

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG DISPLAY CO., LTD.
Petitioner,

v.

PICTIVA DISPLAYS INTERNATIONAL LTD.,
Patent Owner.

Case No. IPR2024-01223
Patent No. 6,949,389

PATENT OWNER'S PRELIMINARY RESPONSE

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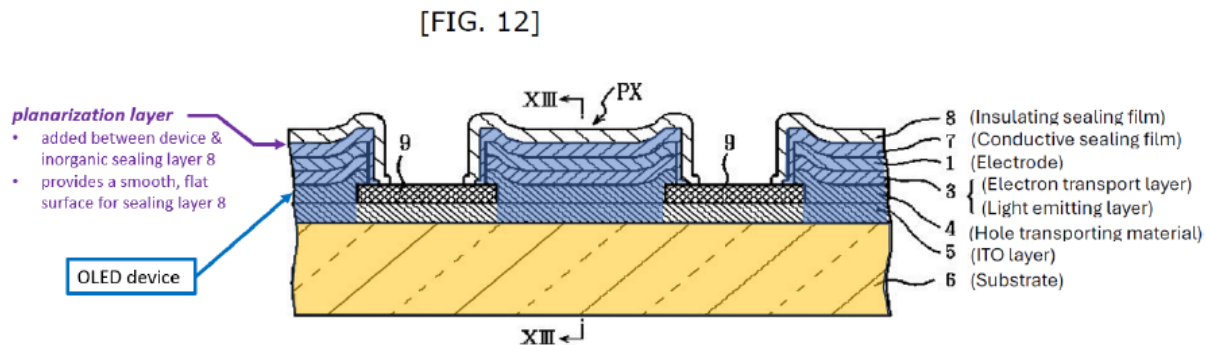
EXHIBIT LIST

Exhibit No.	Document Description
EX2001	Declaration of Mr. Kurt Humphrey
EX2002	Declaration of Dr. E. Fred Schubert on behalf of Samsung Electronics Co., Ltd. et al. in <i>Pictiva Displays Int'l Ltd. v. Samsung Electronics Co. Ltd.</i> , et al., Case No. 2:23-cv-000495 (Nov. 12, 2024)
EX2003	Samsung's Notice of Corrected Exhibit B to Joint P.R. 4-3 Statement in <i>Pictiva Displays Int'l Ltd. v. Samsung Electronics Co. Ltd.</i> , et al., Case No. 2:23-cv-000495, Dkt. 110 & 110-1 (E.D. Tex. Nov. 13, 2024)
EX2004	Samsung's Proposed Claim Constructions for the Terms and Phrases Identified for Construction per Local Rule 4-2 in <i>Pictiva Displays Int'l Ltd. v. Samsung Electronics Co. Ltd.</i> , et al., Case No. 2:23-cv-000495 (E.D. Tex. Oct. 22, 2024)
EX2005	Thermal Conductivity tables, downloaded from hyperphysics.phy-astr.gsu.edu/hbase/Tables/thrcn.html (last visited Dec. 11, 2024), referencing Chapter 15 of Young, Hugh D., University Physics, 7th Ed., Addison Wesley, 1992.
EX2006	Thermal conductivities of common solids, liquids and gases, from https://www.engineeringtoolbox.com/thermal-conductivity-d_429.html (last visited Dec. 11, 2024)
EX2007	Ekaterina Selzneva et al., <i>Strong Suppression of Thermal Conductivity in the Presence of Long Terminal Alkyl Chains in Low-Disorder Molecular Semiconductors</i> , Advanced Materials 33, 2008708 (2021)
EX2008- EX2013	omitted
EX2014	Docket Control Order in <i>Pictiva Displays Int'l Ltd. v. Samsung Electronics Co. Ltd.</i> , et al., Case No. 2:23-cv-000495, Dkt. 40 (E.D. Tex. Apr. 17, 2024)
EX2015	Federal Court Management Statistics for U.S. District Courts, available from https://www.uscourts.gov/statistics/table/na/federal-court-management-statistics/2024/06/30-1

Exhibit No.	Document Description
EX2016	Samsung Invalidity Contentions in <i>Pictiva Displays Int'l Ltd. v. Samsung Electronics Co. Ltd., et al.</i> , Case No. 2:23-cv-000495 (E.D. Tex. Jun. 11, 2024)

I. Introduction

All grounds of challenges rely on the theory that a POSITA would have added an organic layer as disclosed by Suzuki between Kijima's conductive sealing film 7 and its insulating sealing film 8, as illustrated below:



(Pet. 37; *see also* Pet. 58 (arguing for claim 41 that modified Kijima would involve depositing “the organic sealing layer added in view of Suzuki”))

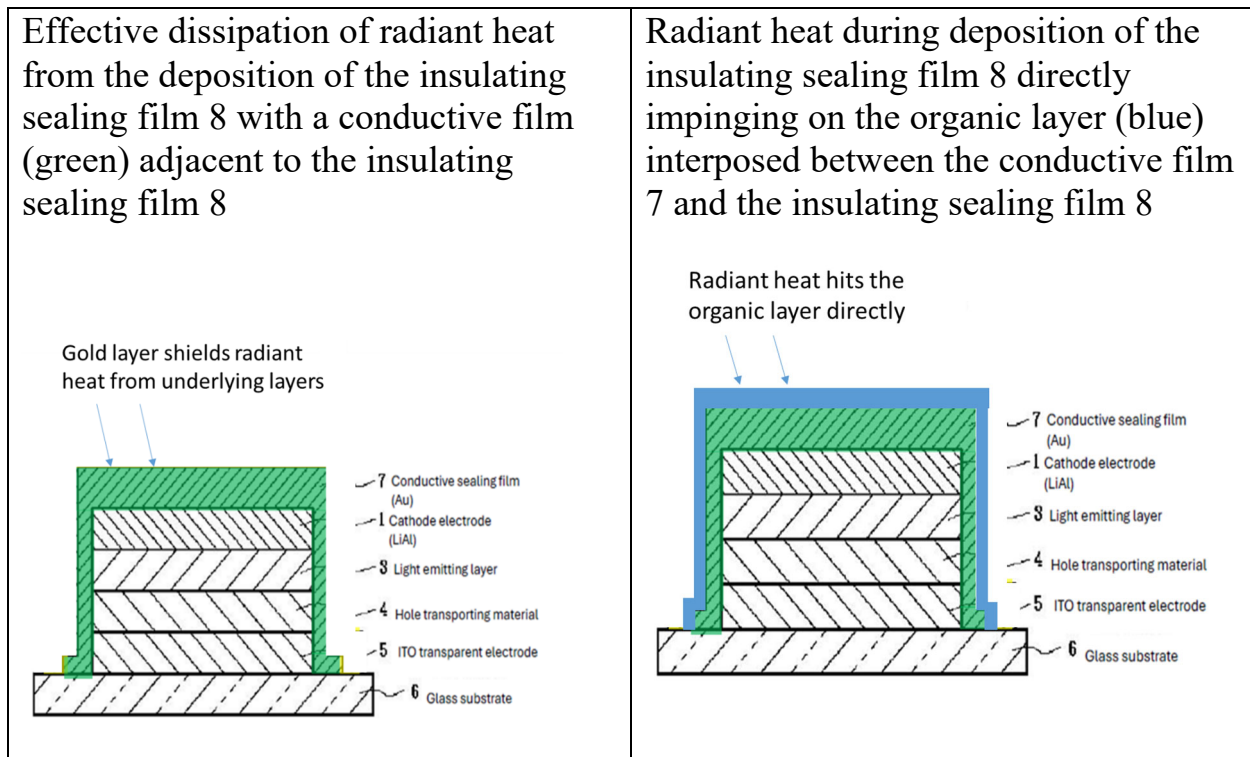
Petitioner’s proposed modification simply ignores the fact that, unlike Suzuki whose device without a sufficiently thick organic layer would suffer from large dark spots, Kijima’s devices with its double sealing films 7 and 8 are already effective against dark spots formation. In fact, Kijima reports that devices made according to its (unmodified) method had “almost no darks spots” even after a month in air. Kijima, [0054], [0064], [0068], [0072]. In contrast, Suzuki reports observable dark spots even with its double organic and inorganic sealing layers. *See* Suzuki, 8:6-9:50 (Suzuki examples 1 to 5 reporting devices with “15 dark spots/mm²” and average diameters of darks spots after 100 hours ranging from 18

μm to 27 μm); Fig. 3 (showing average diameter of dark spots over 100 hours), Fig. 4 (showing average diameter of dark spots as a function of the thickness of organic barrier layer).

There is thus no evidence in the record that a newly added organic layer would improve Kijima's devices by "help[ing] 'cover defects' and smoothen[ing] surface irregularities of the underlying conductive element, and ... flatten[ing] the contours of Kijima's conductive layer 7 prior to depositing the Insulating layer 8." Pet. 33-34. As such, there is also no competent evidence or analysis on why a POSITA would have incurred the cost and the risk of additional failure mechanisms to include in Kijima an organic layer that has no evidence of providing additional benefits to Kijima. *See* Sections IV.C.2-IV.C.3 below.

Another fatal flaw in Petitioner's analysis is that it ignores Kijima's express teaching that "the effect of radiant heat during deposition of the insulating sealing film [8] will be large, raising concerns about the effect on organic layers"

Kijima, [0028]. Kijima considers it important to have a "conductive sealing film *adjacent to and below* the insulating sealing film" so that the conductive sealing film can effectively dissipate the heat and protect the underlying organic layers. The proposed modification eliminates that critical design element, exposing the organic layer to the radiant heat during deposition of the insulating sealing film 8. This effect is illustrated as below. EX2001, ¶38.



Simply put, Petitioner's obviousness theory fails because it ignores the specific facts and warnings of Kijima. As another example, Petitioner proposes using ink-jetting and screen-printing to deposit the organic layer, (*see* Pet. 41-49), ignoring Kijima's express warning of "adverse effects of exposing the [OLED] element to the atmosphere before the formation of the insulating sealing film 8." Kijima, [0087]. This is because ink-jetting and screen-printing are distinct approaches to vacuum deposition and would expose the devices to pressure (atmosphere) before forming the insulating sealing film 8. EX2001, ¶¶ 53, 60. By ignoring Kijima's express teaching-away, Petitioner's obviousness theories fail. For these and other reasons stated below, the Board should deny the Petition.

II. The ‘389 Inventions

The challenged claims of the ‘389 patent all relate to encapsulating multiple devices fabricated on a substrate. *E.g.*, claims 34, 41. At the time of the inventions, thin film encapsulation methods were being explored as “a cheaper and better manner of encapsulation.” EX1001, 1:17-19. One way to achieve thin film encapsulation is using PML or polymer multi-layer comprising “alternating and repeating layers of an organic ... and a barrier layer.” *Id.*, 1:19-22. The organic layer, such as layer 106, typically serves as a “planarization layer” that “is provided to give a planar surface for the deposition of the PML structure 112a” as depicted below. *Id.*, 1:30-36, Fig. 1. The PML structure 112a includes a barrier layer 108 and another organic planarization layer 110. *Id.*, 1:37-47. The PML structure 112 may be repeated with the barrier layer deposited on a planarization layer of a lower PML structure. *Id.*

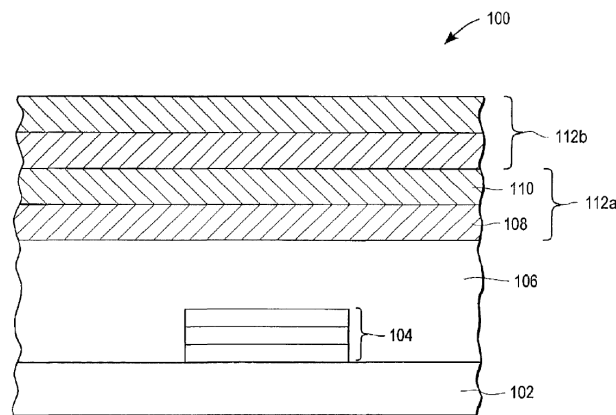


FIG. 1 (PRIOR ART)

Direct thin-film encapsulation results in “thinner and/or lighter and/or mechanically more flexible” encapsulation with “cost reduction and improved reliability.” *Id.*, 1:48-52. The use of the planarization layer also address the drawbacks associated with “point defects (i.e., pin holes) in [the barrier layer’s] surface.” *Id.*, 1:56-62.

One significant drawback of the traditional direct thin film encapsulation method was that the PML structure was deposited on areas—such as “electrical contact pads,” “scribe and break lines and/or glue lines”—that do not require and should in fact not have encapsulation. EX1001, 2:17-29.

The ‘389 patent addresses this drawback by providing for selective deposition of the PML layers and/or easy removal of materials deposited in undesired areas. *E.g.*, Figures 3A-3B (using mask to selectively cure a portion of deposited organic layer and remove organic layer from undesired areas, followed by selective deposition of barrier layer), 4A-4B (selectively depositing barrier layer on deposited organic layer using a mask and using the barrier layer as an etching mask to remove organic layer from undesired areas), Fig. 5 (using a mask to selectively deposit organic layers and barrier layers), Figs. 6A-6E (using masks deposited on the substrate to control the areas of deposition for organic layers, followed by selective deposition of barrier layers); Figs. 7A-7C (using gas to direct organic materials away from undesired areas).

III. Claim Construction

For purposes of this POPR, Patent Owner applies the constructions that Petitioner’s real parties-in-interest (“Samsung”) propose in the district court, including those for “planarization layer” and “selectively depositing.” *See* EX2003 at 6-10 (pp. 3-7). This comports with 37 C.F.R. § 42.104(b)(3), (4), which requires the petition to identify “[h]ow the challenged claim is to be construed” and “[h]ow the construed claim is unpatentable under the statutory grounds identified in paragraph (b)(2) of [37 C.F.R. § 42.104].”

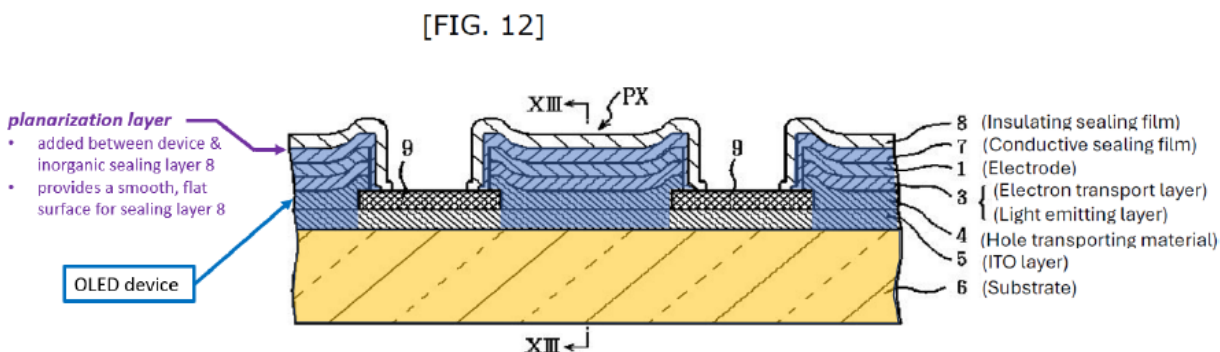
Samsung proposes in the district court that “planarization layer” means “a layer of material that planarizes such that the propagation of defects from one layer to another layer is interrupted and the topography of the underlying layer is not reproduced.” EX2003 at 6. Samsung’s expert contends that the construction is supported by the specification and the prosecution history. EX2002, ¶¶56-59; EX1002, 371 (applicants stating “this ‘sealing material 20’ is not a planarization layer since it is not used to interrupt the propagation of defects from one layer to another layer.”).

Samsung also proposes that “selectively depositing” means “depositing a material in only desired areas, such that no additional processing must be performed for removing unwanted material.” EX2003 at 10. According to

Samsung's expert, this construction finds support in the specification. EX2002, ¶¶64-66.

IV. Petitioner Has Not Shown a Reasonable Likelihood to Prevail on Ground 1 Because It Has Not Provided Any Competent Reason to Incorporate an Organic Barrier Layer in Kijima (All Grounds)

In all grounds, Petitioner proposes combining Kijima with Suzuki by adding an organic layer between Kijima's conductive sealing film 7 and insulating sealing film 8, to serve as the claimed planarization layer. Pet. 32-36.¹



(Pet. 37)

Petitioner asserts that the newly added organic layer would allegedly “help ‘cover defects’ and smoothen surface irregularities of the underlying conductive element, and would ... flatten the contours of Kijima's conductive layer 7 prior to

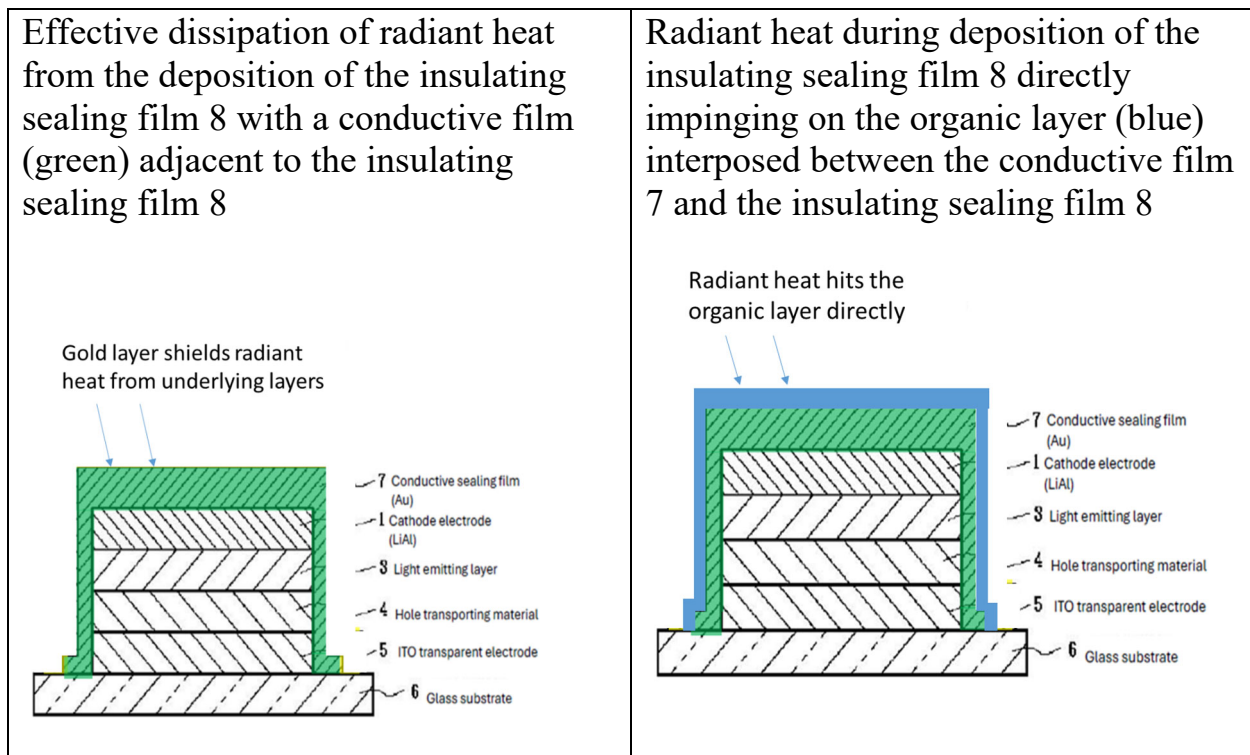
¹ Petitioner treats the conductive sealing film 7 as part of the cathode and the device. See Pet. 37 annotation. Regardless, the effects of the conductive sealing film 7 are present in Kijima however Petitioner characterizes it.

depositing the Insulating layer 8.” Pet. 33-34. But Suzuki interposed an organic layer between its inorganic protective layer and the cathode because the organic layer reduces dark spot sizes when the organic layer exceeds a certain threshold thickness (*i.e.*, above 0.5-1 μm). *See* EX1012-Suzuki, Figs. 3-4 (large dark spots when no organic layer or too thin an organic layer); *see also id.*, 2:4-7 (noting that prior art could not satisfactorily address “the enlargement of a dark spot” and “[t]his presents a serious problem when the organic electroluminescent devices is in services”). Kijima, on the other hand, already effectively addresses the dark spots growth with its conductive sealing film 7. Kijima, [0054] (even after one month of exposure to air, no performance degradation, “almost no dark spots were observed, and the sealing effect of the sealing films 7 and 8 was remarkable”); [0064] (same), [0068] (same), [0072] (same).

The Petition does not explain why a POSITA would have incurred the cost and tolerated the risk of additional failure mechanisms to include in Kijima an organic layer that has no evidence of providing additional benefits to Kijima. *See* Sections IV.C.2-IV.C.3 below; Pet. 32-36. In fact, Petitioner ignores Kijima’s express teaching that “the effect of radiant heat during deposition of the insulating sealing film [8] will be large, raising concerns about the effect on organic layers” Kijima, [0028]. Kijima addresses this radiant heating issue by including the conductive sealing film 7 “with good thermal conductivity,” which can provide for

“efficient dissipation of the radiant heat” and prevent “degradation of the organic layer due to radiant heat during vapor deposition of the insulating sealing film 8.”

Kijima, [0057], [0056]; *see also*, [0075] (emphasizing the importance of “providing the conductive sealing film *adjacent to and below* the insulating sealing film”). The detrimental effect of adding an organic layer above the conductive sealing film 7 is illustrated as below. EX2001, ¶¶ 38, 43.



Petitioner’s obviousness theory fails because Petitioner fails to consider the specific facts of Kijima, treating the prior art devices as if they were all interchangeable and any layers from one device could be inserted into another with predictable results. Such an analysis fails as a matter of law because Petitioner fails to explain why a POSITA would have included Suzuki’s organic layer when

Kijima does not suffer from the dark spots problem that Suzuki's approach is designed to address and Kijima specifically states the need for a conductive film "adjacent to and below" the insulating film 8 (that is, there should not be an intervening non-conductive film adjacent to and below the insulating film 8 as Petitioner proposes). *See InTouch Techs., Inc. v. VGO Comm'ns., Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014) (rejecting expert analysis that "consisted of conclusory references to her belief that one of ordinary skill in the art *could* combine these references, not that they *would* have been motivated to do so") (emphasis in original); *ActiveVideo Networks, Inc. v. Verizon Commc'ns, Inc.*, 694 F.3d 1312, 1327 (Fed. Cir. 2012) ("[T]he expert's testimony on obviousness was essentially a conclusory statement that a person of ordinary skill in the art would have known, based on the 'modular' nature of the claimed components, how to combine any of a number of references to achieve the claimed inventions. This is not sufficient and is fraught with hindsight bias.").

The sections below start with introductions to disclosures of Kijima and Suzuki and then explain in further detail why a POSITA would not have combined Kijima and Suzuki in the manner proposed.

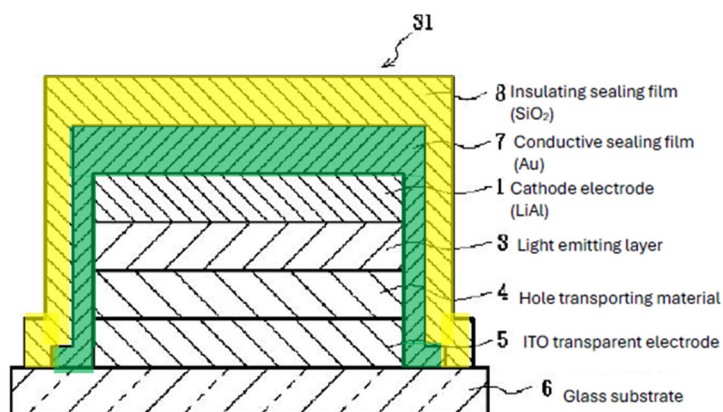
A. Kijima's thin film encapsulation already prevents dark spot growth

Kijima relates generally to producing an optical device that exhibits good stability even when exposed to moisture and oxygen. *See* EX1010, abstract. In particular, Kijima observes that conventional OLEDs suffer from “a major problem” of “degradation.” EX1010, [0026]. Kijima states that “the causes of this degradation are thought to include thermal degradation of the organic materials due to heat degradation accompanying light emission, the effects of moisture and oxygen contamination during production, and peeling of the organic layer due to oxidation of the cathode electrode.” *Id.*

A solution to this problem is “to provide a sealing film to protect the organic layer and the metal electrode, and then to continuously fabricate a sealing film structure in a vacuum.” *Id.*, [0027]. Yet, “if the insulating sealing film is deposited in a vacuum deposition device, *the effect of radiant heat during deposition of the insulating sealing film will be large, raising concern about the effect on organic layers*” *Id.*, [0028].

To solve that latter problem of radiant heat during deposition, Kijima interposes “at least a conductive sealing film” 7 (green) on the top electrode (such as the cathode 1) “while maintaining the vacuum (and preferably further forming an insulating sealing film thereon).” *Id.*, [0030]. In the figure below, the

conductive sealing film 7 is colored green and the insulating sealing film 8 is colored yellow.



In Kijima, after depositing a 2k angstrom (or 0.2 μm) thick cathode made of LiAl or SrAl (*see* EX1010, [0049], [0061], [0065], [0069]), a 10k angstrom (or 1 μm) thick gold-based conductive sealing film 7 is deposited under vacuum (*id.*, [0031]-[0032], [0050], [0062], [0066], [0070], [0052]). Thereafter, without breaking vacuum, a 2k angstrom (or 0.2 μm) thick SiO₂ or Al₂O₃-based insulating sealing film 8 is deposited on the gold sealing film 7. *Id.*, [0031]-[0032], [0051], [0052], [0063], [0067], [0071]. Devices made in this manner exhibit the same performance after one month in air with “almost no dark spots [] observed.” *Id.*, [0054], [0064], [0068], [0072].

Kijima also describes three comparative examples to emphasize the importance of conductive sealing film 7 and the need to maintain a vacuum before completing the deposition of the insulating sealing film 8. For example, in

Comparative Example 1, the conductive sealing film is omitted. *Id.*, [0073]-[0074]. The resulting OLED is non-operative because “the organic layer had degraded due to radiant heat generated during deposition of the insulating sealing film 8.” *Id.*, [0075]. This demonstrates the importance of “providing the conductive sealing film adjacent to and below the insulating sealing film[.]” *Id.* This is because being a “material with good thermal conductivity such as a metal,” “efficient dissipation of the radiant heat can be expected.” *Id.*, [0057]. Hence, in Kijima, it is important to have a “thickly formed” conductive sealing film 7 “as a buffer layer during deposition.” *Id.*, [0056].

In Comparative Example 2, before depositing the conductive sealing film 7, the deposition chamber “was temporarily returned from vacuum to atmospheric pressure, and then the device was again evacuated to a vacuum.” *Id.*, [0077]-[0078]. The resulting device showed significantly reduced stability and lifetime, with “a large number of dark spots.” *Id.*, [0080]. This demonstrates the “adverse effects of exposing the elements to the atmosphere before the formation of the conductive sealing film 7,” and ‘the importance of ... forming the conductive sealing film 7 under vacuum conditions.’ *Id.*, [0081].

Finally, in Comparative Example 3, before depositing the insulating sealing film 8, “the pressure inside the deposition device was temporarily returned from vacuum to atmospheric pressure, and then the device was again evacuated to a

vacuum.” *Id.*, [0084]. Again, the resulting devices showed worse performance with “an increase in dark spots” than a device whose sealing layers 7 and 8 were both deposited under vacuum. *Id.*, [0086]. This example demonstrates “the importance of forming all of the films under vacuum conditions.” *Id.*, [0087]; *see also* [0058] (“the organic layer and above are formed continuously in the same vacuum deposition device, so productivity is high and there is no effect of oxygen in the atmosphere during production.”).

Thus, as Mr. Humphrey explains,

according to Kijima, (1) a sufficiently thick conductive sealing film such as a gold film of 1 micron and above is needed to address the radiant heat during the deposition of the inorganic sealing film 8; (2) both the conductive sealing film 7 and the inorganic sealing film 8 must be deposited under vacuum, without exposing the device to atmosphere before completing the deposition of both sealing layers.

EX2001, ¶23; Kijima, [0028] (noting the effect of radiant heat during deposition of insulating sealing film 7 on the integrity of organic layers); [0056]-[0057] (discussing the heat dissipation function of the conductive sealing film); [0073]-[0075] (emphasizing “the effect of providing the conductive sealing film adjacent to and below the insulating sealing film”); [0076]-[0081] (emphasizing “the adverse effects of exposing the element to the atmosphere before the formation of the conductive sealing film 7”); [0082]-[0087] (emphasizing “the adverse effects

of exposing the element to the atmosphere before the formation of the insulating sealing film 8”).

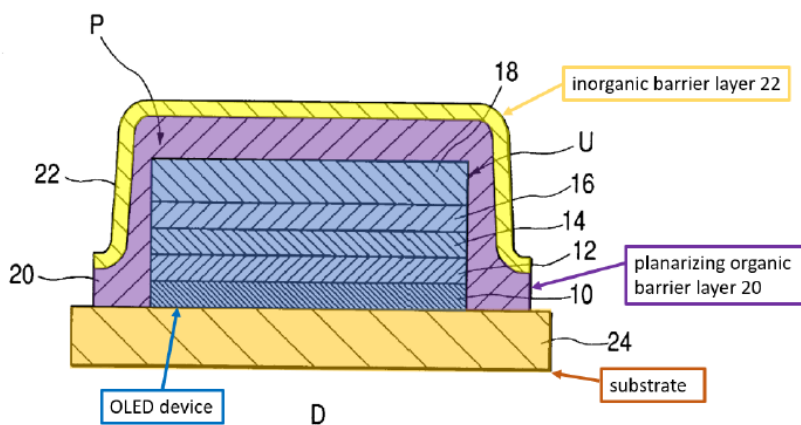
B. Suzuki’s thin film encapsulation is no more effective against dark spot growth than Kijima

Like Kijima, Suzuki attempts to address the problem associated with “shortage of stability” and “dark spot[s]” in OLEDs. EX1012, 1:41-49. Suzuki believes that dark spots are caused by “moisture entering from defective portions” of the OLEDs. *Id.*, 1:50-52. Suzuki’s solution is to provide a protective layer consisting of “an organic barrier layer 20² and an inorganic barrier layer 22.” *Id.*, 2:26-29, 2:60-62, Fig. 1.

² Suzuki does not describe its organic barrier layer 20 as a “planarization layer.”

Unlike a traditional “planarization layer,” as depicted and as Mr. Humphrey confirms, Suzuki’s organic layer generally follows the topology of the underlying layer even though it can cover particles and other defects deposited on the underlying layer. EX2001, ¶26.

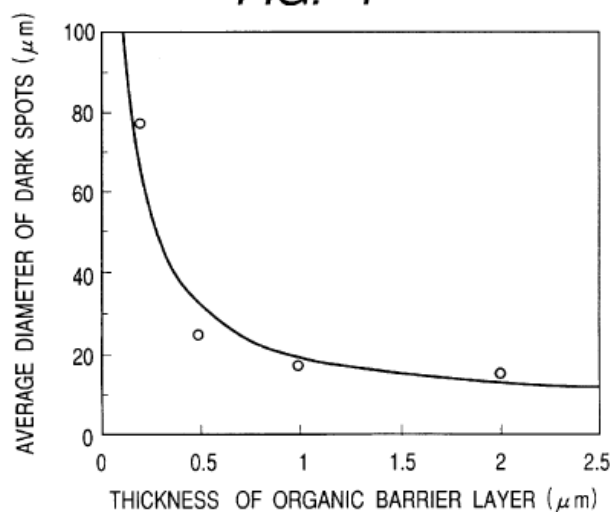
FIG. 1



(annotated by Petitioner, Pet. 20)

Unlike Kijima's devices, Suzuki's devices still have observable dark spots, although the sizes are significantly reduced when the organic layer 20 is sufficiently thick, *e.g.*, above 1 μm . See Fig. 4 (average diameter of dark spots approaches a plateau of slightly below 20 microns when the thickness of the organic barrier layer is 1 μm and above).

FIG. 4



Suzuki describes its organic layer 20 as “exhibit[ing] good affinity for the metal or alloy cathode, cover[ing] defects in the electroluminescent unit U therewith and mak[ing] a smooth surface on the relatively irregularly surface of the cathode 18.” EX1012, 5:59-62. Suzuki notes that “defects are mainly caused by foreign matter inevitably deposited on the electroluminescent unit U during the course of the fabrication thereof under very severely controlled conditions.” *Id.*, 5:54-58. According to Suzuki, forming the inorganic barrier layer 22 “on the smooth surface of the organic barrier layer 20” “ensur[es] the formation of the layer 22, which is substantially defect-free and dense.” *Id.*, 5:63-66. Suzuki uses the double-layer structure for moisture proofing and passivation. *Id.*, 5:66-67.

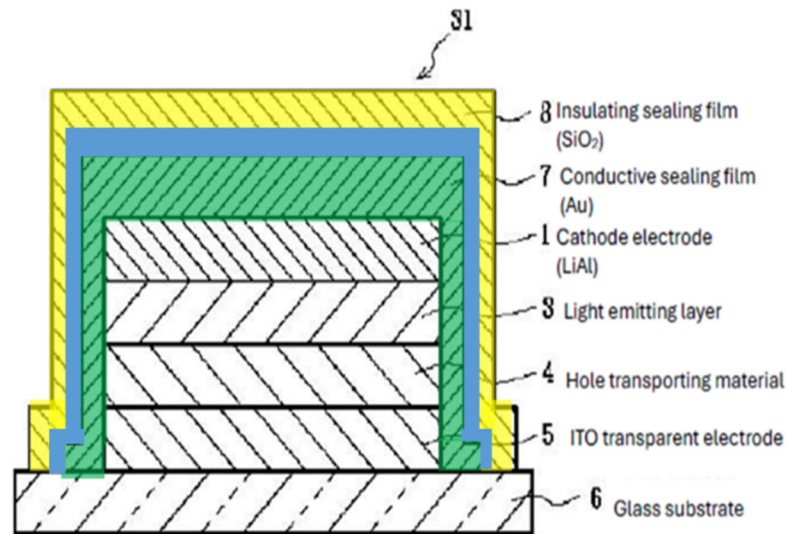
- C. Petitioner has provided no competent reason for interposing an organic layer between Kijima’s conductive sealing film 7 and insulating sealing film 8 because Kijima’s sealing films 7 and 8 already provide better protection against dark spots than Suzuki 1. The modification still would not yield a planarization layer.**

As a preliminary matter, even if Kijima now includes “a ‘protective double layer made of an organic barrier layer and an inorganic barrier layer’” as Petitioner proposes, (Pet. 32-233), Petitioner still has not shown why the resulting device includes a “planarization layer” as required by all challenged claims.

Specifically, the new organic layer will have similar topology to the conductive sealing film 7 and the insulating sealing film 8. Mr. Humphrey confirms that the new layer “would be generally following the topology of the

underlying conductive sealing film 7, just like the inorganic sealing film 8 generally following the topology of the underlying conductive sealing film 7.” See illustration below (blue layer corresponding to the proposed organic layer).

EX2001, ¶32.



As Mr. Humphrey explains:

Even if the organic layer is sufficiently thick to cover particles and other defects, if any, on the conductive sealing film 7, those defects are created unintentionally on the surface of the underlying layer and is generally not considered to be part of the underlying layer’s topology, which is a property of design. Thus, even with an added organic layer, there would not be a planarization layer in the modified Kijima device.

EX2001, ¶33.

2. There is no competent evidence that a POSITA would have made the proposed modification to Kijima's device

Petitioner argues that its modification—interposing an organic layer between Kijima's conductive sealing film 7 and insulating sealing film 8—would “add[] a new organic sealing layer on top of Kijima's OLED in order to form a smooth surface on which to deposit Kijima's inorganic sealing film 8.” Pet. 32. Per Petitioner, a POSITA would do so because Kijima's conductive film 7 allegedly “would be vulnerable to the known problems associated with the cathode surface discussed in Suzuki.” Pet. 33. Thus, according to Petitioner, “depositing such an organic sealing layer on top of Kijima's OLED device would [allegedly] be beneficial for the same reason that Suzuki discusses for its organic barrier layer 20.” *Id.*

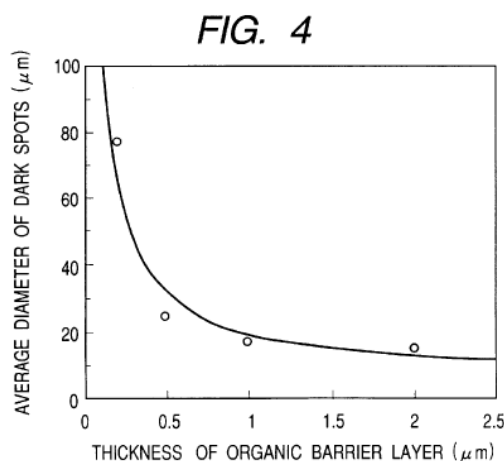
Petitioner's first assumption that Kijima's thick conductive sealing film 7 (1 micron and above) would supposedly be vulnerable to the same problem associated with Suzuki's thin cathode layer (about 150 nm or 0.15 micron)³ lacks support as neither it nor its expert analyzed whether the issues of alleged defects exist in the thick sealing film as in the thin cathode film.

³ *E.g.*, Suzuki, 8:11 (“a 150 nm thick cathode”), 8:47-48 (device made the same way as in Example 1), 8:64-65 (same).

Petitioner's second assumption that "depositing such an organic sealing layer on top of Kijima's OLED device would be beneficial for the same reason that Suzuki discusses for its organic barrier layer 20" is demonstrably incorrect. EX2001, ¶34. Kijima expressly discloses that with a sufficiently thick gold layer (conductive sealing film 7) on top of the cathode material 1 and an inorganic sealing film 8 on top of the gold layer, all deposited continuously under vacuum, "an organic EL element having good stability even when used in air can be obtained." EX1010, [0058]; EX2001, ¶34. Kijima states that, when an organic EL element made according to Kijima's method "was left in air for one month after production," it had "almost the same" luminescence "as ... measured immediately after the element was produced." EX1010, [0054], [0064], [0068], [0072]. Put another way, "even without an organic layer, Kijima is free from the concerns related to 'shortage of stability' and 'dark spot[s]' in Suzuki." EX2001, ¶34. The Petition provides no reason why a POSITA would have looked to Suzuki to solve a problem that it did not have.

Additionally, "*almost no dark spots were observed*" in Kijima's devices made according to Kijima's method, which does not involve depositing a separate organic layer between the conductive sealing film 7 (*e.g.*, the gold layer) and the insulating sealing film 8 (*e.g.*, the SiO₂ or Al₂O₃ film). *Id.* In contrast, noticeable dark spots remain in Suzuki's devices made according to Suzuki's design. *See*

EX1012, Fig. 4 (even with the organic layer, average diameters of the dark spots remained about 20 microns); 8:37-44 & Fig. 3 (even with the organic layer and a silver barrier layer, Suzuki's devices "had 15 dark spots/mm² on average with an average diameter of 15 μ m" after fabrication with the average size of the dark spots increased to 27 μ m after 100 hours); 8:55-61 (average diameter of the dark spots was 25 μ m after 100 hours).



Petitioner provides no reason why a POSITA would have added an organic layer between Kijima's conductive sealing film 7 and insulating sealing film 8 as proposed, when there is no evidence that Suzuki's method would have further improved Kijima EL device's resistance to moisture or dark spots. In fact, if the performance shown in Suzuki's Figure 4 would also reflect the performance of Kijima's devices after the proposed modification, then Kijima's devices would actually suffer a degradation in performance, because "almost no dark spots were observed" in Kijima's unmodified devices after 100 hours whereas as many as 15

dark spots per square millimeter with average sizes of 20 microns and above would occur in the modified devices. *Compare* Kijima, [0054], [0064], [0068], [0072] *with* Suzuki, Figure 4;); 8:37-44 (Suzuki's devices "had 15 dark spots/mm² on average with an average diameter of 15 μ m" after fabrication with the average size of the dark spots increased to 27 μ m after 100 hours); 8:55-61 (average diameter of the dark spots was 25 μ m after 100 hours). Petitioner does not explain why a person of ordinary skill in the art would have incurred cost to include an additional organic layer in exchange for reduced performance. Pet. 32-36.

Further, as Mr. Humphrey explains, a POSITA would understand that they should avoid additional layers whenever possible. EX2001, ¶36. "This is because every time a layer is added, not only an additional processing step needs to be added, but one has to be concerned with issues such as

- Interfacial properties, including adhesions of the additional layer, to the layer immediately above and below (so it won't cause delamination)
- Stresses and associated failure caused by property mismatches between the new layer and the layer above and below, which can cause film stress; and the mismatched properties can be due to mismatches in thermal coefficients of expansion,

- the cohesion strength of the additional layer so it won't be the point of failure
- whether the deposition process of the additional layer is compatible with the already deposited layers and whether the deposited additional layer is compatible with the layer to be deposited, *e.g.*, whether there would be chemical reactions between layers
- how it would affect light transmission, for example, whether it is sufficiently transparent to let through the desired wavelengths, how different or similar its refractive index is compared to the layer above or below, how thick it needs to be in order to provide the needed mechanical strength as well as resistance to moisture and oxygen, the incident light's angles and wavelengths
- added risk of contamination and defects with each additional deposition step.”

EX2001, ¶36. As Mr. Humphrey concludes based on his decades of industry experience, a POSITA “would not have incurred expenses for additional process steps, materials, complexities and risks, when there is no attendant added benefits.”

EX2001, ¶¶37, 4; *cf. ActiveVideo*, 694 F. 3d at 1373 (“[k]nowledge of a problem and motivation to solve it are entirely different from motivation to combine particular references”). This is particular the case that there is not even any

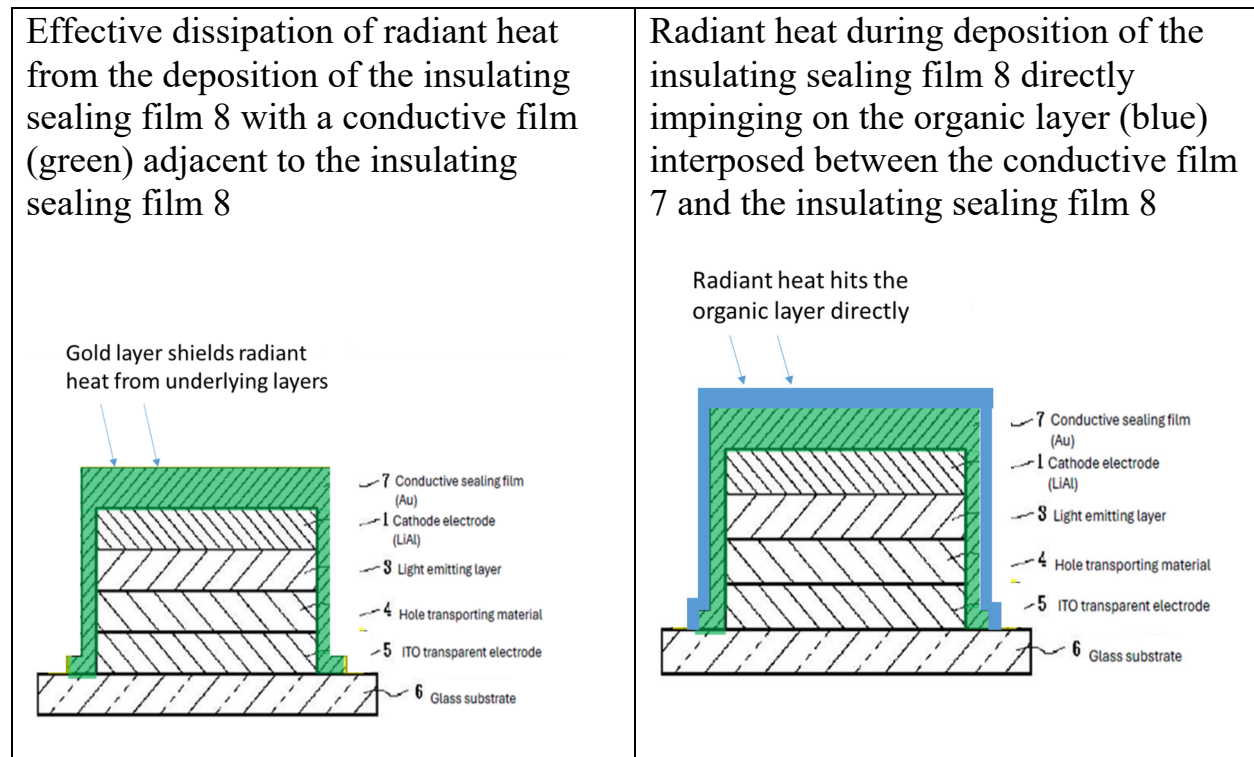
competent analysis as to whether the proposal would have been a suitable solution for Kijima.

For instance, Kijima discloses that

When the conductive sealing film 7 is made of a material with good thermal conductivity such as a metal, efficient dissipation of the radiant heat can be expected, which is considered to be advantageous in preventing degradation of the organic layer.

EX1010, [0057]. Kijima also concludes that it is the use of the sealing film 7 that prevents “degradation of the organic layer due to radiant heat during vapor deposition of the insulating sealing film 8.” *Id.*, [0056].

A POSITA, who is defined as someone with a bachelor’s degree and as few as one year of experience in display (Pet. 14), would view it unacceptable to vapor deposit the insulating sealing film 8 directly over an organic interlayer interposed between the conductive sealing film 7 and the insulating sealing film 8. EX2001, ¶38. As Mr. Humphrey explains, “[t]hat is because they would conclude from Kijima’s teaching that without a thermally conductive layer such as gold to shield the organic layer from the radiant heat generated during deposition of the insulating sealing film, the radiant heat would degrade the organic layer that Samsung argues should be deposited between the insulating sealing film 8 and the conductive film 7,” as illustrated below:



Id.

Petitioner does not explain why a POSITA would have incurred cost to deposit the organic layer when they knew that the very organic layer would degrade under Kijima's processing condition and therefore would not provide the protective function expected of it. EX2001, ¶39 (Mr. Humphrey opining "there is no reason for a person of ordinary skill in the art to deposit the organic layer when they know that (1) it is unlikely to provide any improvement in device performance or stability; (2) it will introduce many unpredictable complexities as noted in [EX2001, ¶36]; and (3) the organic layer will likely suffer degradation when the

insulating sealing film is deposited on top of it and therefore will not provide the needed protection at any rate.”).

Put another way, there is no competent evidence that a POSITA would have found it suitable to include an organic layer below Kijima’s insulating sealing film 8 when Kijima expressly warns of the potential degradation of organic layers caused by radiant heat during deposition of inorganic sealing film 8, when no thermally conductive layer is provided to protect the organic layer from the radiant heat. *E.g.*, EX1010, [0075] (comparative example 1 showing “the effect of providing the conductive sealing film *adjacent to and below* the insulating sealing film”). A POSITA therefore would not have found it suitable to deposit an organic layer between Kijima’s insulating sealing film 8 and the conductive sealing film 7, as it would expose the organic layer to radiant heat during deposition of the insulating sealing film 8 and thereby degrade the organic layer. EX2001, ¶39.

Komatsu—another reference on suppressing growth of dark spots (“DS”) by reducing the device’s reactions with moisture or oxygen (*see* EX1017, 2:29-58)—does not suggest otherwise. In the relied-on embodiment employing protective layer comprised of multiple sublayers, Komatsu notes the need for “thickened protective film.” EX1017, 11:21-25. Komatsu uses an organic layer in addition to the inorganic SiON layer because “SiON alone is very difficult to form a thick protective film necessary for the organic electroluminescence device.” *Id.*, 11:32-

36. Komatsu's solution is to combine SiON with "a layer of material having a lower internal stress than that of SiON, where lower moisture permeation can be attained in the protective film by the SiON layer and *thick protective film* formation *can be attained by the layer of a material having a lower internal stress.*" *Id.*, 11:37-45. Thus, as Mr. Humphrey confirms, "Komatsu discloses that an inorganic layer with low moisture permeation property combined with a sufficiently thick under-layer is the key to protection against environmental elements and dark spots." EX2001, ¶40.

This is similar to Suzuki's finding that a sufficiently thick organic layer in combination with an inorganic barrier layer is required for protection against dark-spot growth. *See* EX1012, Fig. 4 (organic layer of 1 micron or thick needed to obtain reduction in dark spot sizes); EX2001, ¶41.

Kijima, however, already has such a thick protective film structure in the form of a gold layer 7 of 1µm and above and an inorganic insulating sealing layer 8 on top of the thick gold layer. *See* EX1010, [0056] (emphasizing that "the conductive sealing film 7 must be thickly formed as a buffer layer during deposition, and the above thickness (about 10 kÅ) is sufficient"); [0062] (gold of about 10 kÅ is deposited on cathode 1); [0066] (same); [0070] (same); EX2001, ¶42. As discussed above, Kijima reports that devices with its double-layer

protection already suppresses dark spots growth even after exposing to air. *Id.*, [0054], [0064], [0068], [0072].

Because Kijima's encapsulation can already effectively defend against oxygen and moisture to suppress dark spot growth and because there is no evidence that Suzuki's organic-inorganic layer structure would have brought any additional improvement in performance while there are risks of added failure mechanisms (*see* EX2001, ¶36) as well as degradation of the new organic sealing layer during deposition of the insulating sealing film 8 (EX2001, ¶38), a POSITA would not have incurred the extra cost to add the extra layer when there were no concomitant benefit and only increased risks of failure. EX2001, ¶¶43-44; *see also, e.g., Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324 (Fed. Cir. 2019) (upholding the Board's non-obviousness finding based on balancing tradeoffs with benefits, especially in light of the fact that the primary reference already included an oil quality sensor that performed the same function as the oil sensor in the secondary reference even though the secondary reference's oil sensor used a different way to measure oil quality);⁴ *In re Anova Hearing Labs, Inc.*, 809 F.

⁴ *Henry Penny* is consistent with *Virtek Vision Int'l ULC v. Assembly Guidance Sys.*, 97 F.4th 882, 886-87 (Fed. Cir. 2024), where the Federal Circuit held that it

App’x 840, 843 (Fed. Cir. Apr. 7, 2020) (vacating the Board’s finding that a hearing aid invention was obvious, noting, *inter alia*, that the Board failed to explain why a POSITA would have been motivated to modify the primary reference in view of a secondary reference disclosing vents when the primary reference already had vents); *South-Tek Sys., LLC v. Engineered Corrosion Sols., LLC*, 748 F. App’x. 1003 (Fed. Cir. 2018) (affirming the Board’s finding that it would not be obvious for a POSITA to combine Wood’s condensate drain with Viking’s sprinkler system because Viking’s system already included a drum drip drain to allow water to drain from Viking’s system and a POSITA therefore would not be motivated to include Wood’s condensate drain in Viking to perform “redundant functions”).

Thus, as Mr. Humphrey observes, “even if an OLED device without the thick gold layer could have defects on the cathode surface and could thus require a thick organic layer to attain the optimized protection against dark spots, Kijima’s device—with its thick gold layer in combination with an insulating sealing film 8—does not suffer from the same problem and does not need an organic layer

was not enough that two alternative arrangements for computer controlled aiming system were known, but a reason must be provided to explain why a POSITA would have substituted one system with another.

between the insulating sealing film 8 and the conductive film 7.” EX2001, ¶45; Kijima, [0030], [0056]-[0057], [0062]-[0064], [0066]-[0068], [0070]-[0072].

Again, as a reminder, in contrast to Kijima’s device with a thick gold layer of 1 μm and above, Suzuki’s devices used only “a 150nm thick cathode.” See EX1012-Suzuki, 8:11 (device having “a 150nm thick cathode”), 8:47-48 (same device as example 1), 8:64-65 (same), 9:13-14 (same), 9:27-29 (same). The Petition provides no competent reason for why a POSITA would have had a reason to modify Kijima in order to solve a problem that does not exist in Kijima given the different architecture in Kijima and Suzuki. The Petition provides no competent reason for why a POSITA would have had a reason to modify Kijima in order to solve a problem that does not exist in Kijima.

That is, in contrast to Suzuki where depositing only an inorganic barrier layer over an electrode is insufficient to prevent dark spots, (*see* Suzuki, Figs. 3-4), in Kijima, an inorganic layer over a cathode already coated with a gold sealing layer is sufficient to prevent dark spots (*see* Kijima, [0030], [0056]-[0057], [0062]-[0064], [0066]-[0068], [0070]-[0072]). Hence, even if the use of an organic layer was a known solution for addressing the dark spots caused by irregularity on electrode surfaces, that solution does not apply to Kijima which does not suffer from the problem.

3. There is no competent evidence of a reasonable expectation of success

Petitioner has also offered no competent evidence on the reasonable expectation of success prong of the obviousness analysis. For example, Petitioner simply ignores Kijima's express warning that the radiant heat during deposition of the insulating sealing film 7 would degrade organic layers if a conductive sealing film 7 is absent. *E.g.*, Kijima, [0028] ("when providing an insulating sealing film, it has been found that if the insulating sealing film is deposited in vacuum deposition device, the effect of radiant heat during deposition of the insulating sealing film will be large, raising concerns about the effect on organic layers"); [0056]-[0057] ("since the conductive sealing film 7 made of gold is interposed under the insulating sealing film 8, degradation of the organic layer due to a radiant heat during vapor deposition of the insulating sealing film 8 is prevented" and "[w]hen the conductive sealing film 7 is made of a material with good thermal conductivity such as metal, efficient dissipation of the radiant heat can be expected, which is considered to be advantageous in preventing degradation of the organic layer"); [0075] ("the effect of providing the conductive sealing film adjacent to and below the insulating sealing film ... was demonstrated").

Put another way, Kijima discloses that, for Kijima's device, it is critical to "provid[e] the *conductive* sealing film *adjacent to and below* the insulating sealing

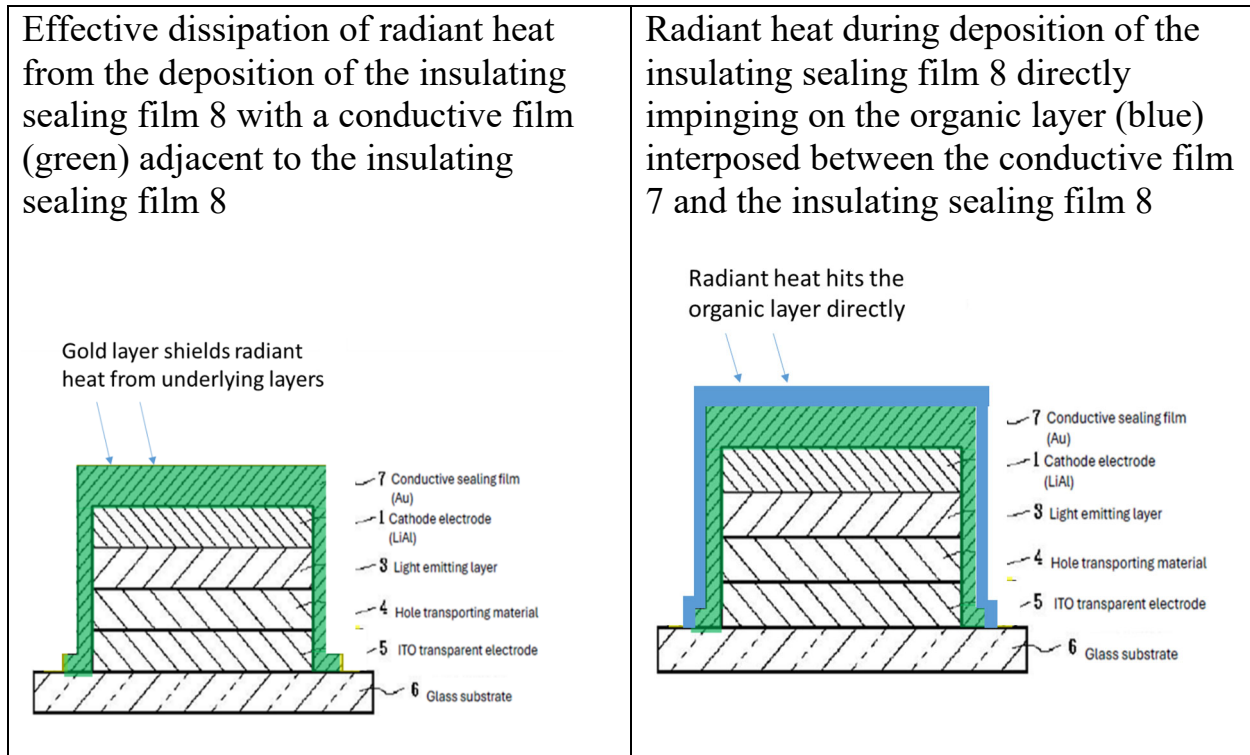
film” in order to conduct the radiant heat generated during deposition of the insulating sealing film 8 away from the device. EX1010, [0075]; EX2001, ¶47. Otherwise, the resulting device may be inoperable. *Id.* (without a conductive layer “adjacent to and below the insulating sealing film,” the resulting device had “almost no light” emission); *see also id.*, [0057] (“When the conductive sealing film 7 is made of material with good thermal conductivity such as a metal, efficient dissipation of the radiant heat can be expected.”).

Petitioner’s proposal, however, would interpose a thermally non-conductive and electrically insulating organic layer between the conductive film 7 and the inorganic film 8, against Kijima’s express teaching. *See* Pet. 38 (adding an organic sealing layer between the conductive sealing film 7 and insulating sealing film 8); Suzuki, Fig. 4 (organic layer needs to be 1 μm or above for reduced dark spot sizes), 6:11-23, 6:56-64 (exemplary organic materials).

Yet the Petition provides no analysis whatsoever on whether a thick organic film suitable for filling the surface irregularity of a cathode could also efficiently dissipate the radiant heat to ensure the resulting device would operate, in light of the express warning by Kijima. *See* Pet. 32-36. The thermal conductivity of gold is 2-3 orders of magnitude that of organic materials. EX2005 (<http://hyperphysics.phy-astr.gsu.edu/hbase/Tables/thrcn.html>) (thermal conductivity for gold is 314 W/mK versus 0.8W/mK for glass); EX2006

(https://www.engineeringtoolbox.com/thermal-conductivity-d_429.html) (common organic materials, such as paraffin, acrylic, cellulose, polyethylene, have a thermal conductivity on the order of 0.2-0.4 W/mK); EX2007 [https://onlinelibrary.wiley.com/doi/epdf/10.1002/adma.202008708], 2008708-2 (“The thermal conductivity in organic materials is usually assumed to be low due to lattice disorder”); EX2001, ¶49. A POSITA “would therefore not consider the organic layer to be able to dissipate the radiant heat or to withstand the radiant heat.” EX2001, ¶50.

Kijima has warned that when the inorganic insulating film is deposited under vacuum, “the effect of radiant heat during deposition of the insulating sealing film will be large.” Kijima, [0028]. Kijima also demonstrated importance “of providing the conductive sealing film adjacent to and below the insulating sealing film.” *Id.*, [0075]. Given these express disclosures and the knowledge by a POSITA of these disclosures, Petitioner has not provided any competent evidence that a POSITA would go against Kijima’s express warning or have a reasonable expectation of success in obtaining a workable “planarization layer” by interposing between the conductive sealing film and the insulating sealing film a low thermal conductivity material, such as an organic layer.



EX2001, ¶51 (“A person of ordinary skill in the art with barely one year of experience in display would not have enough knowledge to go against Kijima’s express warning and add an organic layer directly below the inorganic sealing film 8. They would know that if they do so, the resulting device likely would not have worked, and therefore it would be unsuitable to add an organic layer between the sealing films 7 and 8 as proposed.”). This is an additional reason why a POSITA would not have made the modification as Petitioner suggests or have had any reasonable expectation of success in obtaining a workable device. *See* Kijima, [0075].

D. If the insulating sealing film 8 of modified Kijima is deposited using Suzuki's method, there is no evidence that it would be deposited selectively

The Petition assumes that the barrier layer for the modified Kijima devices would be deposited using “Kijima’s technique.” Pet. 37-38. But as explained above, Kijima expressly warns that radiation heat during deposition of the insulating sealing film 8 using Kijima’s techniques would raise the concern of degraded organic layers. *See* Kijima [0028], [0056]-[0057], [0075] as discussed on pages 32-33 above.

To the extent that Petitioner argues that Suzuki’s method for depositing a barrier layer over an organic layer could be used instead, there is no evidence that Suzuki’s method involves a selective deposition of a barrier layer over the planarization layer. Pet. 37-38. For example, Suzuki disclose that the inorganic barrier layer is to be deposited using “a vapor phase technique such as vacuum deposition, sputtering and the like” EX1012, 7:20-23. The Petition presents no evidence that these vapor phase techniques would similarly utilize a mask as in Kijima for the alleged selective deposition of the barrier layer. In fact, Suzuki does not mention masks or selective deposition at all. *See* EX1012 *generally*.

V. Petitioner Has Provided No Competent Reason for Using Ink-jetting to Deposit the Organic Layer Sequence in Kijima

Kijima makes clear of “the importance of forming all of the films under vacuum conditions.” EX1010, [0087]. For example, even after a thick gold layer is deposited under vacuum, exposing the device to atmospheric pressure before depositing the insulating sealing film 8 would still cause significant degradation in OLED device and increase in dark spots. *Id.*, [0082]-[0087].

But this is exactly what Petitioner suggests by depositing an organic layer using Sturm’s ink-jetting method followed by the inorganic barrier layer 8. Pet. 41-45; EX1013-Sturm (no reference to using vacuum while performing ink-jetting); EX1016, 3:15-17 (contrasting “ink jet printing step” with “a printing step involving a vacuum based process”). Petitioner does not explain why a POSITA would ignore Kijima’s express warning and expose the device to atmospheric pressure before completing the entire encapsulation process.

Sturm is also of no help because it does not address OLED barrier or encapsulation layers at all beyond a casual reference to a vacuum-deposited Ag layer over the Mg/Ag cathode. Sturm, 4:66-5:2. Petitioner does not contend that the silver layer is a planarization layer or a barrier layer. Likewise, Duthaler concerns electrophoretic displays and addressing devices, not OLEDs. There is no evidence that deposition techniques suitable for electrophoretic displays would also

be suitable for OLEDs. As Mr. Humphrey notes, “electrophoretic displays do not share the same degree of sensitivity to moisture and oxygen as is well-known for OLED displays.” EX2001, ¶55. Duthaler also describes electrophetic displays as including “a capsule with one or more species of particle that either absorb or scatter light and that are suspended in a fluid.” EX1016, 23:26-27. There is no evidence that any OLED devices would have this form of encapsulation. EX2001, ¶55.

There is thus no competent evidence that a POSITA would apply Sturm or Duthaler to deposit the planarization layer or the barrier layer of the challenged claims. *Arendi S.A.R.L v. Apple Inc.*, 832 F. 3d 1355, 1365-66 (Fed. Cir. 2016) (searching by names or addresses for duplicative entries does not render obvious an approach that searched for duplicative entries by telephone numbers).

Nor does Sturm or Duthaler even suggest using ink-jetting to deposit an encapsulation layer as opposed to “form[ing] electronic components or component arrays.” EX1016, 15:6-8. For example, in the figure on Sturm’s cover page, layer 122 is formed by ink-jetting, with 122 being “a polymer semiconducting layer” having source/drain contacts 124/126 then formed over 122. EX1013, 6:52-67, Figs. 14(a)-(b). As another example, Sturm’s Figures 7(a)-(c) shows islands 22 and 24 deposited by inkjet, with electrodes 26, 28 then applied over 22 and 24. *Id.*, 5:39-47. Likewise, in Figures 8(a)-(c), electrodes 40, 42, 44 are deposited over

ink-jetted islands 34, 36 and 38 containing red, blue and green inks. Figures 9(a)-(c) use inkjet to deposit top and bottom contacts as well as organic materials contacting the contacts. *Id.*, 5:64-6:5. Figure 10 involves ink-jetting top electrodes 60 and 62. *Id.*, 6:6-13; *see also* 6:19-51 (ink-jetting used to deposit organic red/blue/green materials as well as contacts). None of the examples, however, involved using ink-jetting to deposit an organic layer for encapsulation. EX2001, ¶57. Just like searching by names or addresses for duplicative entries does not disclose an approach that searched for duplicative entries by telephone numbers (*Arendi* 832 F.3d at 1365-66), depositing electronic components or component arrays that are a part of the device using ink-jetting does not suggest doing so to encapsulation layers that are not part of the device but are used to seal the device.

As Weaver explains, the concern of susceptibility to oxygen and moisture arises after the top electrode, such as a cathode is deposited:

In forming an OLED, a layer of metal is typically utilized as the cathode to ensure efficient electron injection and low operating voltages. However, metals and their interface with the organic material are susceptible to oxygen and moisture, which can severely limit the lifetime of the devices. Moreover, moisture and oxygen are also known to increase “dark spot areas” in connection with OLEDs.

EX1008-Weaver, [0004]. Hence, although inkjet may be suitable for depositing organic light emitting layers, as Kijima observed, after cathode deposition, the

subsequent encapsulation step must take place under vacuum in order to obtain a suitable and operable OLED device. *See* EX1010-Kijima, [0076]-[0081] (comparative example 2, showing the “adverse effects of exposing the element to the atmosphere before the formation of the conductive sealing film 7”); EX2001, ¶58.

Moreover, according to Sturm, materials deposited with ink-jetting would have non-flat surfaces. *See* Figs 6B, 6C, 7B-7C, 8B-8C, 9A-9C, 10C, 11B-11C, 12B-12C, 13B, 14B. But such a surface shape would be inconsistent with Petitioner’s alleged reason for interposing an organic layer below the inorganic sealing film 8, which is to provide a flat surface for the sealing film 8. *See* Pet. 33-34. Under Petitioner’s invalidity theory, this inconsistency would have dissuaded a POSITA from using ink-jetting to apply the organic layer. That is another factor that Petitioner has not provided any competent reason for and has not demonstrated why a POSITA would have used Sturm’s ink-jetting method that results in curved surfaces in order to allegedly obtain a flat surface.

VI. Petitioner Has Provided No Competent Reason for Using Screen-Printing to Deposit the Organic Layer Sequence in Kijima

As with the ink-jetting process, Petitioner simply ignores Kijima’s express teaching of “the importance of forming all of the films under vacuum conditions.” EX1010, [0087]; Pet. 46-49. Screen-printing would also break the vacuum before

completing the encapsulation process. EX2001, ¶60. For example, Duthaler⁵ distinguishes “screen printing” with “a printing step involving a vacuum based process” EX1016, 3:18-20. As with the ink-jetting process, Petitioner does not explain why a POSITA would ignore Kijima’s express warning and expose the device to atmospheric pressure before completing the entire encapsulation process.

This is not about the weight of evidence, but the fact that Petitioner fails to explain why a POSITA would have performed the proposed modification specifically in the context of Kijima. *ActiveVideo*, 694 F.3d at 1328 (rejecting expert testimony that “fail[ed] to explain why a person of ordinary skill in the art would have combined elements from specific references *in the way the claimed invention does*”); *TQ Delta, LLC v. Cisco Sys., Inc.*, 942 F.3d 1352, 1359-61 (Fed. Cir. 2019) (“conclusory expert testimony is inadequate to support an obviousness determination on substantial evidence review”).

Indeed, Petitioner makes no attempt to demonstrate that using screen printing in Kijima would have improved Kijima’s throughput or lowered its cost, the alleged reason for using screen printing. Pet. 48. For instance, Kijima

⁵ As noted above, Duthaler concerns electrophoretic displays and not OLEDs, and there is no evidence that printing techniques suitable for electrophoretic displays would also be suitable for OLEDs.

observes that its method of forming the various layers “continuously in the same vacuum deposition device” provides “high” “productivity” while precluding “effect of oxygen in the atmosphere during production.” EX1010, [0058]. But there is no evidence that screen-printing could be carried out in the same “vacuum deposition device.” Pet. 46-49.

Petitioner does not explain why disrupting this continuous use of vacuum deposition with screen printing that requires a different set of equipment and operating conditions would not negatively affect Kijima’s productivity. Put another way, screen-printing would not only expose the devices to air before completion of encapsulation, but would also require a new set of equipment and processing conditions that disrupt the continuous operation “in the same vacuum deposition device.” There is no explanation why this disruption would improve the already high productivity of Kijima or lower its cost. Indeed, as Mr. Humphrey observes, screen-printing would decrease productivity:

Screen-printing would require new equipment and cannot be easily integrated into Kijima’s evaporative vacuum deposition chamber or conditions. Screen-printing would therefore likely disrupt Kijima’s continuous use of vacuum deposition, which would negatively affect Kijima’s productivity. Thus, screen-printing would not only expose the devices to air before completion of encapsulation, but would also require a new set of equipment and processing conditions. *A person of*

ordinary skill in the art would recognize that instead of improving Kijima's productivity or lowering Kijima's cost, including screen printing in Kijima would actually increase cost by requiring a new set of equipment beyond the vacuum deposition chambers that Kijima already has and would lower the productivity. This is because now, instead of forming films "continuously ... in the same vacuum deposition device 11," the devices need to be removed from the vacuum deposition device to screen-print the organic layer, dry the organic layer and then put the devices back into the vacuum deposition device

EX2001, ¶64. Hence, Petitioner fails to show a reasonable likelihood of success in showing that a POSITA would have used screen-printing in lieu of Kijima's vacuum evaporation method.

VII. Petitioner Has Not Shown a Reasonable Likelihood to Prevail on Ground IV

Ground IV again relies on interposing an organic layer between Kijima's conductive sealing film 7 and the insulating sealing film 8. Pet. 51 (asserting "[i]t would have been obvious to further use a selectively deposited organic planarization layer in view of Suzuki"). For the same reasons stated for Ground 1, Petitioner has not made a *prima facie* case that a POSITA would have added the organic layer. Thus, Petitioner has not demonstrated a reasonable likelihood of success for Ground IV either.

Petitioner has also not demonstrated a POSITA would have used Fujimori's mask in Kijima. The problem that Fujimori attempts to address is that the deposited material would wrap around the shadow of finely patterned masks such that deposited electrodes are not sufficiently separate and thus "cause a short in the elements and crosstalk." EX1014, [0008].

Fujimori as a whole does not disclose or suggest using its magnetized masks for depositing encapsulation layers, be it an organic planarization layer or an inorganic barrier layer. *See* EX1014 *generally*; EX2001, ¶67. Instead, it uses the magnetized masks to deposit (1) electrodes, in particular the electrodes above the (OLED) organic layers, *see* EX1014, [0026], [0041]-[0042], [0044], [0047], [0048]; (2) materials to create closely spaced blue, green and red multicolor regions, *see* EX1014, [0050]; and (3) non-emission regions such as the black matrix that blackens the gaps between the light-emitting region to improve contrast or pixel define layers that surround/define emission regions and insulate electrodes from one another, *see id.*, [0027]. Notably, for the non-emission regions such as the black matrix, in the actual examples, no masks were used to develop the black matrix. *See id.*, [0049]. Instead, "spin-coating" followed by "conventional photolithography method" was used "to form a black layer ... that served as both a spacer and a black matrix." *Id.* "Thus, to the extent that Samsung suggests that a person of ordinary skill in the art would have used the same method that Fujimori

uses for forming the non-emitting region to deposit Kijima's encapsulation layer, the person would not have used a magnetic mask." EX2001, ¶68.

Fujimori therefore does not teach or suggest a need to use a magnetized mask for depositing insulating protection layers for OLED devices, likely because these insulting layers won't "cause a short in the elements" or "crosstalk," the problem that led to Fujimori's invention. EX1014, [0008]; EX2001, ¶69. As such, Petitioner's suggestion that a POSITA would have looked to Fujimori for suggestion of depositing a planarization layer or a barrier layer is not supported by Fujimori's disclosures.

VIII. The Board Should Exercise Its Discretion Under 314(a)

The Board should exercise its discretion to deny the Petition under 35 U.S.C. § 314(a) and *Apple Inc. v. Fintiv, Inc.*, IPR2020-0019, Paper 11 (PTAB Mar. 20, 2020) (precedential), in view of the co-pending litigation, *Pictiva Displays Int'l Ltd. v. Samsung Elecs. Co.*, No. 2:23-cv-0495 (E.D. Tex.) (Gilstrap, J.).

First, Petitioner has not requested a stay in the co-pending litigation, nor is there evidence that Judge Gilstrap would grant a stay if a trial is instituted. In fact, Judge Gilstrap frequently denies stays in such cases. *E.g.*, *Netlist, Inc. v. Micron Tech., Inc.*, Civ. No. 2:22-cv-00294-JRG, Dkt. 72 (E.D. Tex. Mar. 12, 2024) (denying motion to stay pending instituted IPRs); *Netlist, Inc. v. Samsung Elec.*

Co., Civ. No. 2:22-cv-00293-JRG, Dkt. 180 (ED. Tex. Oct. 17, 2023) (denying motion to stay pending instituted IPRs); *id.*, Dkt. 689 (Mar. 11, 2024) (same).

Second, as Petitioner acknowledges, trial is scheduled for August 4, 2025, (Pet. 90; EX2014 at 1), more than seven months before the projected statutory deadline of early March 2026 for a final written decision here. And August 4, 2025, is about 21.6 months from October 19, 2023, the date when Pictiva filed its complaint against Samsung, which is also the median time-to-trial in the Eastern District of Texas. *See* EX2015, at 35. Notably, the Board recently declined to institute another IPR involving a petition filed by Petitioner (with the same real parties-in-interest) (with the POPR due nearly 3.5 months prior to this POPR) challenging a different Pictiva patent involved in the same district court litigation, finding that this factor “favors denial based on the trial date set for the District Court action, as well as the District Court’s median time-to-trial data.” *Samsung Display Co. v. Pictiva Displays Int’l Ltd.*, IPR2024-00855, Paper 12, at 8-9 (PTAB Nov. 19, 2024).

Third, on the current schedule, by the projected institution date, the parties would have completed fact discovery, the court would have already held a *Markman* hearing, and opening expert reports would be due in a week. *See* EX2014, at 3-4. In the IPR2024-00855 decision, the Board found that this factor favored Samsung, but in that case, the Board noted that it was “directed to no

substantive orders issued by the District Court” or evidence of “concrete discovery activity,” and thus concluded that there had not been “a substantial investment by the parties and the District Court in the parallel litigation.” IPR2024-00855, Paper 12, at 10. Now, however, the parties and the court will have invested heavily in the parallel litigation, as evidenced by a recent Order addressing motions to compel, *Pictiva Displays Int’l Ltd. v. Samsung Elecs. Co.*, No. 2:23-cv-00495-JRG, Dkt. 104 (Order) (ED. Tex. Oct. 23, 2024), and the parties’ recent filing of the joint claim construction and prehearing statement pursuant to Local Patent Rule 4-3. *See id.*, Dkt. 108 (Joint 4-3 Statement) (Nov. 12, 2024). In addition, an expert deposition is happening today (December 11, 2024); and the parties are scheduling five depositions for January 2025. Pictiva has also already served its 30(b)(6) deposition notices with Samsung agreeing to produce a witness for most topics. The deadline for substantial completion of document production is two weeks away on December 24, 2024. EX2014 at 4. It suffices to say that the parties will have invested significant resources in the district court litigation by the deadline for institution.

Fourth, there is significant overlap between this proceeding and the parallel district court action given that Samsung has also asserted the same primary references in the district court (*see* EX2016 at 32-34) and has not filed any stipulation regarding the use of the references in district court that it has raised or

could have reasonably raised in the Petition. Like the petition in IPR2024-00855, Samsung asserts the same prior art references in the district court action and has not filed any stipulation regarding their use. *Id.* Thus, as in that case, “[e]ven if the trial in the District Court action ultimately resolves fewer than all of the claims challenged in the Petition ... significant concerns about duplicative efforts persist because the same substantive issues related to the same prior art references are in contention in both forums.” IPR2024-00855, Paper 12, at 11.

Fifth, Petitioner admits that the named defendants in the parallel district court case—its parent company, Samsung Electronics Co., Ltd., and its sibling company, Samsung Electronics America, Inc.—are real parties-in-interest. Pet. 1. Thus, as in IPR2024-00855, “[t]his factor favors denial.” IPR2024-00855, Paper 12, at 11.

In summary, each of the first five *Fintiv* factors favors denial. In the recent case involving an earlier-filed petition involved in the same parallel litigation, the Board determined that “[u]nder a holistic view of the first five *Fintiv* factors, we find that these factors, taken together, weigh in favor of denial.” *Id.*, 12. The balance tips even greater in Patent Owner’s favor here because all five factors favor denial, unlike that case, in which the Board only found that the “second, fourth, and fifth *Fintiv* factors favor denial.” *Id.*

Additionally, as demonstrated above, the Petition lacks compelling merits.

For these reasons, the Board should exercise its discretion to deny institution.

IX. Responses to Petitioner's Notice of Multiple Petitions

As the Board recognizes, “one petition should be sufficient to challenge the claims of a patent in most situations.” PTAB Consolidated Trial Practice Guide (“TPG”) (Nov. 2019) at 59. Petitioner suggests that its filing of a second petition is justified because “there is a dispute about priority date requiring arguments under multiple prior art references.” Paper 3 at 1. But Petitioner does not explain why the alleged dispute regarding priority date justifies its filing of the second petition.

Instead, Petitioner makes the boilerplate assertion that “despite its best efforts ..., Petitioner had to separate the challenges into two petitions in order to ensure the grounds associated with each challenged claim within each petition contain the necessary specificity as to how the asserted prior art meets the recited limitations within the word limit applicable to IPR petitions.” Paper 3 at 3. What Petitioner fails to mention is that it has included two separate primary references in IPR2024-01222, Yamazaki and Weaver. *See* IPR2024-01222 Petition. Petitioner offers no justification for doing so. For example, it does not explain why it could not have included the Kijima ground instead of the Weaver ground in IPR2024-

01222. Paper 3 at 3-4. In *Whatfix Inc. v. Walkme Ltd.*, IPR2023-01443, faced with a similar situation, the Board declined to institute both trials:

Petitioner does not persuasively explain in its Ranking why these arguments could not have been provided in a single petition. It is difficult to reconcile Petitioner's arguments that two petitions were necessary when Petitioner has asserted three alternative challenges against nineteen of the challenged claims in the -01368 petition.

IPR2023-01443, Paper 11 at 13-14 (PTAB, March 20, 2024). The same is true here: Petitioner offers no reason for why it could not have filed a single petition that includes only the Kijima and Yamazaki (or Weaver) grounds. In other words, Petitioner offers no reason why it has to include both Yamazaki and Weaver in its first petition and all three of Yamazaki, Weaver and Kijima over two petitions.

Petitioner also does not specify the particular strengths with respect to each petition, stating instead generally and meaninglessly that “[e]ach of these references has particular strengths with respect to the claimed features and positions that Patent Owner may take during the proceeding, including as to priority.” Paper 3 at 2. This does not inform the Board or the Patent Owner why both petitions are needed and why IPR2024-01222 references would be preferred. For example, Petitioner does not assert that IPR2024-01223 references fail to disclose or render obvious certain limitations while IPR2024-01222 references do not suffer from the same deficiencies.

The fact that the Petitioner apparently views the second petition, which does not implicate priority issue, as having similar strength to the first petition counsels against instituting both trials. This is because, if the 102(b) references at issue in IPR2024-01223 are as strong as or stronger than those at issue in IPR2024-01222, then regardless of whether a dispute over priority exists, there is no reason to institute a trial over IPR2024-01222 involving references that are weaker (or of equal strength) but have potential priority issues. Instead, to best utilize the Board's resources, to the extent a trial is warranted, the Board should institute the trial on the petition based on references having at least the same strength and no priority disputes, *i.e.*, the IPR2024-01223 petition.

Petitioner also makes the unsubstantiated and nonsensical assertion that “the burden to address the grounds raised in both petitions would not be substantially greater than that for just one petition.” Paper 3 at 3-4. That statement is demonstrably false. As Petitioner's own table summarizing the grounds in the two petitions shows, the two petitions involve completely different references with very different disclosures and therefore different analysis. Paper 3 at 2. There is little if any overlap between the two petitions. Moreover, as Petitioner concedes, one petition may involve priority issues while the other won't. Hence, instituting both petitions would “place a substantial and unnecessary burden on the Board the patent owner.” TPG at 59. It would also “raise fairness, timing and efficiency

concerns.” *Id.* Consequently, to the extent that priority is an issue and should both petitions are sufficient for institution, the Board should simply institute IPR2024-01223 that permits a more streamlined proceeding.

Dated: December 11, 2024

Respectfully submitted,

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CERTIFICATE OF WORD COUNT

I hereby certify, pursuant to 37 C.F.R. section 42.24, that the foregoing Patent Owner Preliminary Response contains 10,394 words, excluding the words in the table of contents, table of authorities, exhibit list, this certificate of word count, signature block and certificate of service. The word count is based on the word count of the Microsoft Word program used to prepare the Patent Owner Preliminary Response.

/Susan M. Langworthy/
Susan M. Langworthy

CERTIFICATE OF SERVICE

I hereby certify, pursuant to 37 C.F.R. section 42.6, that on December 11, 2024, a complete copy of the foregoing document **PATENT OWNER'S PRELIMINARY RESPONSE and EXHIBITS 2001-2007 and 2014-2016** were served by electronic mail, as agreed to by the parties, upon the following:

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