Karppanen are not in the same field and Nagashima's cooling solutions are "not reasonably pertinent" to large outdoor electronic display cooling. POR, 26–27. MRI is incorrect.

Nagashima is analogous art that is both from the same field of endeavor and reasonably pertinent to the inventor's particular problem. *See In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004). First, Nagashima, Karppanen, and the '287 patent each address the field of electronic displays. *See id.* at 1327 (finding prior art toothbrush references in the same field of endeavor as hair brush patent). None of the Challenged Claims limit the size or location of the display, and some do not even limit the type of display. Regardless, Nagashima's teachings regarding cooling and preventing contaminants from entering the systems' cooling chambers are applicable to any LCD display systems. Ex. 1002, ¶287; *see also In re Clay*, 966 F.2d 656, 659 (Fed. Cir. 1992) ("[T]he purposes of both the invention and the prior art are important in determining whether the reference is reasonably pertinent to the problem the invention attempts to solve.").

Karppanen discloses that device casing 12 is positioned behind the electronic display (Ex. 1006, Fig. 1), and includes its own cooling elements 32 and 36, so as to form its own rear cooling chamber (Pet., 40–41; Ex. 1006, 7:7–22; Ex. 1002, ¶155). Thus, modifying Nagashima with Karppanen's sealed closed loop cooling chamber

advantageously constrains the flow of air, and ensures proper circulation of air within the chamber. Ex. 1002, ¶¶288–90. The combination combines known prior art techniques (using fans to move heated air) according to known methods (employing a closed loop in a sealed chamber) to obtain the predictable results of reliable temperature and pressure efficiency. *Id.*, ¶291; *see Intel Corp. v. PACT XPP Schweiz AG*, 61 F.4th 1373, 1380–81 (Fed. Cir. 2023) (“There is a motivation to combine when a known technique has been used to improve one device, and a [POSITA] would recognize that it would improve similar devices in the same way.”).

VI. GROUNDS 3–4: OHTA IN COMBINATION WITH MARUMOTO AND YARE

A. Ohta Alone or in Combination Renders Obvious a Housing

MRI contends that Ohta with Marumoto alone, or additionally with Yare, do not render obvious a “housing.” POR, 28–30. MRI argues that Samsung improperly relies on the embodiments of Ohta’s Examples 3 and 5 and that Ohta’s Example 5 would not function “as needed” if combined with Example 3. *Id.*

Yet, these are the same arguments that the Board already rejected in observing that Samsung is not “propos[ing] [to] physically combin[e] the cooling systems described in Ohta’s embodiment examples 3 and 5; instead [Samsung] proposes containing the system described in embodiment example 3 in a housing, as taught by embodiment example 5.” Paper 10 (Institution Decision), 36. Further, a POSITA

would have been motivated to contain the display and its cooling system in a single housing to protect from the environment during outdoor use and to facilitate physical transfer of the display. Pet., 65; Ex. 1002, ¶300.

MRI's argument that a POSITA would not alternatively look to Yare's housing because Yare's display is in a cabinet and supposedly would have its own housing (POR, 30), was rejected in the ITC proceeding. The ALJ found that Yare's cabinet satisfied the identical "housing" requirement of claim 6 of MRI's U.S. Patent No. 11,013,142. Ex. 1042, 282. Finally, while MRI contends there would have been no motivation to combine these references since Yare includes "additional structures" that MRI contends would require a POSITA to refine the closed or open loop pathways (POR, 30), MRI ignores that Yare teaches the benefits of including such pathways within a single housing. Ex. 1002, ¶¶418–20; Ex. 1013, 7:8–20, Fig. 1.

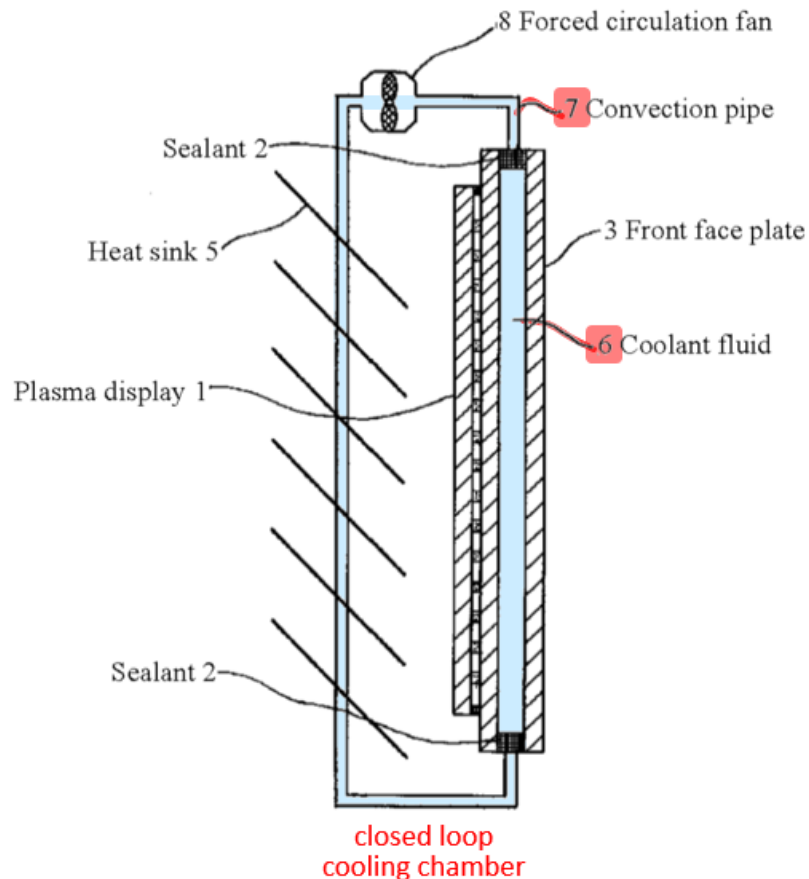
B. Ohta Alone or in Combination Renders Obvious a "Closed Loop" of "Isolated Gas"

MRI contends that Ohta with Marumoto does not disclose a "closed loop" of "isolated gas." POR, 32–33.

Once again, MRI misconstrues Samsung's positions by suggesting Samsung proposes a physical combination of Ohta's and Marumoto's closed loops. *See id.* Samsung does not rely on this physical combination; rather, the combination renders obvious the limitation because each discloses a closed loop for cooling, and

Marumoto advantageously suggests isolated air can be used to produce the cooling effect. Pet., 66–67.

MRI does not dispute that Ohta discloses a closed loop cooling chamber located within the housing.



Ex. 1004, Fig. 3 (annotated), ¶[0021]. The container having the closed loop is “sealed” and “airtight,” and hence “isolated.” *Id.*, ¶[0006].

Marumoto’s Figure 1 similarly discloses a closed loop “cooling/heating system for liquid crystal panel” where the “heating/cooling material may be a gas or a fluid.” Ex. 1005, ¶¶[0006]–[0007], Fig. 1. A POSITA would have been motivated

to modify Ohta's closed loop *by replacing the cooling fluid with gas*, since Marumoto also discloses a closed loop. Pet., 67; Ex. 1002, ¶¶319–21.

C. Ohta Alone or in Combination Teaches an “Open Loop ... Along the Backlight”

MRI contends that Ohta with Marumoto does not disclose an “open loop of ambient air” passing through the housing “and along the backlight.” POR, 34–35. MRI admits Ohta discloses the use of forced convection over a heat sink. *Id.*, 34; *see also* Ex. 1004, ¶¶[0019], [0024], Fig. 3. MRI nonetheless contends that because Ohta does not discuss the specific location of the heat sinks, a POSITA would not conclude that forced air convection over them passes along the backlight. POR, 34. In doing so, MRI illogically criticizes Samsung for suggesting that it would have been obvious to position an open loop fan in Ohta in a direction that cools both the heat sink and the rear surface of the LCD containing a backlight, even though Ohta suggests multiple positions for that fan and contemplates cooling the heat sink. *Id.*, 34–35; *see also* Ex. 1002, ¶¶313, 317.

Further, MRI does not address Samsung's explanation of how Marumoto's teachings would have been used to modify Ohta. Dr. Pokharna conceded at his deposition that Figure 1 of Marumoto discloses an LCD panel that may be a “passive matrix type.” Ex. 1043, 50:20–51:17. Dr. Pokharna also conceded that Marumoto's backlight could be located right of the channel in Figure 1. *Id.*, 51:18–23. Thus, in Ohta as modified by Marumoto, the ambient air open loop passes “along the

backlight” under either proposed construction, since the substitution of Marumoto’s LCD panel for Ohta’s plasma panel locates it between the electronic display and heat sink 5. As Samsung explained, it would have been obvious to modify Ohta’s open loop to direct the air through the housing, and along heat sink 5 and the rear surface of the display (which contains the backlight) to maximize cooling efficiency. Pet., 75; Ex. 1002, ¶¶355.

Further, this explanation for the motivation to combine also rebuts MRI’s separate contention that Ohta with Marumoto does not disclose that the LCD is “coolable by a combination” of open and closed loop systems. POR, 36.

D. Ohta Alone or in Combination Renders Obvious “Electronic Components”

MRI contends that Ohta with Marumoto does not disclose “electronic components for driving the LCD positioned within the rear chamber.” POR, 36–37. MRI contends that there is no evidence that the external power supply for Ohta’s circulation fan 8 meets this limitation or that it is located within the closed loop. Both arguments are baseless.

Ohta teaches that “[t]he forced circulation fan 8 is furnished with ... an external power supply (*which may be shared with the drive circuit* of the plasma display panel) to drive the fan.” Ex. 1004, ¶[0019] (emphasis added). This implies proximity of an electronic component (i.e. an external power supply) to the drive circuit already within the closed loop chamber. A POSITA would have understood

that a power supply “*shared with*” the drive circuit for the display is an electronic device for operating the display, and necessarily is *within* the closed loop. Pet., 73; Ex. 1002, ¶¶330–33.

E. Ohta Alone or in Combination Discloses an “Intended Direction”

MRI contends that Ohta with Marumoto does not disclose the substantially perpendicular airflow direction required by claims 5 and 17. POR, 37–38.

Yet, as shown in Ohta’s Figure 3 as annotated, while air within the closed loop gas cooling chamber in Ohta as modified by Marumoto moves both vertically and horizontally, it moves predominantly in a vertical direction. Ex. 1002, ¶323. As noted above (*supra* VI.C), MRI does not deny that Ohta discloses “forcibly air-cool[ing]” the heat sink using fans, or that a POSITA would have understood that the fan which cools the heat sinks 5 could be located in multiple different areas to optimize thermal performance. Ex. 1002, ¶324.

MRI offers no rebuttal to Samsung’s argument that a POSITA would have sought to blow ambient air on a substantial portion of the heat sink to facilitate heat removal from the heat sink. *Id.* Nor does MRI dispute that a POSITA considering Ohta’s disclosure would have been motivated to allow some ambient air to access the rear surface of the LCD display so as to dissipate heat generated by the backlight. *Id.* The placement of the fan to achieve an open loop airflow that is substantially

perpendicular to the closed loop is not random or speculative as MRI argues, but achieves both goals. *Id.*

F. A POSITA Would Have Been Motivated To Combine Ohta with Marumoto, or Marumoto and Yare

MRI argues that a POSITA would not be motivated to combine Ohta with Marumoto, or Marumoto and Yare, in part because the inclusion of Yare’s housing and the substitution of Marumoto’s LCD supposedly introduces too many complexities. POR, 30–32, 38–40. The gist of MRI’s argument is that Samsung is proposing that Ohta, Marumoto, and Yare all be combined physically in what MRI contends are incompatible systems. MRI’s argument ignores what is *taught* by the references as relied on by Samsung, and the nature of the problem to be solved, both of which are relevant to the motivation to combine analysis. *See Ruiz v. A.B. Chance Co.*, 357 F.3d 1270, 1276 (Fed. Cir. 2004). This “is particularly relevant with simpler mechanical technologies” like those involved with the cooling mechanisms here. *Id.*

MRI argues that Ohta’s plasma display cooling system is in a different field of art than Marumoto’s LCD display, and that Ohta is not pertinent to the cooling needs of large LCD displays. POR, 38–39. As a threshold matter, as discussed above (*supra* V.D), the Challenged Claims are not so limited. Further, the ’287 patent specifically contemplates the use of its cooling system with both plasma and LCD displays in indoor and outdoor settings. Ex. 1001, 3:35–50.

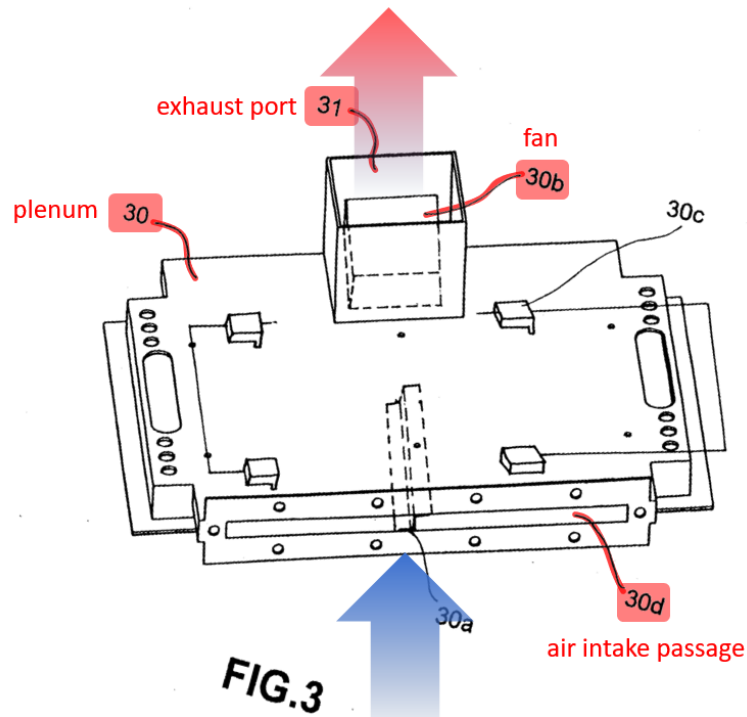
As set forth in the Corrected Petition, a POSITA would have been motivated to modify Ohta's closed loop plasma display cooling system (*see* Ex. 1004, ¶¶[0006], [0023]), with the teachings from Marumoto's closed loop LCD panel cooling system in two ways: (i) to replace Ohta's liquid cooling medium with gas and (ii) to replace Ohta's plasma display with an LCD (Pet., 83; Ex. 1002, ¶¶406–08). Nowhere does MRI address the former. As to the latter, while MRI argues a POSITA would not have been motivated to replace a plasma display with an LCD (POR, 38–40), it ignores that the '287 patent itself acknowledges that both kinds of display systems benefit from the disclosed cooling systems (Ex. 1001, 3:35–42). Nor does MRI adequately explain why a POSITA would not have been motivated to replace Ohta's plasma display with an LCD given that plasma displays suffer from poor contrast due to reflection of external light onto the display. Ex. 1002, ¶¶408, 411; Ex. 1004, ¶¶[0013], [0022]–[0023]. Finally, the difference in closed loop locations in Ohta and Marumoto would not dissuade a POSITA from replacing Ohta's plasma display with an LCD because a POSITA would have recognized the need to cool the front LCD surface to protect it from solar load when placed outdoors. Ex. 1002, ¶¶412–13.

VII. GROUND 5: KITAMURA IN COMBINATION WITH HARRIS

First, MRI argues that a POSITA would not be motivated to combine Kitamura with Harris due to the mechanical structure of the displays. POR, 40–41,

45–46. MRI is wrong. As an initial matter, Kitamura’s LED screen need only be large enough to fit “on the front of the housing.” Ex. 1017, ¶[0001]. Meanwhile, Harris teaches that its LCD screen may be used in a host of applications, including “weather exposed fixed site applications.” Ex. 1018, 3:53–56. Bulb life is 40,000 hours (*id.*, 7:54–56), making its LCD screen particularly useful for wall embedded displays like Kitamura. Given these advantages, a POSITA would have been motivated to modify Kitamura with Harris’s LCD and internal cooling system. Ex. 1002, ¶¶438–39.

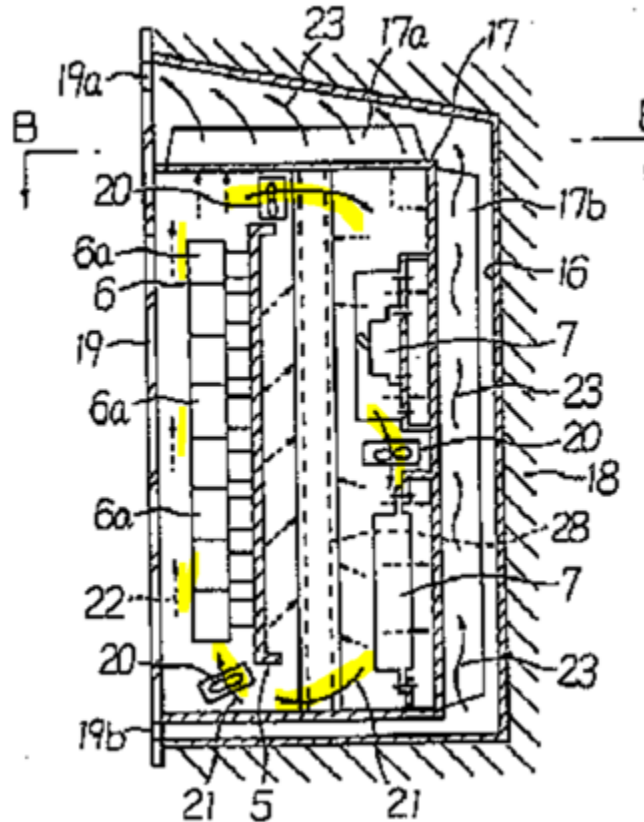
MRI also argues that the combination of Kitamura and Harris does not disclose “an open loop of ambient air which passes through the housing and along the backlight,” and would instead “require significant re-structuring of [Kitamura].” POR, 41–43. But again, MRI focuses on what it contends is an incompatible physical combination created by differences in ducting and weight. POR, 43, 46. However, Harris teaches an advantageous open loop cooling system including an air intake passage, an exhaust port, a fan, and a plenum that can be adapted for use in Kitamura’s display apparatus:



Ex. 1002, ¶¶436–38; Ex. 1018, Fig. 3 (annotated), 5:18–52; 6:5–9, 6:26–10. Just as the backlight in Harris is mounted to the plenum in order to maximize cooling efficiency, a POSITA would have been motivated to mount the backlight in a modified version of Kitamura on duct 28. Ex. 1002, ¶438.

Next, MRI wrongly contends that Kitamura and Harris do not render obvious a closed loop of isolated gas. POR, 43–44. Kitamura specifically discloses its structure is “waterproof and dust-proof” due to the inner housing being “hermetically sealed.” Ex. 1017, ¶[0024]. Further, Harris *claims* that its plenum creates a “sealed air flow path.” Ex. 1018, 10:5–9. The combination of Kitamura and Harris therefore renders obvious the claimed closed loop. Ex. 1002, ¶¶434–41.

Finally, redrawing Figure 3's open loop without identifying the position of the fans, MRI contends that Kitamura does not disclose substantially perpendicular airflow. POR, 44–45. With the fans (20) identified and airflow annotated in Figure 4 (as highlighted below), it is clear MRI is wrong:



Ex. 1002, ¶¶455–57; Ex. 1017, Fig. 4 (annotated).

VIII. THERE ARE NO SECONDARY CONSIDERATIONS

MRI has failed to establish that any secondary considerations exist or that they have a nexus to the Challenged Claims. Indeed, the ALJ found MRI's alleged secondary considerations are “not entitled to significant weight.” Ex. 1042, 288.

A. Long Felt Need, Failure, and Copying

MRI fails to identify any evidence of a long-felt but unmet need with any nexus to the Challenged Claims. While MRI claims that there was a need for outdoor displays with cooling technology (POR, 54–55), the claims are not so limited. *See ABT Sys., LLC v. Emerson Elec. Co.*, 797 F.3d 1350, 1362 (Fed. Cir. 2015) (rejecting argument of long-felt need that “ignores the scope of claim 1, which does not set forth limits on how long or how often periodic fan operation is to be performed”). Moreover, MRI does not set forth how the Challenged Claims satisfy any alleged need. *See* Ex. 1042, 289 (rejecting MRI’s similar long-felt need argument).

MRI also has not established any failure of others. First, Samsung did not fail. Sung Ki Kim’s testimony that Samsung started researching outdoor displays around 2005 but did not launch a product until 2010–2012 does not establish failure. POR, 55–57 (citing Ex. 2029, 45:22–46:11); *see also* Ex. 1042, 290 (“[T]he evidence regarding ‘failure by others’ is unpersuasive.”). There is no evidence that Samsung worked on the display continuously during that time or that it had any difficulties. Second, MRI has not established that “these prior attempts failed because the devices lacked the claimed features.” *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1313 (Fed. Cir. 2006).

MRI’s citation of a Samsung slide deck and photographs that include comparative analysis of [REDACTED] do not establish copying. POR, 57 (citing

Ex. 2042; Ex. 2043). Indeed, MRI has not identified any features of the [REDACTED] that Samsung allegedly copied. *Iron Grip Barbell Co., Inc. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004) (“copying requires the replication of a specific product”).

Moreover, by the time of Samsung’s review, Samsung had already fully designed its cooling scheme. Ex. 1044, 612:11–13, 613:14–614:18; Ex. 2040 (showing [REDACTED] units sold in 2016); Ex. 2042, 65 (showing photographs and test results of OH55F and OH85F). While MRI asserts that Samsung disassembled [REDACTED] in “early 2016” (POR, 57), Samsung engineer Sungsu Lee testified that the March 24, 2016 date on the slide deck cover is incorrect, as confirmed by the [REDACTED] October 2016 manufacturing date (Ex. 1044, 611:23–612:10; Ex. 2042, 34, 69; Ex. 1042, 292). Moreover, comparative product analysis is a common industry practice. Ex. 1044, 611:6–22; Ex. 1042, 292 n.117; Ex. 1045, 159:10–24. Accordingly, there is no evidence of copying.

B. Commercial Success

MRI did not attempt to prove a nexus between the alleged commercial success of Samsung’s or MRI’s products and the Challenged Claims, nor is it entitled to a presumption of nexus. A rebuttable presumption of nexus arises only 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) (cleaned up).

“[I]f the patented invention is only a component of a commercially successful machine or process, the patentee is not entitled to a presumption of nexus.” *Id.* (cleaned up).

MRI’s conclusory claims of coextensiveness should be rejected. POR, 49–52. Coextensiveness requires more than a showing that the claims cover a product. *Fox Factory*, 944 F.3d at 1377 (rejecting “attempt to reduce the coextensiveness requirement to an inquiry into whether the patent claims broadly cover the product . . .”). Whether a product is coextensive depends on, among other things, the significance of unclaimed features. *Id.* at 1374–75. Neither MRI nor its expert has undertaken such an analysis.

As the ALJ found, Samsung’s products do not infringe claim 12 of the ’287 patent. Ex. 1042, 103–16. Moreover, Samsung’s products have numerous unclaimed features. *See id.*, 296. Indeed, Samsung’s marketing documents identify a number of “features & benefits” of the products, such as “Magic glass,” “Slim Design,” “IP 56” certification, “High Contrast Ratio,” “Brightness Greater than 3,500 nits,” and “Remote Management,” among others. *See* Ex. 2038, 7; Ex. 1046. Likewise, MRI’s products include a number of features unrelated to the Challenged Claims such as “Unsurpassed Image Quality,” “Extreme Outdoor Durability,” “Intelligent Self Optimization,” and “IoT Empowered Architecture.” *See, e.g.,*

Ex. 1048. These features are important to customers and drive sales. Ex. 1049, 312:4–22, 316:16–321:4. Accordingly, these products are not coextensive. For these same reasons, MRI has not established a nexus between its own or Samsung’s sales and the Challenged Claims. *See Ormco*, 463 F.3d at 1312 (“[I]f the commercial success is due to an unclaimed feature of the device, the commercial success is irrelevant.”); Ex. 1042, 295.

MRI’s alleged evidence regarding market share is a single document concerning Samsung’s *global 75-inch* market share. *See* POR, 61–62 (citing Ex. 2041, 29–30). But MRI does not argue that Samsung’s 75-inch products are coextensive. This is insufficient to demonstrate commercial success.

C. Industry Praise and Licensing

MRI has cited no evidence establishing industry praise. Romulus Stoain’s April 2020 generic email does not identify any technical features of MRI’s products, let alone a product that embodies, and is coextensive with, the elements of the Challenged Claims. *See* Ex. 2001; Ex. 1042, 293–94; Paper 11 (Institution Decision), 43–44. Samsung’s white paper (POR, 63–64) likewise fails to praise, or even mention, MRI. Ex. 2025. MRI also mischaracterizes John Palmer’s testimony (POR, 66), which “does not indicate whether it is the patented features of the cooling system, as opposed to other aspects of the liquid crystal display, that creates the desirable effect” (Ex. 1042, 298).

As to licensing, MRI does not attempt to establish a nexus. MRI's licenses either fail to mention [REDACTED] or additionally list numerous other intellectual property rights. *See* POR, 65–66 (citing Ex. 2049, Ex. 2051, Ex. 2052); *Shoes by Firebug LLC v. Stride Rite Children's Grp., LLC*, 962 F.3d 1362, 1372–73 (Fed. Cir. 2020) (“Because the licenses include numerous intellectual property rights in addition to the [relevant] patents, the agreements on their face do not establish a nexus . . .”).

IX. CONCLUSION

Samsung respectfully requests that the Board find all Challenged Claims unpatentable.

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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that the foregoing Petitioners' Reply to Patent Owner's Response complies with the type-volume limits of 37 C.F.R. § 42.24(c) because it contains 5,576 words according to the word-processing system used to prepare this reply, excluding the words in the Table of Contents, Table of Authorities, Table of Exhibits, Certification Under § 42.24(d), and Certificate of Service, as set forth in 37 C.F.R. § 42.24(c).

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CERTIFICATE OF SERVICE

A copy of this Petitioners' Reply to Patent Owner's Response together with the additional exhibits identified in the above Table of Exhibits have been served on counsel for Patent Owner upon the following addresses as listed in Patent Owner's Mandatory Notices:

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