

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 RESPONSE

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	MRI'S INNOVATIVE THERMAL MANAGEMENT SYSTEM AND SAMSUNG'S FAILURES	2
A.	Background of the Technology	2
B.	The '287 Patent's Innovative Cooling System.....	4
III.	LEVEL OF SKILL IN THE ART	6
IV.	SAMSUNG'S EXPERT TESTIMONY SHOULD BE GIVEN LITTLE WEIGHT	7
V.	CLAIM CONSTRUCTION	8
A.	"between"	8
B.	"open loop of ambient air which passes through the housing and along the backlight"	9
C.	"closed loop"	9
VI.	SAMSUNG FAILS TO ESTABLISH OBVIOUSNESS.....	10
A.	Ground 1 - Karppanen Does Not Render the Challenged Claims Obvious.	10
1.	Claims 12, 18, and 22: Karppanen does not render obvious a "closed loop" of "isolated gas"	10
2.	Claim 12: Karppanen does not render obvious "an open loop of ambient air that passes through the housing and along the backlight"	13
3.	Claim 15: Karppanen does not render obvious "one or more electronic devices for driving the LCD positioned within the rear cooling chamber"	17
4.	Claim 17: Karppanen does not render obvious an "intended direction of closed loop isolated gas flow [that]	

	is substantially perpendicular to the intended direction of [the] open loop of ambient air flow”	19
5.	No Motivation to Modify Karppanen	20
B.	Ground 2 - Nagashima in view of Karppanen Does Not Render the Challenged Claims Obvious.....	21
1.	Claims 4, 12, and 22: Nagashima does not render obvious “closed loop” of “isolated gas”	21
2.	Claims 1, 12, and 21: Nagashima does not render obvious “coolable by a combination” of a closed loop and an open ambient loop	24
3.	Claim 17 and 5: Nagashima does not render obvious “intended direction of closed loop isolated gas flow [that] is substantially perpendicular to the intended direction of [the] open loop of ambient air flow”	26
4.	No Motivation to Modify or Combine Nagashima with Karppanen	26
C.	Grounds 3 and 4 - Ohta in view of Marumoto, with or without Yare, Does Not Render the Challenged Claims Obvious	27
1.	Claims 1, 12, 18, and 21: Ohta does not render obvious “a housing”	28
2.	Claims 1, 12, 18, and 21: Ohta and Marumoto in view of Yare does not render obvious “a housing”	30
3.	Claim 12: Ohta does not render obvious “a liquid crystal display (LCD) positioned within the housing and having a backlight”	31
4.	Claims 1, 12, and 22: Ohta does not render obvious a “closed loop” of “isolated gas”	32
5.	Claims 12: Neither Ohta nor Marumoto discloses “an open loop of ambient air which passes through the housing and along the backlight”	34

6.	Claims 1, 12, and 21: Neither Ohta nor Marumoto renders obvious “coolable by a combination” of a closed loop and an ambient loop airflow pathway.....	36
7.	Claims 15 and 9: Neither Ohta nor Marumoto renders obvious “electronic components for driving the LCD positioned within the rear cooling chamber”	36
8.	Claims 17 and 5: Ohta does not render obvious “intended direction of closed loop isolated gas flow [that] is substantially perpendicular to the intended direction of [the] open loop of ambient air flow”	37
9.	No Motivation to Combine Ohta with Marumoto or Yare	38
D.	Ground 5 - Kitamura in view of Harris does not render the Challenged Claims obvious.....	40
1.	Claim 12: Kitamura does not render obvious “a liquid crystal (LCD) positioned within the housing and having a backlight.....	40
2.	Claim 12: Kitamura does not render obvious “an open loop of ambient air which passes through the housing and along the backlight”	41
3.	Claims 12 and 18: Kitamura does not render obvious a “closed loop” of “isolated gas”	43
4.	Claim 17: Kitamura does not render obvious “intended direction of closed loop isolated gas flow [that] is substantially perpendicular to the intended direction of [the] open loop of ambient air flow”	44
5.	No motivation to modify or combine with Harris	45
VII.	OBJECTIVE INDICIA SHOW THE NON-OBVIOUSNESS OF THE CHALLENGED CLAIMS.	46
A.	There is a Nexus to Both Samsung and MRI Products.....	48
B.	Long-Felt Need, Samsung’s Failures, and Copying	54



C. Commercial Success.....60

D. Industry Praise and Willingness of Others to License the '287
Patent.....62

VIII. CONCLUSION.....67

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	
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	
2008	Decision Denying Institution of <i>Inter Partes</i> Review of U.S. Patent No. 8,854,572 in <i>Civiq Smartscares 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	
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 Sealed in Its Entirety, Parties and Board Only
2017	Intentionally Omitted	
2018	Intentionally Omitted	
2019	Intentionally Omitted	
2020	Intentionally Omitted	

Exhibit	Description	Confidentiality Designation
2021	Intentionally Omitted	
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>See 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

Exhibit	Description	Confidentiality Designation
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
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 [REDACTED] Outdoor 86” product, dated Mar. 24, 2016, and English translation	Filed Sealed in Its Entirety, Parties and Board Only

Exhibit	Description	Confidentiality Designation
2043	SEITC0035259 Samsung teardown photos of [REDACTED] 55" product	Filed Sealed in Its Entirety, Parties and Board Only
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

Exhibit	Description	Confidentiality Designation
2052	Confidential Agreement, dated Jan. 22, 2020	Filed Sealed in Its Entirety, Parties and Board Only
2053	Samsung Outdoor Installation Guide	Filed Publicly
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-mhz-fruit-colors/	Filed Publicly
2056	U.S. Patent No. 8,373,841 ("841 Patent")	Filed Publicly

I. INTRODUCTION

Petitioners Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc., (collectively “Samsung”) fail to meet their burden of establishing that claims 1, 4-5, 8-23 (collectively the “Challenged Claims”) of U.S. Patent No. 9,629,287 (the “’287 Patent” or “Challenged Patent”) are obvious in view of the cited prior art.

Samsung misreads the Challenged Patent and the prior art—ignoring clear disclosures of the patent, the understanding of a person of ordinary skill in the art (“POSITA”), and the basic teachings of the prior art. The Challenged Patent concerns thermal management systems for large format electronic display boards that are placed in direct sunlight or areas of high thermal load. Prior to the inventions disclosed in the Challenged Patent, thermal management schemes for electronic displays were either not sufficient to adequately cool the electronic display in outdoor and direct sunlight environments, or utilized air conditioning units that generated excess noise and condensation that threatened the long-term viability of the system. The Challenged Patent claims novel airflows and pathways that enabled, for the first time, large format displays to be used outside in prolonged direct sunlight.

Samsung fails to rebut in its petition and expert’s declaration the substantial objective *indicia* of non-obviousness of which Samsung was indisputably aware.

Using the inventions disclosed in the Challenged Patent, Patent Owner Manufacturing Resources International, Inc. (“MRI”) created a novel market for outdoor electronic displays that led to MRI’s commercial success. Even Samsung recognized MRI’s thermal management systems as a “unique and impressive” solution for companies desiring to replace outdoor static poster displays with electronic display panels. After Samsung spent over a decade attempting to develop a successful outdoor electronic display product, Samsung obtained and tore down [REDACTED], integrated its features into its own product, and released a new product line that led to a dramatic increase in sales.

Collectively, the secondary considerations are entitled to substantial weight and strongly corroborate the absence of obviousness. That is particularly true here where Samsung’s proposed combination relied on multiple modifications, all of which are undercut by operability and other problems. The Challenged Claims are patentable.

II. MRI’S INNOVATIVE THERMAL MANAGEMENT SYSTEM AND SAMSUNG’S FAILURES

A. Background of the Technology

The Challenged Patent generally describes cooling systems and methods for electronic displays that are located in areas where thermal stability of the electronic display is at risk. ’287 Patent, 2:3-17, 4:46-50. Often, such displays are located in

outdoor environments, where high ambient heat and radiation from the sun create temperatures in excess of the electronic display's normal operating range. *Id.*, 2:4-17, 2:29-36. In addition to stress created by solar loading, electronic displays operating in outdoor environments must also be able to function in areas with high pollution, dust, and humidity. *Id.*, 4:12-15.

Such outdoor and semi-outdoor electronic display systems generally comprise four main elements: structural support components, the electronic image assembly, electrical components for operating the various devices in the display system, and a thermal management system. The structural support components comprise both the external housing of the display system and the internal support elements that secure and enclose the electronic display.

Electronic image assemblies are devices that visually present static or moving images. The electronic display can consist of many different forms of electronic image assemblies, including plasma, LEDs, and LCD modules, among others. *Id.*, 4:35-42. In the case of an LCD module, an LCD stack is located forward from a backlight. *Id.*, 2:65-3:5. Though the liquid crystal material itself can modulate light to create different images, the liquid crystal material itself does not produce light. Instead, the liquid crystal material must be illuminated using a light source. That light source is termed the backlight. The light from the backlight

is modulated pixel-by-pixel in the LCD panel to provide a color image to the viewer. Ex. 2024, ¶61.

B. The '287 Patent's Innovative Cooling System

The '287 Patent claims an electronic image assembly within a housing cooled by (1) an open loop ambient air pathway along the rear surface of the electronic image assembly and (2) a closed loop gas pathway around the electronic image assembly. *See* '287 Patent at Abstract, Claim 12.

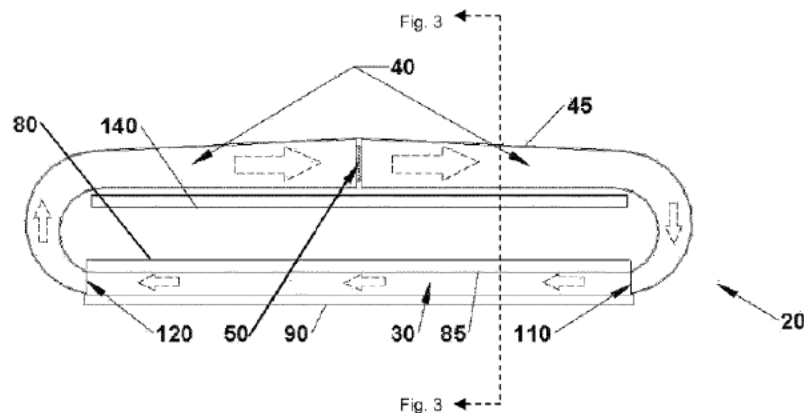
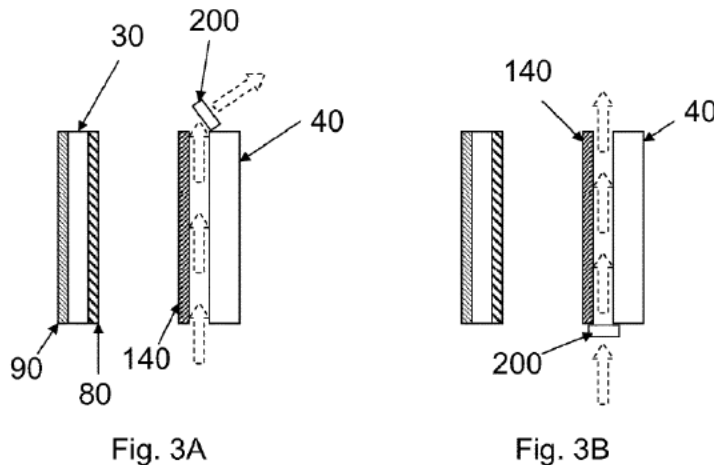


Fig. 2

As shown above, the closed loop of isolated gas travels in chamber 20 through the housing. *Id.* at 4:4-8. The closed loop can be made up of two sections, a first cooling chamber 30 in front of the display and a rear cooling chamber behind the display 40. The closed loop of isolated gas travels between the electronic display surface 85 and between the transparent plate 90 which allows observers to see through the gas and observe the image displayed on the electronic display surface 85. *Id.* at 4:28-41.

Figures 3A and 3B show a vertical cross section of the electronic display, including the location of one open loop of ambient air. *See id.* at 3:25-26.



The vertical cross section shows the same electronic display 80 and transparent plate that form part of the closed loop of isolated gas. *Id.* at 4:42-46. Toward the rear of the electronic display, there is a backlight 140 which serves to illuminate the LCD stack and can be a significant source of heat for an electronic display—especially in large format screens. *Id.* at 3:1-2; 2:14-15, 4:46-47. The backlight 140 is placed in close proximity to the surface of the rear portion of the closed loop of ambient air (referred to in the '287 Patent as the “rear cooling chamber” 40). *Id.* “The close proximity of these two elements, in part, creates the constricted convection cooling of the backlight 140. *Id.* at 4:48-50. Moving air through that smaller space between the backlight 140 and surface of the closed loop of isolated gas (“rear cooling chamber” 40) increases the cooling of the electronic display system. *Id.* at 4:52-54.

To solve the problem of dust and pollution in outdoor environments the invention uses an isolated gas cooling system in the closed loop. *Id.* at 2:37-43.

III. LEVEL OF SKILL IN THE ART

A POSITA would possess a bachelor's degree in a pertinent discipline, such as mechanical or electrical engineering, physics, applied physics, or a related field. Such a person would also have had 2-4 years of experience in working with electronic displays including thermal management associated with electronic displays. Alternatively, a POSITA would have had 4-6 years of experience in the field and would have developed a similar understanding of thermal management associated with electronic displays. Ex. 2024, ¶27.

Samsung proposes that POSITAs include “industrial designers” without any special experience or knowledge of thermal management of the electronic displays. Petition at 11. Under Samsung's definition, a POSITA must have only a generalized knowledge of “product design issues and failure modes associate with electronic displays.” *Id.* This definition is overly inclusive, and sweeps in individuals who fall short of the ordinary skill necessary to understand the issues underlying the thermal management systems disclosed in the '287 Patent, including individuals who design the external housing of displays (e.g., bus shelters), electrical outlets of the display, or computer hardware. Ex. 2024, ¶29.

Such mechanisms are not components of the cooling system for electronic displays.

IV. SAMSUNG’S EXPERT TESTIMONY SHOULD BE GIVEN LITTLE WEIGHT

Samsung’s expert, Smith-Gillespie, should be given little weight as his analysis was later contradicted during deposition and merely parrots the Petition. *See Fanduel, Inc. v. Interactive Games LLC*, 966 F.3d 1334, 1343-44 (Fed. Cir. 2020); *Yorkey v. Diab*, 601 F.3d 1279, 1284 (Fed. Cir. 2010).

First, Smith-Gillespie directly contradicted himself when pressed during deposition. In his declaration, Smith-Gillespie opines that the definition of a POSITA includes an industrial designer. *See* Ex. 1002, ¶39. However, when deposed in February, two months after submitting his declaration, Smith-Gillespie stated that he no longer believed that an industrial designer fell within the scope of an ordinarily skilled artisan in the field of art. *See* Ex. 2022, 73:3-7 (“Q. Okay. So an industrial designer, as we just described, would not qualify based on that educational background as a person of ordinary skill in the art, under your definition; is that right? A. That's correct.”). Thus, it is unclear what standard of a POSITA Smith-Gillespie applied in his declaration, and, in any event, Smith-Gillespie appears to acknowledge that an industrial designer—which is within his

proposed level of skill—would not have been able to make the combinations proposed in the Petition. *Id.*

Second, Smith-Gillespie’s declaration should be discounted as it largely parrots the Petition without any elaboration or supporting evidence. *See generally* Petition and Ex. 1002; *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9, at 18 (PTAB Aug. 24, 2022) (precedential) (an expert declaration is entitled to little weight when it contains an exact restatement of the petition’s arguments without any additional supporting evidence or reasoning).

V. CLAIM CONSTRUCTION

The ITC construed certain relevant terms recited by the claims of the ’287 Patent: “closed loop,” “between,” and “open loop of ambient air which passes through the housing and along the backlight.” *See* Ex. 1034.

A. “between”

The ITC held that the term “between” should be given its plain and ordinary meaning. *Id.* at 30. The ITC rejected Samsung’s argument that “between” had a specialized meaning and required construction and reasoned that “between” was a “commonly understood word that appears to be used in the claims in accordance with its plain and ordinary meaning.” *Id.* MRI applies the plain and ordinary meaning of the term “between.”

B. “open loop of ambient air which passes through the housing and along the backlight”

The ITC held “open loop of ambient air which passes through the housing and along the backlight” had its plain and ordinary meaning. *Id.* at 54. The ITC rejected Samsung’s argument that “along the backlight” should be construed to mean “in thermal communication with the backlight.” *Id.* The intrinsic record did not support the transformation of the preposition “along” to claim the effect of “thermal communication” between two objects and the term “thermal communication” was not used within the references relied upon by Samsung. *Id.* Looking at the same reference, the ITC noted the term “along” was being used “to describe the position of the airflows in relation to the rear surface” of the electronic display. *Id.* The ITC concluded that the term “along” was used during prosecution in its typical use as a positional term. *Id.* Thus, MRI applies the plain and ordinary meaning of the term “along the backlight.”

C. “closed loop”

The ITC construed the claim term: “closed loop.” *Id.* at 42. Samsung argued the same construction it argues in the Petition: “gas pathway within a display housing containing gas that is essentially isolated from external air.” *Id.* MRI argued for a plain and ordinary meaning of the term.

The ITC rejected Samsung's proposed construction, noting that the specification specifically states that the closed loop and open loop need not be isolated from each other. *Id.* at 48. The ITC then "tentatively" construed "closed loop" as "a gas pathway forming a complete loop, within a display housing." *Id.* at 45.

This response rebuts Samsung's arguments based on the ITC construction. As the construction is "tentative," MRI also rebuts Samsung's proposed construction in the alternative.

VI. SAMSUNG FAILS TO ESTABLISH OBVIOUSNESS

A. Ground 1 - Karppanen Does Not Render the Challenged Claims Obvious.

1. Claims 12, 18, and 22: Karppanen does not render obvious a "closed loop" of "isolated gas"

Claim 12 requires a "closed loop of isolated gas" that circulates within the housing. Claim 18 likewise claims a "closed loop of isolated gas." Claim 21 recites a "closed loop" of cooling gas, and dependent claim 22 specifies that the gas within the closed loop "is isolated."

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." '287 Patent, 4:9-11. "Essentially isolated" does not require the loop to be "hermetically sealed," but requires the gas to be "isolated to the extent that dust

and contaminants may not substantially enter the first gas cooling chamber.” *Id.*, 4:19-24.

Samsung’s proposed construction of “closed loop” includes the additional limitation that the gas within the closed loop is “essentially isolated from external air.” This construction imports the same limitation of “isolated gas” in to the “closed loop” term and requires the same structure as the “isolated gas” term.

Karppanen is silent as to the extent to which the display casing 12—which contains the display—must be sealed against particulates and water in order to reach the “isolated gas” or “closed loop” terms. Ex. 2024, ¶¶91-93. To determine the amount of sealing of an enclosure, a POSITA would look to the Ingress Protection (“IP”) rating of an outdoor enclosure to understand the extent to which it is—or should be—isolated from dust and water. *Id.*, ¶¶92-94. *See* Ex. 2023. IP ratings are the industry standard for measuring and determining the amount of seal in a system. Ex. 2024, ¶¶92; Ex. 2023.

The IP rating is comprised of two numbers. Ex. 2024, ¶¶92; Ex. 2023. The first number represents the extent to which dust can enter the system, and the second number represents the extent to which water can enter the system. Ex. 2024, ¶¶92; Ex. 2023. A POSITA would look to an enclosure that meets at least the level 5 for the first and second digits to know it is sealed to the extent that it is “substantially free” of dust and contaminants. Ex. 2024, ¶¶92; Ex. 2023. Absent a

disclosure that an enclosure is rated to a level 5 IP rating, a POSITA would look for explicit statements that the enclosure is sealed from dust or sealed from water. Ex. 2024, ¶¶92.

Karppanen is silent as to the IP rating of the enclosure or whether dust and water can enter the system. *Id.*, ¶¶93-96. At most, Karppanen references a “waterproof” display casing. *Id.*, ¶¶93-94; Karppanen at Abstract. This disclosure alone is not sufficient. “Waterproof” merely refers to the lower scale of the IP rating system (levels 2-3). *Id.* In fact, there are “weatherproof” rated devices—such as outdoor outlet protectors—that only protect against falling rain and are designed to be opened to the atmosphere, dust, and particulates. *Id.*

In one sentence, Karppanen states that the transparent front plate may be fastened to the rest of the housing by “vibration attenuating sealing elements 50.” *Id.*, ¶¶95; Ex. 1006, 7:35-39. However, as a POSITA would know, this is material used to protect the front transparent plate (glass) from physical force that it may encounter in outdoor settings, e.g., vibrations. *Id.* The vibration attenuating elements do not, by themselves, indicate whether or to what extent the display enclosure in Karppanen is sealed against, for example, dust or ambient air.

Samsung states that Karppanen discloses a “closed” display casing. Petition at 32. Contrary to Samsung’s assertions, this has nothing to do with sealing the case. Rather, when Karppanen uses the term “closed,” it refers to the position of

the casing being shut, i.e., not open for maintenance. *See, e.g., id.* 7:7-11 (“In normal use, the display casing and the device are turning against each other to a *closed* position and locked to each other by locking means 18 on one side of the casings. In the *closed* position, there remains a cooling space 20”).

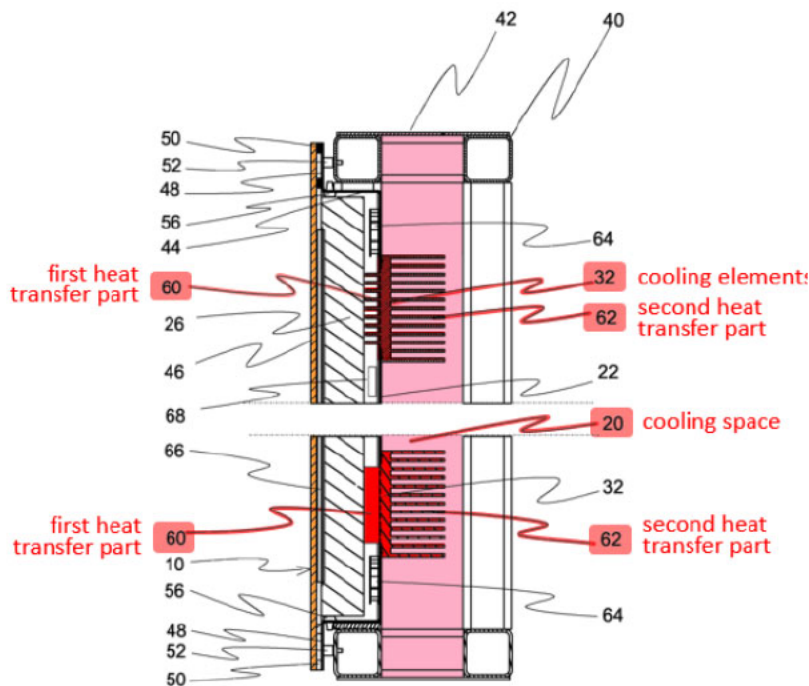
Samsung does not address the extent to which Karppanen’s enclosure is sealed against dust or contaminants as required by the “isolated gas” limitation. Further, Samsung fails to address its “closed loop” construction of “essentially isolated from ambient air” with regard to Karppanen. Moreover, because Karppanen does not discuss the extent to which the display casing 10 is sealed from external air, Karppanen does not teach a closed loop under Samsung’s construction of “closed loop” or “isolated gas” per the lexicography in the specification.

2. Claim 12: Karppanen does not render obvious “an open loop of ambient air that passes through the housing and along the backlight”

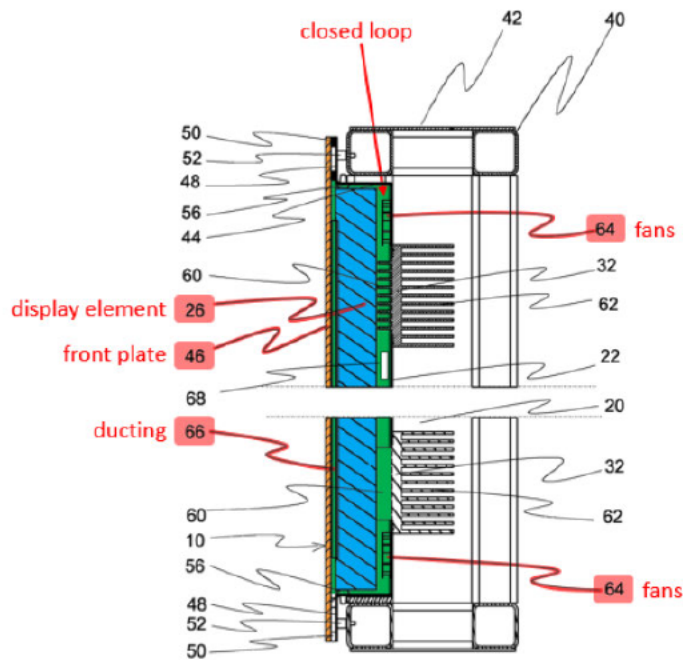
Claim 12 recites “an open loop of ambient air which passes through the housing and along the backlight.” This claim uses the positional term “along” to claim the inventive cooling feature of directly cooling the backlight using ambient air passing next to the backlight to transfer heat out of the system. Ex. 2024, ¶98.

Karppanen discloses an ambient air cooling space 20 that passes through a channel defined by two walls—neither of those walls constitute the backlight of an

LCD display if Karppanen were to include an LCD. As annotated by Samsung, Figure 2 of Karppanen shows a pathway for external air that passes through cooling space 20. Cooling space 20 is formed between the wall 22 separating the display casing 10 from the cooling space and wall 28 of the device casing. *See* Ex. 1006, 7:7-14.



Samsung correctly notes that the display is located entirely within the display casing. Petition at 32, Ex. 1006, 6:14-23. Samsung also argues that the display—which would include the LCD and backlight—is “placed into a sealed casing” and “encircled by a closed loop of isolated gas.” Petition at 32.



Thus the air within what Samsung maps to the “closed loop” passes along the backlight; the ambient air instead passes through an entirely separate cooling space 20.

Faced with this inadequacy, Samsung makes two arguments in an attempt to map Karppanen onto the open loop pathway along the ambient light limitation. Both fail. *First*, Samsung urges that “along the backlight” merely requires some form of thermal communication with the backlight. *Second*, Samsung suggests that “along the backlight” requires only that ambient air passes along *any* structure *close to* the backlight. See Petition at 34-35; Ex. 1002, ¶123. Both fail.

A POSITA would not conclude that any airflow which is “in thermal communication” with the backlight is traveling “along” the backlight. As noted by

the ITC, “[t]he intrinsic record does not support [Samsung’s] proposal to define ‘along’ to mean ‘is in thermal communication with.’” Ex. 1034, at 54. There is no reference to the term “thermal communication” within any of: the references relied on for claim construction, the patent specification, or the prosecution history. *See generally* Exs. 1014, 1012. Samsung attempts to expand and transform the positional and locational language of “along” to mean “in thermal communication with” in a failed attempt to cure the inadequacies of the prior art and broaden the claim’s reach to cover any configuration where a hot backlight is located near another cooler structure. *See* Pokharna Dec. at ¶¶102. A POSITA would not conclude that merely because one airflow is “in thermal communication” with the backlight that airflow is traveling “*along* the backlight,” as the claims require. *Id.*

In fact, Samsung’s assertion renders the entire phrase “which passes through the housing and along the backlight” superfluous and instead requires only that the “electronic display is coolable by a combination of a closed loop of isolated gas ... and an open loop of ambient air.” “In thermal communication with” merely recites the same physical phenomena of “coolable.” Under Samsung’s theory, if the display is coolable in any way by the ambient air—i.e. in thermal communication with that air—then the claim is satisfied. This theory ignores the explicit language of the claim and must be incorrect.

A POSITA would not conclude that air traveling along a structure that is separated from the backlight by multiple intervening structures is traveling “along” the backlight. Smith-Gillespie argues that ambient air in the cooling space 20 passes “along” the backlight because “the air flowing through the heat exchanger ‘cooling elements’ also is in thermal communication with the backlight, because first heat transfer parts 60 are placed in direct contact with the backlight thereby conducting heat ‘along the backlight.’” If the display in Karppanen were to be an LCD display with a backlight on the rear surface, Karppanen discloses at least four intervening structures between the backlight and the airflow in the cooling space: (1) glue to fix the first heat transfer part 60 to the display, (2) the first heat transfer part, (3) the back wall 22, (4) and the second heat transfer part extending into the cooling space. *See* Ex. 2024, ¶¶101. A POSITA would conclude this is simply too many intervening structures to meet the “along the backlight” limitation required by the claims and needed to provide the direct cooling of the backlight.

3. Claim 15: Karppanen does not render obvious “one or more electronic devices for driving the LCD positioned within the rear cooling chamber”

Claim 15 requires “electronic devices for driving the LCD positioned within the rear cooling chamber.” The “rear cooling chamber” is a portion of the closed loop cooling chamber that passes behind the LCD. *See* claim 14 (“a rear cooling chamber positioned behind the LCD and containing *the* closed loop of isolated

gas”). The overall closed loop cooling chamber includes both the first gas chamber 30 and rear cooling chamber 40. ’287 Patent at 4:47. The electronics are placed within the rear cooling chamber of the closed loop in order to facilitate additional cooling of those components, protect them from dust and contaminants, and provide a thinner overall design (eliminating the need for multiple cooling chambers). *See* Ex. 2056, 8:22-36, Ex. 2024, ¶47.

In contrast to the claim language, Karppanen teaches separating the electronics for operating the display from the casing which cools the display itself. Ex. 1006, 6:21-29 (“The separation of the display element and control electronics from each other and placing them in their own casings makes it easier to control the temperature of the information board and to arrange the cooling thereof.”). Thus, if anything, Karppanen teaches away from including electronics for controlling the display inside of *the* closed loop cooling chamber which also cools the display. A fact which Samsung ignored to twist the disclosures of Karppanen in attempting to reach claim 15.

Samsung misreads Karppanen, concluding that the electronics for driving the display *must* be located within the display casing along with the display. Petition at 39. This conclusion runs contrary to the explicit disclosure of Karppanen that the control units and power units for the display are in the *device casing*. *See* Ex. 1006, 6:19-26 (“[T]he electronic equipment needed in the control

of the display element have been placed inside of the device casing. Typically, this equipment includes a programmable control unit with its power supply for controlling the display, and the power supplies of the background light of the display.”). For this reason along, Karppanen does not render obvious claim 15.

4. Claim 17: Karppanen does not render obvious an “intended direction of closed loop isolated gas flow [that] is substantially perpendicular to the intended direction of [the] open lop of ambient air flow”

Claim 17, which depends from claim 12, claims a “substantially perpendicular” direction of ambient air through the open loop and isolated gas in the closed loop.

Karppanen is silent as to the intended orientation of the air within the display casing and its relationship (if any) to the ambient air passing through the cooling space 20. *See* Ex. 2024, ¶106-110. Karppanen describes horizontal ducts for the cooling space in only one of its embodiments. *Id.* ¶106. There is insufficient information to conclude that the air within the display casing is moving in a substantially perpendicular direction to that horizontal direction, much less that this is “the intended direction of [the] open lop of ambient air flow.” *Id.* Indeed, with respect to the direction of airflow, if anything, Karppanen suggests that the direction is parallel because the fins of the first heat transfer part and second heat

transfer part are oriented parallel to each other in all Figures. *See id.*, ¶106-09, Ex. 1006, Fig. 2.

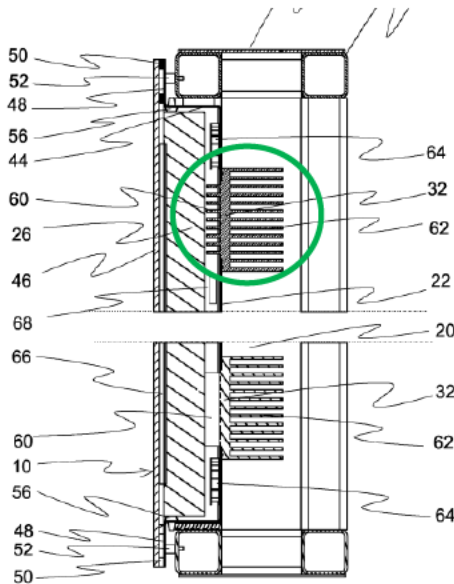


Fig. 2

5. No Motivation to Modify Karppanen

Notably, Samsung suggested no modifications of Karppanen, nor identified how Karppanen differs from the claims outside of claim 15. Samsung has thus failed to meet its burden to show claims 12-14, 16-23 are obvious. *Cohesive Techs., Inc. v. Waters Corp.*, 543 F.3d 1351 at 1364 & n.2 (Fed. Cir. 2008) (explaining that “precedent has rejected reliance on the ‘legal homily’ that ‘anticipation is the epitome of obviousness’ and obviousness requires analysis of additional elements); *CRFD Rsch., Inc. v. Matal*, 876 F.3d 1330, at 1340 (Fed. Cir. 2017).

Samsung does not suggest modifying Karppanen to meet the “isolated gas,” or “open loop of ambient air which passes through the housing and along the backlight” as required by independent claim 12 and the substantially similar claim limitations in claims 18 and 22. Nor would a POSITA be motivated to do so. To create an open loop of ambient air which passes through the housing *and along the backlight*, the housing would have to be restructured to move ambient air into the display housing itself. *Id.*, ¶103. This would destroy the modularity that Karppanen achieves by separating the display casing from the cooling space. *Id.* Destroying the modularity would render Karppanen unsatisfactory for its intended purpose and teaches away from making this modification. MPEP § 2143.01 (“If a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.”); *see also In re Gordon*, 733 F.2d 900, 903 (Fed. Cir. 1984).

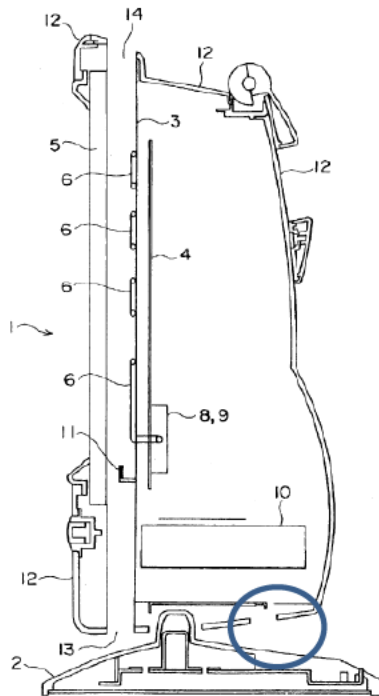
B. Ground 2 - Nagashima in view of Karppanen Does Not Render the Challenged Claims Obvious.

1. Claims 4, 12, and 22: Nagashima does not render obvious “closed loop” of “isolated gas”

As explained above, “isolated gas” refers to gas that is “isolated to the extent that dust and contaminants may not substantially enter the first gas cooling chamber.” ’287 Patent, 4:19-24. Nagashima describes an all-in-one personal

computer that integrates the electrical computing elements and display elements of a computer into one casing. Ex. 1007, Abstract; Ex. 2024, ¶¶67-68. Such devices were intended for indoor use, and the most significant heat source arose from the electrical components of the computer (such as the CPU) and not the display itself. *Id.* Accordingly, and entirely differently from the claims here, all-in-one computers at the time made use of the display itself as a heat dissipation source—transferring heat *from* the electrical components *to* the display. *See id.*, 120.

Nagashima teaches an open casing for the electronics that uses ambient air to exhaust heat created by the electronic components of the computer. These electrical components are located between cover 12 and chassis 3. Samsung relies on the disclosure of a fan on the CPU of the computer in cover 12 as creating a “closed loop” of “isolated gas.” *See* Petition at 57-60. However, as typical of indoor computer systems at the time, Nagashima shows vents within cover 12. *See, e.g.*, Figure 1.



These vents allowed ambient air to enter the system, pass over the hot electrical components, and vent heat out of the system. *See* Ex. 2024, ¶115-16. Because the all-in-one system was located indoors, dust and water from the external environment was not a significant concern, and the ambient air could be used to directly cool electrical components of the device. *Id.*, ¶116.

Samsung ignores the context of Nagashima and concludes that the electrical computer components within cover 12 must be in a “closed loop” of “isolated gas” because there is an apparent lack of vents or opening in the *chassis* 3. First, this ignores the all-in-one personal computer nature of Nagashima. Second, this is simply wrong since Nagashima describes openings in chassis 3 for wiring and connectors to pass between the computer and display. A fact that Samsung

acknowledges. *See* Ex. 1007, 3:63-4:1 (“On the backside of the LCD panel 5, i.e. its side facing main chassis 3 are arranged a large number of connectors, and electric wiring lines, connected to the connectors, *extend through an opening in the main chassis 3*”).

Samsung also argues Nagashima could be combined with Karppanen to seal the rear cover 12 and create a pathway for circulating isolated gas. Petition at 57-60, 65. However, Karppanen does not teach a “closed loop” of “isolated gas” as discussed above. Additionally, a POSITA would not be motivated to modify Nagashima based upon a large format electronic display system as disclosed in Karppanen because the thermal and environmental problems faced by each are distinct. Ex. 2024, ¶¶129-31. Finally, the Karppanen teachings would not function in a small format all-in-one personal computer because the hotter internal computer parts of all-in-one computers such as Nagashima’s required cooler external airflow in order to provide adequate heating. *Id.*, ¶¶117.

2. Claims 1, 12, and 21: Nagashima does not render obvious “coolable by a combination” of a closed loop and an open ambient loop

Claim 12 requires the LCD to be “coolable by a combination” of both the open loop and closed loop systems. Claims 1 and 21 require the same effect using substantially similar language. Ex. 2024, ¶118.

Nagashima, by contrast, teaches the deliberate heating of the display rear surface in order to transfer heat *to the display* from the electronics inside of the cover 12. *See* Ex. 1007, 5:38-49 (“As shown in FIG. 4, this embodiment is so constructed that a tube goes through a pump, a heat receiving head, and an opening in a main chassis and is fixed on the back surface of an LCD panel *to form a heat radiating portion. The back surface of the LCD panel is made of a metal material, and the heat of a cooling medium liquid from the tube... can be transferred effectively onto the back surface of the LCD panel and radiated.*”).

Samsung identifies statements in Nagashima to assert the tubes carrying heat from the electronic components inside the cover *cool* the rear surface of the display. Petition at 63 (“[T]he tube is attached to the display, thereby transferring heat from the display to the rear cooling chamber containing a closed loop generated by the heat receiving head and fan. The closed loop thus cools the display in this embodiment.”). Samsung identifies no evidence within Nagashima to support this conclusion, instead relying solely on Paragraph 226 of the declaration of Smith-Gillespie. However, Paragraph 226 does not address cooling the display, let alone transferring heat away from the display with tube 6.

Nagashima explicitly teaches *transferring heat to the electronic display*. For this reason alone, Nagashima does not render obvious claims 1, 12, and 21.

3. Claim 17 and 5: Nagashima does not render obvious “intended direction of closed loop isolated gas flow [that] is substantially perpendicular to the intended direction of [the] open loop of ambient air flow”

Claim 17 recites a “substantially perpendicular” direction of ambient air through the open loop and isolated gas in the closed loop. Claim 5 includes similar language. Ex. 2024, ¶122. Nagashima describes the direction of external airflow through the channel defined between the LCD panel 5 and chassis 3. Ex. 2024, ¶123; Ex. 1007, 5:64-6:3. Nagashima is silent as to the direction of airflow inside of cover 12, and, if anything, the airflow within cover 12 would be substantially parallel to the external airflow along chassis 3. Ex. 2024, ¶125-26. Samsung’s annotation of Nagashima illustrates the lack of substantial perpendicular airflow and is a mere self-serving annotation to reach the limitations of the claim. *Id.*, ¶123-25.

4. No Motivation to Modify or Combine Nagashima with Karppanen

There is no motivation to combine Nagashima with Karppanen. The two references are directed to different fields of art. “Two separate tests define the scope of analogous prior art: (1) whether the art is from the same field of endeavor, regardless of the problem addressed and, (2) if the reference is not within the field of the inventor’s endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved.” *In re Bigio*, 381 F.3d

1320, 1325 (Fed. Cir. 2005). First, the Nagashima is not from the same field of endeavor: The '287 Patent describes cooling systems for large format outdoor information systems and Nagashima describes cooling systems for small format all-in-one indoor computer systems. Ex. 1007, 1:8-9; Ex. 2024, ¶129-31. Second, Nagashima's cooling solutions are not reasonably pertinent to the problem of large format outdoor electronic display cooling. Ex. 2024, ¶130. The primary thermal stressors in large format displays are solar loading associated with being positioned outside in sunlight and the size of the display itself. *Id.* The primary thermal stressors in small format displays, by contrast, are the electrical components of the computer system. *Id.* Additionally, the indoor environment of a desktop personal computer reduces concerns for external dust and water, and allows ambient air to be a source of cooling for the electrical components. *Id.*, ¶131.

A POSITA would not be motivated to modify Nagashima's cover 12 to unnecessarily reduce the ambient air cooling and increase the thermal load on the electrical components. *Id.*, ¶131-33. Instead, the modifications are the application of hindsight in order to reach the limitations of the Challenged Claims. *Id.*, ¶134.

C. Grounds 3 and 4 - Ohta in view of Marumoto, with or without Yare, Does Not Render the Challenged Claims Obvious

Samsung proposes extensive modifications of Ohta and Marumoto. Samsung argues a POSITA would be motivated to extensively modify Ohta and Marumoto,

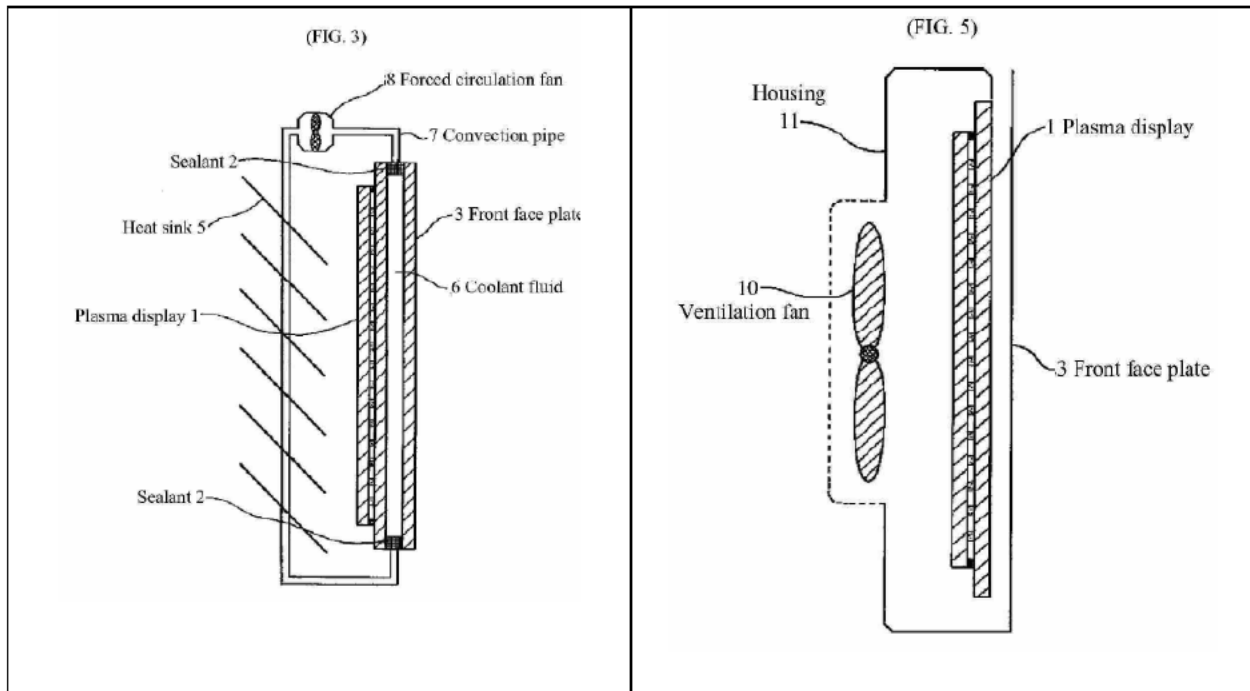
including (1) adding a housing (element [12a]), (2) replacing a plasma display with an LCD (element [12b]), (3) replacing liquid with gas in a closed loop (element [12c]), (4) moving an open loop from the front surface of the display to the backlight (element [12c]), (5) placing electronic components for driving the display (which are not mentioned in either reference) in a newly created closed loop of gas (claim 15), and (6) creating perpendicular airflow (claim 17).

Such extensive modifications suggest the use of impermissible hindsight through using the claims as a roadmap to combine the prior art to reach the claimed invention. *In re Ratti*, 270 F.2d 810, 813 (C.C.P.A. 1959) (holding the suggested combination of references improper under §103 because it “would require a substantial reconstruction and redesign of the elements shown in [a prior art reference] as well as a change in the basic principles under which the [that reference’s] construction was designed to operate”); *see also Plas-Pak Indus., Inc. v. Sulzer Mixpac AG*, 600 F. App’x 755, 758 (Fed. Cir. 2015) (same); *In re Gardner*, 449 F. App’x 914, 916 (Fed. Cir. 2011) (same).

1. Claims 1, 12, 18, and 21: Ohta does not render obvious “a housing”

All independent claims in the ’287 Patent claim a “housing” for the LCD (claim 12) or electronic display (claims 1, 18, and 21). Example 3 of Ohta, cited by Samsung, does not disclose a housing. Instead, in Ground 3, Samsung asserts a

POSITA would combine the embodiment in Example 3 with the housing of Example 5. Petition, 79. But Example 5's housing would not function as needed in Example 3 because the housing in Example 5 is specifically designed to provide an opened space between the LCD front surface and the front glass plate for ambient air to pass over the *front* surface of the LCD. Ex. 2024, ¶140; Ex. 1004 (Ohta), (0031). Example 3, by contrast, requires that area to be sealed so that the liquid ethylene glycol may flow through the channel between the LCD front surface and front glass plate. Ex. 2024, ¶140; Ex. 1004, (0026). Figures 3 and 5 illustrate the different configurations of Example 3 and Example 5. *Compare* Ohta Figure 3, *with* Figure 5.



2. Claims 1, 12, 18, and 21: Ohta and Marumoto in view of Yare does not render obvious “a housing”

In Ground 4, Samsung combines Ohta with Yare to obtain a housing for the Example 3. However, Yare does not disclose a housing for an electronic display. Instead, it describes a cabinet in which to place a fully formed display product. Ex. 2024, ¶142, Ex. 1013, 1:4-6, 2:15-17. The fully formed display product placed within the cabinet would have its own housing. Ex. 2024, ¶142.

Even *if* Yare’s cabinet was a housing for an LCD module (or other form of electronic thin panel), a POSITA would not be motivated to integrate the Ohta system (along with the many modifications suggested by Samsung) into Yare. *Id.*, ¶168-69. The Yare cabinet includes additional structures—such as a heat exchanger and pressure system—that would force a POSITA to further refine the Ohta/Marumoto combination for both gas pathways to pass through the heat exchanger, and the open loop pathway to enter into the sealed zone of the cabinet and travel along the backlight. *Id.* Samsung provides no explanation for how its Ohta and Marumoto modifications would fit within Yare to function with Yare’s structures and cooling systems.

3. Claim 12: Ohta does not render obvious “a liquid crystal display (LCD) positioned within the housing and having a backlight”

Claim 12 claims a particular form of electronic display, an LCD. Ohta does not disclose an LCD with a backlight. Instead, Ohta is exclusively directed to a plasma display. *See generally*, Ex. 1004; Ex. 2024, ¶144-47. Samsung argues a POSITA would be motivated to combine Marumoto—which teaches an LCD display with a backlight—with Ohta. Petition at 91.

Replacing the plasma display in Ohta requires more than simple substitution of one display panel type for another. Ex. 2024, ¶145. LCDs have reduced brightness, and the colored glass and liquid in Example 3 of Ohta would reduce the visibility of the LCD display. *Id.* This would require modifying the backlight assembly to have an increased brightness—which would necessitate structural changes to the LCD module and electronics. *Id.* ¶145. The structural changes would require disassembling the LCD module, modifying the bracketing and support structure to house different lighting, changing electrical components used to control and drive the new lighting system, and integrating additional cooling structures to cool the hotter lighting system. *Id.* Additionally, modifying Ohta with Marumoto would require additional design experimentation to determine the desired glass and liquid consistency in Ohta’s closed loop of liquid over the front surface of the LCD in order to maintain a visible and bright display. *Id.* ¶165.

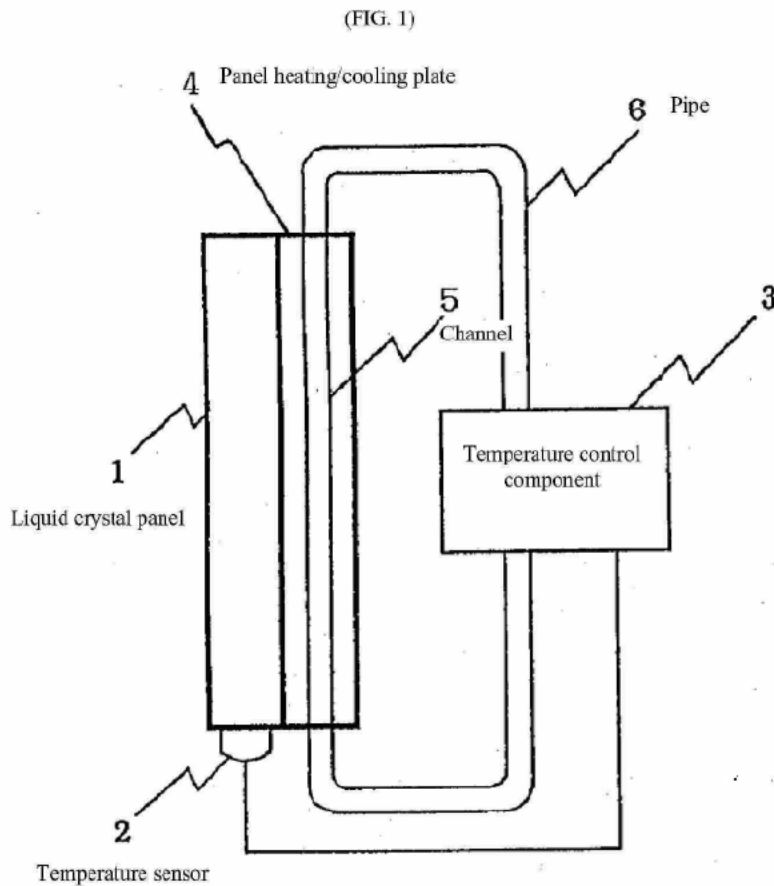
These are not run-of-the-mill modifications, but would instead require extensive design and prototyping that would dissuade a POSITA from combining the two references. *Id.* 165, 145.

Accordingly, Ohta in view of Marumoto does not render obvious an LCD and backlight within a housing.

4. Claims 1, 12, and 22: Ohta does not render obvious a “closed loop” of “isolated gas”

As discussed above, these claims require a closed loop of “isolated gas.” Ohta does not disclose a closed loop of circulating gas within any of its examples. Ohta describes a closed loop of liquid (ethylene glycol) or an open loop of external air. *Compare* Ex. 1004, (0018)-(0024), Fig. 3, *with id.*, (0030)-(0035), Fig. 5. In both instances, the closed tube of liquid or open pathways for air passes over the front surface of the plasma display. *See id.*, Fig. 3, Fig. 4. Thus, there is no “closed loop” of “isolated gas” as required by these claims.

Marumoto does not cure this deficiency. Samsung argues Ohta can be combined with Marumoto to create a closed loop isolated gas pathway within the housing. Petition at 80-81. However, the closed tube of gas in Marumoto passes along the *rear surface* of the display, not the *front surface* as described in Ohta. *See* Ex. 1005, Fig. 1.



Thus, if Marumoto were modified to include pipe (6) as shown above and described in Ohta, the pipe would pass along the backlight of the LCD, not the front surface. Ex. 2024, ¶149-50. This modification would prevent ambient air from passing along the backlight, as is required by claim 12. *See* claim 12 (“an open loop of ambient air which passes through the housing and along the backlight.”).

Accordingly, modifying Ohta based on Marumoto would not meet the elements required by claim 12.

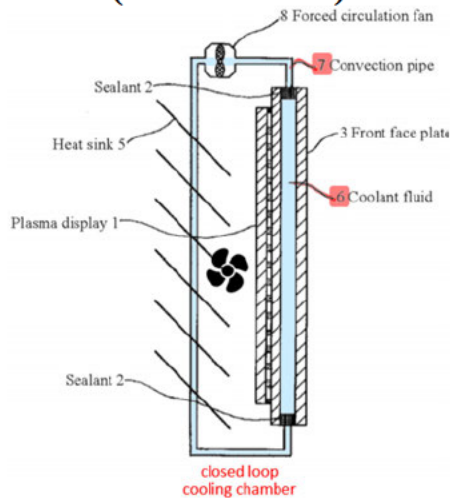
5. Claims 12: Neither Ohta nor Marumoto discloses “an open loop of ambient air which passes through the housing and along the backlight”

As explained regarding Karppanen, claim 12 recites “an open loop of ambient air which passes through the housing and along the backlight.” The positional term “along” incorporates the inventive cooling feature of ambient air, direct cooling of the backlight by directing that cooler external air directly along the backlight. Ex. 2024, ¶152.

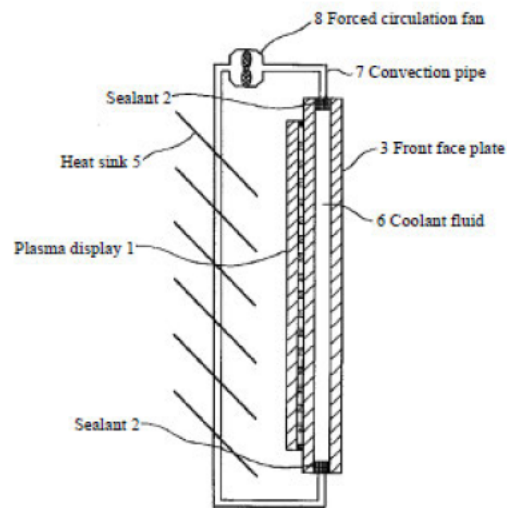
Neither Ohta nor Marumoto describes an open loop of ambient air that travels along the backlight of an LCD. Ex. 2024, ¶153-55. First, Ohta describes only a plasma display—and a plasma display does not have a backlight. Second, Ohta describes one external airflow pathway—and that pathway flows along the front surface of the plasma display in Example 5, not Example 3. Though Ohta discloses the use of forced convection over a heat sink, Ohta does not discuss the location of the heat sinks within the overall configuration of a housing, much less positioning those heat sinks proximally or along a backlight. *Id.*, ¶156. Thus, a POSITA could not conclude whether any forced air convection over those heat sinks was passing along the backlight.

Samsung inserts a clip art fan in a self-serving location within the figure of Example 3 to suggest that a POSITA would know that heat sinks are cooled by forced ambient air.

**Samsung's Modification
(Petition at 83)**



Ohta Figure 3 (Unmodified)



Samsung identifies no disclosure within Ohta nor any knowledge of a POSITA suggesting placement of a fan in the middle of Figure 3. Ohta only describes one aspect of cooling a plasma panel, it does not provide details as to the overall cooling and configuration of the electronic display assembly. Therefore, Samsung's illustration of Figure 3 is merely the application of hindsight—unsupported by any disclosure in the reference itself—to meet the claim limitations. Ex. 2024, ¶156.

None of Samsung's references shows an open loop of ambient air which passes along the backlight. Accordingly, Ohta in view of Marumoto fails to disclose an open loop of ambient air which passes along the backlight.

6. Claims 1, 12, and 21: Neither Ohta nor Marumoto renders obvious “coolable by a combination” of a closed loop and an ambient loop airflow pathway

As explained earlier, claim 12 requires the LCD be “coolable by a combination” of open loop and closed loop systems. Claims 1 and 21 require the same effect using substantially similar language. Ex. 2024, ¶118. Both Marumoto and Ohta describe *only* the use of either a sealed loop of fluid or gas *or* an ambient air pathway. *Id.*, ¶157. Samsung does not describe how its many modifications of Ohta and Marumoto would create a closed loop and an open loop of air that *both* cool the display. Accordingly, Samsung fails to establish that Ohta in view of Marumoto discloses a display that is “coolable by a combination” of both “a closed loop” and “an open loop of ambient air which passes through the housing.”

7. Claims 15 and 9: Neither Ohta nor Marumoto renders obvious “electronic components for driving the LCD positioned within the rear cooling chamber”

As explained above, the “rear cooling chamber” is a portion of the closed loop cooling chamber. *See* Ex. 2056, 8:22-36, Ex. 2024, ¶104. Claim 9 claims a similar structure. Ex. 2024, ¶158.

Both Ohta and Marumoto are silent as to the location of the electronics for driving the LCD (or display) and how those components are cooled. Ex. 2024, ¶159. Samsung maps “electronic components *for driving the display*” to power supply of a fan. Petition at 88. This plainly does not meet the claim element.

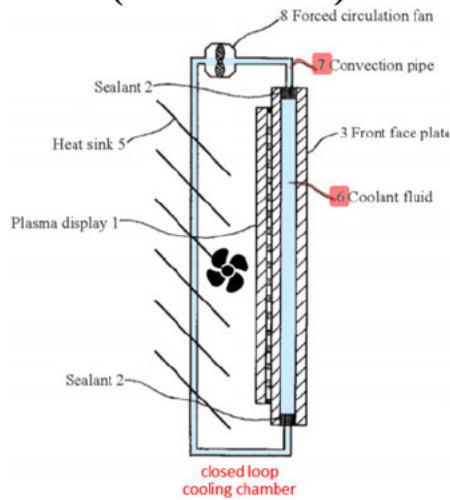
Further, it does not render the claims obvious. A POSITA would understand that simply because a fan is within a “closed” or “open” loop, and the fan may have a power supply, does not mean the power supply is itself located within the closed loop. *Id.* To the contrary, Ohta’s closed loop is filled with liquid, teaching away from including any electronics within that area to avoid damaging the circuitry or creating short circuits. *Id.*

8. Claims 17 and 5: Ohta does not render obvious “intended direction of closed loop isolated gas flow [that] is substantially perpendicular to the intended direction of [the] open loop of ambient air flow”

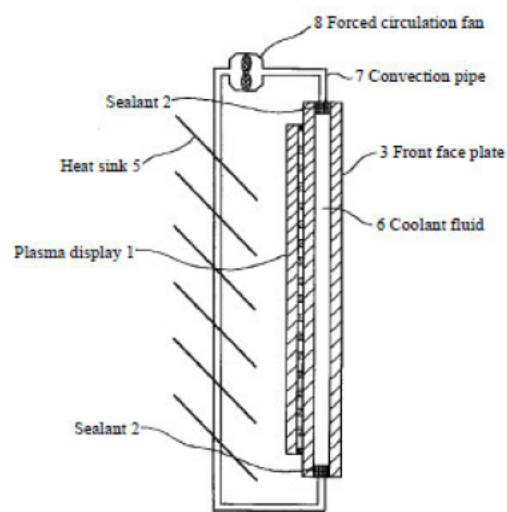
As explained above, claims 17 and 5 claim a substantially perpendicular airflow of the closed and open loops using substantially the same language.

Ohta does not describe the orientation of any of its airflows within the housing. *Id.*, ¶161-62. Samsung again inserts clip art of fans and speculates as to the direction of airflow in order to meet the claim limitations.

**Samsung's Modification
(Petition at 87)**



Ohta Figure 3 (Unmodified)



Samsung does not and cannot point to any disclosure in Ohta for the placement of this clip art fan. Similarly, Marumoto is silent as to the intended direction of airflow. Ex. 2024, ¶163. Thus, Ohta does not meet this claim.

9. No Motivation to Combine Ohta with Marumoto or Yare

There is no motivation to combine Ohta with Marumoto (Ground 3) or Ohta with Marumoto and Yare (Ground 4). First, the three references are directed toward different fields of art, and the solutions for cooling a smaller plasma display are not reasonably pertinent to the unique cooling needs of LCD displays, especially large format information displays. Ex. 1013, 1:4-6; Ex. 1004, (0001)-(0003). Further, Samsung's assertion to the contrary relies on a need to protect the various displays from solar loading. Petition at 105. But nowhere in Ohta is there

any disclosure as to placing the display in an outdoor setting or in sunlight or near other thermal stressors, nor is there discussion of a large format display.

Additionally, as explained by Dr. Pokharna, there are at least three reasons why a POSITA would not be motivated to replace a display containing a plasma display with an LCD display:

(1) Plasma displays during the time of the invention had superior contrast. Since each pixel emits its own light, and can be turned off, it can create true black colors and better contrast than LCD displays that have a backlight and thus cannot block light completely.

(2) Plasma displays during the time of the invention had a broader viewing angle than the LCD displays available at the time.

(3) Plasma displays during the time of the invention had a better response rate. Plasma displays are better for handling fast moving objects often depicted in televised sports and action movies. Ex. 2024, ¶146.

Finally, Samsung resorts to citing novel features of the claimed invention to support its motivation to combine Ohta, Yare, and Marumoto. Petition at 86 (“In the case of Ohta, a POSITA would also be motivated to have *some ambient air access the rear surface of the LCD display so as to dissipate heat generated backlight.*”). Such reasoning demonstrates the hindsight bias of the proposed modification—Samsung relies upon the claims to provide a roadmap to a

modification that is found nowhere with any of the cited prior art. Further, to the extent that Samsung argues the desire to bring cooler ambient air to the backlight is based in the common sense of a POSITA: “In cases in which ‘common sense’ is used to supply a missing limitation ... our search for a reasoned basis for resort to common sense must be searching. And this is particularly true where the missing limitation goes to the heart of an invention.” *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1363 (Fed. Cir. 2016).

D. Ground 5 - Kitamura in view of Harris does not render the Challenged Claims obvious

1. Claim 12: Kitamura does not render obvious “a liquid crystal (LCD) positioned within the housing and having a backlight

Kitamura does not describe an LCD. Instead, Kitamura describes a direct view LED display. *See generally* Ex. 1017 (Kitamura). Faced with this deficiency, Samsung argues a POSITA would be motivated to combine Kitamura with Harris to arrive at an LCD with a backlight within the housing. Petition at 108-09. However, Harris describes a small format LCD module that uses a compact fluorescent light backlight. Ex. 2024, ¶174; Ex. 1018, 5:41-61. The energy draw for a compact fluorescent backlight is significant, even at the small size of the LCD module in Harris, the backlight draws 29 watts. Ex. 2024, ¶174; Ex. 1018, 5:55-61. If the LCD module—with its compact fluorescent backlight—were substituted into

the Kitamura enclosure, the energy draw of the bulbs would increase the thermal load on the system—thwarting the purpose of the inventions disclosed in the '287 Patent. Ex. 2024, ¶174. Further, a POSITA would know that the fluorescent bulbs would have a shorter life than the LEDs within the direct view LED display, necessitating regular maintenance of the display. *Id.*, ¶175. The substitution of the Harris LCD module would thus thwart one of the explicit goals of the Kitamura enclosure: the avoidance of regular maintenance. *Id.*, ¶175; Kitamura (0007)-(0008).

Accordingly, a POSITA would not be motivated to install Harris's LCD module with a compact fluorescent backlight into Kitamura. Thus, this combination fails to render claim 12 obvious.

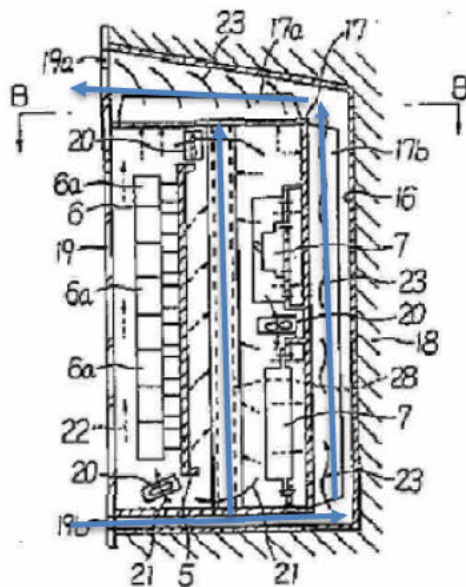
2. Claim 12: Kitamura does not render obvious “an open loop of ambient air which passes through the housing and along the backlight”

As explained with references to Karppanen, claim 12 recites “an open loop of ambient air which passes through the housing and along the backlight.” This claim uses the positional term “along” to claim the inventive cooling feature of ambient air, direct cooling of the backlight by directly that cooler external air directly along the backlight. Ex. 2024, ¶179.

Kitamura does not teach an open loop of ambient air which passes along the backlight. Ex. 2024, ¶180. First, Kitamura does not disclose “along the backlight,”

because LED display does not require a backlight. Second, the ambient air pathways in the Kitamura enclosure travel through the outer housing. Ex. 1017, (0010); Ex. 2024, ¶180. The channel formed by the outer housing and inner housing is separated from the rear surface of the LED display (where the backlight would be located in an LCD module). *Id.* Additionally, the other ambient air pathway travels through a rectangular ducting located in the middle of the inner housing—and that location is also spaced apart from the LED display. *Id.*; *see also* Ex. 1017, Fig. 4 (annotated).

(FIG. 4)



Samsung’s proposed modification of Kitamura with Harris to meet the “ambient air which passes along the backlight limitation” is not straightforward and would require significant re-structuring of the device. Ex. 2024, ¶181-84.

There is no motivation to make such a modification. For example, the ducting would need to be enlarged and moved forward of its current location toward the front of the display. *Id.* This modification would distance the ducting from the electronic components of the display, thereby reducing the cooling on those components. *Id.* Further, the additional weight of the LCD module with heavier compact fluorescent bulbs would necessitate designing a new surface of the rectangular plenum to mount and support such weight. *Id.*, ¶182. These significant changes require a substantial redesign that is not supported in either of the references. There is no support for these modifications at least because there is no backlight required by Kitamura's LED display. Thus there is no thermal load of a backlight that necessitates the additional cooling capacity of an open loop of ambient airflow as required by claim 12.

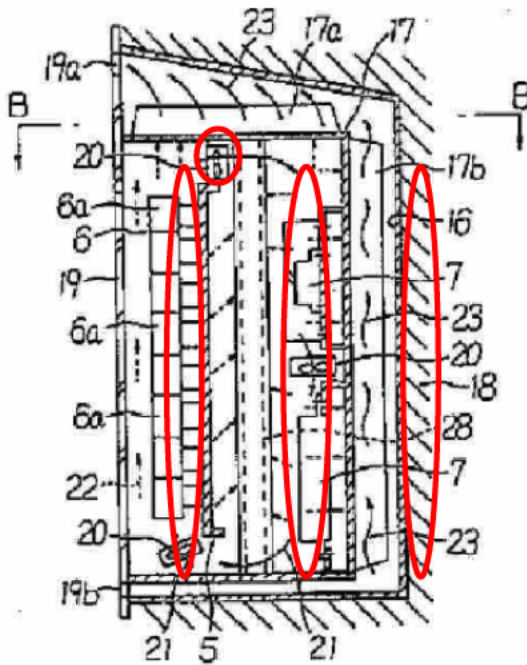
3. Claims 12 and 18: Kitamura does not render obvious a “closed loop” of “isolated gas”

Samsung urges that because there are fins located within the surface of the outer housing of Kitamura (what Samsung maps to the open loop), the inner housing must be isolated from external air. Petition at 110. The presence of fins in another area of an enclosure does nothing to inform a POSITA as to the extent of isolation of the gas in the inner housing. Ex. 2024, ¶177. Samsung additionally ignores the clear disclosure of Kitamura that the inner housing is intended to have

ventilation ports that bring external air into the inner housing. *Id.*, ¶178; Ex. 1017, (0009) (“an inner housing which has an opening on the front side that is covered by a screen ... and *ventilation ports, which are provided on the left and ride sides, top and bottom sides, a back side of the aforesaid inner housing, and which serve the ventilate the interior of the aforesaid inner housing*”). The only independent claim in Kitamura specifically claims the ventilation ports for ventilating the interior of the housing. *See* claim 1 (“ventilation ports, which are provided on the left and ride sides, top and bottom sides, and back side of the aforesaid inner housing, and which serve to ventilate the interior of the aforesaid inner housing”). These ventilation ports are, at most, opening that allow ambient airflow. Kitamura fails to disclose a “closed loop” of “isolated gas.” Samsung never suggests that this deficiency is cured by Harris. Samsung’s analysis thus fails with respect to claims 12 and 18.

4. Claim 17: Kitamura does not render obvious “intended direction of closed loop isolated gas flow [that] is substantially perpendicular to the intended direction of [the] open loop of ambient air flow”

Kitamura does not describe substantially perpendicular airflow in the inner housing and outer housing. Ex. 2024 ¶¶186-88. In fact, Figure 4 shows that the airflow within the inner housing flows in a parallel direction to the airflow in the outer housing. *Id.*, ¶187; Ex. 1017, Fig. 4 (annotated).



Contrary to Samsung's argument, a POSITA would not conclude that merely because air flows in a perpendicular direction at merely one point of its path that it travels in a "substantially perpendicular" direction. Ex. 2024, ¶188.

5. No motivation to modify or combine with Harris

A POSITA would not be motivated to combine or modify Kitamura in view of Harris. The two references relate to different design challenges that teach against their combination. Ex. 2024, ¶189; Ex. 1017, (0002) ("an LED display device, and in particular relates to an LED display device ... embedded in a wall 3 or like of a building"); Ex. 1018, 1:5-9 ("computer for operation in severe environments" such as locomotives). A POSITA would understand that large format displays intended to be embedded in walls have distinct cooling and heating

needs from smaller format computer displays that are placed in places such as trains. Ex. 2024, ¶189. The solutions described in Harris for smaller format, movable displays intended for locomotives are not reasonably pertinent to the issues faced by outdoor large format displays as there is no need to cool the front of the face of the display and there is not thermal stress from solar loading. *Id.* Further, the designs in Harris have other express design considerations, such as dealing with additional vibrations caused by the locomotive in operation.

To support its conclusion that a POSITA would be motivated to combine Kitamura with Harris, Samsung merely recites what is novel about the Challenged Claims—direct cooling of the LCD backlight using cooler ambient air. Petition at 122-24. Such a suggestion is the mere application of hindsight, and Samsung has failed to show that the combination renders the Challenged Claims obvious.

VII. OBJECTIVE INDICIA SHOW THE NON-OBVIOUSNESS OF THE CHALLENGED CLAIMS.

The objective indicia analysis is ... a fundamental part of the overall § 103 inquiry.” *Liqwd, Inc.*, 941 F.3d at 1137 (Fed. Cir. 2019) (citation omitted). It is an essential safeguard that protects against hindsight bias. *In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Pat. Litig.*, 676 F.3d at 1079. These objective facts against which obviousness or nonobviousness is determined include long felt but unsolved needs, failure of others, copying, commercial success, and

industry praise. *Graham*, 383 U.S. 1, 17 (1966). Objective evidence “may often establish that an invention appearing to have been obvious in light of the prior art was not.” *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc.*, 699 F.3d 1340, 1349 (Fed. Cir. 2012). In fact, “[i]t is the secondary considerations that are often most probative and determinative of the ultimate conclusion of obviousness or nonobviousness.” *Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573 (Fed. Cir. 1996).

Before Mr. Dunn’s conception, there existed a need for effective cooling of outdoor electronic displays without the need to resort to air conditioning, with its associated electricity, environmental, and maintenance costs. Others had attempted to solve this problem without success. Mr. Dunn solved this problem and he achieved commercial success because his inventions allowed displays to operate effectively for years in harsh outdoor conditions, eliminating the thermal management problems that plagued displays in the prior art. MRI effectively created a new market for outdoor LCD displays that did not exist before his inventions.

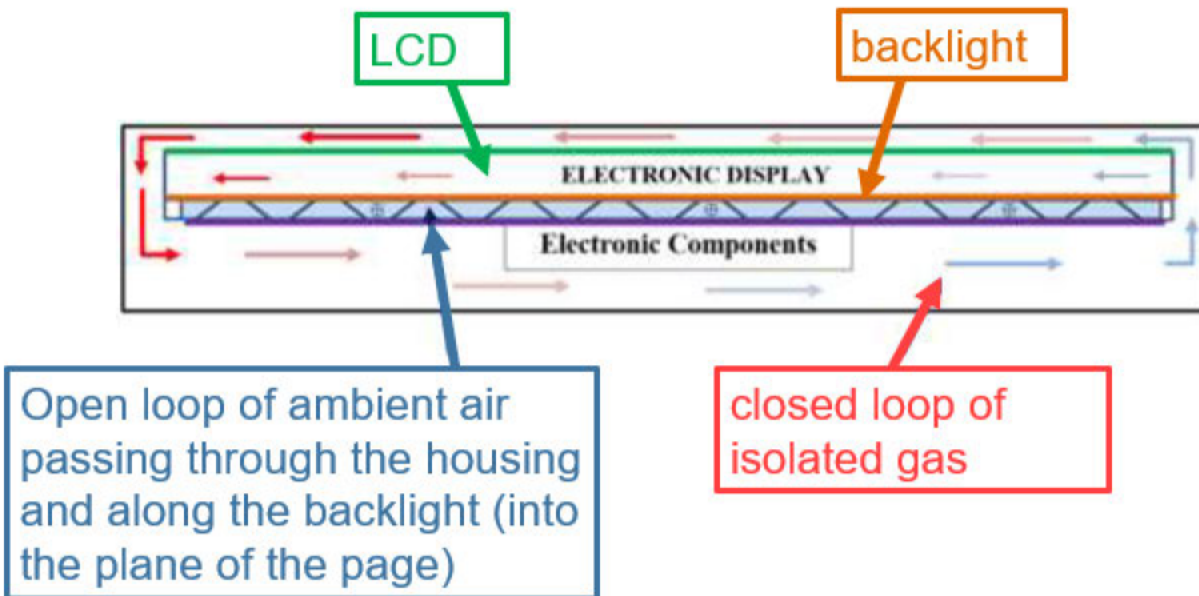
Samsung asserts that the challenged claims would have been obvious in 2008. But the real-world, objective evidence shows that, despite its expertise and enormous resources, Samsung was not able to develop a successful outdoor LCD display for over *ten years* and then achieved remarkable commercial success

immediately after tearing down [REDACTED] products and introducing a copycat product using MRI's innovative approach to cooling. Others in the industry recognized MRI's innovation including LG (a leader in the digital display industry), which formed a joint venture with MRI to provide outdoor electronic displays. Even Samsung praised MRI in private communications to Mr. Dunn. This objective evidence demonstrates the non-obviousness of MRI's inventions.

A. There is a Nexus to Both Samsung and MRI Products

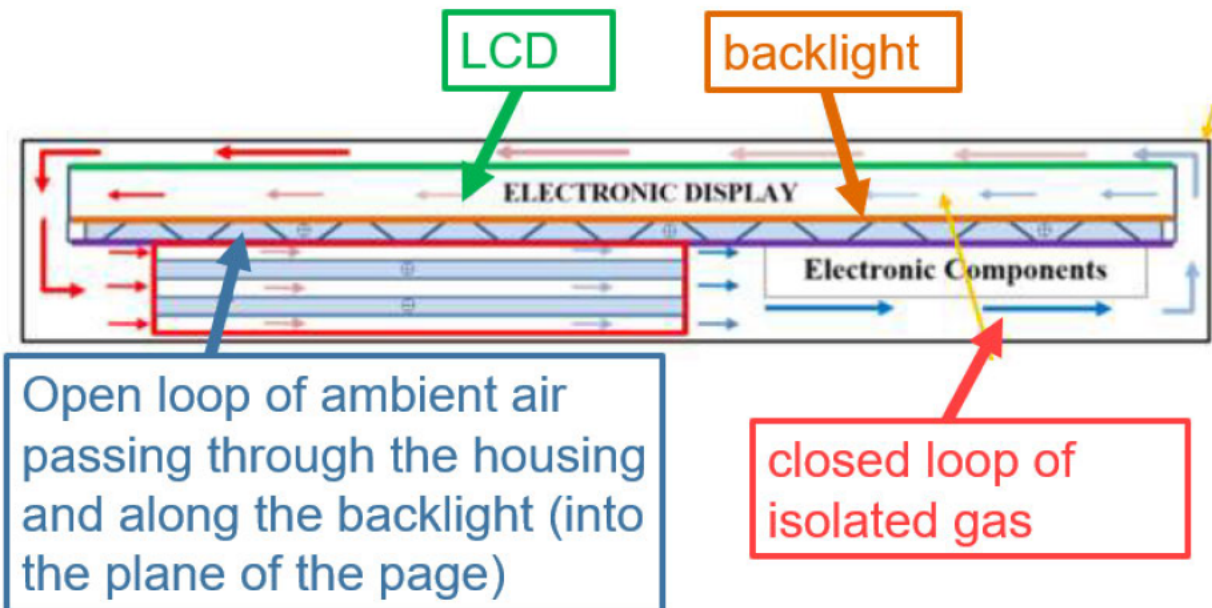
“For objective evidence ... to be accorded substantial weight, its proponent must establish a nexus between the evidence and the merits of the claimed invention.” *In re Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011) (emphasis & citation omitted). “A patent owner is entitled to a presumption of nexus when it shows that the asserted objective evidence is tied to a specific product that ‘embodies the claimed features, and is coextensive with them.’” *Volvo Penta of the Americas, LLC v. Brunswick Corp.*, 81 F.4th 1202, 1210 (Fed. Cir. 2023) (quoting *Brown & Williamson Tobacco Corp. v. Philip Morris, Inc.*, 229 F.3d 1120, 1130 (Fed. Cir. 2020)). “The inclusion of noncritical features does not defeat a finding of a presumption of nexus.” *Id.* Here, Patent Owner is entitled to a presumption of nexus with regard to its outdoor LCD displays and Samsung's outdoor LCD displays, and even absent that presumption, the nexus exists.

MRI's 55-, 75-, and 86-inch outdoor displays are commercial embodiments of and coextensive with challenged claim 12 of the '287 Patent. Ex. 2024, ¶¶195-97; Ex. 2054. The below schematic demonstrates the operation of MRI's 55-inch displays. Ex. 2023 ¶ 196; Ex. 2054, at 15-28. MRI's 55-inch electronic displays include a housing and an LCD positioned within the housing. The LCD includes a backlight. The LCD is coolable by a combination of a closed loop of isolated gas circulating within the housing and an open loop of ambient air passing through the housing and along the backlight (into the plane of the page). *Id.*



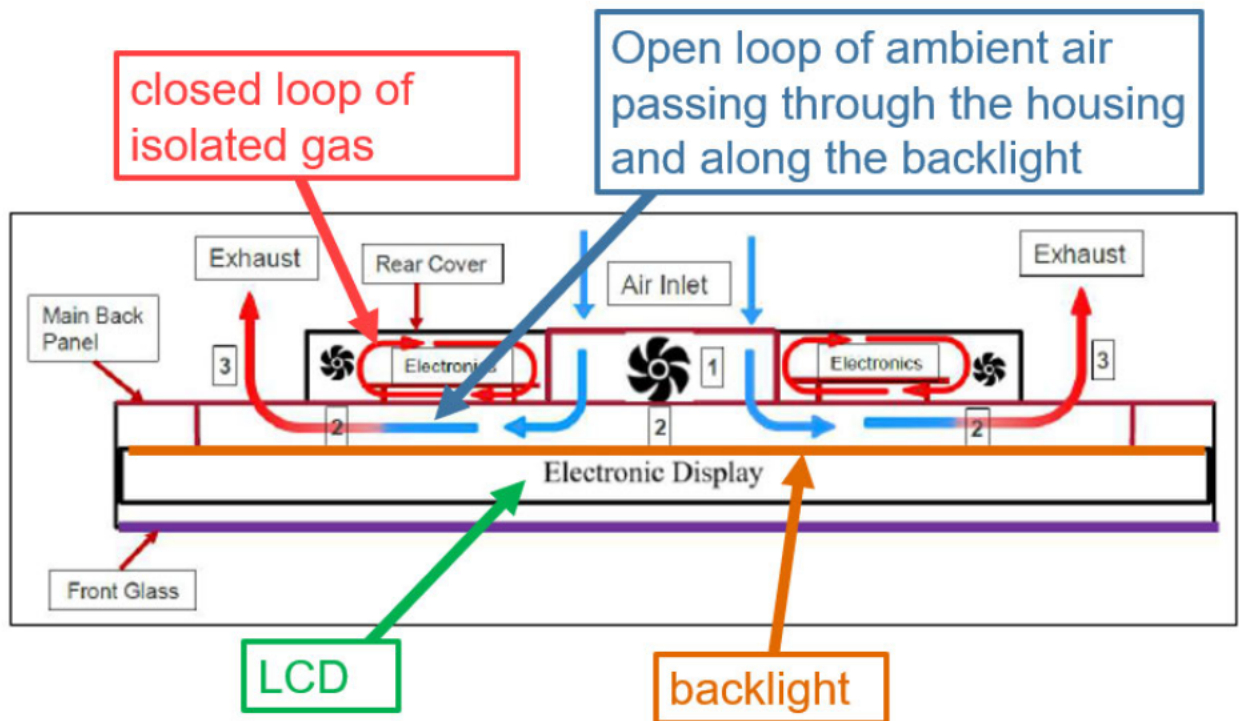
The schematic below demonstrates the operation of MRI's 75- and 86-inch electronic displays. Ex. 2024, ¶¶197; Ex. 2054, at 1-14. These large format displays likewise include a housing and an LCD positioned within the housing. The LCD includes a backlight. The LCD is coolable by a combination of a closed loop of

isolated gas circulating within the housing and an open loop of ambient air passing through the housing and along the backlight. *Id.*

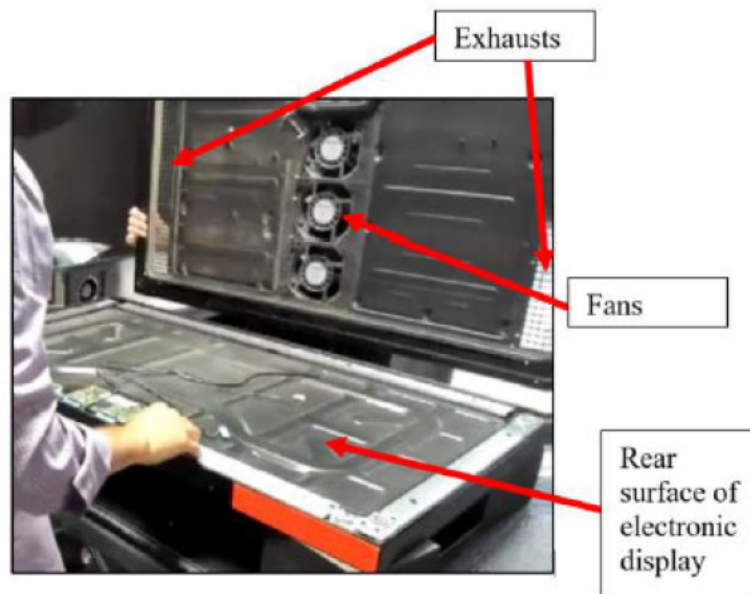


In both the schematic for MRI's 55-inch displays and for the 75- and 86-inch displays, the open loop is the flow path (shaded light blue) for external ambient air that passes along the backlight (shaded orange) perpendicular to the plane of the page.

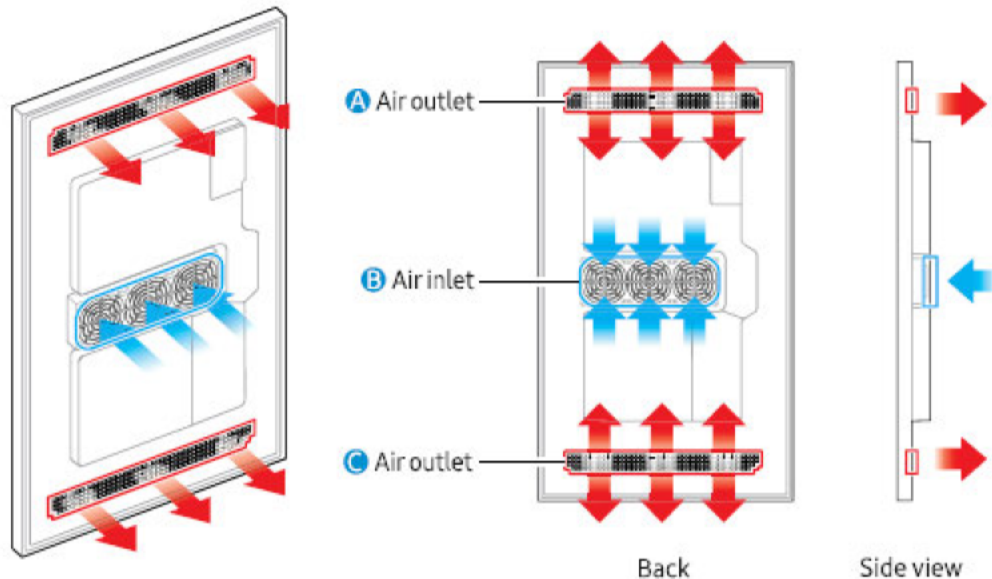
Samsung's 46- and 55-inch outdoor displays also embody and are coextensive with challenged claim 12 of the '287 Patent. Ex. 2024, ¶¶193-94; Ex. 2039. This is shown in the schematic below, showing Samsung's infringing use of MRI's innovative dual open and closed loop cooling system with the open loop of ambient air passing through the housing and along the backlight.



The air flow paths through the Samsung OH products is further shown in teardown photos and in Samsung's Outdoor Installation Guide for its products. Exs. 2039, 2053.



OH46F/OH55A/OH55F



The MRI and Samsung products are coextensive with the '287 Patent claims, which are directed to an electronic display that is coolable by a combination of a closed loop and an open loop of ambient air that passes through the housing and along the backlight. While these displays include additional features beyond what is recited in the claims, the presumption of nexus still applies because but for the incorporation of the cooling systems in these displays, they would not exist as a viable outdoor display. Ex. 2039, 2054. *PPC Broadband, Inc. v. Corning Optical Commc'ns RF, LLC*, 815 F.3d 734, 747 (Fed. Cir. 2016) (emphasis added); see also *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1331 (Fed. Cir. 2016) (“[Patentee] was entitled to the presumption of nexus for its objective evidence of non-obviousness because it established that the specific products ... are embodiments of the invention in the asserted claims.”); *Ecolochem, Inc. v. S.*

Cal. Edison Co., 227 F.3d 1361, 1378 (Fed. Cir. 2000) (applying presumption even through commercial embodiment had unclaimed mobility feature). Put more directly, the cooling system defines these products as outdoor displays. It is what distinguishes “outdoor” LCD displays as a separate “outdoor” display market with separate products and pricing. Ex. 2025, at 5 (explaining that pricing for outdoor signage is “many multiples of their indoor cousins”).



There is thus a presumption that a nexus exists between the claimed inventions and the parties’ commercial products. *See Immunex Corp. v. Sandoz, Inc.*, 964 F. 3d 1049, 1067 (Fed. Cir. 2020) (“Nexus is appropriately presumed in this case where the court concluded that the claims are directed to the active ingredient in Enbrel® and its method of manufacture.”).

Furthermore, even if there were no presumption, the record evidence confirms the nexus between the secondary considerations and the unique characteristics of the claimed inventions. *Volvo Penta*, 81 F.4th at 1210 (quoting *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373-74 (Fed. Cir. 2019)).

Without the claimed cooling systems practiced by the parties' products, those products could not function properly in outdoor environments, in full sun, without failing. This is shown by Samsung's own technical marketing documentation, which focuses heavily on the thermal management systems—the very features that distinguish its products from ordinary LCD displays—demonstrating the connection between the MRI's thermal management innovations and the objective evidence presented below. Ex. 2038, at 7-27. It is the thermal management systems that provide the cooling necessary for the outdoor display market to exist, and the evidence of secondary considerations below relating to the outdoor LCD display market is thus attributable to the cooling systems of those products, but for which the market would not exist.

B. Long-Felt Need, Samsung's Failures, and Copying

Around the early 2000s, larger LCDs of 32-inches and above began to appear in the market and there was a demand for using those larger LCDs for outdoor signage. Outdoor LCDs promised the potential for converting static print signage to digital screens for various uses including advertising, information signage, and menu boards. Samsung itself explains that companies had “wanted their messages outdoors” but “were challenged by a variety of issues during the early years.” Ex. 2025, at 3, 6 (touting the benefits of digital outdoor displays); *see* Ex. 2026 (publication of white paper in 2015).

But those larger display screens faced significant challenges that prevented their use outdoors. “The biggest obstacle was heat—from inside and from the sun. Direct sunlight and its amplified heat could alter the properties of LCD crystals—the display layer of screens—and discolor or cause black blotches.” Ex. 2025, at 3. Samsung admits that the harsh outdoor environment posed “*enormous engineering challenges*.” Ex. 2025, at 2 (emphasis added). When used outdoors in full sun, screens of this size would overheat because of the increased heat generated from the screen and the additional solar thermal load. *See, e.g.*, Exs. 2025, 2026, 2038, 2047.

At the time of the inventions, other entities including Samsung had tried to solve the problem of cooling electronic displays. Patent filings dating back several decades show that companies were attempting to develop effective cooling systems for outdoor displays. Samsung’s “Notice of Prior Art” in the co-pending ITC investigation lists 13 pages of allegedly relevant prior art patents and printed publications dating back to the early 1970s. Ex. 2027. But their solutions were inadequate. Samsung itself referred to outdoor electronic displays as a “challenging target” that required an “advanced thermal scheme.” Ex. 2038, at 10-11; Ex. 2047.

Samsung holds itself out as a “Leader in Innovation,” with “\$15.6B Invested in R&D” and as the “#2 Patent Holder in US.” Ex. 2028, at 4 (Samsung marketing touting its “History of Success” manufacturing “top-of-the-line” displays and

expertise in advancing the field of digital signage). Samsung is undoubtedly an industry leader, yet it repeatedly failed in its effort to develop outdoor LCD displays. Despite being a supplier of MRI's LCD modules at the time of the inventions and filing patents on cooling systems for LCD modules, Samsung had attempted to make its own outdoor displays but failed. Ex. 2033 (U.S. 2006/0077535); Ex. 2034 (U.S. 2006/0132699); Ex. 2035 (U.S. 7,948,575); Ex. 2036 ("Na"); Ex. 2037 ("Kim"). Samsung began researching development of outdoor LCD displays around 2005—three years before MRI's priority date. Ex. 2029, 45:22-46:11. However, at that time there was no successful outdoor LCD display product on the market. Ex. 2029, 46:12-17. Samsung itself did not begin producing a working outdoor electronic display product for many years, until 2010-2012. Ex. 2029, 46:16-21. That display made use of an air-conditioning unit to cool the display. Ex. 2029, 47:17-20. Samsung's 5-7 year gap between beginning research and launching an outdoor display product illustrates the difficulty of the problems involved, even for a company like Samsung that holds itself out as a "relentless" innovator. Ex. 2028, at 4; *see* Ex. 2038, at 69 ("Premium technology leader in electronics cooling"). It is particularly telling that Samsung did not at first develop and use the systems developed by Mr. Dunn that Samsung now contends were obvious all along. *Heidelberger Druckmaschinen AG v. Hantscho Commercial Products, Inc.*, 21 F.3d 1068, 1072, (Fed. Cir. 1994) (A

“[l]itigation argument that an innovation is really quite ordinary carries diminished weight when offered by those who had tried and failed to solve the same problem, and then promptly adopted the solution that they are now denigrating.”).

Samsung first released an outdoor electronic display that did not use refrigeration (referred to as the “OHD” series) sometime between 2013 and 2016. Ex. 2029, 49:9-17. However, the OHD series [REDACTED] in the field and needed to be [REDACTED]. Ex. 2029, 51:1-9. At the same time, the commercial success of the OHD series displays were low, eventually resulting in annual losses. From 2015-2017, the years the OHD display was on the market, the products generated [REDACTED] in U.S. sales in 2015; [REDACTED] in U.S. sales in 2016; [REDACTED] in U.S. sales in 2017; and [REDACTED] in losses in 2018. Ex. 2040.

Around the same time, a team of Samsung engineers obtained and tore down two of [REDACTED] products: a large-format 86-inch product and a mid-sized 55-inch product. Exs. 2042, 2043; *see* Ex. 2030, at 184:15-191:8; Ex. 2031, 77:13-81:16 (discussing Ex. 2043 and showing how Samsung disassembled [REDACTED] products and studied them in early [REDACTED]; Ex. 2029, 139:7-16; Ex. 2042 (analyzing, specifically, the [REDACTED] and [REDACTED] of the Samsung and [REDACTED] outdoor displays). Thereafter, Samsung released new versions of its outdoor displays, the OHF series. The OHF series infringes the challenged claims and functions outside and in full sunlight because of their infringing cooling system. Indeed, but for their effective cooling

system, they would not be suitable for outdoor use. Ex. 2038, at 13-22 (comparing the Samsung OH series thermal management system having a [REDACTED] [REDACTED] with conventional systems).

[REDACTED]

[REDACTED]

The integration of the effective cooling system first developed by [REDACTED]— which was available to Samsung through a tear down of [REDACTED] technology and

disclosures in patents named on the [REDACTED] on the product Samsung tore down—led to success of the OHF series and all models that came after which use the same cooling systems and infringe the patents (OHB, OHA, and OHN). Ex. 2038, at 13-15; Ex. 2040.

Copying is “strong evidence of nonobviousness.” *Volvo Penta*, 81 F.4th at 1213. Indeed, “[secondary] considerations such as failure by others to solve the problem and copying may often be the most probative and cogent evidence of nonobviousness” and that “copying the claimed invention, rather than one in the public domain, is indicative of non-obviousness.” *Id.* (quoting *Advanced Display Sys. v. Kent State Univ.*, 212 F.3d 1272, 1285 (Fed. Cir. 2000) and *Windsurfing Int’l, Inc. v. AMF, Inc.*, 782 F.2d 995, 1000 (Fed. Cir. 1986)). The fact that Samsung only developed its successful designs after experiencing failures with other designs—despite its own extensive research efforts and only after MRI’s own successful product was in the market—is compelling real-world evidence that MRI’s design was not obvious to persons of ordinary skill in the art at the time. *See, e.g., Panduit Corp. v. Dennison Mfg. Co.*, 774 F.2d 1082, 1099 (Fed. Cir. 1985) (“That Dennison, a large corporation with many engineers on its staff, did not copy any prior art device, but found it necessary to copy the cable tie of the claims in suit, is equally strong evidence of nonobviousness.”).

C. Commercial Success

MRI's pioneering inventions established the market for outdoor LCD displays and MRI has achieved significant success. Before MRI there was no market for outdoor LCD displays, and after MRI's inventions, the market grew to hundreds of millions of dollars. Indeed, MRI's own sales increased in mid- to late-2008—shortly after the claimed priority date of the '287 Patent—confirming the commercial success is tied to the novel aspects of the '287 Patent. Ex. 2044. MRI's commercial success has continued to the present, with sales of its large-format products alone totaling over [REDACTED] between 2018 and 2022. *Id.*; Exs. 2045, 2046. Federal Circuit precedent holds sales of this magnitude alone show commercial success. *See e.g., J.T. Eaton & Co. v. Atlantic Paste & Glue Co.*, 106 F.3d 1563, 1566, 1572 (Fed. Cir. 1997) (affirming a finding that “sales evidence...shows [strong commercial] success,” where the “sales evidence” consisted solely of the patentee's “\$17 million of sales from 1979 through 1984, and its \$4 million of annual sales from 1985 through 1989.”)

The commercial success of Samsung's products also shows the claimed inventions were non-obviousness. The integration of MRI's intellectual property led to the success of Samsung's OHF and subsequent outdoor displays. Whereas Samsung's predecessor OHD designs (which are not accused of infringement) had less than [REDACTED] U.S. sales in their lifetime, Samsung's U.S. sales for its

mid-sized OHF and subsequent products (which infringe the '287 Patent) totaled over [REDACTED] from 2017-2022—a more than [REDACTED] increase—with the OH55F product alone having achieved over [REDACTED] in U.S. sales in a single year, showing Samsung's commercial success. Ex. 2040; *J.T. Eaton*, 106 F.3d at 1566, 1572.

“An important component of the commercial success inquiry in the present case is determining whether [a practicing product] had a significant market share relative to all competing [products] based on the merits of the claimed invention....” *In re Applied Materials, Inc.*, 692 F.3d 1289, 1300 (Fed. Cir. 2012); *In re Huang*, 100 F.3d 135, 140 (Fed. Cir. 1996); *In re Baxter Travenol Labs.*, 952 F.2d 388, 392 (Fed. Cir. 1991). Samsung's market share grew from [REDACTED] (before entering the outdoor display market) to [REDACTED] (in 2017 after launch of the Accused Products) to [REDACTED] (by 2020). Ex. 2041, at 29-30.

This market share is further evidence of commercial success.

D. Industry Praise and Willingness of Others to License the '287 Patent

MRI departed from the established approaches taken by others. Proceeding against the prevailing wisdom, Bill Dunn was able to achieve what others were not by providing a cooling system using both an open and closed loop and further by placing the open loop flow path “along the backlight” of the LCD display. This innovative design went against prevailing wisdom for open- and closed-loop systems by placing an ambient air flow path (i.e., moist dusty air) into contact with the posterior of the display itself.

Mr. Dunn's background made him uniquely qualified to make this advancement in the art. After receiving an electrical engineering degree from Georgia Tech, Mr. Dunn embarked on a career dedicated to pioneering display technologies in challenging environments. Ex. 2013, 44:8-13. By 2004 when he founded MRI, Mr. Dunn had over a decade of experience focused on developing LCD technology for use in harsh environments, including developing LCD displays for military aircraft and ground vehicles through his prior companies, Avionic Displays Corporation and American Panel Corporation. Ex. 2013, 42:24-46:14. Mr. Dunn recognized the demand for digital outdoor signage and founded MRI to pursue that opportunity. Ex. 2013, 47:1-14. Direct sunlight proved to be a formidable challenge, as Mr. Dunn learned by observing thermal failures of outdoor LCD displays even in freezing temperatures. Ex. 2013, 58:14-60:25. Mr. Dunn's engineering advances, as claimed in his patent, made it possible to effectively use LCD displays outdoors in the elements.

Samsung itself has recognized these advances. Ex. 2025, at 2. In its 2015 white paper, Samsung observed that "[t]he many barriers that limited how digital screens could be used outdoors and in direct sunlight have all come down." *Id.* "Many early adopters" saw failures "because the components and engineering...weren't up to the task of working in heat and blazing sun." *Id.* But

[REDACTED]

Samsung observed that “years of insights and experience” and “engineering advances” made putting screens in the elements “entirely possible.” *Id.*

“[I]f there is evidence of industry praise of the claimed invention in the record, it weighs in favor of the non-obviousness of the claimed invention.” *Apple Inc. v. Samsung Electronics Co., Ltd.*, 839 F.3d 1034, 1053-54 (Fed. Cir. 2016). Samsung recognized that it was MRI that conquered the “enormous engineering challenges of keeping displays running no matter what Mother Nature threw at them.” Ex. 2025, at 2; *see also id.*, 3 (acknowledging that “outdoor displays reflect ***years of engineering*** designed to make running an LCD in harsh environments as crisp and reliable as running an LCD on the reception wall of a law office”). In correspondence to Mr. Dunn from Romulus Stoian, Samsung’s DOOH Leader (i.e., digital out-of-home leader), Samsung sought to “embrace the MRI technology,” calling it “impressive and unique.” Ex. 2001. Samsung praised Mr. Dunn for “entering into a virgin space” and “pioneer[ing] a new business model.” *Id.*, *see also* Ex. 2048 (Vertigo, a competitor, acknowledging that MRI is a technology leader and innovator in the manufacture and provision of ruggedized LCD displays and...they have technical patents covering a range of features and benefits not available elsewhere”).

Bill,

Good afternoon and many thanks for taking the time talking to me.

What you've done at MRI it's impressive and unique; I bet was not easy entering into a virgin space and then shortly after being able to pioneer a new business model based on turnkey solutions for DOOH, raising the bar for high quality standards.

Per our conversation, I see loads of opportunities for collaboration in the outdoor space (smart city, transit, rail, etc) where we can embrace the MRI technology and blended in with Samsung displays. Our customers will benefit from quality products and executions.

See attached our MNDA. Kindly review and add comments if needed too.

Thank you. Again, a real pleasure talking to you Sir.

Romulus Stoian
Director, DOOH Leader
Digital Innovation Solutions
Display B2B Team

Samsung SDS America

Ex. 2001.

Other third parties have also recognized MRI's innovations by licensing the '287 Patent and paying royalties for use of the claimed inventions. "Licenses taken under the patent in suit may constitute evidence of nonobviousness" where "that licensing arose out of recognition and acceptance of the subject matter claimed." *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995); *South Alabama Medical Science Foundation v. Gnosis S.P.A.*, 808 F.3d 823, 827 (Fed. Cir. 2015) (explaining that "the relevant inquiry is whether there is a nexus between the patent and the licensing activity itself, such that the factfinder can infer that the licensing 'arose out of recognition and acceptance of the subject matter claimed' in the patent"). Here, Samsung's primary competitor LG has recognized and acknowledged MRI's innovations by not only licensing MRI's patents but also by

entering a joint venture with MRI for marketing MRI's products. Ex. 2049 (LG license); Ex. 2050 (LG-MRI joint venture agreement). Others in addition to LG have taken licenses. Ex. 2051 (Megatech); 2052 (). The willingness of others to license the patent is additional evidence that others in the industry appreciated the validity and value of MRI's '287 Patent, supporting the non-obviousness of the inventions.

MRI's patented cooling technology is also a critical feature of Samsung's products that Samsung uses as a key selling point of its products in its marketing to its customers and without which the products would not work. Ex. 2038, at 99-102 (focusing on the thermal management system, and explaining the primary considerations of an outdoor display enclosure is the heat dissipation for components, cooling from solar radiation, and sealing of the enclosure from dust and water). John Palmer, who is a Samsung customer and integrator of the Samsung OH displays for end users, testified that Samsung's products were requested by customers (and believed by Palmer to be superior) because of their built-in cooling systems. Ex. 2032, 118:6-119:8.

The foregoing real-world facts show that the claimed inventions would not have been obvious to a person of ordinary skill in the art in 2008. Despite the demand for outdoor displays, no one (including Samsung, despite having begun attempting to develop outdoor displays at least by 2005) was successful until Mr.

[REDACTED]

Dunn conceived of the invention. Only after MRI's pioneering design and Samsung's own failures with other designs, was Samsung ultimately able to achieve success by infringing.

VIII. CONCLUSION

The Petition fails to establish that any Challenged Claim is obvious.

Dated: October 17, 2023

/s/ John Alemanni

John C. Alemanni

Reg. No. 47,384

Counsel for Patent Owner

CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that this Patent Owner's Response contains 12,894 words according to the word-processing program used to prepare this paper. The foregoing word count complies with the 14,000 word type-volume limit specified by 37 C.F.R. § 42.24(b)(2).

Dated: October 17, 2023

Respectfully submitted,

/s/ John C. Alemanni

John C. Alemanni

Reg. No. 47,384

Counsel for Patent Owner

CERTIFICATE OF SERVICE

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

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