

IPR2023-00255

U.S. 9,629,287

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

Case IPR2023-00255

Patent 9,629,287

PATENT OWNER'S SUR-REPLY

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EXHIBIT LIST

Exhibit	Description	Confidentiality Designation
2001	MRI-ITC-1331_0000435123-24 (4/24/2020 Romulus Stoain email to Dunn)	Filed Publicly
2002	MRI-ITC-1331_0000435125-27, Mutual Non-Disclosure Agreement	Filed Publicly
2003	MRI-ITC-1331_0000435133-34 (5/4/2020 Romulus Stoain email to Dunn)	Filed Publicly
2004	Intentionally Omitted	Filed Publicly
2005	Office Action mailed April 11, 2018, in Application No. 12/234,360	Filed Publicly
2006	Office Action mailed August 11, 2011, in Application No. 12/237,365	Filed Publicly
2007	Intentionally Omitted	Filed Publicly
2008	Decision Denying Institution of <i>Inter Partes</i> Review of U.S. Patent No. 8,854,572 in <i>Civiq Smartscales LLC v. Manufacturing Resources International, Inc.</i> , IPR2018-00774, Paper 6 (PTAB Sep. 25, 2018)	Filed Publicly
2009	Email Exchange Between Patent Owner and Petitioner Regarding Word Count	Filed Publicly
2010	Intentionally Omitted	
2011	Intentionally Omitted	
2012	MRI-ITC-1331_0000092739	Filed Publicly
2013	<i>Certain Outdoor and Semi-Outdoor Electronic Displays</i> , Inv. No. 337-TA-1331, Day 1 Public Hearing Tr. (June 26, 2023)	Filed Publicly
2014	Intentionally Omitted	
2015	Intentionally Omitted	
2016	<i>Certain Outdoor and Semi-Outdoor Electronic Displays</i> , Inv. No. 337-TA-1331, Transcript, Deposition of Chris Bolton (Feb. 23, 2023)	Filed Publicly
2017	Intentionally Omitted	
2018	Intentionally Omitted	
2019	Intentionally Omitted	
2020	Intentionally Omitted	
2021	Intentionally Omitted	

Exhibit	Description	Confidentiality Designation
2022	<i>Certain Outdoor and Semi-Outdoor Electronic Displays</i> , Inv. No. 337-TA-1331, Transcript, Deposition of Robert Smith-Gillespie (Feb. 20, 2023)	Filed Publicly
2023	<i>IP ratings, Int’l Electrotechnical Comm’n</i> , https://www.iec.ch/ip-ratings (last visited Aug. 29, 2023) (“IEC Standards”)	Filed Publicly
2024	Declaration of Dr. Himanshu Pokharna (“Pokharna Dec.”)	Filed Publicly
2025	Samsung White Paper: Taking the Message Outdoors (Dec. 4, 2015)	Filed Publicly
2026	Website - Samsung White Paper: Taking the Message Outdoors (Dec. 4, 2015) https://insights.samsung.com/2015/12/04/taking-the-message-outdoors-with-high-brightness-display-tech-white-paper/ (last visited Sept. 26, 2023)	Filed Publicly
2027	Respondents’ Notice of Prior Art, <i>Certain Outdoor and Semi-Outdoor Electronic Displays</i> , Inv. No. 337-TA-1331 (Jan. 4, 2023).	Filed Publicly
2028	Digital Solutions for Convenience Stores, Samsung, dated 2021	Filed Publicly
2029	Sung Ki Kim deposition transcript excerpts, <i>Certain Outdoor and Semi-Outdoor Electronic Displays</i> , Inv. No. 337-TA-1331 (Mar. 31, 2023)	Filed Sealed in Its Entirety, Parties and Board Only
2030	Sungsu Lee deposition transcript excerpts, <i>Certain Outdoor and Semi-Outdoor Electronic Displays</i> , Inv. No. 337-TA-1331 (Mar. 20, 2023)	Filed Sealed in Its Entirety, Parties and Board Only
2031	Wunkil Lee deposition transcript excerpts, <i>Certain Outdoor and Semi-Outdoor Electronic Displays</i> , Inv. No. 337-TA-1331 (Mar. 21, 2023)	Filed Sealed in Its Entirety, Parties and Board Only
2032	John Palmer deposition transcript excerpts, <i>Certain Outdoor and Semi-Outdoor Electronic Displays</i> , Inv. No. 337-TA-1331 (Mar. 16, 2023)	Filed Sealed in Its Entirety, Parties and Board Only

Exhibit	Description	Confidentiality Designation
2033	U.S. Patent Application Publication No. 2006/0077636 A1 to Kim, dated Apr. 13, 2006	Filed Publicly
2034	U.S. Patent Application Publication No. 2006/0132699 A1 to Cho et al., dated Jun. 22, 2006	Filed Publicly
2035	U.S. Patent No. 7,948,575 to Oh et al., dated May 24, 2011	Filed Publicly
2036	Certified translation of Korean Unexamined Patent Application KR 10-2006-0016469 to Na, dated Feb. 22, 2006 (“Na”)	Filed Publicly
2037	U.S. Patent No. 7,800,706 B2 to Kim et al., dated Sep. 21, 2010)	Filed Publicly
2038	SEITC0027754 McDonald’s Outdoor DMB presentation, dated Mar. 2017	Filed Sealed in Its Entirety, Parties and Board Only
2039	Infringement Claim Chart for U.S. Patent No. 9,629,287, Samsung OH46 / OH55	Filed Publicly
2040	Samsung OH product sales spreadsheet, CX-1728C	Filed Sealed in Its Entirety, Parties and Board Only
2041	SEITC0028579 Samsung Market Requirements Document, Outdoor LCD Signage, dated Apr. 23, 2021, and English translation	Filed Sealed in Its Entirety, Parties and Board Only
2042	SEITC0035224 Samsung teardown of Outdoor 86” product, dated Mar. 24, 2016, and English translation	Filed Sealed in Its Entirety, Parties and Board Only
2043	SEITC0035259 Samsung teardown photos of 55” product	Filed Sealed in Its Entirety, Parties and Board Only

Exhibit	Description	Confidentiality Designation
2044	MRI-ITC-1331_0000046205 MRI Sales Detail	Filed Sealed in Its Entirety, Parties and Board Only
2045	Declaration of Alan Brand, <i>Certain Outdoor and Semi-Outdoor Electronic Displays</i> , Inv. No. 337-TA-1331 (Aug. 19, 2022)	Filed Sealed in Its Entirety, Parties and Board Only
2046	MRI-ITC-1331_0000444713 MRI Sales Detail	Filed Sealed in Its Entirety, Parties and Board Only
2047	Article – Sunlight and Solar Clearing, https://lg-mri.com/sunlight-and-solar-clearing/ (last visited Sept. 26, 2023)	Filed Publicly
2048	Letter from Chris Bolton (Vertigo Group) to Bill Dunn (MRI), dated Apr. 6, 2009	Filed Sealed in Its Entirety, Parties and Board Only
2049	Trademark and Technology License Agreement, dated Feb. 18, 2014	Filed Sealed in Its Entirety, Parties and Board Only
2050	Joint Venture and Limited Liability Company Agreement, dated Jan. 8, 2014	Filed Sealed in Its Entirety, Parties and Board Only
2051	License Agreement, dated Aug. 27, 2008	Filed Sealed in Its Entirety, Parties and Board Only
2052	Confidential Agreement, dated Jan. 22, 2020	Filed Sealed in Its Entirety, Parties and Board Only
2053	Samsung Outdoor Installation Guide	Filed Publicly

Exhibit	Description	Confidentiality Designation
2054	Claim Chart for U.S. Patent No. 9,629,287 and MRI's 55-inch and MRI's 75- and 86 inch Domestic Industry Products	Filed Publicly
2055	<i>Apple iMac "PowerPC G3" 333MHz 1999 Specs</i> , Techable (last visited April 5, 2023), https://techable.com/apple/specs/imac-g3-333-mhzfruit-colors/	Filed Publicly
2056	U.S. Patent No. 8,373,841 ("841 Patent")	Filed Publicly
2057	Declaration of Andrea A. Anderson in Support of Patent Owner's Unopposed Motion for <i>Pro Hac Vice</i> Admission of Andrea A. Anderson Under 37 C.F.R. § 42.10(c)	Filed Publicly
2058	Intentionally Omitted	

I. Introduction

No challenged claim is obvious because each reference lacks multiple claim limitations. Petitioners' arguments rely on taking indoor devices and placing them outside, and the only evidence Petitioners give for doing so is to meet the Challenged Claims. This is impermissible hindsight, which is particularly problematic here in light of the strong evidence of non-obviousness, demonstrating Samsung's own decade-long struggle to solve the thermal stability problem for outdoor displays. Samsung achieved success only *after* obtaining and tearing down a commercial embodiment of the Challenged Claims. This evidence must be considered and demonstrates that none of the Challenged Claims would have been obvious.

II. The Karppanen Ground Fails.

The combination of Karppanen and the knowledge of a POSITA does not teach a closed loop *of isolated gas*, ambient air passing along the backlight, electronic components in a rear cooling chamber, or airflow pathways that are *substantially* perpendicular as the Challenged Claims require. Petitioners rely on hindsight and conclusory expert opinion to fill these gaps.

A. Karppanen does not teach a closed loop *of isolated gas*.

Claims 12, 18, and 22 require a closed loop of *isolated gas*. The '287 Patent defines "isolated gas" as "gas within the isolated gas cooling chamber 20 [that] is essentially isolated from external air in the housing of the display." Ex. 1001, 4:9-

11. “Essentially isolated” requires the gas be “isolated to the extent that dust and contaminants may not substantially enter the first gas cooling chamber,” but does not require the display be “hermetically sealed.” *Id.*, 4:19-24. Because Karppanen does not teach any particular level of isolation of air inside the display chamber, it does not teach the required closed loop *of isolated gas*. See Paper 19 (Patent Owner Response (“POR”)), at 10-13; Ex. 2024, ¶¶91-97.

In order to reach the “isolated gas” limitation, Petitioners largely repeat arguments while misreading the prior art. For example, Petitioners point to one sentence stating there are vibration attenuating sealing elements around the front glass. Reply at 3. Petitioners ignore that the sealing elements are “vibration attenuating,” reducing vibrations and mechanical stressors common in high traffic locations, and unrelated to airflow. See Ex. 1001 7:37, Ex. 2024, ¶95. These vibration sealing elements say nothing about gaseous sealing of the display. Ex. 2024, ¶95.

Petitioners also misread filters at inlets to the “ventilation space” as teaching “isolated gas” in the *display* casing. Reply at 3. However, Karppanen makes clear the filters are located at “ventilator slots” that allow air to enter the “ventilation space”—the area mapped by Petitioners to the *open loop*. Ex. 1001, 7:16-21. Thus, the presence of filters in the separate cooling space 20 says nothing of air within the

display casing—a separate area in Karppanen’s modular configuration. *Id.* at 3:26-31, 7:9-10.

Petitioners attempt to bolster their argument with Dr. Pokharna’s testimony at the 1331 Investigation Hearing. Ex. 1047. Petitioners assert that Dr. Pokharna “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).” Paper 32 (Reply), at 3 (emphasis added). However, Dr. Pokharna said the *opposite*, acknowledging that he knew of open loop systems that used filters, but explicitly noting that those open loop systems *were not rated IP56*. See Ex. 1047, 1279:12-16.

11 Q. So, thank you, Dr. Pokharna.
12 So you would agree, companies like Vertigo were
13 selling displays that leveraged exclusively open loop
14 technology that did not have an IP56 rating; is that right?
15 A. I have heard that, but it required frequent
16 filter changes.

Because Karppanen does not teach any sealing of gas within the display casing, it does not teach creating a loop of isolated gas. Petitioners’ argument that the display being outside means the display casing must be isolated are unavailing as Petitioners themselves point out that some past systems experimented with totally open loop cooling outside. See Ex. 1047, 1279:12-16.

B. Karppanen does not teach creating an ambient airflow pathway through the housing *and along the backlight*.

Claim 12 requires “an open loop of ambient air which passes through the housing and along the backlight.” Petitioners no longer contend ambient air travels “along the backlight” in the Karppanen reference according to the plain and ordinary meaning of that term. *See* Reply, 4-5. The only dispute which remains is whether “along the backlight” should be construed to mean “in thermal communication with the backlight.”

1. “Along the backlight” should be afforded its plain and ordinary meaning as a prepositional phrase

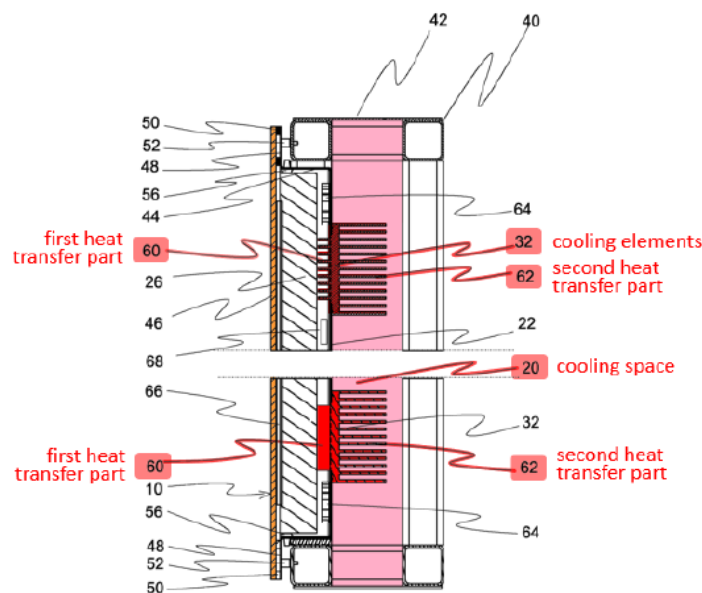
Petitioners press an already rejected argument that “along the backlight” means “in thermal communication with the backlight.” To support this construction, Petitioners skip over all disclosures in the ’287 Patent specification and prosecution history—which all use the preposition “along” according to its ordinary positional meaning. *See* Ex. 1034, 54. The ITC has already rejected Petitioners’ argument in its Claim Construction Order. *See id.*, 52-54. At the ITC, the Petitioners presented the same arguments they make here: “***along*** the backlight” requires construction and means “***in thermal communication with*** the backlight,” relying on the prosecution history in a parent application and the extrinsic evidence, the declaration of its expert Smith-Gillespie. *Compare* Ex. 1034, at 52-53, *with* Petition at 11-12, Ex. 1002 ¶¶75-76. The ITC concluded that none of Petitioners’ evidence supported their proposed

construction Ex. 1034 at 54. Instead, the ITC concluded that all evidence used “along” in its ordinary positional context. *Id.*¹

Because there is no support for the contention that “along” has a special meaning in the ’287 Patent, it has its ordinary meaning as a preposition. *Id.* Ambient air must be traveling along the backlight of the LCD display.

2. Karppanen does not describe an ambient air pathway that travels along the backlight

Petitioners map the “open loop” to the ambient air flow pathway located between two walls in cooling space 20. POR, 13-16; Ex. 2024, ¶¶99-103. *See* Ex. 1006, at Fig. 2 (as annotated by Petitioners).



¹ Petitioners did not challenge the ITC’s construction of “along” and abandoned this argument at the ITC.

The figure above does not show an electronic display, let alone an LCD with its backlight, located in this cooling space 20. POR, 13-14; Ex. 2024 ¶99. Instead, the display (26) (along with any backlight) is located in the display casing (10). *See* Ex. 1006, at Fig. 2. Thus, ambient air cannot be traveling along the backlight because the backlight is located in a separate space in Karppanen’s modular design. Ambient air of the alleged open loop is instead traveling between the internal walls of the display casing and device casing. *Id.* Accordingly, Karppanen does not teach an open loop of ambient air passing through the housing and ***along*** the backlight according to its plain and ordinary meaning.

C. Karppanen does not teach placing the electronic components for driving the display in the rear chamber of the closed loop pathway.

Claim 15 requires “electronic devices for driving the LCD positioned within the rear cooling chamber.”

Petitioners argue that because claim 15 depends from claim 12, claim 14 cannot be informative as to the meaning of claim 15. But “claim terms are presumed to be used consistently throughout the patent, such that the usage of a term in one claim can often illuminate the meaning of the same term in other claims.” *Res. Plastics, Inc. v. Fed. Packaging Corp.*, 421 F.3d 1290, 1295 (Fed. Cir. 2005). Accordingly, claim 14 informs that the “rear cooling chamber” of claim 15 is a

portion of the closed loop located behind the display. Ex. 1006 claim 14, 4:4-7, Ex. 2024, ¶ 104.

Petitioners argue MRI did not rebut their assertion that a POSITA would have expected the drivers be located in the display casing—which they map to the rear cooling chamber. Reply at 5. This is incorrect; MRI and its expert addressed this error—drawing attention to Smith-Gillespie’s apparent conflation of the display casing with the device casing. POR, 18-19; Ex. 2024, ¶105. Regardless, Karppanen explicitly teaches that the drivers for the display are located within the *device* casing, not the *display* casing that Petitioners map to the alleged closed loop rear cooling chamber. *See* Ex. 1006, 7:22-29; Ex. 2024, ¶¶104-05. Karppanen clarifies that the separation of the display from their control electronics “makes it easier to control the temperature of the information board” and thus teaches *away* from placing control electronics in the display casing. *Id.* 7:26-29.

D. Karppanen does not teach a substantially perpendicular direction of the loop airflow pathways.

Claim 17 claims a “substantially perpendicular” direction of open and closed loop pathways. Petitioners argue Karppanen discloses a substantially perpendicular flow direction because “the closed loop in the display encircles the display” and therefore *must* flow in a perpendicular direction. Petitioners state that because the open loop pathway *can* be horizontal or vertical the airflow *must* be perpendicular

with the closed loop. Reply at 6. Petitioners point to no evidence stating the airflow within the open loop requires a particular direction of the closed loop.²

Finally, Petitioners rely on the air flow on the top and bottom of the display as satisfying the perpendicular limitation. *Id.* This is a new argument not presented anywhere in the Petition and not supported with any citation to the any evidence. As such, it must be discarded. *See, e.g., Corephotonics Ltd. v. Apple Inc.*, 84 F.4th 990, 1001-02 (Fed. Cir. 2023).

III. The Nagashima/Karppanen Ground Fails As Well.

The combination of Nagashima and Karppanen does not teach a closed loop *of isolated gas*, coolable by a combination of a closed and open loop, or airflow pathways that are *substantially* perpendicular as required by the Challenged Claims. Further, any motivation to combine Karppanen with Nagashima—two technologies designed and intended for different uses with different design considerations—is the mere application of hindsight.

² As Dr. Pokharna explained, the configuration of the heat sinks is the only hint as to airflow direction in the display casing. Ex. 2024, ¶¶ 107-09. Those heat sinks indicate the air flows in a substantially parallel direction. *Id.* ¶¶ 108-09.

A. Nagashima in view of Karppanen does not teach creating a closed loop of isolated gas.

Nagashima discloses a desktop computer for indoor use. POR, 21-22; Ex. 2024, ¶¶67-68; Ex. 1007, at Abstract. Nagashima cannot disclose a closed loop of isolated gas because Nagashima's desktop computer explicitly discloses keeping the rear cooling chamber open so that ambient air may cool the electrical components within. *See* POR, 21-24; Ex. 2024, ¶¶68-69, 115-16, Ex. 1007, Figure 1, 3:63-4:1.

Petitioners argue “[t]here is no evidence” that “air enters or exits the rear chamber” through the openings shown in Figure 1 and described in the chassis 3. Reply, 7. Petitioners ignore Nagashima's description of air flowing into the cover 12 to pass over and cool the CPU and other electronic components.

Nagashima teaches taking and using the existing cover of a desktop type computer for its invention. Ex. 1007, 5:29-32. Nagashima explains the heat generating components of the smaller all-in-one desktop computers are the electronic components. *Id.*, 4:10-14., 1:54-56. Such components, Nagashima explains, are typically cooled with air that enters through the casing of a desk-top computer, “in a lower casing section thereof” and the air is then discharged to the outside. *Id.* at 1:41-48. Nagashima states that the same “casing (or cover) of a currently used desk-top type computer can be used *as it is*” in the first embodiment of its invention “without changing its size.” *Id.*, 5:29-32 (emphasis added); *see also*

id., 5:57-60 (“[T]he heat radiation portion can be provided without changing the external dimensions *of the currently-used casing of a desk-top type computer.*”) (emphasis added).

Thus, Nagashima teaches using the existing covers of desk-top type computers, which contain vents for ingesting and venting cooler ambient air, as its cover 12. This confirms the gaps in the cover 12 and chassis 3 are intended to pull in and vent external air over the heat generating components.

B. Nagashima does not teach *cooling* the display with a combination of closed loop and open loop pathways.

Nagashima does not teach cooling the display with any alleged closed gas loop. Instead, Nagashima directs heat *to the rear surface of the display* from the area under cover 12 (which Petitioners map to the closed loop). As explained above, Nagashima describes the heat generating elements of its system as the electrical components inside of the cover 12—such as the CPU and motherboard. Ex. 1007, 4:10-14, 1:54-56. To provide additional cooling of the heat generating elements, Nagashima describes a tube of liquid which extends from those heat generating elements, through the chassis 3, and toward the display. *Id.*, 4:4-10; 4:36-39; 5:39-49. As part of its cooling scheme, Nagashima suggests attaching the tubes to the rear surface of the display to transfer heat *from* the CPU—through the liquid tubes—*to* the display surface itself. *Id.* at 5:39-49, Fig. 4. Nagashima explains that in this way,

the rear surface of the display serves as a heat sink of the heat from the electronic components. *Id.* 5:44-49, 5:61-63.

Petitioners argue Nagashima’s liquid tubes cool the display because one cannot “assume[] the tubes contain liquid that is warmer than the LCD.” *Id.* at 8. But Nagashima consistently describes the hotter liquid in the tubes as transferring heat *to* the display—meaning the liquid is hotter than the display it transfers heat to. *See, e.g.,* Ex. 1007, 2:41-46 (“The cooling medium liquid circulating through the **tubes serves as a heat transferring medium**, thus **radiating the heat generated at the heat generating portion through the tube secured to the back surface of the plane-shaped display and the plane-shaped display itself**.”) (emphasis added); 5:45-59 (“The back surface of the LCD panel is made of a metal material, **and the heat of a cooling medium liquid from the tube**, which is arranged spirally or in a zigzag or serpentine manner, **can be transferred effectively onto the back surface of the LCD panel and radiated**.”) (emphasis added). Because heat is being transferred *onto* the back surface of the LCD *from* the liquid tubes, the LCD is being heated by thermal energy from inside of cover 12, not *cooled* by it.

C. Nagashima in view of Karppanen does not teach a substantially perpendicular direction of airflow pathways.

The parties dispute how much perpendicular air flow is “substantially” perpendicular within the meaning of claim 17. Petitioners repeatedly map

“substantially” to airflow pathways where only *part* of the pathways are perpendicular. *See* POR at 26, 45. However, the Federal Circuit construes “substantially” as more than just *part*—and affirms the term requires a considerable magnitude. *Epson Gas Sys., Inc. v. Bauer Compressors, Inc.*, 279 F.3d 1022, 1030-31 (Fed. Cir. 2002) (construing “substantially” as “essentially” and “to a considerable degree”); *LNP Eng’g Plastics, Inc. v. Miller Waste Mills, Inc.*, 275 F.3d 1347, 1354 (Fed. Cir. 2001) (construing “substantially” as “largely but not wholly that which is specified”).

Here, Petitioners draw in a clip art fan, speculate as to two loop directions from that fan, and then conclude that because its speculative airflow is perpendicular only in a limited portion of the overall loop, there is *substantially* perpendicular airflow. *Id.* at 10. The Board should discard this argument because airflow direction in only a limited part of each loop is not sufficient to meet the *substantially* perpendicular limitation.

IV. The Ohta Grounds Fare No Better.

Ohta fails to teach nearly every limitation of the Challenged Claims. Petitioners suggest a complete overhaul of Ohta, combining Ohta with Marumoto and further using hindsight to speculate as to the undescribed locations of internal components in the combination. Petitioners further suggest combining Yare to the

Ohta and Marumoto combination to obtain the housing limitation. Petitioners' extensive modifications and inferences serve to illustrate non-obviousness.

A. Ohta in view of Marumoto does not teach creating a closed loop of isolated gas.

Ohta does not disclose a closed loop of isolated gas. Instead, Ohta teaches using a fluid to cool the front surface of a plasma display. POR at 32-33; Ex. 2024, 149-51; Ex. 1004, (0020).

Petitioners suggest a POSITA would be motivated to replace Ohta's liquid with gas because Marumoto uses gas. Reply, 14-15. But Petitioners ignore the entire teaching of Marumoto, which concerned cooling for an LCD panel, not a plasma panel. Ex. 1005, (0006). Marumoto explains its closed gas system should be used for the rear portion of the LCD to cool the hotter backlight. *Id. Even assuming* a POSITA would be motivated to combine Marumoto's LCD display with the Ohta plasma cooling system, a POSITA would direct the closed gas to the rear surface of the display, not the front. POR at 33; Ex. 2024, 149-50. Because the closed gas loop would run along the backlight in such a combination, ambient airflow could not run along the backlight. POR at 33; Ex. 2024, 150. Thus, even *if* a POSITA would be motivated to combine Marumoto with Ohta (they would not), a POSITA would not arrive at the invention. Petitioners' suggestion that a POSITA would ignore the teachings of Marumoto when combining with Ohta should be rejected.

B. Ohta in view of Marumoto does not teach creating an ambient airflow pathway through the housing *and along the backlight*.

Ohta does not disclose directing open loop air along the backlight of an LCD panel—even if an LCD panel were to be substituted into its system. POR, 34-35; Ex. 2024, ¶¶153-56. Instead, the only description of external air in Ohta comes in a separate example—Example 5—that replaces the closed liquid over the front display surface with the external air over the *front* display surface. POR, 34; Ex. 2024, ¶153; Ex. 1004, (0031).

Petitioners rely on this lone example to conclude that Ohta teaches or renders obvious an ambient air flow pathway through the housing and along the backlight: “Ohta discloses the use of forced convection over a heat sink.” Reply, 15. Forced convection over a heat sink means nothing more than there is a heat sink somewhere in the display system, and that heat sink is cooled with a fan. Ex. 2024, ¶154. This disclosure does not say what kind of air, isolated or ambient, cools the heat sink. Ohta does not describe where the heat sinks are located in the overall display system. *Id.* Electronic display systems are not simple hollow devices, and contain many different internal support structures, electronic control devices, cooling features, and housing elements. POR, 3. Petitioners ignore all these complexities and suggest it would be obvious that (1) the heat sinks are located close to the backlight in its modified construction, (2) external air is used in conjunction with an isolated gas

loop, and (3) the open loop is also located along the backlight of the newly added LCD. Reply, 15. There is no basis for such assumptions. Petitioners offer nothing more than hindsight and conclusory statements to support their conclusion that using heat sinks means there is an ambient air pathway that passes through the housing and along the backlight.

C. Ohta in view of Marumoto does not teach cooling the display with a combination of closed loop and open loop pathways.

Petitioners do nothing more to meet their burden of establishing a motivation to combine than state: “[T]his explanation for the motivation to combine also rebuts MRI’s separate contention that Ohta and Marumoto does not disclose the that the LCD is ‘coolable by a combination’ of open and closed loop systems.” Reply, 16. Petitioners fail to provide any evidence that a POSITA would be motivated to use two airflow pathways to cool the LCD display where both references explain that using one pathway is sufficient.

D. Ohta in view of Marumoto does not teach placing the electronic components for driving the display in the rear chamber of the closed loop pathway.

Ohta does not teach placing electronic components for driving the display in the closed loop. POR at 36-37; Ex. 2024, ¶159. Because Ohta’s closed system contains liquid, a POSITA would understand that power sources and control devices are not located in that liquid system. POR at 36-37; Ex. 2024, ¶159. Petitioners fail

to rebut MRI's contention that a liquid environment is not a suitable location for electronics. Instead, Petitioners conclude that because the liquid loop has a fan, it must therefore contain all other electronic components for driving the display. Reply, 16-17. Petitioners ignore the basic science of electronic devices, and in so doing, continue their pattern of using the claim language as a roadmap to combine the references.

E. Ohta in view of Marumoto does not teach a *substantially* perpendicular direction of airflow pathways.

The combination of Ohta and Marumoto does not teach *substantially* perpendicular airflow pathways because (1) the references teach only one pathway is sufficient for cooling a display, (2) neither reference discusses the three-dimensional direction of gas or liquid flow, and (3) mere mentioning cooling a heat sink describes nothing about the direction of airflow. POR at 36, 38; Ex. 2024, ¶¶157, 161-63. Petitioners jump to the conclusion that the direction of airflow in Ohta and Marumoto is perpendicular without pointing to a single disclosure in either reference. *See* Reply at 17. Accordingly, Petitioners' analysis is nothing more than speculation to reach the claim limitation of *substantially* perpendicular loop pathways. POR at 37-38; Ex. 2024, ¶¶161-63.

F. There is No Motivation to Combine

Petitioners do not cite the prior art to support their conclusory motivations to combine. Instead, Petitioners again rely on the '287 Patent itself to find motivation to combine an LCD with a plasma display reference. Reply, 19 (“[T]he '287 patent itself acknowledges that both kinds of display systems benefit from the disclosed cooling systems.”). This fails as the invention itself cannot be the source of motivation to combine the references. *Purdue Pharma L.P. v. Depomed, Inc.*, 643 F. App'x. 960, 966 (Fed. Cir. 2016).

V. The Kitamura Ground Is Similarly Deficient.

The combination of Kitamura and Harris does not teach a closed loop *of isolated gas*, an ambient air pathway along the backlight, or airflow pathways that are *substantially* perpendicular. Further, the sole asserted motivation to combine Kitamura and Harris—two technologies designed and intended for distinct use cases—is hindsight. Indeed, the Board has noted that Petitioners failed to explain why a POSITA would have been motivated to combine the two references beyond allegations of structural similarity. Paper 11, at 41. Petitioners fail to address the deficiency identified at Institution, again merely pointing to the structural similarity to support their motivation to combine. Reply, 20-21. The Kitamura ground fails.

A. Kitamura in view of Harris does not teach creating a closed loop of *isolated gas*.

Kitamura does not teach creating isolated gas. POR, 43-44; Ex. 2024, ¶¶177-78. Instead, Kitamura describes ventilation ports into the inner housing that ventilate the interior space. POR, 43-44; Ex. 2024, ¶¶178; Ex. 1017, (0009), claim 1. Petitioners ignore this disclosure and point to other portions of Kitamura that describe the inner housing as hermetically sealed. Reply, 21. But ventilated and hermetically sealed are diametrically opposed, and thus the contents of Kitamura's inner housing are unclear. Petitioners present no evidence that the ventilation ports function differently than as explicitly described in Kitamura, and thus Petitioners fail to establish that Kitamura teaches a closed loop of *isolated gas*.

Finally, Petitioners for the first time point to Harris to import a teaching of "isolated gas.". Reply, 21. First, this is a new argument not presented in the Petition and should be discarded. *See* Petition at 112. Second, this argument is directly contrary to Petitioner's obviousness claim: the air pathway in Harris is an "open loop of *ambient air*." *See id.* at 112-13 Reply, 20. Petitioners' own confusion regarding Kitamura and Harris further highlights Kitamura's lack of clarity, and thus its failure to teach a POSITA the extent to which the inner housing should be sealed.

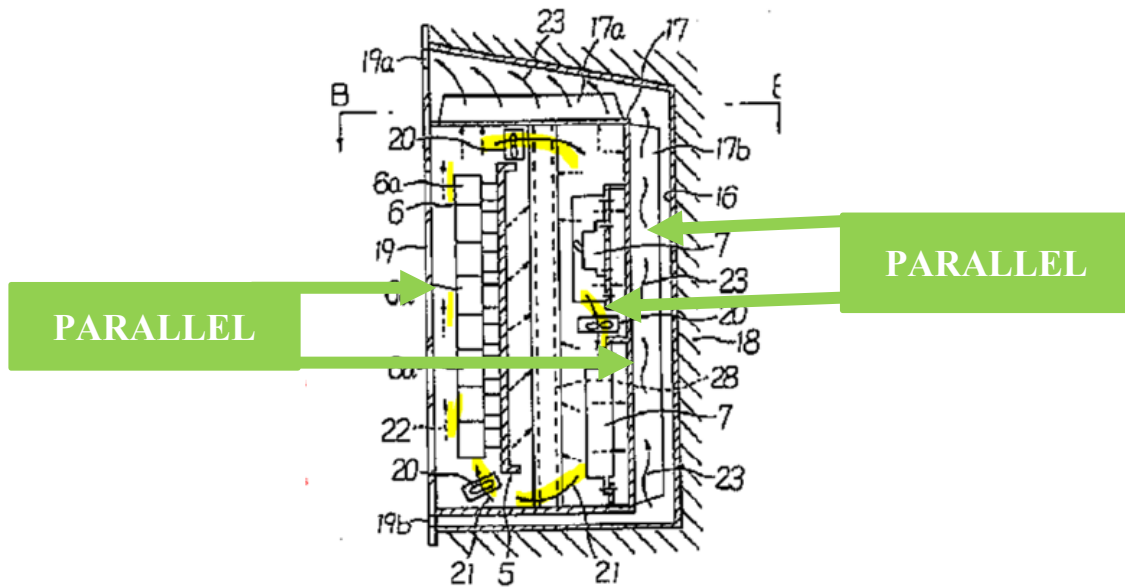
B. Kitamura in view of Harris does not teach creating an ambient airflow pathway through the housing *and along the backlight*.

Kitamura does not disclose ambient air traveling along the backlight of an LCD backlight because it uses an LED display with the closest ambient air ducting being located rearward, away from the display. POR, 42; Ex. 2024, ¶¶181-83. In Kitamura, the ducting is located toward the rear of the inner chamber to cool the electronic components. POR, 43; Ex. 2024, ¶181. The LED display, by contrast, is located toward the front to facilitate better viewing of the display face. POR, 43; Ex. 2024, ¶184.

A POSITA would not be motivated to combine the LED cooling system with Harris's small format LCD cooling system because the designs are incompatible, and LED displays present additional advantages over the LCD displays described in Harris. POR, 41-43; Ex. 2024, ¶¶180-85. Petitioners never credibly dispute incompatibility of these two references, and in Reply simply parrot the Petition. Reply, 20-21.

C. Kitamura in view of Harris does not teach a *substantially perpendicular* direction of airflow pathways.

Petitioners again argue that because air flows in a perpendicular direction in one location, the airflow pathways are *substantially* perpendicular. Petitioners are incorrect. In fact, Figure 4 as annotated by Petitioners illustrates that the airflow is *substantially parallel* in its pathway:



VI. The Secondary Considerations Confirm Non-Obviousness

A. There is Nexus to All of the Evidence Presented.

Petitioners do not contest any of MRI's evidence that both MRI and Samsung practice the Challenged Claims. *See* POR, 48-53; Ex. 2024, ¶¶193-97; Ex. 2054; Ex. 2039. Thus, it is un rebutted that the parties' products practice the claims and that nexus should be presumed. *PPC Broadband, Inc. v. Corning Optical Commc'ns RF, LLC*, 815 F.3d 734, 747 (Fed. Cir. 2016).

Petitioners attempt to rely on the ITC's initial determination, but that decision is only preliminary, relied on different evidence, and subject to a petition for review. Petitioners cannot rely on a decision that has no binding effect on the Board, without offering substantive argument or evidence here, which they have not done. *Memorandum Re: Interim Procedure for Discretionary Denials in AIA Post-Grand*

Proceedings with Parallel District Court Litigation, UPSTO 6 (June 21, 2021) (citing *Tandon Corp. v. U.S.I.T.C.*, 831 F.2d 1017, 1019 (Fed. Cir. 1987)). Samsung and MRI’s outdoor displays practice the claims for the reasons set forth in the Patent Owner Response.

B. Long-Felt but Unmet Need for Effective Cooling

Samsung’s White Paper³ describes the development of outdoor displays. Ex. 2025. Customers wanted to “tak[e] the message outdoors” using digital displays but confronted a big obstacle: heat from the sun and the brighter backlights. Ex. 2025, 2-3. Samsung does not dispute there was a long-felt need for effective outdoor display cooling and instead argues that “the claims are not limited to outdoor displays.” Reply, 19.

Samsung confuses *long-felt need* with the *claimed invention* that meets the need. The Federal Circuit’s recent *Volvo Penta* opinion is instructive. *Volvo Penta of the Americas, LLC v. Brunswick Corp.*, 81 F. 4th 1202 (Fed. Cir. 2023). There, the Court identified “safe wakesurfing on stern-drive boats” as a long-felt need, even

³ Samsung notes that the ITC did not give significant weight to MRI’s secondary consideration evidence. Reply, at 19. The ITC record was different and did not include Samsung’s White Paper tying the long-felt need for outdoor displays and later commercial success to cooling innovations.

though the claims were directed to “a tractor-type stern drive for a boat” without any mention of wakesurfing in the claims. *Id.* at 1206, 1214. The Court found error in the Board’s failure to give weight to this unmet need for a safer drive for wakesurfing. *Id.* at 1214. Likewise here, there was a long-felt need for outdoor displays (which require effective cooling), and MRI developed and claimed displays with an effective cooling system that enabled use outdoors.⁴

C. Failure of Others

Testimony from Samsung’s engineer establishes failures spanning a decade. Samsung was researching outdoor LCD displays by 2005, but lacked a product. Ex. 2029, 46:7-15. Samsung contends the challenged claims would have been obvious, but Samsung did not create a product until 2010-2012, and even then, resorted to air conditioning. Ex. 2029, 46:16-47:22. Samsung later introduced its OHD product in 2013-2015, which proved a failure because the “generated heat, was not being taken out well.” Ex. 2029, 51:1-9. In 2016, Samsung launched its infringing OHF product line that finally proved successful. Ex. 2029, 53:1-4.

Samsung also argues there is no evidence that it worked “continuously during that time,” but there is no requirement that failures be continuous to serve as

⁴ In *ABT Sys. LLC v. Emerson Elec. Co.*, 797 F.3d 1350, 1362 (Fed. Cir. 2015), unlike here, the prior art taught a system that met the alleged unmet need. *Id.*

evidence of nonobviousness. Finally, Samsung's repeated failures all lacked the claimed features, and Samsung's ultimate use of the challenged claims led to commercial success. POR, 57-59.

D. Copying

The facts show that Samsung failed to develop its own product and then created a successful infringing product while having access to the claimed design. POR, 57-58. Copying "requires duplication of features of the patentee's work based on access to that work." *Institut Pasteur & Universite Pierre Et Marie Curie v. Focarino*, 738 F.3d 1337, 1347-48 (Fed. Cir. 2013). This is exactly what Samsung did. Indeed, Samsung does not dispute that it performed teardowns and thereafter released its own products incorporating key features of the product it tore down. Reply, 23-24. Samsung's teardown analysis details the open loop pathway that runs along the backlight and electronics within the closed loop pathway, features of the inventive cooling system which Samsung incorporated its own small-format OH displays. Ex. 2043, 1-3, 6; Ex. 2039, 18. Samsung disputes the precise date of its teardown analysis but cannot dispute it had access during product development of its copy-cat product. Ex. 2030, 189:16-191:1. Moreover, Samsung only disputes the date of a tear down of a **large-sized product**. See Reply, 24. Samsung does **not** dispute its teardown of a **small-sized product** before releasing its OHF displays. *Id.* These undisputed teardowns during development of Samsung's own small-sized

products is un rebutted evidence of copying.

Samsung argues that it was a common practice “for Samsung to review outdoor displays of other companies,” suggesting that Samsung’s copying culture⁵ somehow negates its copying. Reply, 21 (citing Ex. 1038, 6:11:22). It does not, and instead supports a finding of nonobviousness.

E. Commercial Success

Samsung does not dispute that Samsung and MRI’s products practice the challenged claims and are commercially successful.⁶ POR, 60-62. Samsung instead argues against a presumption of nexus because the products are not coextensive with the claims. Reply, 21-22 & 24-26. First, almost all of the “features” and “highlights” that Samsung identifies are, in fact, features or benefits of the ’287 Patent’s invention, including the “slim design” (*id.*, 5:11-14), water and dust resistant “IP56” certification (*id.*, 5:28-49), and “excellent visibility” (*id.*, 5:25-28, 9:25-35). And

⁵ Samsung was recognized as a “fast follower” and “not an innovator.” *Apple, Inc. v. Samsung Elecs. Co., Ltd.*, No. 12-CV-00630-LHK, 2014 WL 7496140, at *8 (N.D. Cal. Aug. 27, 2014).

⁶ There is no requirement that commercial success evidence be domestic. *See Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1255 (Fed. Cir. 1989).

providing “Extreme Outdoor Durability” by protecting against overheating is a key feature of the invention.

Furthermore, even if there were other product features, “[i]t is not necessary ... that the patented invention be solely responsible for the commercial success, in order for this factor to be given weight....” *Oren Techs., LLC v. Proppant Express Investments LLC*, No. 2019-1778, 2021 WL 3120819, at *7 (Fed. Cir. Jul. 23, 2021).

Finally, the evidence shows that the success of MRI’s and Samsung’s products is attributable to the effective cooling systems. Indeed, there was no market for outdoor LCD displays until MRI’s patented inventions and a market would not exist but for the inventions. Exs. 2001, 2025. This is shown by the White Paper in which Samsung observed that “[t]he many barriers that limited how digital screens could be used outdoors and in direct sunlight have all come down.” Ex. 2025, 2. Earlier adopters failed, but “years of insights and experience” and “engineering advances” made putting screens outdoors “entirely possible.” *Id.* Samsung recognized that *MRI was the “pioneer” who “entered into a virgin space”* and Samsung wanted to form a “collaboration in the outdoor space.” Ex. 2001.

F. Industry Praise and Licensing

Samsung attacks the White Paper for not mentioning MRI and attacks Romulus Stoain’s email for not identifying specific products. Reply, 26. These attacks miss the mark. The White Paper shows the need, importance, and enormous

challenge to provide effective cooling. Ex. 2025. And the Stoain email shows that Samsung recognized it was Bill Dunn that pioneered the outdoor space with his technology. Ex. 2001. This direct praise is entitled to significant weight.

Samsung attacks John Palmer's testimony as purportedly failing to establish what features create "the desirable effect" in the infringing products. Reply, 26. Mr. Palmer's testimony is clear: customers want Samsung because sunlight causes other displays to get hot and develop black spots where the liquid crystals are overheated. Ex. 2032, 118:21-119:8. The infringing cooling system thus drives demand for the Samsung Product.

Finally, Samsung argues that MRI's licenses lack a nexus because they encompass other patents. Reply, 27. Samsung's cited case actually supports giving some weight to licenses even where they are not limited to the single patent at issue. *Shoes by Firebug LLC v. Stride Rite Children's Grp., LLC*, 962 F.3d 1362, 1373 (Fed. Cir. 2020). Here, Samsung's main competitor, LG, has not only licensed MRI's patents but has entered a JV for marketing MRI's products. Exs. 2049, 2050. And another licensee specifically licenses the '287 Patent family. Ex. 2051, 10.

VII. Conclusion

All challenged claims are non-obvious.

Dated: February 20, 2024

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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that this Patent Owner's Sur-Reply contains 5,582 words according to the word-processing program used to prepare this paper. The foregoing word count complies with the 5,600 word type-volume limit specified by 37 C.F.R. § 42.24(b)(2).

Dated: February 20, 2024

Respectfully submitted,

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing **PATENT OWNER'S SUR-REPLY** has been served electronically via email upon the following:

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