UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

MANUFACTURING RESOURCES INTERNATIONAL, INC.
Patent Owner

Title: CONSTRICTED CONVECTION COOLING SYSTEM FOR AN ELECTRONIC DISPLAY

U.S. Patent No. 9,173,322

Inter Partes Review No. IPR 2023-00220

PETITIONERS' REPLY TO PATENT OWNER'S RESPONSE

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1004	U.S. Patent Application Publication No. 2006/0199514 to Kimura ("Kimura")
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1012	Memorandum Opinion (D.I. 150) dated September 27, 2018 in *Manufacturing Resources Int'l, Inc. v. Civiq Smartscapes, LLC, et al.*, Civil Action No. 17-269-RGA (D. Del.)
1013	U.S. Patent No. 6,825,828 B2 to Burke, et al. ("Burke")
1014	E. Fred Schubert & Jong Kyu Kim, *Solid-State Light Sources Getting Smart*, 308 *Science* 1274 (2005) ("Schubert")
1015	U.S. Patent Application Publication No. 2004/0223299 to Ghosh ("Ghosh")
1016	Military Handbook: Reliability Prediction of Electronic Equipment, DEPARTMENT OF DEFENSE, MIL-HDBK-217F (1991) ("MIL-HDBK-217F")
1017	Allan Webber, *Calculating Useful Lifetimes of Embedded Processors,* TEXAS INSTRUMENTS INCORPORATED, SPRABX4 (Nov. 2014) ("Webber")
1018	LIAN-TUU YEH & RICHARD C. CHU, THERMAL MANAGEMENT OF MICROELECTRONIC EQUIPMENT: HEAT TRANSFER THEORY, ANALYSIS METHODS, AND DESIGN PRACTICES (Dereje Agonafer ed., 2002) ("Yeh & Chu")
1019	ALLAN W. SCOTT, COOLING OF ELECTRONIC EQUIPMENT (John Wiley & Sons, 1974) ("Scott")

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1020	DAVE S. STEINBERG, COOLING TECHNIQUES FOR ELECTRONIC EQUIPMENT (John Wiley & Sons, 1980) ("Steinberg")
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1022	U.S. Patent Application Publication No. 2002/0122134 to Kalua ("Kalua")
1023	Custom Luxeon Design Guide, LUMILEDS FUTURE ELECTRONICS, Application Brief AB12 (Nov. 2004) ("Lumileds AB12")
1024	Thermal Design Using: Luxeon Power Light Sources, PHILLIPS LUMILEDS LIGHTING COMPANY, Application Brief AB05 (June 2006) ("Lumileds AB05")
1025	Japanese Patent No. 2006-330196 to Tachikawa ("Tachikawa")
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1027	Japanese Unexamined Patent Application Publication No. 10-2003-162228 to Kochiyama ("Kochiyama")
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1029	United States Patent Application Publication No. 2007/0171353 to Hong ("Hong")

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1035	U.S. Patent No. 8,854,595, to Dunn ("the '595 patent")
1036	U.S. Patent Application Publication No. 2008/0218446 to Yamanaka ("Yamanaka")
1037	U.S. Patent No. 7,753,567 to Kang, et al. "(Kang")
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1039	Redline of Corrected Petition
1040	Claim Construction Order (Order No. 13) dated May 15, 2023 in *In the Matter of Certain Outdoor and Semi-Outdoor Electronic Displays, Products Containing Same, And Components Thereof*, Inv. No. 337-TA-1331 (U.S.I.T.C.)

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1041	Supplemental Certification of Translation Accuracy by Natalia Lehmann for Certified Translation of Japanese Patent No. 2006-330196 to Tachikawa ("Tachikawa") (Ex. 1026)
1042	Supplemental Certification of Translation Accuracy by Brian Toth for Certified Translation of Japanese Unexamined Patent Application Publication No. 10-2003-162228 to Kochiyama ("Kochiyama") (Ex. 1028)
1043	Supplemental Certification of Translation Accuracy by Byoung-Go for Certified Translation of Korean Unexamined Patent Application Publication No. 10-2006-0016469 to Na ("Na") (Ex. 1010)
1044	Supplemental Certification of Translation Accuracy by Dan McCourt for Certified Translation of Japanese Unexamined Patent Application Publication No. H11-68363 to Takahashi ("Takahashi") (Ex. 1008), Certified Translation of Japanese Patent No. 2006-330196 to Tachikawa ("Tachikawa") (Ex. 1026), and Certified Translation of Japanese Unexamined Patent Application Publication No. 10-2003-162228 to Kochiyama ("Kochiyama") (Ex. 1028)
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1047	Declaration of Srikanth K. Reddy in Support of Motion for *Pro Hac Vice* Admission Under 37 C.F.R. § 42.10(c)
1047	Corrected Declaration of Srikanth K. Reddy in Support of Motion for *Pro Hac Vice* Admission Under 37 C.F.R. § 42.10(c)
1048	Final Initial Determination on Violation of Section 337 in *In re Certain Outdoor and Semi-Outdoor Electronic Displays, Products Containing Same, and Components Thereof*, Investigation No. 337-TA-1331 [CONFIDENTIAL]
1049	November 30, 2023 Deposition of Michael Neal Gershowitz
1050	Excerpt of Day 1 Hearing Testimony in Investigation No. 337-TA-1331
1051	Excerpt of Day 3 Hearing Testimony in Investigation No. 337-TA-1331 [CONFIDENTIAL]
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1053	Excerpt of Declaration of Michael N. Gershowitz (IPR2023-00199, Ex. 2006)

I. INTRODUCTION

As set forth in the Petition, the Challenged Claims are invalid as obvious. Kim, Na, Kimura, and Cho disclose cooling systems that use fans and forced convection to direct ambient air across heat-generating components to remove heat and cool the display. These primary references, alone or in combination with secondary references, render obvious the Challenged Claims, which are generally directed to a "constricted convection plate" that directs air via a fan along the rear of the display to remove heat—precisely what is described by each of these prior art references.

In view of the strong showing of obviousness, MRI resorts to unduly narrow claim interpretations, attempting to read limitations from preferred embodiments into the claims, misconstruing the prior art, and weak secondary considerations arguments that lack nexus to the Challenged Claims. These arguments all fail, and the Challenged Claims should be found unpatentable.

II. RELATED ITC PROCEEDING

In the time since MRI filed its Response, Administrative Law Judge Monica Bhattacharyya issued a Final Initial Determination ("FID") on Violation of Section 337 in related matter *Certain Outdoor and Semi-Outdoor Electronic Displays, Products Containing Same, and Components Thereof*, Inv. No. 337-TA-1331 ("ITC proceeding"). Ex. 1048. In that decision, the ALJ held that Samsung had proven by

clear and convincing evidence that claim 3 of the '322 patent is obvious over Kim and Tachikawa [Ground 4] (*id*., 207–13), claim 4 is obvious over Kim and Hong [Ground 1] (*id.*, 213–16), claim 5 is obvious over Kim, Hong, and Tachikawa [Ground 2] (*id.*, 216–17), and claim 8 is obvious over Kim, Hong, and Takahashi [Ground 3] (*id.*, 217; *see also id.*, 204–06).[1] The ALJ also found that Samsung had not proven, by clear and convincing evidence, that claims 9, 12, and 13 are anticipated or obvious over Kimura [Ground 8].[2] *Id*., 218, 226–27. The FID credited testimony from Samsung's expert Robert Smith-Gillespie, who also submitted a declaration in this proceeding (Ex. 1002).

III. CLAIM CONSTRUCTION

Samsung does not dispute MRI's proposal to adopt the ALJ's construction of "constricted convection plate" as "a plate configured to form part of a constricted convection channel." Paper 21 ("POR"), 9. However, as discussed herein, MRI's attempts to improperly further limit the meaning of this term should be rejected.

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[1] Samsung did not present any arguments based on Na (Ex. 1010) during the ITC evidentiary hearing. MRI did not assert claims 1, 2, 10, 11, or 16 in the ITC proceeding.

[2] The ALJ found claims 9, 12, and 13 invalid for lack of written description. Ex. 1048, 229.

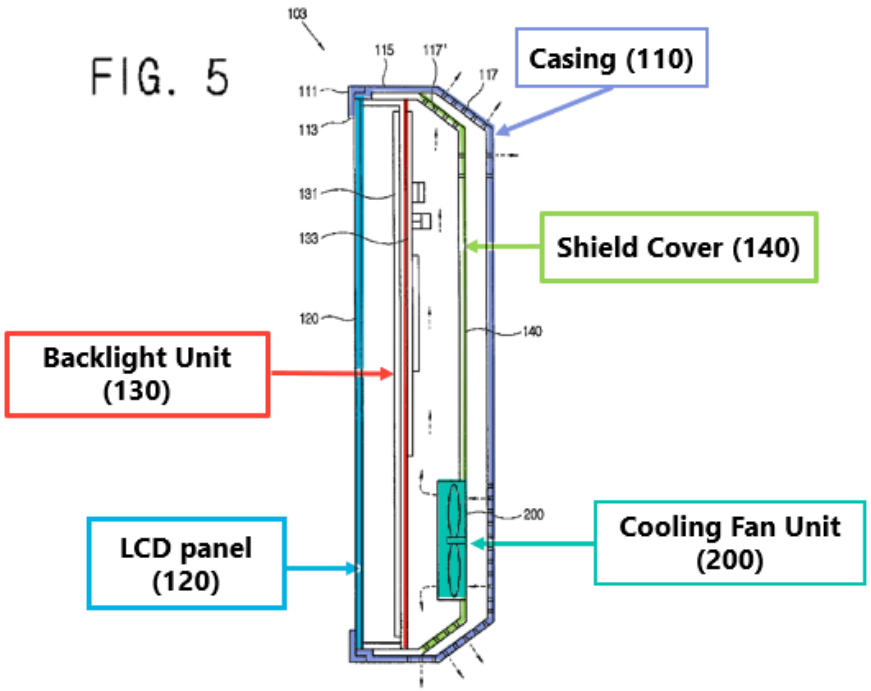
IV. GROUNDS 1–4: KIM IN COMBINATION WITH SECONDARY REFERENCES, RENDERS OBVIOUS CLAIMS 1–5, 7, AND 8

MRI's arguments regarding Kim rely on an overly restrictive reading of the claims and are contrary to Kim's teachings. Accordingly, none disturb the strong showing of obviousness.

A. Ground 1: Kim in View of Hong Renders Claims 4 and 7 Obvious

1. Kim Discloses a "Constricted Convection Plate"

Kim discloses a "constricted convection plate" in the form of "shield cover 140." Paper 9 ("Pet."), 36–38. MRI disputes that Kim discloses this element because "the cooling air flows through the air slits 117' throughout the shield cover 140 and through the corresponding air slits 117 on the top and sides of the rear casing" such that the "airflow is not directional through a channel." POR, 24. However, Kim teaches that its shield cover 140 is strategically formed and placed "such that the flowing air produced by the cooling fan 210 can be efficiently guided" through a channel between the shield cover and display posterior. Ex. 1005, 4:59–63; *see also id.*, 5:34–38 ("cooling air generated by [a] cooling fan 210 can efficiently cool the LEDs . . . while the cooling air flows through a space between the shield cover 140 and the backlight unit 130"). Consistent with these teachings, Kim's Figure 5 shows the airflow through the channel:



Id., FIG. 5 (annotated).

MRI next argues that Kim's cooling space is not a "channel" by attempting to narrow the claim through extrinsic evidence. *See* POR, 24–25. Neither the claims nor the '322 patent specification require "directional flow" or a channel enclosed on all four sides.[3] Nor must Kim's embodiments match the *embodiments* of the '322 patent for this limitation to be met, as MRI suggests. *See id.; see also Maalouf v.*

[3] Notably, in construing "constricted convection plate" as "a plate configured to form part of a constricted convection channel," the ALJ agreed with Samsung that the term "channel" did not require construction because it "appear[ed] to be used in the claims in accordance with its plain and ordinary meaning." Ex. 2010, 36-37.

Microsoft Corp., No. 2022-1164, 2023 WL 2182284, at *3 (Fed. Cir. Feb. 23, 2023) ("The Board properly declined to import a portion of an exemplary embodiment from the specification into the claim"). In any event, MRI's expert agreed at deposition that in Kim's system, air flows directionally from the entrance through fan 200 to the exits through slits 117' to remove heat from the backlight unit 130. Ex. 1049, 42:17–24.

MRI's positions here run contrary to its infringement positions in the ITC proceeding. At MRI's urging, the ALJ determined for purposes of infringement that a constricted convection plate can contain additional openings, beyond the open loop's entrance and exit openings: "The ['322] patent does not require the constricted convection plate to be solid, with no openings." Ex. 1048, 72, 86 (applying infringement analysis from "constricted convection plate" limitation of '595 patent to '322 patent claims). The ALJ found it is enough to show "constricted air flow through the channel which cools the display" to meet this limitation. *Id.*, 76. The ALJ also agreed that even with air slits 117', "air flow [in Kim] is constricted and provides an identified air flow path from the fan to the air slits on the periphery through the area between the shield cover and the backlight unit, as shown in Figure 5." *Id.*, 192; *see also id.*, 193 n.74 ("As discussed above regarding infringement . . . (and as argued by MRI), certain holes in the plate do not necessarily preclude coverage by this limitation"). The ALJ further found that "even if the

airflow occurs as shown as [MRI sets forth in annotated Figure 2 on page 24 of its Response], this airflow is still constrained in the area between the shield cover and backlight unit." *Id*., 192 n.74.

2. Kim's Constricted Convection Plate is "Substantially Parallel" to the Posterior Display Surface

MRI admits that "[t]he cross-section view in Kim's Fig. 5 appears to show shield cover 140 substantially parallel to the posterior display surface." POR, 25. Nonetheless, MRI suggests that Kim does not teach that shield cover 140 is substantially parallel to the posterior surface of backlight assembly 130 because the shield cover "has substantial topology" and the backlight assembly "is not a flat surface" as shown in Kim's Figure 2. POR, 26. But the claims do not require the constricted convection plate or posterior surface to be flat. Instead, the claims require those components to be oriented "substantially parallel," which Kim's Figures 2 and 5 disclose. Pet., 33–34, 36–37.

3. Kim in Combination with Hong Discloses a PCB

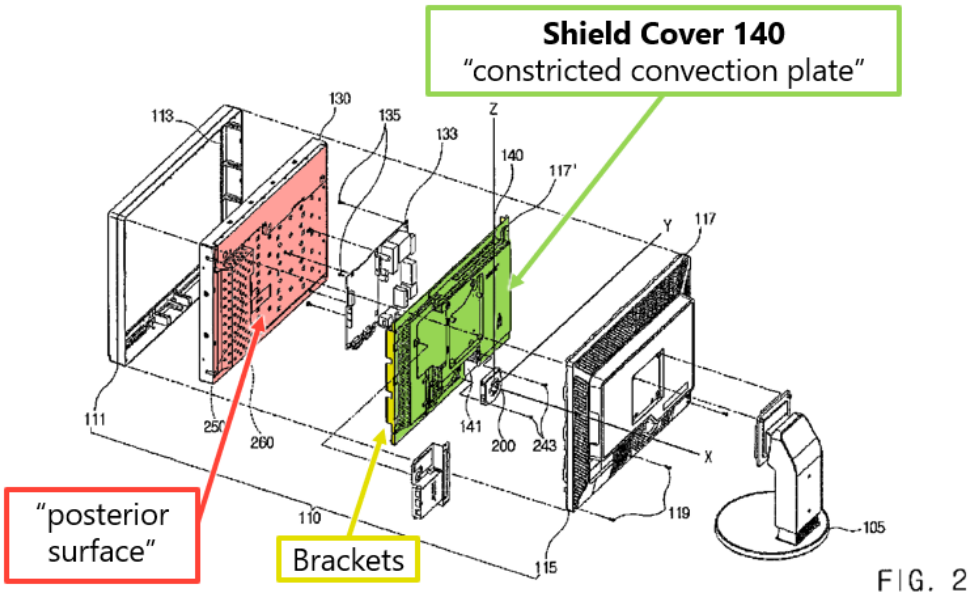
MRI does not dispute that a POSITA would have understood Kim alone to disclose the claimed PCB as set forth in the Petition. *See* Pet., 33; Ex. 1002, ¶ 123. MRI only disputes the motivation to arrive at the alternative combination of Kim and Hong. POR, 27–30. But MRI mischaracterizes Samsung's argument. Kim's display is agnostic about the type of LED PCB used therein, and at the time it would have been an (obvious) matter of routine design choice to utilize a PCB in Kim's

display. *See* Pet., 36–37. Samsung does not argue that one would bodily incorporate Hong's thermal convection and heat sink into Kim's display. *MCM Portfolio LLC v. Hewlett-Packard Co.*, 812 F.3d 1284, 1294 (Fed. Cir. 2015) ("[t]he test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference . . . . Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.") (citations omitted).

MRI's remaining arguments are also improperly focused on Hong's exemplary disclosure of a *metal core* PCB, which is not required by claim 4 of the '322 patent or relied on by Samsung in this combination. *See* POR, 27–29; Pet., 35, 39–40. MRI does not explain why it would not have been obvious to incorporate a PCB into Kim's display. Instead, MRI's expert agreed at deposition that "in general, LEDs are components that must be mounted on some substrate, and that a PCB would be a reasonable substrate for mounting them." Ex. 1049, 33:8–13. Accordingly, the ALJ found MRI's arguments meritless. *See* Ex. 1048, 214 (finding clear and convincing evidence shows that the combination of Kim and Hong discloses a PCB, and that the POSITA would have been motivated to combine them with a reasonable expectation of success).

B. Ground 2: Kim in Combination with Hong and Tachikawa Renders Obvious Claim 5

MRI argues that Kim's "alleged brackets" connect shield cover 140 to the sides of Kim's backlight 130 instead of its posterior surface. POR, 30–31. But claim 5 does not limit the location of the connection between the bracket and posterior surface, and Kim's brackets are "used to secure the constricted convection plate" (Ex. 1001, 5:35–37) to the rear of the backlight unit 130, i.e. the posterior display surface. *See* Pet., 46–47.



Ex. 1005, FIG. 2 (annotated).

MRI also mischaracterizes Mr. Smith-Gillespie's cross-examination testimony with respect to the modified version of Kim's Figure 2 created by MRI. *See* POR, 31. When asked about the modified figure at the ITC hearing, Mr. Smith-

Gillespie testified that he "can't agree to anything based on this graphic here because it is clearly mismade." Ex. 2013, 1058:25–1059:8. On direct, Mr. Smith-Gillespie explained that Kim's brackets would attach the shield cover 140 via screws through a frame to the rear case of the backlight assembly, which is the posterior surface of the display. *Id.*, 957:23–958:12.

Based on these same arguments and testimony, the ALJ "agree[d] with Respondents that this limitation does not require that the bracket be directly attached to the posterior display surface and that securing the constricted convection plate at the side of the posterior display surface, in the manner shown by Kim, meets the 'connects' requirement of this limitation, properly construed." Ex. 1048, 210–11; *see also id.*, 211 n.82.

To the extent this claim element is not disclosed by Kim, it would have been obvious to a POSITA to use brackets as disclosed by Tachikawa to connect the posterior surface of backlight unit 130 to Kim's shield cover 140. *See* Pet., 46–47. MRI argues that "Kim, however, does not disclose any serviceability or structural strength concerns relating to its design." POR, 31. But this cannot detract from the POSITA's motivation to improve upon Kim's cooling system with simple features that were well-known in the art. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007) ("For the same reason, if a technique has been used to improve one device, and a [POSITA] would recognize that it would improve similar devices in

the same way, using the technique is obvious unless its actual application is beyond his or her skill"); *Unwired Planet, LLC v. Google Inc.*, 841 F.3d 995, 1003 (Fed. Cir. 2016) ("For the technique's use to be obvious, the skilled artisan need only be able to recognize, based on her background knowledge, its potential to improve the device and be able to apply the technique."). Brackets were commonly used in the assembly of electronic displays by March 2008. Ex. 1049, 52:11–16 (agreeing that by 2008, "brackets [were] well known both in mechanical as well as electrical disciplines."). Even '322 patent inventor William Dunn testified that the use of mounting brackets to attach components within a display system was a routine part of development by 2008. Ex. 1050, 79:7–24 (describing collaboration, including "work[ing] together to come up with various attachment points, mounting brackets, whatnot, to attach what we provided to what they provided."); *see also* Ex. 2019, 113:4–13. Moreover, MRI does not dispute that Tachikawa's design would have improved the structural strength of Kim's design. *See* POR, 31–32; Pet., 46–47. Therefore, it would have been obvious to add Tachikawa's brackets to Kim with a reasonable expectation of success. *See* Ex. 1048, 211–12.

C. Ground 3: Kim in Combination with Hong and Takahashi Renders Obvious Claim 8

MRI's arguments with respect to claim 8 similarly focus on a hypothetical physical combination of Kim and Takahashi, arguing that "flow of air through Kim's 'small holes' (air slits 117') are crucial to its cooling system design" and that

"[p]lugging Kim's air slits 117' would have destroyed the basic objective of Kim's air slits 117'." POR, 33. However, MRI mischaracterizes Mr. Smith-Gillespie's testimony. He did not testify that a POSITA would plug all of Kim's air slits 117', but that a POSITA would have been motivated to modify Kim's system in view of the disclosures of Takahashi. Ex. 2013, 955:4–21; *see also MCM Portfolio*, 812 F.3d at 1294. The ALJ found that "Mr. Smith-Gillespie's testimony that these through-holes and air leak prevention parts would have improved Kim by allowing access to hardware without having to remove the shield cover, and that this modification would be 'straightforward' is clear and convincing." Ex. 1048, 205–06 (citing Ex. 2013, 954:24–955:14; Ex. 1008, ¶ [0007]); Ex. 1002, ¶ 172. The ALJ also found MRI's argument that access apertures are unnecessary because one could remove Kim's shield cover (POR, 33), "unpersuasive because the purpose of the through-holes is to allow access for maintenance or inspection *without* needing to remove the shield cover." Ex. 1048, 206.

D. Ground 4: Kim in Combination with Tachikawa Renders Obvious Claims 1–3

For the same reasons as discussed above with respect to Grounds 1 and 2, MRI's arguments with respect to claims 1–3 are unpersuasive. *Supra* IV.A–B.

V. GROUNDS 5–6: NA, ALONE OR IN COMBINATION WITH SECONDARY REFERENCES, RENDERS OBVIOUS CLAIMS 4, 7–13, AND 16

MRI's arguments regarding Na rely on an overly restrictive reading of the claims and are contrary to Na's teachings.

A. Ground 5: The Combination of Na and Kim Renders Claims 4, 8, 9, 10, and 16 Obvious

1. Na Discloses "a Constricted Convection Plate Behind the Posterior Surface of the Display"

Na's areal light source device 100 is a backlight assembly as described by the '322 patent and has a rear-facing display surface, i.e., "reflective plate 110." Contrary to MRI's argument that "[e]very example of a posterior surface of the electronic display in the specification is the most posterior portion on the outside of a display module" (POR, 37–38), the specification is clear that the posterior surface "may be the posterior surface of a backlight assembly" (Ex. 1001, 4:52–55). MRI's expert admitted at deposition that the specification does not state whether the posterior surface must be internal or external, and that his opinions were based solely on the Figures. Ex. 1049, 76:17–24. Accordingly, MRI's repeated attempt to read embodiments into the claim must be rejected.

2. Na Discloses "a Posterior Surface on the Rear Side of the PCB"

Contrary to MRI's arguments, claim 4 does not require a "distinct 'posterior surface' on the rear side of the PCB distinct from the rear side of the PCB itself."

See POR, 40–41. Mr. Smith-Gillespie explained that a POSITA would have understood from the '322 patent's disclosure that the rear outermost surface of the PCB is the recited "posterior display surface." Ex. 1002, ¶ 202. Indeed, the ALJ found this limitation broad enough to cover the rear of a PCB or a separate surface on the rear of the PCB. Ex. 1048, 78. Accordingly, Na discloses this limitation. *See* Pet., 57–60.

3. Na Discloses "a Constricted Convection Plate"

MRI disputes that Na's bottom plate 210 is a "constricted convection plate" because of the number of through holes 212 on the bottom plate. POR, 42. MRI, however, ignores Na's disclosure that, although the through-holes can be formed on the bottom plate, "the through-holes may be further formed in the first to fourth sidewalls, or may be formed only in the first to fourth sidewalls." Ex. 1010.005. A POSITA would have understood Na's disclosure to include an embodiment where there are no through-holes on bottom plate 210 and through-holes on one or more of the sidewalls. Ex. 1002, ¶ 205. MRI's expert Mr. Gershowitz agreed in his declaration submitted in the related '595 patent IPR that "[t]he configurations taught by Na involve modifying **one or more of the sidewalls 220-250** to add through-holes, either in addition to the through-holes 212 in the bottom plate 210 or using a bottom plate 210 that does not have through holes." Ex. 1053, ¶ 124 (emphasis added).

B. Ground 6: The Combination of Na and Kim Renders Claims 7, 12, and 13 Obvious

A POSITA would have been motivated to add Kim's housing to Na's display for the reasons explained in the Petition and Mr. Smith-Gillespie's declaration. Pet., 72–73; Ex. 1002, ¶¶ 241–47. MRI argues that Samsung did not identify a reason for the combination because Na's driving circuits would still be exposed to ambient air with the addition of Kim's housing. POR, 44. However, Samsung and Mr. Smith-Gillespie recognized this, and Mr. Smith-Gillespie explained that the housing would protect the driving circuits by controlling the flow of air that contacts them. *See* Pet., 72–73; Ex. 1002, ¶¶ 243–44. Further, Mr. Smith-Gillespie explained that a POSITA at the time would have understood the addition of a housing to a liquid crystal display to be a routine and simple modification. Ex. 1002, ¶¶ 244–46.

C. Ground 7: The Combination of Na and Tachikawa Renders Claim 11 Obvious

A POSITA would have been motivated to add Tachikawa's brackets to Na's display for the reasons explained in the Petition and Mr. Smith-Gillespie's declaration, and as discussed above with respect to the combination of Kim and Tachikawa. Pet., 77–78; Ex. 1002, ¶¶ 256–60; *supra* IV.D. MRI's argument based on a "modified version of Na's Fig. 13" with the addition of a "blue stand coupled to Na's backlight using a green attachment means" is based solely on attorney argument. POR, 45. MRI's modified version of Na's Figure 13 does not reflect

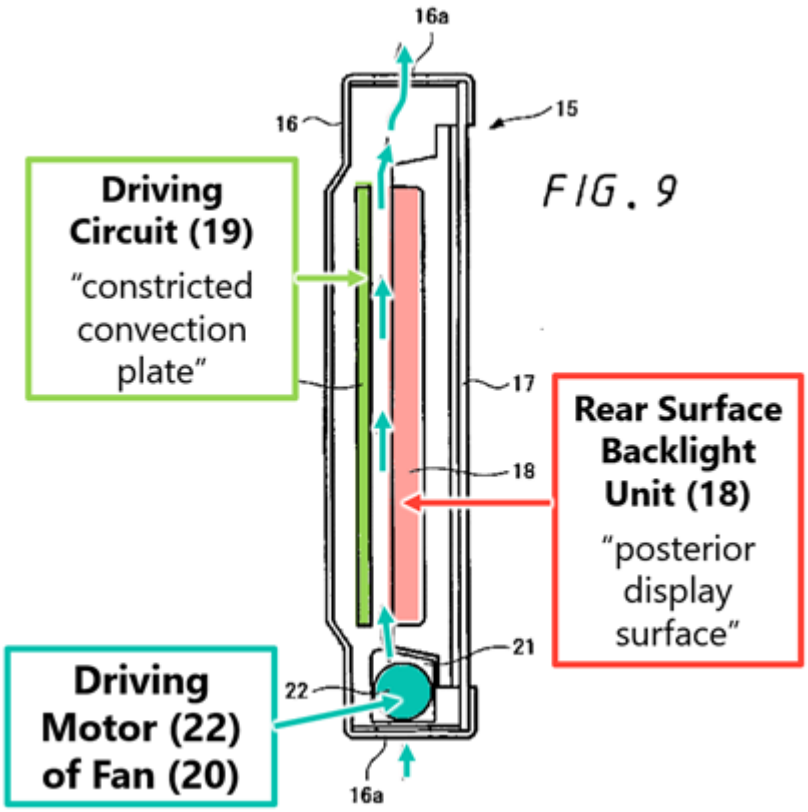
Mr. Smith-Gillespie's opinion that a POSITA, based on the teachings of Tachikawa, would have fitted brackets on the rear surface of Na's areal light source 100. Ex. 1002, ¶ 259. Finally, contrary to MRI's argument, Mr. Smith-Gillespie did not suggest connecting these brackets to the exposed driving circuits 130. *See* POR, 45.

VI. GROUNDS 8–11: KIMURA RENDERS OBVIOUS CLAIMS 9, 12 AND 13 OF THE '322 PATENT

A. Ground 8: Kimura Renders Obvious Claims 9, 12, 13, and 16

1. Kimura Discloses "a Constricted Convection Plate Behind the Posterior Surface of the Display and Covering a Majority of the Posterior Display Surface"

Contrary to MRI's arguments, Kimura discloses "a constricted convection plate behind the posterior surface of the display." A POSITA would have understood from Kimura's disclosures that driving circuit 19 is a plate positioned to form a constricted convection channel because it is spaced behind the rear surface of the backlight unit sufficiently to create a channel for air to flow through to cool the backlight uniformly. Ex. 1002, ¶¶ 273–74. This is reflected in the arrows shown in Kimura's Figure 9 below. In other words, the driving circuit 19 causes the "film" of air to form on the posterior surface. Accordingly, the driving circuit 19 is a plate that forms part of a constricted convection channel.



Ex. 1004, FIG. 9 (annotated).

MRI's attempt to read in a requirement that a "plate" be a "sturdy material used to strengthen a device" based on a single dictionary definition must be rejected. POR, 48. As Mr. Gershowitz admitted at deposition, the claims do not place any limitations on the claimed "plate" other than it be a "constricted convection" plate. Ex. 1049, 61:12–62:1.

The ALJ agreed that Kimura's driving circuit is a "constricted convection plate," explaining:

> Figure 9 illustrates clearly that the driving circuit is a plate which forms a constricted convection channel, *i.e.*, a constricted channel through

> which air may flow to remove heat from the posterior surface of the display. Kimura ¶ [0078], Fig. 9. Figure 9 illustrates that air flows through a channel between the driving circuit and the rear surface of the display, and there is no dispute that this would remove heat from this surface.

Ex. 1048, 222.

A POSITA would have further understood that Kimura's driving circuit 19 must cover a majority of the posterior surface of the backlight unit 18 in order to simultaneously cool these two heat generating elements. Ex. 1002, ¶ 274. A POSITA would have understood the length of cooling fan 20, which runs across the entire width of the display, to be indicative of the size of both the driving circuit 19 and the backlight unit 18. *Id.*; Ex. 1004, FIGs. 9–10; *see also In re Wagner*, 63 F.2d 987, 988 (1933) ("if a drawing clearly suggests to one skilled in the art the way in which the result sought is accomplished by a later applicant, it is immaterial whether the prior patentee's showing was accidental or intentional") (citations omitted). Indeed, MRI has pointed to nothing within Kimura that would indicate that its

drawings "are not drawn to scale with reasonable accuracy." *See Application of Wolfensperger*, 302 F.2d 950, 959 (C.C.P.A. 1962).[4]

In the alternative, it would have been obvious to a POSITA to optimize the display cooling capability by enlarging Kimura's "driving circuit 19" to cover a majority of the posterior display surface. Pet., 83. Contrary to MRI's argument that increasing the size of the driving circuit would create non-uniform cooling (POR, 50–51), non-uniform cooling would result from a driving circuit that does not extend the length of the backlight. While the ALJ found that Mr. Smith-Gillespie had not opined that it would have been obvious to enlarge the driving circuit (Ex. 1048, 223), he opined in this proceeding that "a POSITA would have been inclined to optimize the display cooling capability by enlarging Kimura's 'driving circuit 19' to cover the entire rear surface of the display so that 'the entire backlight is cooled ***uniformly***.'" Ex. 1002, ¶ 274 (emphasis added). Accordingly, this limitation is obvious based on this record.

[4] The ALJ found that while Kimura discloses a "constricted convection plate," Samsung failed to prove by clear and convincing evidence that Kimura's driving circuit covers a majority of the posterior display surface. Ex. 1048, 222–23.

2. Kimura Discloses a "Means for Forcing Air Between the Constricted Convection Plate and the Posterior Surface of the Electronic Display"

MRI does not dispute that Kimura discloses the means plus function construction of this term that MRI earlier in Response stated it agrees to—a function of "forcing air between the constricted convection plate and the posterior surface of the electronic display" and a structure of "one or more fans 52, air conditioning unit 110, and their equivalents." POR, 8. Instead, MRI attempts to read in additional structural requirements, arguing that air from the cooling fan is divided into the spaces on either side of the driving circuit and is therefore not "forced" into the constricted convection channel and that Kimura disparages the types of fans used in the '322 patent. POR, 52–53.[5] However, neither claim 9 nor the agreed means plus function construction require that the fan *only* force air through the constricted convection channel or a particular type of fan. Therefore, Kimura discloses this claim element. *See* Ex. 1048, 224–25 (finding clear and convincing evidence that Kimura discloses this limitation and rejecting MRI's attempts to further limit the parties' agreed construction).

[5] Notably, at deposition, MRI's expert insisted that he had not formed an opinion as to whether air flows on the rear side of Kimura's driving circuit 19. Ex. 1049, 66:16–67:7.

With respect to claim 13, Kimura does not teach away from multiple fans as MRI suggests. *See* POR, 54; *Syntex (U.S.A.) LLC v. Apotex, Inc.,* 407 F.3d 1371, 1380 (Fed. Cir. 2005) ("a prior art reference that does not specifically refer to one element of a combination does not, per se, teach away"). Instead, in the paragraphs MRI cites, Kimura merely discloses the benefits of its fan design over prior fans used in plasma display panels, such as propeller fans. POR, 54 (citing Ex. 1004, ¶¶ [0003] – [0012]). Further, while the ALJ found that Samsung failed to show that it would have been obvious to modify Kimura to include a plurality of fans upon finding Mr. Smith-Gillespie's testimony conclusory (Ex. 1048, 229), Mr. Smith-Gillespie here explains that a POSITA would have been motivated to use a plurality of shorter rotating fans to "(i) 'increase the wind-producing area,' and (ii) to prevent vane deformation during operation," with a reasonable expectation of success. Ex. 1002, ¶¶ 292–93. Accordingly, claim 13 is obvious based on this record. *See B/E Aerospace, Inc. v. C&D Zodiac, Inc*, 962 F.3d 1373, 1379 (Fed. Cir. 2020) (affirming the Board's conclusion of obviousness because "modifying the [prior art] to include a second recess" where prior art disclosed a "first recess" was "nothing more than the predictable application of known technology").

B. Ground 10: Kimura in Combination with Hong Renders Claims 4 and 7 Obvious

MRI's arguments with respect to the combination of Kimura and Hong are meritless for the reasons discussed above with respect to the combination of Kim

and Hong. *Supra* Section IV.A.3. Contrary to MRI's assertion that "a POSITA would have been aware of other LED substrates than PCBs" (POR, 59), MRI's expert Mr. Gershowitz agreed at deposition that conventionally, including around 2008, LEDs would have been mounted to a PCB and mechanical support (Ex. 1049, 79:21–80:18).

VII. THERE ARE NO SECONDARY CONSIDERATIONS OF NONOBVIOUSNESS

MRI has failed to establish that any secondary considerations exist or that they have a nexus to the Challenged Claims, let alone overcome the strong showing of obviousness. Indeed, in the ITC proceeding, the ALJ found MRI's alleged secondary considerations were "not entitled to significant weight." Ex. 1048, 288.

A. Long Felt Need, Failure, and Copying

MRI fails to identify any evidence of a long-felt but unmet need that has any nexus to the Challenged Claims. While MRI claims that there was a need for outdoor displays with cooling technology (POR, 63), the claims are not so limited. *See ABT Sys., LLC v. Emerson Elec. Co.*, 797 F.3d 1350, 1362 (Fed. Cir. 2015) (rejecting argument of long-felt need that "ignores the scope of claim 1, which does not set forth limits on how long or how often periodic fan operation is to be performed"). Moreover, MRI does not set forth how the Challenged Claims satisfy any alleged need. *See* Ex. 1048, 289 (rejecting MRI's similar long-felt need argument).

MRI also has not established any failure of others. First, Samsung did not fail. Sung Ki Kim's testimony that Samsung started [redacted] around 2005 but did not [redacted] until 2010–2012 does not establish "a decade of failures." POR, 64–65 (citing Ex. 2029, 45:22–47:22); *see* Ex. 1048, 290 ("[T]he evidence regarding 'failure by others' is unpersuasive."). There is no evidence that Samsung worked on the display continuously during that time or that it had any difficulties. Second, MRI has not established that "these prior attempts failed because the devices lacked the claimed features." *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1313 (Fed. Cir. 2006).

MRI's citation of a Samsung slide deck and photographs that include comparative analysis of [redacted] products do not establish copying. POR, 71 (citing Exs. 2042, 2043). Indeed, MRI has not identified any features of the [redacted] products that Samsung allegedly copied. *Iron Grip Barbell Co., Inc. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004) ("copying requires the replication of a specific product").

Moreover, by the time of Samsung's review, Samsung had already fully designed the cooling scheme for its OH products. Ex. 1051, 612:11–13, 613:14–614:18; Ex. 2040 (showing sales of [redacted] units in 2016); Ex. 2042, 65 (showing photographs and test results of Samsung OH55F and OH85F). While MRI asserts that Samsung disassembled [redacted] in "early 2016" (POR, 71),

Samsung engineer Sungsu Lee testified that the March 24, 2016 date on the slide deck cover is incorrect, as confirmed by a photograph of the [redacted] within the slide deck that indicates an October 2016 manufacturing date (Ex. 1051, 611:23–612:10; Ex. 2042, 34, 69; Ex. 1048, 292). Moreover, comparative product analysis is a common industry practice. Ex. 1051, 611:6–22; Ex. 1048, 292 n.117 ("a tear-down of another company's product is not unusual."); Ex. 1050, 159:10–24. Accordingly, there is no evidence of copying.

B. Commercial Success

MRI did not attempt to prove a nexus between the alleged commercial success of Samsung's products and the Challenged Claims, nor is it entitled to a presumption of nexus. A rebuttable presumption of nexus arises only where "the patentee shows that the asserted objective evidence is tied to a specific product and that product embodies the claimed features, and is coextensive with them." *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019) (cleaned up). "[I]f the patented invention is only a component of a commercially successful machine or process, the patentee is not entitled to a presumption of nexus." *Id.* (cleaned up).

MRI's conclusory claims of coextensiveness should be rejected. POR, 70. And regardless, coextensiveness requires more than a showing that the claims cover a product practicing the patents. *Fox Factory,* 944 F.3d at 1377 (rejecting "attempt to reduce the coextensiveness requirement to an inquiry into whether the patent

claims broadly cover the product that is the subject of the evidence of secondary considerations"). Whether a product is coextensive with the patent depends on, among other things, the significance of unclaimed features. *Id.* at 1374–75. Neither MRI nor its expert have undertaken such an analysis.

As the ALJ found, Samsung's products have numerous unclaimed features. *See* Ex. 1048, 296–97 ("[T]he evidence shows that [Samsung's products] have significant unclaimed features."). Indeed, Samsung's marketing documents identify a number of "features & benefits" of the products, such as "Magic glass," "Slim Design," "IP 56" certification, "High Contrast Ratio," "Brightness Greater than 3,500 nits," and "Remote Management," among others. Ex. 2038, 7; *see generally* Ex. 1052. Accordingly, these products are not coextensive with the Challenged Claims. For these same reasons, MRI has not established a nexus between Samsung's sales and the Challenged Claims. *See Ormco*, 463 F.3d at 1312 ("[I]f the commercial success is due to an unclaimed feature of the device, the commercial success is irrelevant."); Ex. 1048, 295.

MRI also has not offered any evidence regarding Samsung's market share aside from a single document regarding Samsung's *global 75-inch* market share. *See* POR, 73 (citing Ex. 2041, 29–30). But MRI does not even argue that Samsung's 75-inch products are coextensive with the Challenged Claims. This is insufficient to demonstrate commercial success.

C. Industry Praise and Licensing

MRI relies on Romulus Stoain's April 24, 2020 generic email to Samsung SDS (POR, 74) to allege industry praise, but this email does not identify any specific technical feature of MRI's products, let alone a specific product that embodies, and is coextensive with, the elements of the Challenged Claims (*See* Ex. 1048, 293–94; Paper 11 (Institution Decision), 45–47).

With respect to licensing, MRI fails to even attempt to establish a nexus. MRI's licenses either fail to mention the [redacted] *See* POR, 74 (citing Exs. 2049, 2051, 2052); *Shoes by Firebug LLC v. Stride Rite Children's Grp., LLC*, 962 F.3d 1362, 1372–73 (Fed. Cir. 2020) ("Because the licenses include numerous intellectual property rights in addition to the '038 and '574 patents, the agreements on their face do not establish a nexus . . . ").

VIII. CONCLUSION

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

Date: December 19, 2023

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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that the foregoing Petitioners' Reply to Patent Owner's Response complies with the type-volume limits of 37 C.F.R. § 42.24(c) because it contains 5,423 words according to the word-processing system used to prepare this reply, excluding the words in the Table of Contents, Table of Authorities, Table of Exhibits, Certification Under § 42.24(d), and Certificate of Service, as set forth in 37 C.F.R. § 42.24(c).

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CERTIFICATE OF SERVICE

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

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