

U.S. Patent No. RE45,117

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MANUFACTURING RESOURCES INTERNATIONAL, INC.,
Petitioner,
v.

SAMSUNG ELECTRONICS CO., LTD,
Patent Owner

U.S. Patent No. RE45,117

Case No. IPR2023-01201

PATENT OWNER'S PRELIMINARY RESPONSE

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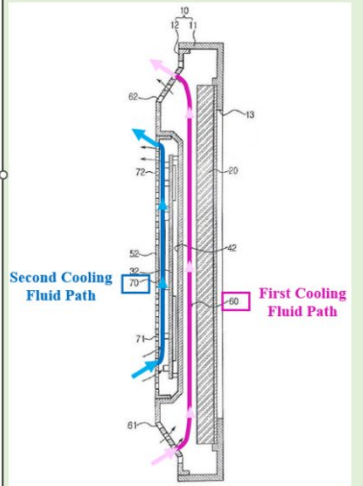
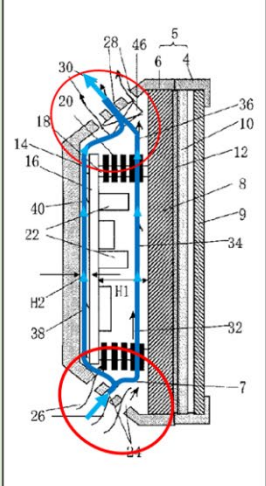
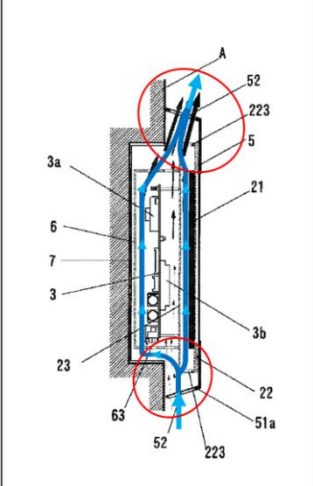
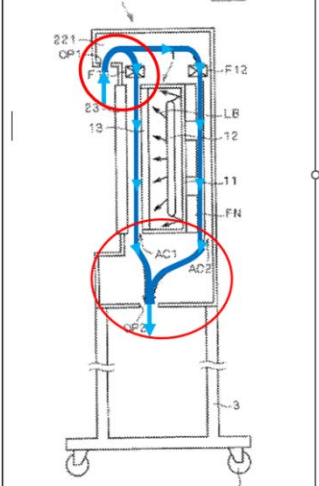
Exhibit No.	Description of Document
2001	Declaration of Bruce W. Smith, Ph.D.
2002	Curriculum Vitae of Bruce W. Smith, Ph. D.
2003	Excerpts from Willem den Boer, Active Matrix Liquid Crystal Displays: Fundamentals and Applications (2005)
2004	<i>Components for Certain Environmentally-Protected LCD Digital Displays and Prods. Containing Same</i> , Inv. No. 337-TA-1349, Order No. 28, 2023 WL 6551036 (Oct. 4, 2023)
2005	Excerpts from ITC Inv. No. 337-TA-1349 Hearing Transcript
2006	June 14, 2023 Joint Chart Setting Forth Parties Post Hearing Claim Construction from ITC Inv. No. 337-TA-1349

Pursuant to 35 U.S.C. § 313 and 37 C.F.R. § 42.107, Patent Owner Samsung Electronics Co., Ltd. (“Samsung”) submits this Patent Owner Preliminary Response to Manufacturing Resources International, Inc.’s (“MRI”) Petition challenging claims 1, 2, and 5 of U.S. Patent RE45,117 (“the ’117 patent”). Samsung requests that the Board deny MRI’s Petition because MRI has not met its burden of establishing that there is a reasonable likelihood it would prevail with respect to at least one challenged claim.

MRI’s Petition (“Petition” or “Pet.”) suffers two fatal flaws. First, MRI fails to explain how the cited prior art discloses all elements of the challenged claims. The ’117 patent claims a display panel with a specific arrangement of elements designed to maximize the removal of heat from inside a digital display. The prior art MRI cites, while in the field of display panels, does not disclose the elements of the challenged claims in the claimed arrangement. For example, neither of the prior art references on which MRI relies for the disclosure of the first and second cooling fluid path limitations (Takahashi and Nagayama) teaches these elements. As explained further below, the ’117 patent claims require two separate cooling fluid paths. In contrast, both Takahashi and Nagayama disclose only airflow paths with a single entry and single exit. But this is exactly the arrangement that the inventors distinguished from the invention of ’117 patent. Specifically, the Background of the Invention in the ’117 patent identifies Japanese Patent Unexamined Publication No.

2006-162641 (“JP ’641”) to illustrate the types of existing cooling flows that the inventors endeavored to improve upon.

Like the prior art on which MRI relies, JP ’641 employs a single inlet, single outlet ventilation system, as shown in the images below.

'117 Patent's Invention	The Prior Art as Disclosed by the '117 Patent (JP '641)	Ground 1 (Takahashi)	Ground 2 (Nagayama)
[1f] <u>separate</u> cooling paths	<i>Mixed cooling paths: No separate cooling paths</i>		
			

MRI thus has not pointed to any prior art that discloses a first cooling fluid path and a second cooling fluid path that are separated and has not presented any argument that a POSITA would have been motivated to modify the cited prior art to achieve separate cooling paths. MRI's Petition also fails to identify prior art disclosures of other elements of the challenged claims, as explained in more detail below.

Second, MRI fails to establish that a person of ordinary skill in the art (“POSITA”) would have been motivated to either modify the identified lead

references or combine those references with the secondary references in the manner claimed. MRI's petition does not articulate why a POSITA would have been motivated to modify the display panels disclosed in Karppanen '116 or Nagayama. Nor does it explain why a POSITA would have been motivated to combine Karppanen '116 with Takahashi or Nagayama with Kaneko with any specificity. The fact that these references all address display panels does not establish that a POSITA would have been motivated to combine these references in the claimed manner with a reasonable expectation of success.

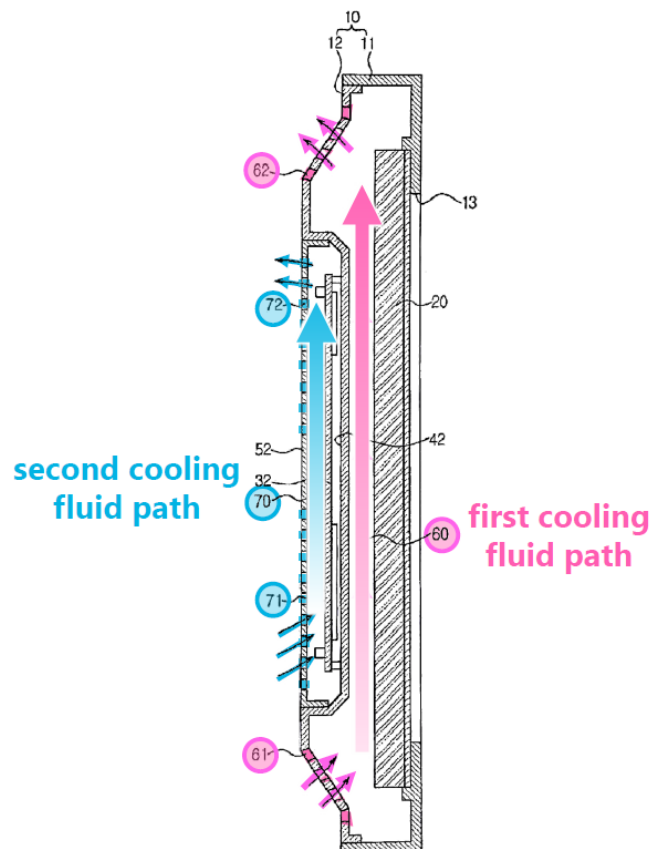
As a result, MRI's petition fails to establish that there is a reasonable likelihood that MRI would prevail with respect to any challenged claim, and therefore, the Board should deny the petition.

I. The '117 Patent

The '117 patent, titled "Panel type display device," issued from U.S. Application Ser. No. 13/403,559 filed on February 23, 2012, as a reissue of U.S. Patent No. 7,667,964. Korean Application No. 10-2007-0002081, which contains a written description of the asserted claims of the '117 patent, was filed on January 8, 2007.

The '117 patent relates to a display panel device with a particular configuration of components that facilitates efficient removal of heat from the display device. Ex. 1001 ('117 patent) at Abstract. The display device includes a

case and a display panel mounted in an interior of the case. *See, e.g., id.* at claim 1. The display device includes a first and second cooling path that are separated from each other. *Id.* at Abstract. The first cooling path cools the display panel and the second cooling path cools a circuit board which controls the display panel. *Id.* at Abstract. The circuit board(s) are mounted on a rear surface of the case using a circuit board mounting part. *E.g., id.* at claim 1. Figure 1 of the '117 patent, below, shows an exemplary illustration of the first cooling path 60 and the second cooling path 70.



'117 patent, Fig. 1 (annotated).

II. Technology Background

Flat panel display technology includes several electro-optic display device technologies, including Liquid Crystal Displays (LCDs), Plasma Display Panels (PDPs), and organic electroluminescent displays (such as organic light emitting diodes, OLEDs). Ex. 2001 (Smith Decl.) ¶ 44.

An LCD is made up of multiple liquid crystal (LC) cells in an array of picture elements, known as pixels. *Id.* at ¶ 45. A diagram of a portion of an active matrix (AM) LCD using thin film transistors to control pixel switching is shown below. Each pixel is driven separately by its own thin film transistor (TFT) switch. *Id.* These TFTs are fabricated on the bottom glass substrate of the display, known as the TFT plate or substrate. *Id.* The LC is sandwiched between this bottom glass and a top color filter substrate or plate and controlled by applying an electric field to shutter light between the top and bottom of the display. Thus, the electrical switching is carried out by the neighboring TFT associated with each pixel. Ex. 2003 (Den Boer) at 49.

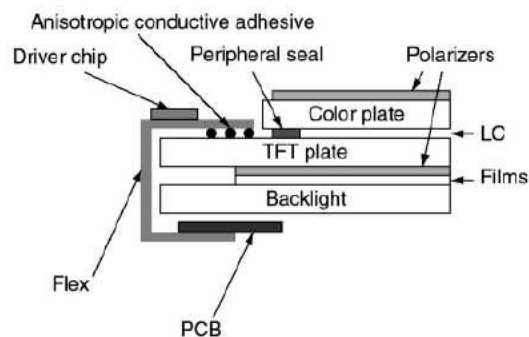
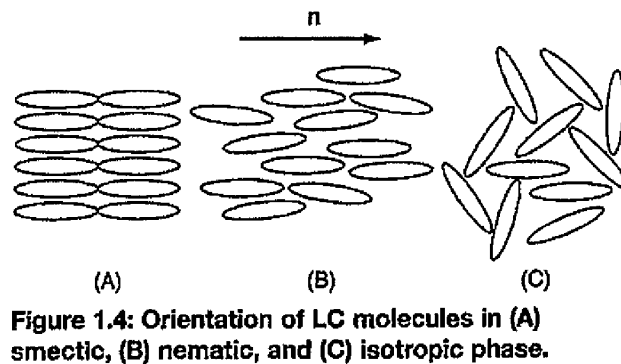


Figure 3.2: Cross section of an edge of a TFT LCD.

Id. at Fig. 3.2.

When liquid crystal is heated beyond a certain temperature, it undergoes a phase transition from a nematic state to an isotropic liquid. Ex. 2001 (Smith Decl.) ¶ 46. This temperature is known as the clearing point or clearing temperature. As a liquid crystal is heated toward the clearing point, the desired optical properties of the crystalline nematic state (or phase) begin to decline. *Id.* Above the clearing point, the liquid crystal becomes isotropic and a display device will fail. Ex. 2003 (Den Boer) at 8. The diagram below shows the different crystalline phases:



Id. at Fig. 1.4.

Due to the temperature sensitivities of the liquid crystal, temperature control is an important feature of any display, but inherently difficult because of the necessarily close proximity of heat generating elements with the devices. Ex. 2001 (Smith Decl.) ¶ 47; Ex. 1009 (Karppanen '116) at 2:24-26 (“present solutions have the problem of temperature control caused by the integration of electronics controlling the display . . .”). The heat generating components (e.g., power modules)

that are mounted onto the circuit board of these devices add heat to the device, not only risking failure of the LCD, but also impacting the performance of the electronic components of the display panel. If left unchecked, the combination of necessary components in a display would lead to unsustainably high temperatures and eventual device failure.

As the LCD technology developed, there was considerable effort in the field to optimize temperature control in LCD panels. Ex. 2001 (Smith Decl.) ¶ 48. Various temperature control solutions were developed, many of which were targeted to specific applications of the displays. *See, e.g.*, Ex. 1011 (Takahashi) (addressing temperature control issues specific to wall-embedded devices).

III. Expert Testimony

MRI alleges that its positions are supported by the testimony of Dr. Carl Meinhart, but Dr. Meinhart's alleged expert testimony set forth in Ex. 1003 should be disregarded. On at least the issues addressed in this Preliminary Response, Dr. Meinhart's declaration merely parrots the exact statements that appear in the petition, without additional support or explanation. *Compare, e.g.*, Petition at 52-53 with Ex. 1003 (Meinhart Decl.), ¶¶ 133-134. As the Board has stressed, conclusory and unsupported expert testimony is entitled to little weight. *Xerox Corp. v. Bytemark Inc.*, IPR2022-00624, Paper 9, 2022 WL 3648989 at *6 (P.T.A.B. August 24, 2022) (precedential). Dr. Meinhart's statements do not provide additional

explanation that would assist the Board with its analysis and, therefore provide only the precise type of conclusory testimony that the Board has cautioned against.

In support of the positions in this Preliminary Response, on the other hand, Samsung submits testimony from Dr. Bruce Smith. Ex. 2001. Dr. Smith is a Distinguished Professor of Electrical and Microelectronic Engineering at the Rochester Institute of Technology and has over 35 years of experience in fields related to the subject matter of the '117 patent. *Id.* at ¶ 9. Unlike Dr. Meinhart, Dr. Smith has provided thorough explanation of, and support for, his opinions that MRI has failed to show the challenged claims are invalid as obvious.

IV. Claim construction

A. “Display Panel”

MRI proposes a construction of “display panel” that improperly limits this term to only a “screen” on which images are displayed. While Samsung disputes that this term should be so limited, the construction of this term does not impact the issues in this proceeding. This term was construed in the parties’ related ITC action to mean “flat type display for displaying images.” Ex. 2004 (ITC claim construction order) at 8. The ALJ further provided “[a]s explanation, but not part of the claim construction itself, this would include both a Liquid Crystal Display and a Plasma Display Panel.” *Id.*

B. “Circuit Board Mounting Part”

MRI mistakenly argues that “circuit board mounting part” should be interpreted as a means plus function claim term. There is no support for MRI’s claim that this term should be so limited. Claims lacking the words “means for” are presumed not to be means-plus-function terms. *Williamson v. Citrix Online LLC*, 792 F.3d 1339, 1349 (Fed. Cir. 2015) (*en banc*). This presumption “provides clarity and predictability for the public and the patentee alike. It helps the public determine when claim elements are expressly limited to structures disclosed in the specification (or their equivalents) and provides the patentee with the tools for reliably invoking or avoiding means-plus function claiming.” *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1297 (Fed. Cir. 2014). To overcome this presumption, a “challenger [must] demonstrate[] that the claim term fails to recite sufficiently definite structure or else recites function without reciting sufficient structure for performing that function.” *Williamson*, 792 F.3d at 1349.

MRI has made no such showing. To do so, MRI must show, by a preponderance of the evidence, that a POSITA would fail to understand the structure of the “circuit board mounting part” in light of the claim as a whole. *See Apex Inc. v. Raritan Computer, Inc.*, 325 F.3d 1364, 1373 (Fed. Cir. 2003). As Dr. Smith explains, a POSITA would understand that the word “part” in “circuit board mounting part” refers to a “portion” or “region” or “area” of the rear case—not a

separate component. Ex. 2001 (Smith Decl.) ¶43. It is a location on the rear case. *Id.* The meaning of “part” as “portion” or “region” or “area” is well-understood by persons of ordinary skill in the art and lay persons alike. *Id.* In light of MRI’s failure to establish this term as a means-plus-function limitation, and in light of a POSITA’s ability to immediately understand the meaning of “circuit board mounting part,” the Board should construe this term according to its plain and ordinary meaning.

Notably, in the ITC proceeding between the parties, the ALJ agreed with Samsung’s proposed construction. The ALJ issued a claim construction order that found that “circuit board mounting part” should not be interpreted as a means-plus-function term, but according to its plain and ordinary meaning. Ex. 2004 (ITC claim construction order) at 12-13.

If the Board finds that this term should be construed as a means-plus-function term, Samsung proposes that Board construe the function of this element to be “to provide an area for mounting the circuit board” and the structure to be the structure recited in Column 3, lines 3-12 and lines 60-65, and/or the structures illustrated in Figures 1-2, and equivalents thereof.

To be clear, in the two step means-plus-function analysis set forth by *Williamson*, “circuit board mounting part” passes the first step—i.e., it has sufficient structure. Therefore, the second part of the means-plus-function analysis—i.e., determining the function and corresponding structure—should never be reached.

However, if the Board decides that Section 112, ¶ 6 applies, Samsung's proposed function and structure is correct. Samsung's proposed function accurately reflects that the circuit board mounting part is the part of the rear surface of the case on which a circuit board is mounted (to use claim language, it is the surface on which the circuit board is "received"). Likewise, Samsung's proposed structure accurately reflects the multiple structures discussed in the specification by using the non-limiting language "and/or." By contrast, MRI's proposed structure only uses "and," which unduly limits the corresponding structure. Samsung's proposed structure and function accurately reflects the full scope of the claimed inventions of the '117 patent. Furthermore, it would be legal error to adopt MRI's proposed means-plus-function construction without including the "and equivalents thereof" required by Section 112, ¶ 6. *See* 35 U.S.C. § 112 (f) ("such [means-plus-function] claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.").

V. GROUND 1: MRI Has Not Shown that Any Challenged Claim is Obvious in Light of Karppanen '116 and Takahashi

MRI has failed to show that there is a reasonable likelihood that any challenged claim is invalid under Ground 1. Karppanen '116 and Takahashi each fail to disclose certain critical elements of the claims, and MRI has not adequately articulated a reason why a POSITA would have been motivated to either modify

Karppanen '116 or to combine Karppanen '116 with Takahashi to arrive at the claimed invention. *See* Ex. 2001 (Smith Decl.) ¶¶ 68-70.

A. The Prior Art Does Not Disclose All Limitations of Claim 1

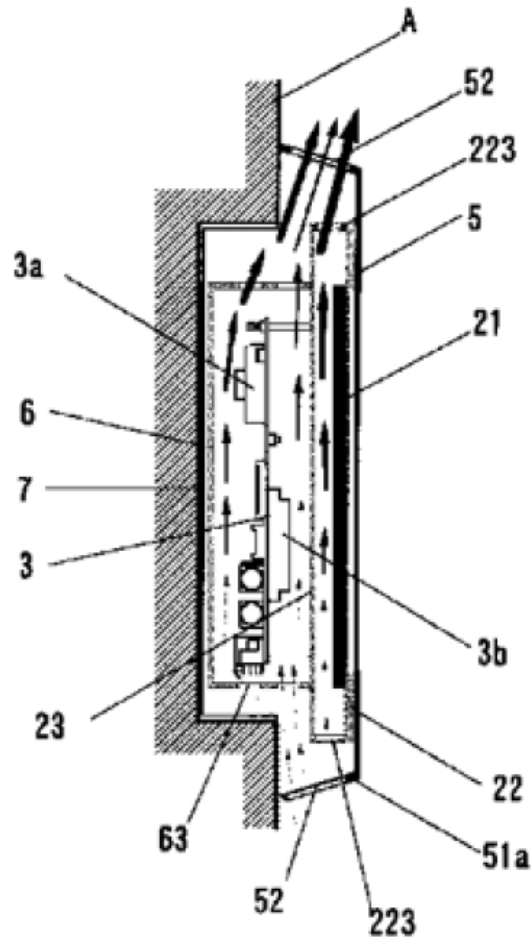
MRI's Ground 1 asserts that the challenged claims are obvious in light of a combination of Karppanen '116 and Takahashi. Specifically, MRI relies on Takahashi's disclosures for elements 1[f] and 1[g] and Karppanen '116 for the remaining elements.¹ Pet. at 37. MRI's arguments fail at least because the combination of the cited reference does not teach elements 1[f] or 1[g] of the '117 patent, and MRI fails to identify a motivation to combine these specific references to arrive at the challenged claims.

¹ The Petition discusses the disclosures of Karppanen '116 in the sections devoted to these elements, but the Petition does not explicitly rely on these disclosures for any ground of invalidity. In an abundance of caution, Samsung has addressed issues raised in MRI's discussions of the disclosures of Karppanen '116 related to elements 1[f] and 1[g], where appropriate. Samsung maintains, however, that MRI has not properly asserted any ground of invalidity that relies on the disclosures of Karppanen '116 for elements 1[f] and 1[g].

1. The Combination of Karppanen '116 and Takahashi Does Not Teach Separate Cooling Paths as Required by 1[f]

MRI admits that Karppanen '116 does not expressly disclose separate cooling paths. Petition at 49. The Petition discusses Karppanen '116 in the section related to this element (Section VII.A.7), but the Petition fails to make an obviousness argument that relies on Karppanen '116 for this element. Instead, MRI relies on Takahashi for a disclosure of separate cooling paths. Takahashi, however, does not disclose claim limitation 1[f] (“wherein the first and second cooling fluid paths are separated from each other”).

A POSITA would have understood that Takahashi's air paths enter through a single air inlet and exit through a single air outlet, and therefore are not “separate from each other.” Ex. 2001 (Smith Decl.) ¶¶ 73-74. Figure 4 of Takahashi discloses “vent openings 52 and 63 [being] provided on the upper and lower sides of the front cover 5 and the rear cover 6 respectively” to allow air to be ventilated upwards. Ex. 1011 (Takahashi), [0025]-[0027], Fig. 4.



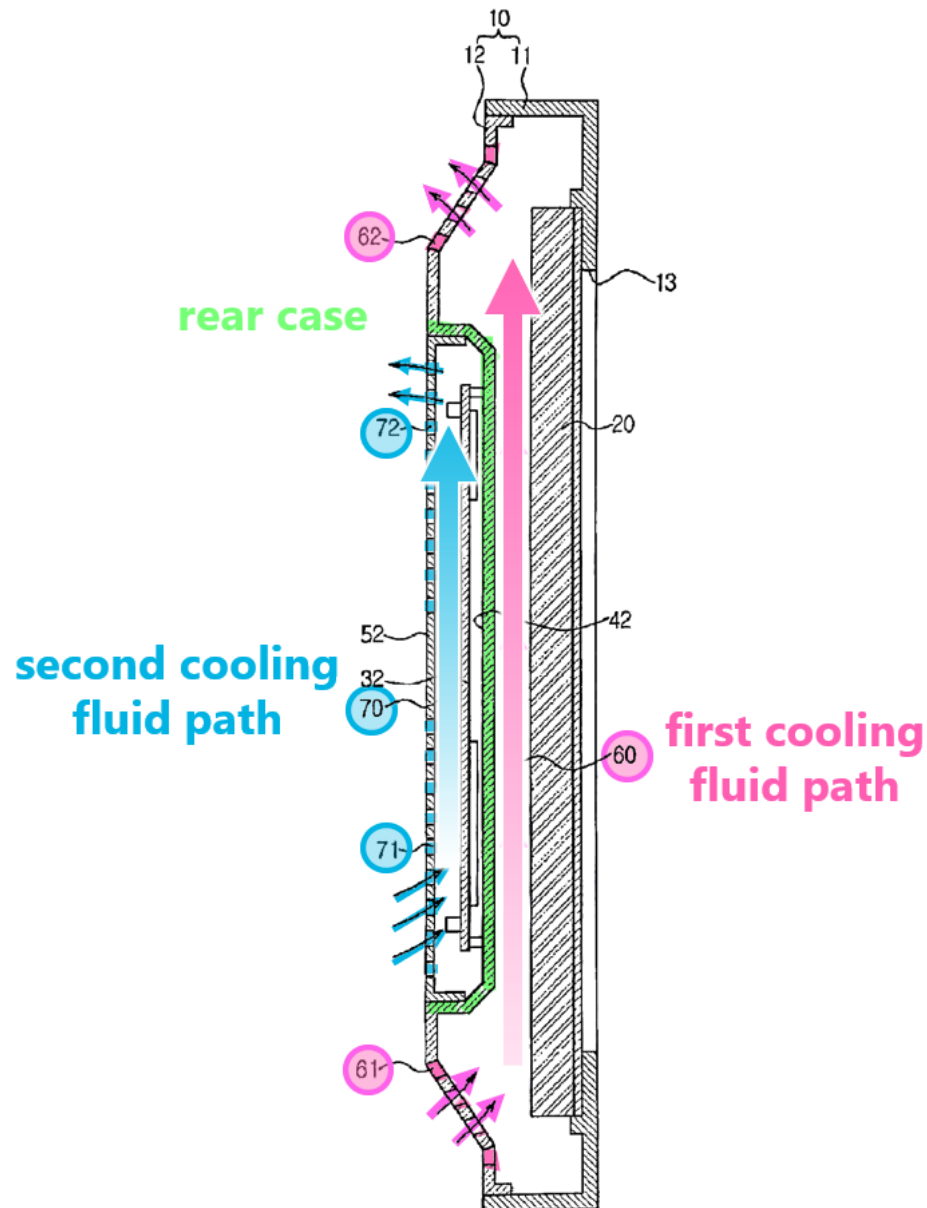
Ex. 1011 (Takahashi), Fig. 4.

A POSITA reading the '117 patent would have understood the separation of the two cooling fluid paths to be a critical aspect of the described invention and a key feature that distinguishes the invention of the '117 patent from the prior art.²

² MRI did not raise this as a claim construction issue, and Samsung believes that this term should be interpreted according to its plain and ordinary meaning. That said, if the Board believes construction is necessary, the term “first and second cooling

The specification describes the claimed air paths from entry to exit, and demonstrates that they do not mix or overlap. *See, e.g.*, Ex. 1001 ('117 patent), Fig. 1, 3:35-38 (“Air flowing in through the air inlets 61 cools the display panel 20 while rising along the first cooling fluid path 60 and is then exhausted through the upper air outlets 62.”). *See also* Ex. 1001 ('117 patent) at 3:32-33, 4:12-14 (stating that “the first and second cooling fluid paths 60 and 70[0] are separated” from each other).

fluid paths are separated from each other” should be construed to mean “first and second cooling fluid paths do not mix.”

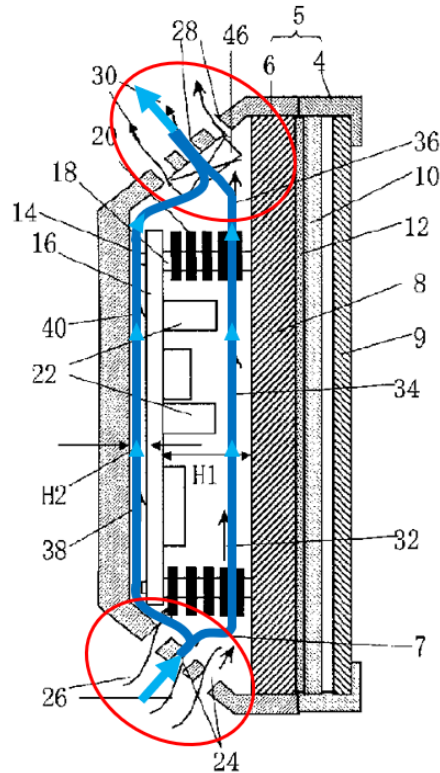


Ex. 1001 ('117 patent) at Fig. 1 (annotated).

The specification likewise explains *why* it is important to keep the two air paths separate from entry to exit. For example, the specification explains that the claimed configuration of separate cooling fluid paths prevents a “phenomenon in which the circuit boards are heated by the heat of the display panel or the display

panel is heated by the heat of the circuit boards.” *Id.* at 4:16-22. A POSITA would have understood that the ’117 patent taught that in order to efficiently remove heat from the display device, air surrounding the display panel on the one hand and the circuit board on the other hand would need to be kept separate. Ex. 2001 (Smith Decl.) ¶ 76. Otherwise, the heated air streams would mix, causing a heat sink inside the display device. *Id.* at ¶ 75. Likewise, heat from one air stream could be transferred to the other element. *Id.*

Specifically, in the Background of the Invention, the applicants referenced Japanese Patent Unexamined Publication No. 2006-162641 (“JP ’641”), noting that it is a “display device that includes a case having a front and rear cases, a display panel mounted in an interior of the case, and circuit boards mounted in the interior of the case.” Ex. 1001 (’117 patent) at 1:32-51; Ex. 1002 (Prosecution History) at 152-157 (JP ’641); Ex. 1002 (Prosecution History) at 151 (JP ’641 English Abstract); *see also* Ex. 2001 (Smith Decl.) ¶77. As shown in the image below, the display device in JP ’641 includes two cooling paths, one which travels along the display panel and one which travels along the circuit board. Ex. 2001 (Smith Decl.) ¶ 78. Air is pulled into the device through a common intake vent and exits through a common exhaust vent. Ex. 1002 (Prosecution History) at 151 (JP ’641 English Abstract).



Id. at Fig. 1.

The '117 patent states that this type of arrangement leads to “inter-heating between the display panel and the circuit boards.” Ex. 1001 ('117 patent) at 1:45-49. The specification goes on to explicitly state that the claimed invention was “made to address the above-mentioned problems [of JP '641] occurring in the related art.” *Id.* at 1:55-59. A POSITA would have understood that the “inter-heating” problem arises in part from the fact that the two cooling paths share the same entrance and exit. Ex. 2001 (Smith Decl.) ¶ 79. In light of the specification, a POSITA would have understood that the claims were directed to display panels with cooling fluid paths that do not mix. *Id.*

As a result, MRI's reliance on Takahashi for this claim element is misplaced. *See id* at ¶ 80. Takahashi does not disclose a second cooling path which cools the circuit board; rather, all of the air flows in through the same vent opening, and out through the same vent opening. *Id.* Notably, Takahashi does not represent the air flow in its device as anything other than a single path. *Id.* Takahashi only describes an arrangement in which air that flows in through vents 52 at the bottom and exits through vents 52 at the top. Ex. 1011, [0026]-[0027]. Takahashi explicitly refers to this as a single path, referring to the path from the entry to the exit. Ex. 1011 (Takahashi), [0023] ("forming a vent path through the vent openings 52"). Simply put, Takahashi does not disclose first and second cooling paths that are separated from each other as required by claim 1, because all the air has a shared entry and shared exit. Ex. 1011 (Takahashi), Fig. 4; Ex. 2001 (Smith Decl.) ¶¶ 80-81. Far from being separate, the air is drawn into the device from the same entry area and mixes within the device before leaving.

As noted above, a POSITA would recognize this as an important distinction between the claimed invention and the prior art – having separate cooling paths maximizes the amount of heat that is exhausted from the system by avoiding mixing of the multiple heat flows. Ex. 2001 (Smith Decl.) ¶¶ 75-77. The air flow structure of Takahashi on which MRI relies is precisely the distinction that appears in the specification of the '117 patent when explaining the flaws of the prior art. *Id.* at ¶¶

79-80. The '117 patent distinguished the claimed inventions from JP '641, which has the same air flow configuration as Takahashi, because JP '641 suffered from “inter-heating between the display panel and the circuit boards.” *Compare* Ex. 1002 (Prosecution History) at 151 (JP '641 English Abstract), Fig. 1 *with* Ex. 1011 (Takahashi), Fig. 4; *see also* Ex. 2001 (Smith Decl.) ¶ 79. Therefore, a POSITA would not have understood that Takahashi taught or disclosed “first and second cooling fluid paths are separated from each other” as required by claim 1.

Since Takahashi does not disclose separate cooling paths, the combination of Karppanen '116 and Takahashi does not render obvious the challenged claims.

2. Petitioner Has Not Established that the Combination of Karppanen '116 and Takahashi Discloses the “Case” of the Element 1[g] of Claim 1

Here again, the petition relies on the disclosures of Takashi for the alleged disclosure of element 1[g]. Pet. at 37. MRI acknowledges that under its own proposed construction of “circuit board mounting part,” Karppanen '116 does not expressly disclose a panel display device “wherein the case includes a circuit board mounting part provided on a rear surface of the case and partitioned from space in which the display panel is mounted such that the circuit board is received in the circuit board mounting part.” Pet. at 52. MRI instead states that Takahashi teaches this claim element. The petition also discusses Karppanen '116's disclosures related to a circuit board mounting part, but MRI does not explain how these disclosures

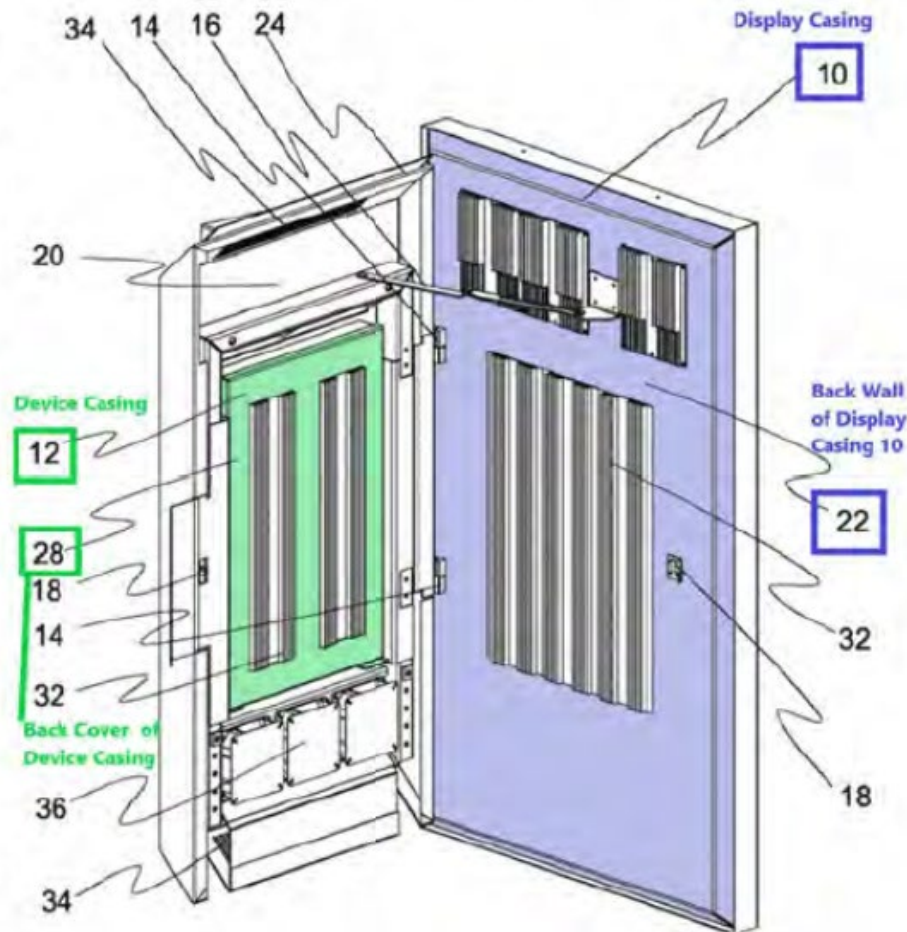
meet the claim limitation and the Petition does not articulate any ground of invalidity that relies on Karppanen '116 for this element. Even ignoring this ambiguity in the petition, however, MRI's invalidity argument fails because neither Karppanen '116 nor Takahashi teach this element under either party's construction.

a) Karppanen '116 Does Not Disclose Element 1[g]

As an initial matter, MRI's papers are inconsistent about which structures in Karppanen '116 disclose the limitations of the challenged claims. For example, when addressing element 1[a], MRI alleges that the features of Karppanen '116 that meet the "case" element are the "display case 10" and the "device case 12" in combination. Petition at 39. When addressing element 1[g], however, MRI refers to device case 12 as the "circuit board mounting part" and appears to refer to display case 10 as the "case" of the challenged claims. *See* Pet. at 51. It is thus unclear which portions of Karppanen '116's structure MRI believes provide a teaching of the required elements of 1[g] when viewed in context of Karppanen '116 as a whole. Ex. 2001 (Smith Decl.) ¶ 83. Based on this lack of clarity alone, the Board should disregard MRI's assertions regarding Karppanen '116's disclosure of element 1[g] of claim 1.

Turning to the substance of MRI's representations regarding Karppanen '116, MRI has failed to show that Karppanen '116 teaches or discloses element 1[g]. As Dr. Smith explains, a POSITA reading the '117 patent would understand element

1[g] to require that a circuit board be mounted onto a rear surface of the case by a circuit board mounting part. Ex. 2001 (Smith Decl.) ¶¶ 84-85. If “display case 10” of Karppanen ’116 is the “case” of the challenged claims, Karppanen ’116 does not teach element 1[g] because it does not have any circuit boards mounted to its rear surface, and thus the case also does not include a circuit board mounting part provided on its rear surface. Ex. 2001 (Smith Decl.) ¶ 86; Ex. 1009 (Karppanen ’116). Instead, the circuit boards are presumably provided on the other side of the unit, in a different case (“device case 12”), and set off from the display case by a common cooling space. Ex. 2001 (Smith Decl.) ¶ 86; Ex. 1009 (Karppanen ’116) at 3:36-37, 6:21-24, 7:9-10, Fig. 2. Notably, Karppanen ’116 does not explicitly disclose where in the case the circuit board are located. Ex. 2001 (Smith Decl.) ¶ 86. The different cases of Karppanen ’116 are shown, for example, in Figure 1. Ex. 1009 (Karppanen ’116) at Fig. 1 (annotated); *see also* Ex. 2001 (Smith Decl.) ¶ 90.



To the extent MRI is arguing that the “case” includes both the display case 10 and the device case 12 and that device case 12 is the claimed circuit board mounting part, that too fails. Ex. 2001 (Smith Decl.) ¶ 90; Ex. 1009 (Karppanen ’116) at 3:23-26, Figs. 1 & 2. Karppanen ’116 states that “[i]n normal use, the display casing [10] and the device casing [12] are turned against each other to a closed position and locked to each other by locking means 18 on one side of the casings.” Ex. 1009 (Karppanen ’116) at 7:6-8. “In the closed position, there remains a cooling space 20 between the display casing [10] and the device casing [12].” Ex. 1009 (Karppanen ’116) at 7:9-10. Karppanen ’116 thus makes clear that circuit boards are not

mounted on the rear surface of the display casing, but rather set off by a space. Ex. 2001 (Smith Decl.) ¶¶ 86, 90-91. MRI's argument requires a rewriting of the claims. *Id.* at ¶ 91. Claim 1 explicitly states that the circuit board mounting part is included as part of the case, not that it is a separate element that is attached to the case. See Ex. 1001 ('117 patent), claim 1 ("wherein the case *includes* a circuit board mounting part *provided on a rear surface* of the case") (emphasis added); *see also* Ex. 2001 (Smith Decl.) ¶ 91. Karppanen '116's device case 12 is not a part of display case 10, and is not part of a "rear surface" of display case 10. Ex. 1001 ('117 patent) at 2:58-61, 3:3-23, Fig. 1; Ex. 1009 (Karppanen '116) at 3:23-26, 3:36-37, 6:21-24, 7:9-10; Ex. 2001 (Smith Decl.) ¶¶ 91-93. Therefore, MRI has not established that Karppanen '116 discloses or teaches "a circuit board mounting part provided on a rear surface of the case" under either party's proposed construction of "circuit board mounting part."³

³ MRI has not provided any evidence or argument that the challenged claims are obvious in light of Karppanen '116 alone with respect to this element, and there is no disclosure in Karppanen '116 that would motivate a POSITA to modify Karppanen '116's configuration to arrive at the challenged claims.

b) The Petition Does Not Explain How Takahashi Discloses Element 1[g]

MRI superficially claims that Takahashi cures the deficiency in Karppanen '116's disclosure of element 1[g], but provides no support for that assertion. Ex. 2001 (Smith Decl.) ¶¶ 94-95. The Petition points generally to the figures of Takahashi as illustrations of a "circuit board mounting part" of the challenged claims, but these figures illustrate the entirety of the display panels disclosed in Takahashi. Figure 3 labels 24 different parts of the display, and Figure 4 labels 16 parts of the display. MRI does not point to any structure(s) in Takahashi that shows a case that "includes a circuit board mounting part provided on a rear surface of the case and partitioned from space in which the display panel is mounted such that the circuit board is received in the circuit board mounting part" as required by the challenged claims. *Id.* at ¶ 95. MRI's lack of clarity in its arguments requires Samsung—and the Board—to wade through the record to determine what specific arguments MRI is making. The Board has repeatedly stated that a party must adequately explain its positions and cannot rely on the Board to wade through the record to uncover arguments it failed to articulate. *Tct Commc'n Tech. Holdings Ltd. v. Dataquill Ltd.*, No. IPR2020-00746, 2020 WL 5592711, at *10 (P.T.A.B. Sept. 18, 2020) (denying institution where petitioner's argument merely quoted sections of the prior art "unaccompanied by explanation of how the cited portions teach or disclose limitation 1.f, or of their significance to the analysis"); *Fellowes, Inc.*,

Petitioner, v. Treefrog Devs., Inc., Pat. Owner., No. IPR2020-01623, 2021 WL 1287222, at *5 (P.T.A.B. Apr. 6, 2021) (denying institution where petitioner argued that a claim limitation “can be satisfied by a variety of different disclosures in [the prior art]” because such arguments failed to “identify with sufficient specificity the structure of [the prior art] that allegedly meets the [limitation]”). MRI cannot establish a reasonable likelihood of proving the challenged claims obvious if it cannot articulate where in the prior art the claim elements are disclosed.

MRI’s position here is also inconsistent with the positions it is asserting regarding this element in the ITC. In that proceeding, MRI presented testimony from a different expert, Richard Flasck. Mr. Flasck initially testified that front cover 5 and rear cover 6 of Takahashi matched the case of the ’117 patent, but changed that testimony during his deposition. Ex. 2005 (Excerpt of ITC Inv. 337-TA-1349 Hearing Transcript) at 1090:9-17, 1091:1-3. It comes as no surprise that MRI found a different expert to support its Petition in an attempt to avoid the inconsistent positions it has taken with the respect to the claims of the ’117 patent.

B. The Prior Art Fails to Teach the Additional Limitation of Claim 2

As explained above, MRI has failed to show that claim 1 would have been obvious, and as such, has also failed to show claim 2 would have been obvious. Even assuming MRI’s showing regarding claim 1 is sufficient, however, MRI cannot show that the prior art disclosed the additional element of “wherein the case includes

front and rear cases coupled to each other, and the rear case includes a circuit board mounting part provided on an outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part.” Ex. 2001 (Smith Decl.) ¶¶ 97-99.

While MRI admits that Karppanen ’116 does not expressly disclose all of the added limitations of claim 2, it incorrectly claims Karppanen ’116 “teaches” these elements. Pet. At 56-58. As explained above, a POSITA would have understood the “case” of the ’117 patent to mostly closely correspond to display case 10 of Karppanen ’116. Ex. 2001 (Smith Decl.) ¶¶ 98-99. Karppanen ’116’s display case 10, however, does not “include front and rear cases coupled to each other” or “a circuit board mounting part provided on an outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part.” *Id.* at ¶¶ 100-101.

As discussed above, MRI is inconsistent regarding which structures in Karppanen ’116 allegedly meet the limitations of the challenged claims. *Id.* at ¶ 98. For this limitation, MRI points to Karppanen ’116’s rear device casing 12 as a disclosure of a rear case of claim 2, but MRI’s positions regarding the aspects of Karppanen ’116 that meet this claim limitation remain unclear. Karppanen ’116 does not disclose the location of circuit boards in the device. *Id.* at ¶ 104. MRI, however, makes assertions about where the circuit board “must be” located without support or explanation. Pet. At 58-59. Dr. Meinhart’s declaration is similarly devoid

of explanation. Ex. 1003 (Meinhart Decl.), ¶ 151. Therefore, MRI has failed to show that Karppanen '116 teaches this element of the claims.

MRI alleges that Takahashi remedies the deficiencies in Karppanen '116's disclosure of the limitations added in claim 2, but as explained further below, MRI fails to explain why a POSITA would have been motivated to combine Karppanen '116 with Takahashi to arrive at claim 2 with a reasonable expectation of success.

C. The Prior Art Does Not Teach the Elements of Claim 5

Claim 5 depends from claim 2, and further requires “the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes an internal space of the circuit board mounting part.” As explained above, MRI has failed to show that claims 1 and 2 would have been obvious, and as such, has also failed to show claim 5 would have been obvious.

MRI relies on Karppanen '116 for the disclosure of the additional limitations of claim 5. MRI contends that the first cooling path is the space between the rear surface of display element 26 and inner surface of the cover 28 of the device case 12, wherein the device case 12 is the rear case and the front case is the display case 10. Pet. At 60-61. MRI then claims that the second cooling fluid path is inside device casing 12. *Id.*

As explained above with regard to claim 2, Karppanen '116 does not disclose a circuit board mounting part provided on rear surface of the case (or the outer surface of the rear case), and thus cannot disclose the cooling fluid paths required by claim 5. *See* Ex. 2001 (Smith Decl.) ¶¶ 106-109. MRI does not contend that Takahashi discloses the additional element of claim 5. *Id.* at ¶ 109. As a result, Karppanen '116 in combination with Takahashi does not teach the elements of Claim 5.

D. A POSITA Would Not Have Been Motivated to Combine Karppanen '116 and Takahashi

MRI has failed to show that a POSITA would have been motivated to combine the prior art to achieve the challenged claims and has not provided evidence that there would be a reasonable expectation of success in doing so. MRI's petition lacks any specific motivations to combine Karppanen '116 and Takahashi to achieve the claimed invention. Rather, MRI relies on nothing more than generalities regarding thermal management in display panels. MRI broadly alleges that a POSITA would have been motivated to combine the cited art because these references sought to solve the same problem of controlling temperature in display devices and represent a "finite number" of known techniques to solve that problem. Pet. at 32-36. On its face, this is insufficient to establish a motivation to combine. *Hewlett Packard Enterprise Co. v. K.Mizra LLC*, No. IPR2022-00843, 2022 WL 16556406, at *7 (P.T.A.B. Oct. 31, 2022) (denying institution where petition relied on application of

“known technique,” but did not sufficiently explain why a POSITA would have made the alleged combination); *U.S. Well Servs., LLC v. Halliburton Energy Servs., Inc.*, No. IPR2022-01163, 2022 WL 17822529, at *8 (P.T.A.B. Dec. 20, 2022) (“The fact that the references share commonalities fails to identify what would have prompted the skilled artisan to arrive at the combination in the first place.”).

Even assuming MRI made a minimal showing that there was a motivation to combine, such arguments fail here. As Dr. Smith explains, a POSITA would not have been motivated to combine Karppanen ’116 with Takahashi as MRI contends. Ex. 2001 (Smith Decl.) ¶¶ 67-71. A POSITA would have recognized that Takahashi purports to solve different problems than those faced in Karppanen ’116—Takahashi is directed to solving problems related to overheating in wall-embedded displays, where Karppanen ’116 is directed to reducing temperature variation in outdoor displays. *Id.* at ¶ 68. MRI cherry-picks the elements of Takahashi it believes are favorable to its argument, without acknowledging the purpose those elements serve in the display panels. MRI makes two separate arguments for why a POSITA would have been motivated to combine features of Takahashi with Karppanen ’116, and both fail as explained in more detail below. *Id.* at ¶¶ 68-70. Furthermore, MRI makes no attempt to explain how Karppanen ’116 could be combined with the elements of Takahashi to arrive at the claimed display panel, and in fact, a POSITA

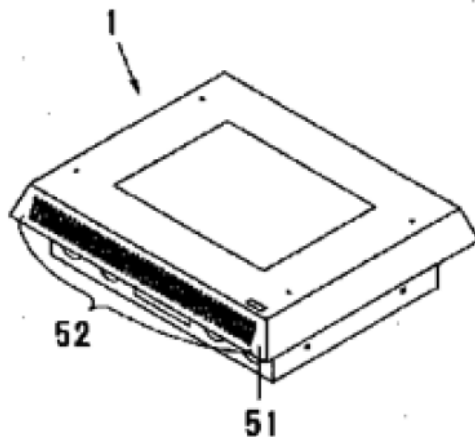
would have recognized that such a combination would contradict the alleged motivation to combine them. Ex. 2001 (Smith Decl.) ¶ 68.

1. A POSITA Would Have Understood that Takahashi Solves Different Issues than Karppanen '116

For elements 1[f] (two separate cooling paths) and claim 2 (circuit board mounting part on an outer surface of the rear case), MRI argues that a POSITA would have combined these alleged features of Takahashi with Karppanen '116 because both references seek to “solve the same problems associated with temperature increase inside a display device casing.” Pet. 50, 60. Not only is this not sufficient to articulate a motivation to combine, as explained above, MRI oversimplifies the problems addressed by these references.

A POSITA would have recognized that Takahashi discloses *wall-embedded* displays using a single air path and strategies for temperature control in those devices. Ex. 2001 (Smith Decl.) ¶ 68. Although Karppanen '116 discloses that its information board can be fastened *to* a wall, it does not teach or suggest that it can be embedded *in* a wall, which is the focus of Takahashi. As Dr. Smith explains, these two embodiments are dramatically different, and a POSITA would not have been motivated to combine them. Ex. 1009 (Karppanen '116) at 3:23-26, 7:2-5; Ex. 1011 (Takahashi) at [0005]-[0006]; Ex. 2001 (Smith Decl.) ¶¶ 68, 70. The issues and challenges that confront wall-embedded displays versus more standard information boards differ dramatically, and a POSITA looking to modify Karppanen

'116 to improve its temperature control would not look to Takahashi for assistance. Ex. 2001 (Smith Decl.) ¶ 70. For example, a major concern of wall-embedded displays is that there is less space and less air flow (with no air flow towards the part of the device mounted inside the wall). *See* Ex. 1011 (Takahashi) at [0006]; Ex. 2001 (Smith Decl.) ¶ 68. Karppanen '116 relies on ventilator slots in the rear of the device to reduce heat build-up. Ex. 1009 (Karppanen '116) at Fig. 1; Ex. 2001 (Smith Decl.) ¶ 68. Takahashi, on the other hand, is entirely aimed at solving the problem of dissipating heat “even in the absence of ventilation on the back side of the mounting surface.” Ex. 1011 (Takahashi) at [0007]; Ex. 2001 (Smith Decl.) ¶ 68. Takahashi solves the issue with the lack of ventilation through a specific arrangement of vents along the exposed surface. Ex. 1011 (Takahashi) at [0008]-[0013]; Ex. 2001 (Smith Decl.) ¶¶ 68, 70.



Ex. 1011 (Takahashi) Fig. 2. MRI has not pointed to any evidence suggesting that a POSITA would look to Takahashi's temperature control solutions to improve Karppanen '116. Ex. 2001 (Smith Decl.) ¶ 69.

Indeed, Takahashi does not purport to solve any temperature control issues through the elements that MRI contends a POSITA would have combined with Karppanen '116 to arrive at the challenged claims. *Id.* at ¶¶ 68-69. As explained above, Takahashi does not teach a display panel with “first and second cooling paths that are separate from each other” as required in 1[f] and a POSITA would not have understood Takahashi to have taught any benefits of two separate cooling paths. Ex. 2001 (Smith Decl.) ¶ 69. Additionally, Takahashi does not disclose that the position of the circuit board could improve temperature control and MRI has not explained why a POSITA would have looked to the position of the circuit board in Takahashi to improve Karppanen '116's display. *Id.* at ¶ 70. Therefore, Takahashi does not disclose “one of a finite number of well-known techniques” for improving temperature control, and MRI has not shown that a POSITA would have been motivated to combine elements of Takahashi with Karppanen '116 in the way MRI contends.

2. A POSITA Would Not Have Been Motivated to Combine Karppanen '116 with Takahashi To Save Space

For element 1[g] (circuit board mounting part on the rear surface of the case), MRI argues that a POSITA would have been motivated to “use the circuit board

mounting part disclosed in Takahashi in Karppanen '116's device to save space while maintaining separation of heat generating components for efficient cooling." Pet. at 53. MRI does not explain why a POSITA would have been motivated to further conserve space in Karppanen '116's device or how the configuration of Takahashi's circuit board would improve Karppanen '116's display. Ex. 2001 (Smith Decl.) ¶¶ 69-70. As a result, MRI has failed to provide any substantive support for its position that a POSITA would have been motivated to combine Takahashi with Karppanen '116 as described.

3. A POSITA Would Have Understood That Combining Karppanen '116 and Takahashi Would Contradict the Alleged Motivation to Combine

MRI provides no information about why or how Karppanen '116 and Takahashi would actually be combined. Indeed, a POSITA would have appreciated that combinations that MRI suggests would interfere with the stated goals of those disclosures.

For example, as Dr. Smith explains, modifying Karppanen '116 to include a circuit board mounting part on the rear surface of the display case that is recessed from rear to front would result in placement of the circuit boards conflicting with the placement of heat transfer parts, placement of circuit boards in closer proximity to the display panel (when Karppanen '116 discloses separating them), or components protruding into the common cooling space and obstructing air flow. Ex. 2001 (Smith

Decl.) ¶ 70. Not only would there be limited space to mount the circuit board, but the circuit board would again be exposed to additional heat from the display panel, going against the teachings of Karppanen '116. *Id.* at ¶¶ 69-70.

Alternatively, if the device in Karppanen '116 were embedded into a wall as disclosed by Takahashi, the vents would end up being covered, no heat would be discharged, and the device would overheat. *Id.* at ¶ 68. As Dr. Smith explains, a POSITA would not have been motivated to move the ventilation to a portion that protrudes to the front, as doing so would have increased the size of the display and the nonviewable portion of the display. *Id.*

For at least these reasons, MRI has not shown that there was a motivation to combine Karppanen '116 and Takahashi to arrive at the subject matter of claims 1, 2, and 5 of the '117 patent.

VI. GROUND 2: MRI Has Not Shown that Any Challenged Claim is Obvious in Light of Nagayama and Kaneko

MRI's Ground 2 alleges that the challenged claims are obvious in light of a combination of Nagayama and Kaneko. Specifically, MRI states that Nagayama "teaches each limitation of claim 1 except for an explicit teaching of elements 1[e], 1[f], and 1[g]." Pet. at 62. MRI relies on Kaneko for the disclosures of elements 1[e], 1[f], and 1[g]. *Id.* But MRI has failed to show that the combination of Nagayama and Kaneko teaches all elements of the challenged claims or that a

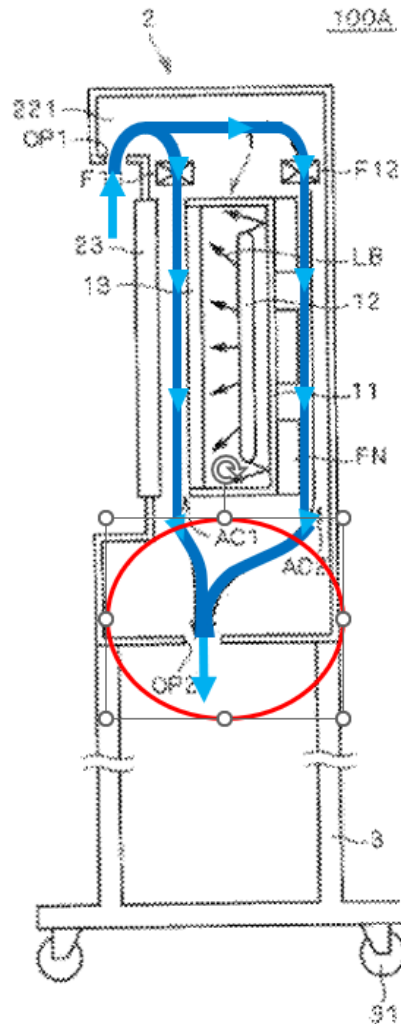
POSITA would have been motivated to combine these references in the manner MRI claims.

A. The Combination of Nagayama with Kaneko Does Not Disclose All the Elements of Claim 1

1. Nagayama does not disclose “wherein the first and second cooling fluid paths are separated from each other” (1[f])

MRI contends that Nagayama (and thus Nagayama in view of Kaneko) discloses “wherein the first and second cooling fluid paths are separated from each other.” As explained below, Nagayama does not disclose this limitation. Moreover, MRI does not rely on any aspects of Kaneko in its analysis of this limitation.

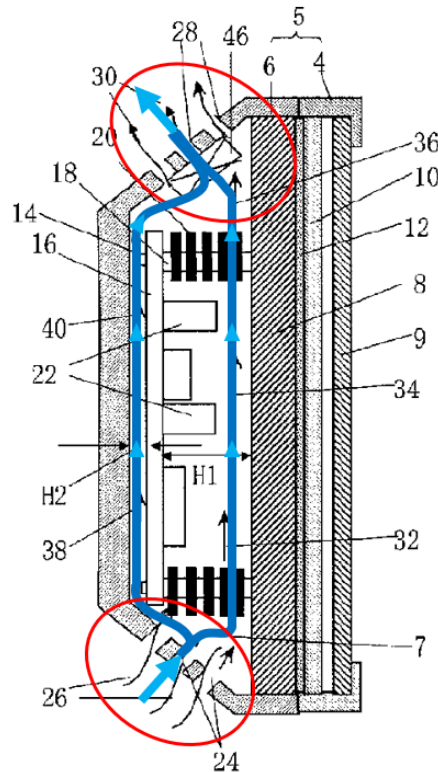
According to MRI, Nagayama’s design includes two cooling fluid paths as illustrated in Figure 3. Pet. 73-74. MRI, however, mistakenly identifies AC1 as the first cooling fluid path and AC2 as the second cooling fluid path. *Id.* AC1 and AC2 are not separate cooling paths. Ex. 2001 (Smith Decl.) ¶ 116. As shown in Figure 3, both AC1 and AC2 include air flow that enters through opening OP1, and mixes together before being exhausted at opening OP2.



Ex. 1013 (Nagayama) at Fig. 3.

A POSITA would have understood that AC1 and AC2, to the extent they constitute two cooling fluid paths, are not separate from each other. Ex. 2001 (Smith Decl.) ¶¶ 116-117. As explained above, a POSITA would have understood the '117 patent to be directed display panels with two fluid cooling paths that do not mix. *See* Section V.A.1, *supra* (discussion of the '117 patent's separate cooling paths); Ex. 2001 (Smith Decl.) ¶¶ 74-77, 117. The cooling paths in Nagayama mix as the

air enters the device and again when it leaves. Like Takahashi, the airflow configuration of Nagayama matches that of JP '641, which the '117 patent distinguishes from the claimed invention.



Ex. 1002 (Prosecution History) at 151 (JP '641 English Abstract), Fig. 1.

(annotated); *see* Section V.A.1, *supra*. Therefore, Nagayama cannot disclose or teach element 1[f] of the challenged claims.

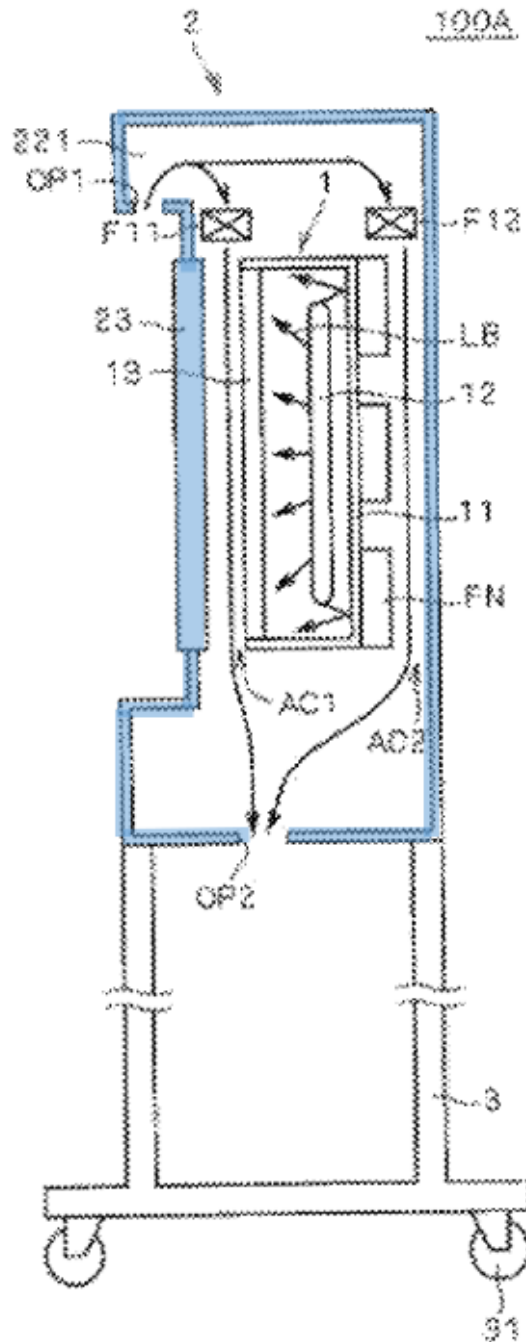
The Petition does not point to any features of Kaneko that describe or teach this limitation. MRI vaguely contends that “Nagayama as modified by Kaneko” discloses this element, but does not point to any specific description in Kaneko that would teach this element. This is not surprising because Kaneko, like Nagayama,

does not disclose separate cooling paths. Ex. 2001 (Smith Decl.) ¶ 119. As shown in Figs. 1, 4, 6-7, the air circulating in Kaneko mixes as it enters and exits the device, contrary to the requirements of the challenged claims. Ex. 1014 (Kaneko).

2. Nagayama in view of Kaneko does not disclose element 1[g]

MRI admits that Nagayama does not explicitly disclose element 1[g] of claim 1, but MRI alleges that Kaneko cures this deficiency. Pet. at 75-76.

For the avoidance of doubt, Nagayama does not disclose a “case with a circuit board mounting part provided on its rear surface” as required by element 1[g] under either parties’ construction. Ex. 2001 (Smith Decl.) ¶¶ 121-123. In its discussion of the case claimed in element 1[a], MRI points to Nagayama’s device box (2) as the claimed case. Pet. at 63-64. But Nagayama discloses that the drive circuits of the liquid crystal panel are located in the housing (11), not on the rear surface of the device box (2). Ex. 2001 (Smith Decl.) ¶ 121; Ex. 1013 (Nagayama) at Figs. 3-6; [0037]. Therefore, the circuit board cannot be mounted on a “rear surface of the case” as the back wall of the housing is not a rear surface of the case. Ex. 2001 (Smith Decl.) ¶ 121.



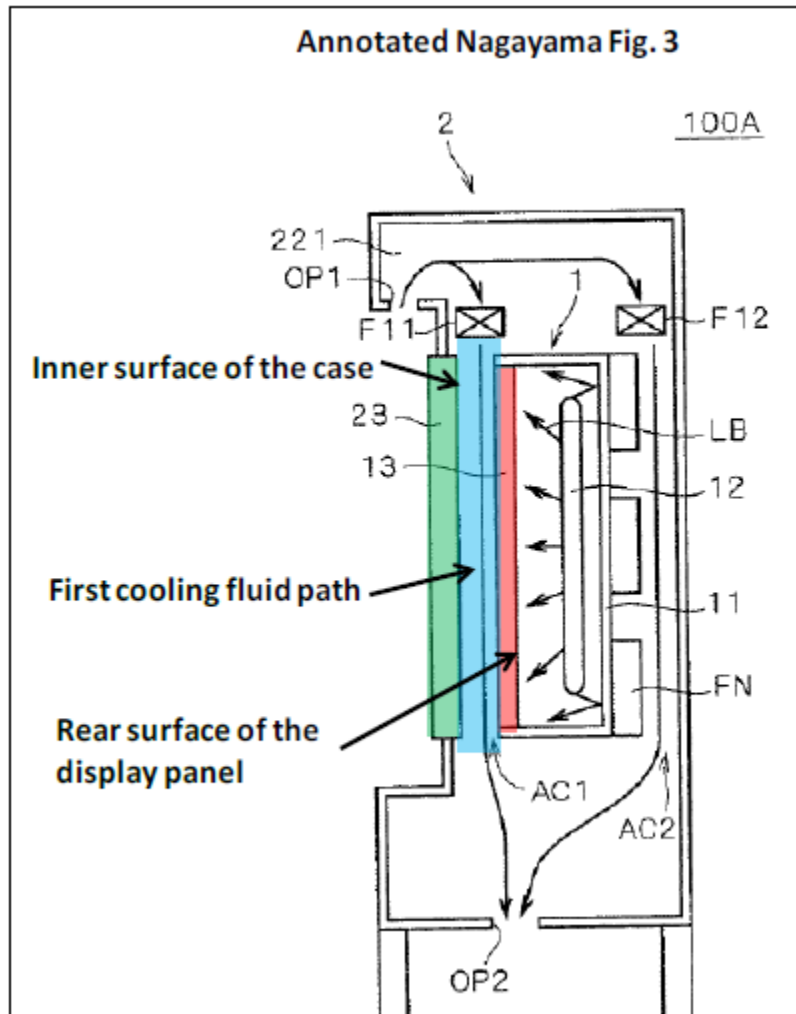
Ex. 1013 (Nagayama) at Fig. 3 (Device Box 2 highlighted in blue). MRI provides no explanation as to how Nagayama and Kaneko would have been combined to have circuit board mounting part included on the rear surface of device box 2. Ex. 2001 (Smith Decl.) ¶ 122. As explained in more detail below, MRI has additionally failed

to explain why a POSITA would have been motivated to combine Kaneko with Nagayama to achieve the claimed invention. *Id.* at ¶¶ 111-114, 125.

To the extent MRI's proposed construction for "circuit board mounting part" is adopted, MRI has not pointed to any disclosure in Nagayama or Kaneko that teaches a recessed circuit board mounting part and has not made any argument that such a recessed circuit board mounting part would have been obvious. *Id.* at ¶ 123.

3. Nagayama in view of Kaneko does not disclose element 1[h]

MRI further contends that Nagayama discloses "the first cooling fluid path includes a space between a rear surface of the display and an inner surface of the case." Pet. at 77. The first cooling path identified by MRI, however, does not include a space between the *rear surface of the display* panel and an inner surface of the case as required by claim 1 of the '117 patent. Ex. 2001 (Smith Decl.) ¶ 126. MRI incorrectly interprets this language to allow the space between the *rear* surface of the display panel and an inner surface of the case to include the space between the *front* of the display panel and the front protection panel as shown in MRI's annotated version of Fig. 3 below.



Pet. at 77.

As Dr. Smith explains, a POSITA reading the '117 patent would not have understood the claim language to refer to the space identified by MRI. Ex. 2001 (Smith Decl.) ¶ 127. To the contrary, a POSITA would have understood this language to refer to the space behind the display panel, not in front of it. *See, e.g.*, Ex. 1001 ('117 patent) at Fig. 1, 3:24-33 ("the first cooling fluid path 60 is formed by a space between a rear surface of the display panel 20 and an inner surface of the

rear case 12”); Ex. 2001 (Smith Decl.) ¶ 127. MRI’s interpretation of this term is incorrect and nonsensical, as reading the claim limitation as including space in any direction (both behind or in front of the display panel) would effectively render that limitation meaningless. MRI, therefore, fails to identify a first cooling fluid path that includes a space between the *rear surface of the display* panel and an inner surface of the case. Ex. 2001 (Smith Decl.) ¶ 127. MRI does not rely on any disclosure of Kaneko for this limitation and does not argue that a POSITA would have been motivated to modify Nagayama in any way to achieve this limitation. Thus, MRI has failed to show that element 1[h] is rendered obvious by the proposed combination of Nagayama and Kaneko.

B. Nagayama does not disclose the additional limitation of Claim 2

As explained above, MRI has failed to show that claim 1 would have been obvious in light of Nagayama in combination with Kaneko, and as such, has also failed to show claim 2 would have been obvious. Even assuming MRI’s showing regarding claim 1 is sufficient, however, MRI cannot show that the prior art disclosed the additional element of “wherein the case includes front and rear cases coupled to each other, and the rear case includes a circuit board mounting part provided on an outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part.” Ex. 2001 (Smith Decl.) ¶¶ 129-132.

MRI contends that Nagayama discloses the additional limitation of Claim 2. As explained below, however, Nagayama does not teach or disclose this limitation and MRI does not rely on any aspects of Kaneko in the analysis of this claim. *Id.* Therefore, MRI cannot show that claim 2 is obvious in light of Nagayama and Kaneko.

MRI baldly argues that Nagayama “discloses the case includes front and rear cases coupled to each other.” Pet. at 79. MRI fails, however, to provide any specifics regarding what aspects of Nagayama match the elements of the claim limitations. Ex. 2001 (Smith Decl.) ¶ 133. The single paragraph to which MRI cites refers to the benefits of being able to change a filter and describes a removable structure that would allow for filter changes. The only element of Nagayama referenced in the cited paragraph [0039] is device case 2, but MRI does not explain how the described structure meets the requirement that the case includes front and rear cases coupled together.

Even assuming that device case 2 is interpreted to be the rear case of claim 2, which MRI has not established, circuit boards are not mounted to the outer surface of the display box 2, as required by claim 2. To the contrary, Nagayama discloses that drive circuits are located in the housing 11, which itself is inside device box 2. Ex. 1013 (Nagayama) at Figs. 3-6; [0037]; Ex. 2001 (Smith Decl.) ¶ 132. As Dr. Smith explains, a POSITA would have thus understood that any circuit boards

would be located inside the case, not mounted on an outer surface of the rear case. Ex. 2001 (Smith Decl.) ¶ 132.

Apparently recognizing this failure in Nagayama's disclosure, MRI argues that moving the circuit board mounting part to the outer surface of the case would have been "an obvious design choice." Pet. at 79-80. The placement of the circuit board, however, is not simply a design choice in the '117 patent, and therefore, a obviousness argument based on "design choice" must fail. The Federal Circuit has explained where a claimed feature performs a different function than the prior art, the claimed feature cannot be found to be an obvious design choice. *In re Gal*, 980 F.2d 717, 719 (Fed. Cir. 1992) (finding of obvious design choice precluded when claimed structure and the function it performs are different from the prior art).

Here, the '117 patent's placement of the circuit board mounting part on the outer surface of the rear case serves the function of physically separating the heat generating components in furtherance of the purpose of the claimed invention. Ex. 2001 (Smith Decl.) ¶¶ 74-77. Nagayama, on the other hand, explains that it is desirable that drive circuits are *inside* a housing with packings, fillers, etc. so there is no gap and to adopt a support structure with cushioning material sandwiched between the housing and the inner wall of the device box 2 in order to mitigate shocks caused by a fall of the display. See Ex. 1013 (Nagayama) at [0037]-[0038]; Ex. 2001 (Smith Decl.) ¶ 132. According to Nagayama's disclosure, mounting the

circuit board to a rear surface (outside device box 2), facing away from the display panel, as required by claim 2, would only jeopardize the safety of the circuit board components and would run counter to the reasoning provided in Nagayama. *See* Ex. 1013 (Nagayama) at [0037]-[0038]; Ex. 2001 (Smith Decl.) ¶ 133. Both Nagayama and the '117 patent describe the placement of the circuit board as part of the functionality of the disclosed displays, and as a result, the claimed placement of the circuit board cannot be merely a “design choice.”

Indeed, MRI admits as much in its petition when it claims that it would have been obvious for a POSITA to “partition the circuit board mounting part from the interior of the display case in which the display panel is mounted so that the cooling paths could cool both heat producing components independently.” Pet. at 80. Beyond this unsupported statement, MRI has not provided any evidence that POSITA would have been motivated to modify the placement of the circuit board in Nagayama to arrive at claim 2 of the '117 patent. Therefore, MRI has failed to show that Nagayama, in combination with Kaneko, renders Claim 2 of the '117 patent obvious.

C. Nagayama in view of Kaneko does not disclose the additional limitation of Claim 5

Claim 5 depends from claim 2, and further requires “the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes an internal space of the

circuit board mounting part.” Nagayama in view of Kaneko fails to teach or suggest all the limitations of claim 5 for the same reasons as provided with respect to claim 1-2. Moreover, Nagayama in view of Kaneko also does not disclose or render obvious additional limitations recited in claim 5.

MRI’s arguments regarding Nagayama’s disclosure of the elements of claim 5 fail for the same reasons discussed above regarding element 1[h]. *See* Section VI.A.3, *supra*. MRI only identifies a cooling path in *front* of the display, but as Dr. Smith explains, a POSITA would have understood the ’117 patent to require the first cooling path to be *behind* the display pane. Ex-2001 (Smith Decl.) ¶ 137. MRI’s interpretation of the claim to allow for cooling paths in front of the display panel eviscerates the claim language and renders the limitation meaningless. *Id.*

Similarly, as explained in greater detail above with regard to claims 1-2, Nagayama does not disclose the claimed circuit board mounting part, or any of the limitations that refer to the claimed circuit board mounting part. *Id.* at ¶¶ 138-139. Because Nagayama does not disclose the claimed circuit board mounting part, it also does not disclose a second cooling fluid path includes an internal space of the circuit board mounting part.

MRI has not shown that all limitations of the challenged claims are disclosed or taught by Nagayama and/or Kaneko, and therefore, cannot show the challenged claims are obvious in light of these references.

D. A POSITA Would Not Have Been Motivated to Combine Nagayama with Kaneko

Even assuming that MRI has demonstrated that the elements of the challenged claims are disclosed in the prior art, which it has not, MRI has failed to provide sufficient evidence that a POSITA would have been motivated to combine Nagayama and Kaneko to arrive at the challenged claims. MRI relies on the combination of Nagayama and Kaneko for elements 1[e], 1[f], and 1[g], but does not explain why a POSITA would have been motivated to combine these references in the manner claimed. Ex. 2001 (Smith Decl.) ¶¶ 111-114.

MRI provides three separate statements of the alleged motivation to combine Nagayama and Kaneko. For element 1[e], MRI alleges simply that the references contain “familiar elements within the same field of endeavor to address the same known problems.” Pet. at 73. For element 1[f], MRI alleges that the combination “reflects on of a finite number of well-known techniques implemented in a predictable manner, to achieve well-known, predictable results.” Pet. at 74. MRI’s positions, however, mischaracterize these references. Ex. 2001 (Smith Decl.) ¶¶ 112-113. A POSITA would not have been motivated to combine Nagayama with Kaneko because these inventions have different objectives. *Id.* at ¶¶ 111-114. Kaneko is related to a specific structure for dissipating heat generated in a drive unit of a plasma display panel, whereas Nagayama relates to cooling and mitigating temperature increases from a liquid crystal display panel and protecting outdoor

displays. *Id.* at ¶¶ 111. The device box in Nagayama contains a housing 11 that houses the backlight 12, a drive circuit and other electronic components of the liquid crystal panel. Ex. 1013 (Nagayama) at [0015]; Ex. 2001 (Smith Decl.) ¶ 111. This housing is sealed with “packings, fillers, etc.” so that there is no gap. Ex. 1013 (Nagayama) at [0037]. Additionally, there can be a support structure with cushioning material sandwiched between the housing and the inner wall of the device box 2 in order to protect the display and its components. *Id.* at [0038].

Modifying Nagayama’s structure to incorporate the heat dissipation elements taught by Kaneko would not make sense physically and would be counter to the objectives of Nagayama. Ex. 2001 (Smith Decl.) ¶ 112. Kaneko teaches separating the heat generating components and the heat sensitive components onto multiple circuit boards and then placing an exhaust hole or exhaust fan above the circuit boards. Ex. 1014 (Kaneko) at [0015]-[0020]; Ex. 2001 (Smith Decl.) ¶ 112. Modifying Nagayama based on Kaneko would explicitly contradict Nagayama’s objective of protecting the liquid crystal panel and backlight from dust in the air and this dust resulting in reduced illumination from the backlight by completely sealing the housing and leaving no gaps. *See* Ex. 1013 (Nagayama) at [0037] (“In this case, direct air cooling such as blowing wind on the back surface of the liquid crystal panel 13 or blowing wind on the backlight 12 is not employed because static electricity induced by the backlight 12, etc. makes it easier for dust in the air to

adsorb to the fluorescent light, and reduces the illuminance of the backlight 12. . .”); *see also* Ex. 2001 (Smith Decl.) ¶ 112. Adding these holes or fans could also potentially damage the device in Nagayama. Ex. 2001 (Smith Decl.) ¶ 112. Further, using multiple circuit boards as taught by Kaneko would only result in taking up more space and more components to protect. *Id.*

For element 1[g], MRI contends that a POSITA would have been motivated to combine Nagayama with Kaneko to “save space with maintaining separation of heat generation components.” Pet. at 76. As Dr. Smith explains, however, a POSITA would not have understood Kaneko’s configuration to save space in Nagayama’s device. Ex. 2001 (Smith Decl.) ¶ 112. With the layout disclosed by Nagayama, recessing the circuit boards would similarly not provide any added benefit and would instead provide problems as the recess would require a portion of the housing to protrude into the alleged cooling path. *Id.* at ¶ 123. Additionally, the protruded section of the housing would interfere with the mounting of the fins FN. *Id.* Kaneko also uses multiple circuit boards and mounts circuit board components separately which would effectively take up more space in the already small space of the housing 11 in Nagayama. *Id.* at ¶¶ 112, 125. MRI’s argument would require a complete redesign of the Nagayama display, and MRI does not provide any evidence that a POSITA would have an expectation of success in such a re-design. *Id.* at ¶¶ 112-113, 125.

MRI, therefore, has not shown that a POSITA would look to Kaneko when attempting to modify Nagayama and as such, there would have been no motivation to combine the two references and no reasonable expectation of success.

VII. CONCLUSION

In light of the above, MRI has not shown that there is a reasonable likelihood that at least one challenged claim is unpatentable, and MRI's petition should be denied.

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Respectfully submitted,

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Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that the foregoing PATENT OWNER'S PRELIMINARY RESPONSE complies with the type-volume limits of 37 C.F.R. § 42.24(b)(1) because it contains 10,266 words according to the word-processing system used to prepare this Response, excluding the words in the Table of Contents, Table of Authorities, List of Exhibits, Certification Under §42.24(d), and Certificate of Service, as set forth in 37 C.F.R. § 42.24(a)(1).

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