

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

SINOTECHNIX LLC
Patent Owner

Case No.: IPR2025-00335

PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 8,132,952

CHALLENGING CLAIMS 1, 2, 4, AND 5
UNDER 35 U.S.C. § 312 AND 37 C.F.R. § 42.104

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Petition for *Inter Partes* Review of U.S. Patent No. 8,132,952
Claims 1, 2, 4, and 5

PETITIONER’S EXHIBIT LIST

Petitioner Exhibit No.	DESCRIPTION
1001	U.S. Patent No. 8,132,952 (“’952 Patent”)
1002	Declaration of Dr. Ioannis Kymissis
1003	U.S. Patent Publication No. 2005/0007516 (“Hong”)
1004	PCT Application Publication No. WO Patent Publication No. 2004/097949 (“Lee”)
1005	U.S. Patent Publication No. 2004/0233665 (“West”)
1006	U.S. Patent Publication No. 2002/0187571 (“Collins”)
1007	PCT Application Publication No. WO 2000/060406 (“Johnson”)
1008	U.S. Patent Publication No. 2005/0184638 (“Mueller”)
1009	U.S. Patent No. 6,252,254 (“Soules”)
1010	U.S. Patent Publication No. 2005/0254258 (“Lee ’258”)
1011	PCT Application Publication No. WO 1997/048134 (“Turnbull”)
1012	Judicial Caseload For Eastern District of Texas
1013	Judge Gilstrap’s Case Schedule (May 4, 2026)
1014	File History of the ’952 Patent
1015	File History of U.S. Application No. 11/909,700
1016	U.S. Patent Publication No. 2004/0130884 (“Yoo”)
1017	“Resins for Optics,” Three Bond Technical News, Jul. 1, 2004
1018	U.S. Patent No. 6,738,120 (“Song”)
1019	U.S. Patent No. 4,229,783 (“Eberhardt”)
1020	U.S. Patent No. 5,587,816 (“Gunjima”)
1021	Docket Control Order in <i>Sinotechnix LLC v. Samsung Electronics et al.</i> , 2:24-cv-544-JRG-RSP

LISTING OF CHALLENGED CLAIMS

Claim 1

[1Pre] A backlight panel, comprising:

[1A] a diffusion plate comprising a top surface and a bottom surface;

[1B] a plurality of white light emitting diodes arranged below the bottom surface of the diffusion plate, the white light emitting diodes to emit light directly onto the bottom surface of the diffusion plate; and

[1C] a reflection sheet arranged below light exit surfaces of the white light emitting diodes, the reflection sheet to reflect light toward the diffusion plate,

[1D] wherein each white light emitting diode comprises a blue light emitting diode chip and a red phosphor and a green phosphor arranged on the blue light emitting diode chip.

Claim 2

[2] The backlight panel of claim 1, further comprising a brightness enhancement film and/or a dual brightness enhancement film arranged on the top surface of the diffusion plate.

Claim 4

[4] The backlight panel of claim 1, further comprising an air gap arranged between the bottom surface of the diffusion plate and the reflection sheet.

Claim 5

[5] The backlight panel of claim 4, wherein light emitted from the white light emitting diodes is mixed together in the air gap before being emitted directly onto the bottom surface of the diffusion plate.

I. Introduction

U.S. Patent No. 8,132,952 (“’952 Patent”) claims a backlight panel that includes a particular type of white light emitting diodes (“LEDs”) that purportedly reduces the thickness of the backlight panel. For example, claim 1 recites, in part, “[a] backlight panel” that includes “a diffusion plate,” “a plurality of white light emitting diodes ... emit[ting] light onto the bottom surface of the diffusion plate,” and “a reflection sheet ... to reflect light toward the diffusion plate.” Claim 1 also requires that each white LED includes “a blue light emitting diode chip and a red phosphor and a green phosphor arranged on the blue light emitting diode chip.”

None of these claim requirements was new. A backlight panel including a diffusion plate, white LEDs, and a reflection sheet arranged in a manner consistent with the claims was well known, as evidenced by US 2005/0007516 to Hong. The specific details of the white LED that includes red and green phosphors arranged on a blue LED chip was also well known, as evidenced by WO 2004/097949 to Lee. There was nothing inventive about using well-known white LEDs, such as taught by Lee, in a well-known backlight panel, such as taught by Hong. Accordingly, Petitioner respectfully requests cancellation of the claims challenged in this Petition.

II. Mandatory Notices

A. Real Parties-In-Interest

Petitioner identifies itself as a real party-in-interest.

B. Related Matters

The '952 Patent is currently asserted against Petitioner in *Sinotechnix LLC v. Samsung Electronics Co., Ltd. et al.*, No. 2:24-cv-00544 (EDTX) (“Litigation”). Petitioner has filed or plans to file petitions for *inter partes* review of U.S. Patent Nos. 7,951,626, 9,412,913, 7,618,162, 7,748,873, and 7,901,113, each of which is being asserted against Petitioner in the Litigation.

C. Counsel

Petitioner is filing a Power of Attorney appointing the practitioners associated with Customer Number 132,593. Petitioner designates the following lead and back-up counsel:

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D. Service Information

Post and hand delivery: Desmarais LLP

Petition for *Inter Partes* Review of U.S. Patent No. 8,132,952
Claims 1, 2, 4, and 5

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III. Fees

Petitioner is concurrently electronically submitting the required fees for this Petition. The Board is authorized to charge Desmarais LLP's deposit account, No. 50-6822, for any fee deficiency.

IV. Grounds For Standing

Petitioner certifies that the '952 Patent is available for *inter partes* review and that Petitioner is not estopped or barred from requesting this *inter partes* review.

V. Overview Of Challenge And Relief Requested

Petitioner requests *inter partes* review and cancellation of claims 1, 2, 4, and 5 of the '952 Patent.

A. Prior Art References

The '952 Patent was filed on October 14, 2010, and it claims priority to Korean Patent Application No. 10-2005-027133, filed March 31, 2005. EX1001,

Cover. Accordingly, this Petition applies pre-AIA provisions of 35 U.S.C. §§ 102 and 103.

The following references are pertinent to the grounds of unpatentability explained below:

1. U.S. Patent Application Publication No. 2005/0007516 (“Hong”) (EX1003), published on January 13, 2005, is prior art under at least 35 U.S.C. §§ 102(a), 102(b), and 102(e).

2. PCT Application Publication No. WO 2004/097949 (“Lee”) (EX1004), published on November 11, 2004, is prior art under at least 35 U.S.C. §§ 102(a), 102(b), and 102(e).

3. Applicant Admitted Prior Art (“AAPA”), set forth in the “Background Art” section of the ’952 Patent—including the specification at column 1, line 25 to column 2, line 53, and Figure 1—is prior art because the ’952 Patent itself identifies the subject matter as “background.” EX1001, 1:25-2:53, Figure 1.

The identified references are not of record on the face of the ’952 Patent.

B. Grounds For Challenge

Petitioner requests cancellation of claims 1, 2, 4, and 5 of the ’952 Patent under 35 U.S.C. §§ 102 and 103 based on the following Grounds.

Ground	35 U.S.C.	Claims	Prior Art Reference(s)
I	§103	1, 2, 4, 5	Hong, Lee

Ground	35 U.S.C.	Claims	Prior Art Reference(s)
II	§103	2, 4, 5	Hong, Lee, Applicant Admitted Prior Art (“AAPA”)

This Petition, supported by the declaration of Dr. Kymissis (EX1002), demonstrates that there is a reasonable likelihood that Petitioner would prevail with respect to at least one challenged claim. 35 U.S.C. § 314(a). Petitioner respectfully requests institution.

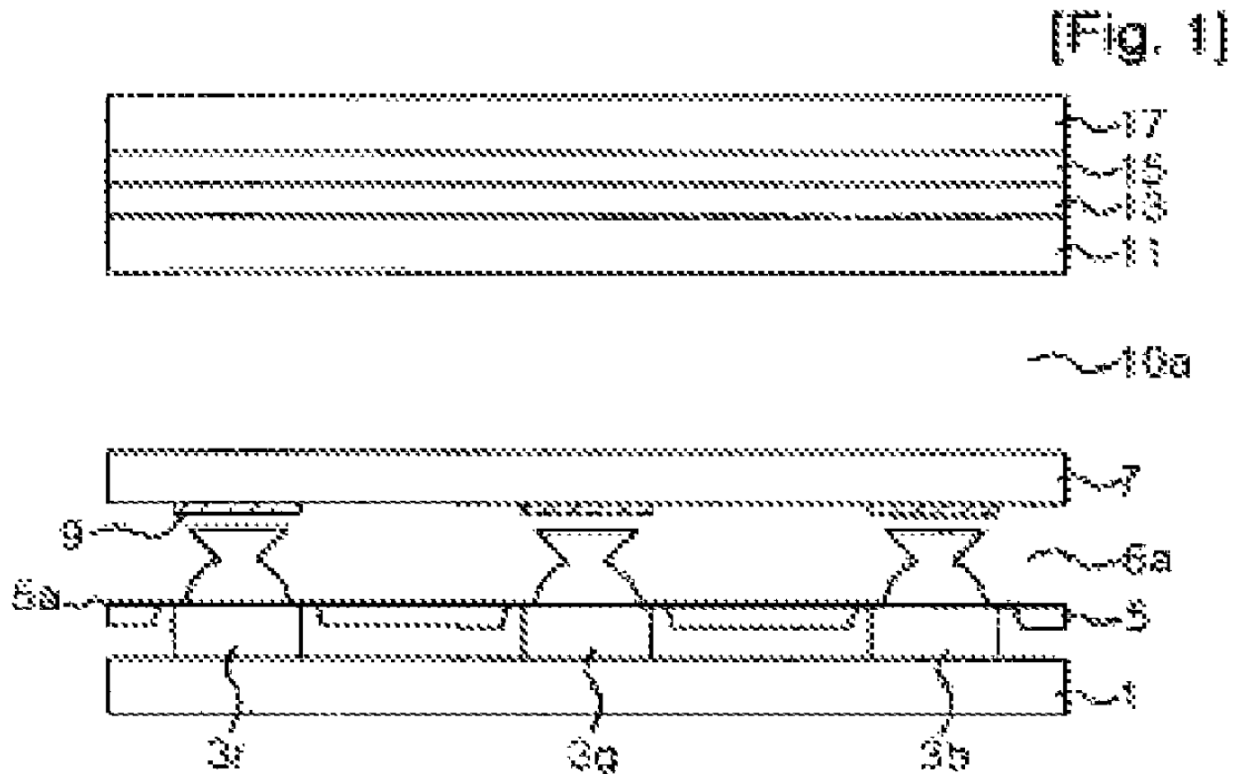
VI. Technology Background

A. Backlight Panels In Liquid Crystal Display (LCD) Device

A liquid crystal display (LCD) device includes an LCD panel that uses light-modulating properties of liquid crystals to display information, such as an image. EX1018, 1:12-26. Because liquid crystals do not emit light, information displayed on LCD panels may be difficult to see, particularly in low-light conditions. To improve the visibility of displayed information, an LCD device typically illuminates the LCD panel using a device called a backlight panel or a backlight unit. EX1016, [0012], [0045]. EX1002, ¶35.

Backlight panels date back several decades. *See, e.g.*, EX1019 (filed in 1979). A backlight panel typically includes multiple light sources that generate light, and other components designed to make the light uniform such that the LCD panel is uniformly illuminated without hot spots. *See generally* EX1001, 1:45-2:31 (describing “Background Art”). Those other components include, for example, a

light mixing chamber for mixing light from multiple light sources; a diffusion sheet that diffuses light to make the light uniform; a reflection sheet that reflects light from the light sources towards the LCD panel; and a brightness enhancement sheet that directs light towards the LCD panel to improve the brightness of the LCD panel. See EX1001, 1:58-2:31; EX1005, [0022], [0030], [0032], Figure 3; EX1016, [0020], [0052]. One example of an admittedly known prior art backlight panel is shown in Figure 1 of the '952 Patent, reproduced below.



EX1001, Figure 1. EX1002, ¶¶36-37.

B. White Light Emitting Diodes For Backlight Panels

Typically, backlight panels illuminate LCD panels using white light so that LCD panels can clearly show a large number of colors (in other words, have a large color gamut). *See* EX1011, 1:22-28. Backlight panels have traditionally used a variety of light sources to generate white light, for example, incandescent lamps (EX1019, 2:33-37) and fluorescent lamps (EX1020, 4:35-48). With the development of light emitting diodes (“LEDs”) that tend to have a longer useful life and lower power consumption than other light sources (EX1004, 1:18-21; EX1007, 3:11-15), backlight panels with LEDs became prevalent (*see, e.g.*, EX1001, Figure 1; EX1003, Figures 1, 3, [0012]-[0013]). EX1002, ¶38.

One of the challenges with using LEDs in backlight panels is that LEDs do not natively emit white light; instead, LEDs emit only certain specific colors, such as red, green, and blue. EX1009, 1:16-19. Accordingly, backlight panels with LEDs typically generate white light either by: (1) mixing red, green, and blue lights generated by a collection of red, green, and blue LEDs (*see, e.g.*, EX1001, 1:48-51, 2:7-19; EX1003, [0021]); or (2) arranging, on a blue LED, phosphors that emit red and green light (*see, e.g.*, EX1004, 14:10-20). In the latter example, the blue LED and the phosphors collectively generate white light because: (1) the phosphors absorb blue light from the blue LED and emit red and green light; and (2) the blue light from the blue LED and the red and green light from the phosphors are then

mixed to form white light. The phosphors may be arranged on the blue LED chip by covering the blue LED chip with a resin that includes the phosphor particles. See EX1004, Figure 5, 14:10-20; EX1008, [0031]. EX1002, ¶39.

VII. Overview Of The '952 Patent

A. Alleged Problems

The '952 Patent relates to “a backlight panel for back lighting a display panel,” (EX1001, 1:19-20) and it purports to address problems with backlight panels that used a collection of red, green, and blue LEDs to generate white light. EX1002, ¶40.

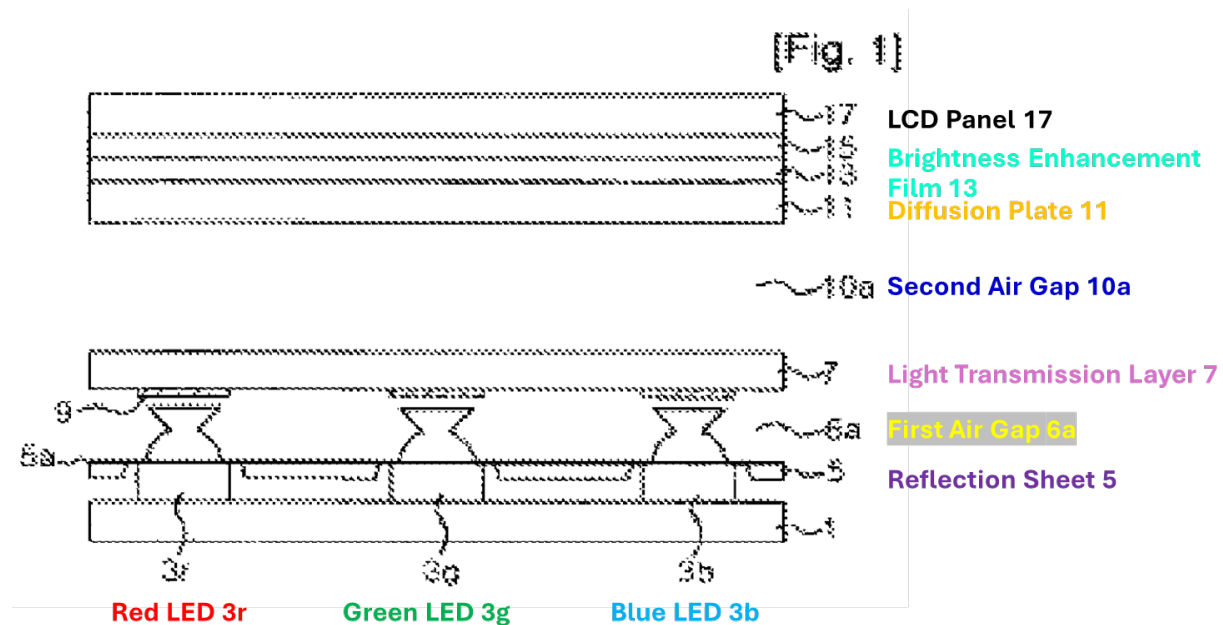
As a way of background, the '952 Patent shows, in Figure 1 (reproduced below), a “conventional backlight panel for backlighting an LCD panel [] using light emitting diodes (LEDs).” EX1001, 1:45-47. The '952 Patent explains that a conventional backlight panel includes:

- (1) “red, green, and blue LEDs” (3r, 3g, 3b) that generate red, green, and blue lights, respectively;
- (2) a reflection sheet 5 that reflects light from the red, green, and blue LEDs towards an LCD panel 17;
- (3) a first air gap 6a that mixes the red, green, and blue lights to generate white light;
- (4) a light transmission layer 7 that transmits the mixed light;

(5) a **second air gap 10a** that further mixes the light transmitted through the **light transmission layer 7**;

(6) a **diffusion plate 11** that diffuses the light received from the **second air gap 10a** to make it more uniform; and

(7) a **brightness enhancement film (BEF) 13** positioned on a top surface of the **diffusion plate 11**. EX1001, 1:45-2:31. EX1002, ¶41.



EX1001, Figure 1.¹ EX1002, ¶41.

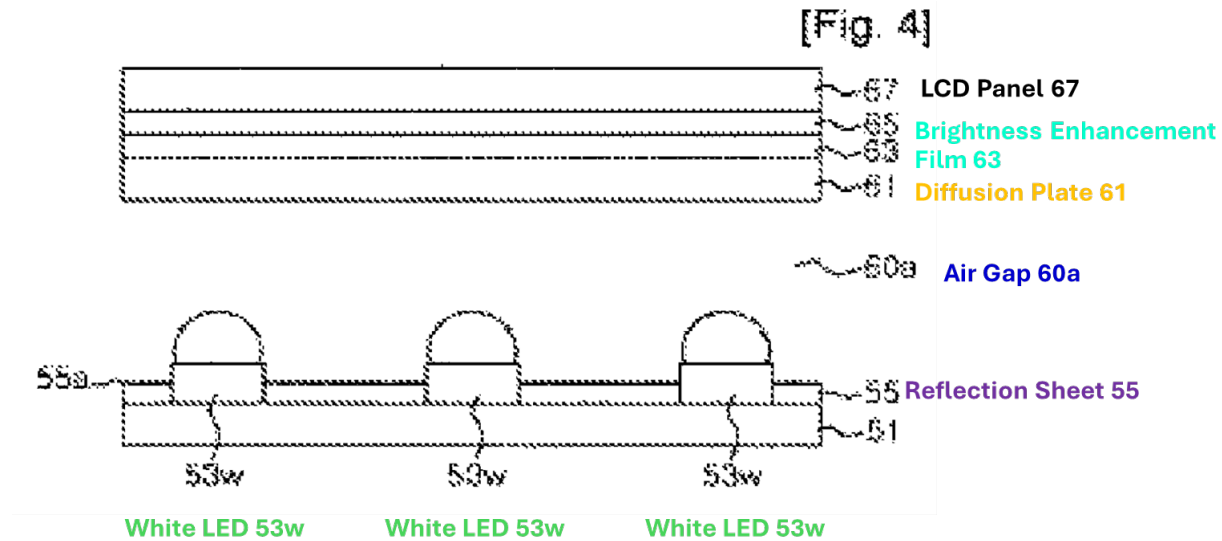
The '952 Patent states that using a collection of separate red, green, and blue LEDs in a backlight panel is undesirable. A conventional backlight panel with red, green, and blue LEDs needs multiple air gaps—the **first air gap 6a** and the **second**

¹ All annotations are added unless noted otherwise.

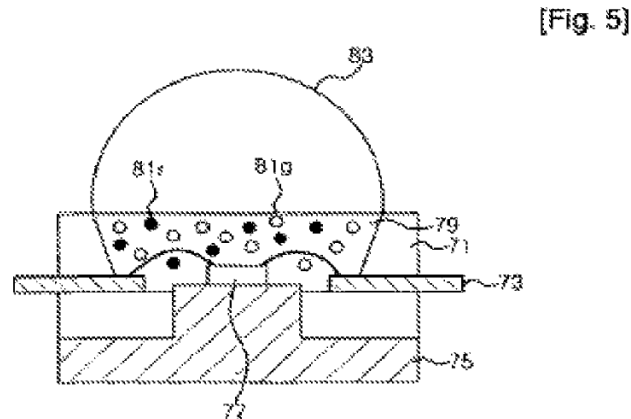
air gap 10a—to create white light, and those air gaps “increase [the] thickness of a backlight panel.” EX1001, 2:34-41. Also, “while light emitted from the LEDs [is being] mixed, light loss [is] generated,” and that loss has to be “compensated [for] by increasing an amount of current supplied to the LEDs, by using a larger number of LEDs or by using the [brightness enhancement film].” EX1001, 2:42-46. Such adjustments leads to a higher power consumption, higher manufacturing cost, and increased thickness of the backlight panel. EX1002, ¶42.

B. Purported Invention

The '952 Patent purports to address those alleged problems by replacing the collection of red, green, and blue LEDs with “white light emitting diode[s] with red and green phosphors” that independently generate white light. EX1001, 2:66-3:1. Figure 4 of the '952 Patent, reproduced below, shows a backlight panel with such white LEDs. Here, “white LEDs 53w are arranged below the bottom surface of the diffusion plate 61 at a certain interval from the diffusion plate 61.” EX1001, 6:14-25. “Each of the white LEDs 53w includes a blue LED chip, and green and red phosphors positioned over the blue LED chip,” as shown in Figure 5 reproduced below. EX1001, 6:20-22. “The red and green phosphors may be ... positioned in a molding member 79 in a state where they are contained therein as shown in [Figure 5]. The molding member 79 may be made of an epoxy or silicone resin” EX1001, 7:45-50. EX1002, ¶¶43-44.



EX1001, Figure 4. EX1002, ¶44.



EX1001, Figure 5. EX1002, ¶44.

Notably, the backlight panel in Figure 4 (shown above) is substantially similar to the conventional backlight panel in Figure 1 (shown in Section VII.A [Alleged Problems]). The main distinction between the two is that the panel in Figure 4 uses white LEDs instead of a collection of red, green, and blue LEDs. Because each of the white LEDs (*i.e.*, blue LEDs with overlying red and green phosphors)

individually generates white light, the purported invention no longer needs the first air gap 6a and the light transmission layer 7, and the LEDs emit white light directly onto the lower surface of the diffusion plate 61. *See* EX1001, Figures 1, 5; 6:49-55. EX1002, ¶45.

C. Prosecution History Of The '952 Patent

The '952 Patent originated from U.S. Application No. 12/904,219 ("’219 Application"), filed October 14, 2010, which is a continuation of U.S. Application No. 11/909,700 ("’700 Application"), filed September 25, 2007, which, in turn, is a national stage application of PCT Application No. PCT/KR2006/000885, filed March 13, 2006, which claims priority to Korean Patent Application No. 10-2005-0027133, filed March 31, 2005. EX1014 [FH of the '219 Appl./'952 Patent], 5-6; EX1015 [FH of the '700 Appl.]. EX1002, ¶¶46-47.

The '219 Application was originally filed with claims 1-8. During the prosecution of the '219 Application, claims 1, 2, 4, and 5 were rejected as being obvious over U.S. Patent Application Pub. No. 2005/0254258 ("Lee '258") in view of U.S. Patent Application Pub. No. 2005/0247953 ("Lin"). EX1014, 812-813. The claims 1-8 of the '219 Application were also rejected for obviousness-type double patenting against claims 1-7 of the '700 Application. EX1014, 813-814, 962-966. EX1002, ¶48.

In response, Applicant antedated Lee '258 by showing that the Applicant's earliest priority document—KR10-2005-0027133—provides §112 support for the claims of the '219 Application and that KR10-2005-0027133 predates the United States filing date of Lee '258.² EX1014, 934-939. Applicant also overcame the obviousness-type double patenting rejection by filing a terminal disclaimer. EX1014, 988, 994-998. EX1002, ¶¶49-51.

Subsequently, the original claims 1-8 of the '219 Application issued as claims 1-8 of the '952 Patent. EX1002, ¶¶52-53.

VIII. Level Of Ordinary Skill In The Art

“Factors that may be considered in determining level of ordinary skill in the art include: (1) the educational level of the inventor; (2) type of problems

² Lee '258, assigned to Petitioner, claims priority to the Korean Patent Application No. KR-10-2004-0032181 that was filed *before* the Korean priority application of the '952 Patent. *Compare* EX1010, Cover (“Assignee: Samsung Electronics Co., LTD.”; “Foreign Application Priority Data[,], **May 7, 2004**), *with* EX1001, Cover (“Foreign Application Priority Data[,], **Mar. 31, 2005**”). But Applicant overcame Lee '258 on the basis that Lee '258's earlier Korean application date does not qualify as the § 102(e) date under the pre-AIA patent statutes. *See In re Hilmer*, 359 F.2d 859 (C.C.P.A. 1966).

encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of active workers in the field.” *Env’t Designs, Ltd. v. Union Oil Co. of California*, 713 F.2d 693, 696 (Fed. Cir. 1983). However, “[n]ot all such factors may be present in every case, and one or more of these or other factors may predominate.” *Id.*

The ’952 Patent is directed to a backlight panel that uses light emitting diodes. *See* EX1001, Title, Abstract (“Disclosed is a backlight panel employing a white light emitting diode. The white light emitting diode includes a blue light emitting diode chip and red and green phosphors positioned over the blue light emitting diode chip”). As Dr. Kymissis notes, the field of back light panels with LEDs was well-established by the claimed priority date of March 31, 2005. For example, as explained in Section VI.A, backlight panels date back several decades. *See, e.g.,* EX1019 (filed in 1979). And by March 31, 2005, backlight panels using LEDs were widely used. *See, e.g.,* EX1003–EX1006. *See also* EX1004, 1:22-23 (“In recent years, white light emitting diodes have been widely used as a backlight for liquid crystal displays (LCD).”). EX1002, ¶54.

Accordingly, a person of ordinary skill in the relevant field or art (“POSITA”) as of the earliest claimed priority date of the ’952 Patent would have had a Bachelor’s degree in Electrical Engineering, Electronics Engineering, Material Science,

Physics, or an equivalent field, and approximately two years of experience in the field of display design, including LCD displays. Lack of professional experience can be substituted by additional education, and vice versa. EX1002, ¶55.

IX. Claim Construction

The claims should be construed “in accordance with the ordinary and customary meaning of such claims as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” 37 C.F.R. § 42.100(b); *see also Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (*en banc*). Moreover, the Board “need[s] only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’” *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor, Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). Petitioner submits that no terms require construction for the purposes of this IPR.³ EX1002, ¶¶57-58.

X. Specific Grounds Of Invalidity

A. Ground I: Hong And Lee Render Obvious Claims 1, 2, 4, And 5.

1. Overview Of Hong

Hong is directed to a “liquid crystal display panel with a reduced thickness, a lower weight and an improved picture quality.” EX1003, [0027]. Like the ’952

³ Petitioner reserves all rights to raise claim construction arguments in other forums.

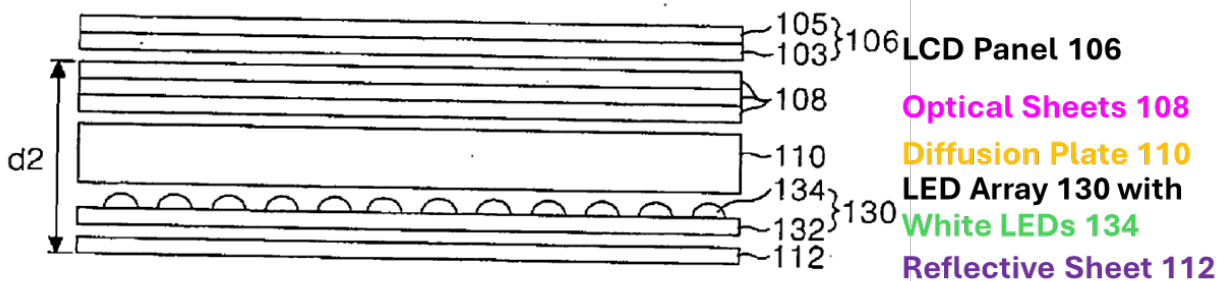
Patent, Hong explains that prior art backlight panels used “red, green, and blue lights emitted from the LED arrays” which were then “combined to be converted into a white light.” EX1003, [0008], [0017], [0023]. Hong observes, however, that such prior art backlight panels had “a large thickness” and were heavy. EX1003, [0025]. EX1002, ¶¶59-62.

Hong addresses such “drawbacks” of then-existing backlight panels by replacing a collection of red, green, and blue LEDs with an array of LEDs that individually “emit[] a white light,” just like the ’952 Patent. *See* EX1003, [0049]-[0054]. Specifically, Hong teaches, as shown in Figure 6 reproduced below, a backlight unit that includes:

- (1) an LED array 130 with LEDs 134 that “emit[] a *white light*” “for irradiating [the white] light onto the liquid crystal display panel 106”;
- (2) a “reflective sheet 112 [] disposed at a rear side of the LED array 130” that redirects the light from the LED array 130 towards the LCD panel 106;
- (3) a “diffusion plate 110 [that] diffuses a light input from the LED array 130 to irradiate the light onto the liquid crystal display panel 106”;
- (4) “a gap between the diffusion plate 110 and the LED array 130”; and
- (5) a “plurality of optical sheets 108 [that] vertically raises light output from the diffusion plate 110 to thereby improve light efficiency.” EX1003, [0050], [0053]-[0057], [0059], [0078]. *See also* EX1003, [0067] (teaching that a backlight

unit includes an LED array with LEDs, a reflective sheet, a diffusion plate, and optical sheets). EX1002, ¶63.

FIG. 6



EX1003, Figure 6. EX1002, ¶63.

Hong explains that by using white LEDs instead of a collection of red, green and blue LEDs, the “gap between the diffusion plate 110 and the LED array 130” is reduced which, in turn, also reduces the “thickness of the backlight unit” (*i.e.*, “d2”). EX1003, [0059]-[0060] (“Furthermore, it becomes possible to apply *the LED array 130 emitting a white light, thereby reducing a gap between the diffusion plate 110 and the LED array 130. A thickness of the backlight unit also is reduced in*

accordance with the reduction of the gap between the diffusion plate 110 and the LED array 130. Specifically, the LED array 130 inherently emits a white light to thereby eliminate a requirement of the desired distance for combining the red, green and blue light to generate a white light. Due to the above-mentioned structure, *a thickness ‘d2’ of the backlight unit of the liquid crystal display module 100 according to the first embodiment of the present invention is reduced* compared to the thickness ‘d1’ of the backlight unit of the related art liquid crystal display module 1.”), Figure 6. EX1002, ¶64.

2. Hong In Combination With Lee (“Hong/Lee”)

As described in Section X.A.1 [Overview of Hong], Hong teaches a backlight unit with LEDs, each of which may be “a point light source and [] emit[] white light.” EX1003, [0054]. Hong does not specifically disclose how such white LEDs are implemented. Such white LEDs and their respective components, however, were well known in the art. EX1002, ¶¶65-66.

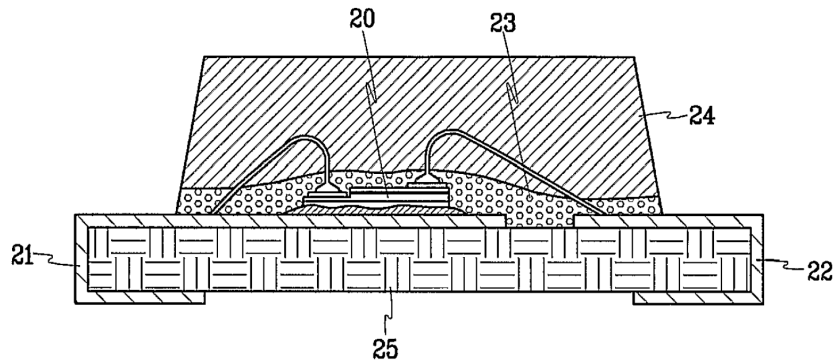
For example, Lee discloses that “white light emitting diodes have been widely used as a backlight for liquid crystal displays (LCD).” EX1004, 1:22-23. *See also* EX1004, 15:20-16:2. Lee explains that such white LED may be formed as a “blue LED” with an overlying resin layer having green phosphors and red phosphors. EX1004, 3:21-4:3 (“The inventive white light semiconductor light emitting device has a **blue LED** having a light emitting chip with a permeable **resin layer** with which

a silicate-base green phosphor and a selenium-base red phosphor are mixed, thereby emitting white light generated by a combination of blue light emitted from the blue LED, green light emitted from the silicate-base phosphor absorbing a portion of the blue light, and red light emitted from the selenium-base red phosphor absorbing a portion of the blue light.”). Specifically, Lee shows, in Figure 5 (reproduced below), “a schematic view of a surface mounting type white light semiconductor light emitting device of a PCB type, which utilizes a barium-silicate-base green phosphor and a zinc-selenium-base red phosphor.” EX1004, 14:10-14.

Lee explains:

A white light semiconductor light emitting device of this embodiment comprises an **LED chip 20**, an anode lead 22, a cathode 15 lead 21, and an **epoxy resin layer 23 containing phosphors**. The LED chip 20 is located on a PCB 25, having N-type and P-type electrodes connected to the leads 21 and 22, respectively. **The phosphors contained in the epoxy mold layer 23 include a barium-silicate-base green phosphor and a zinc-selenium-base red phosphor.** ... The **LED chip 20** may be formed of a **blue LED chip** or a UV LED chip.

EX1004, 14:13-21. EX1002, ¶¶67-68.

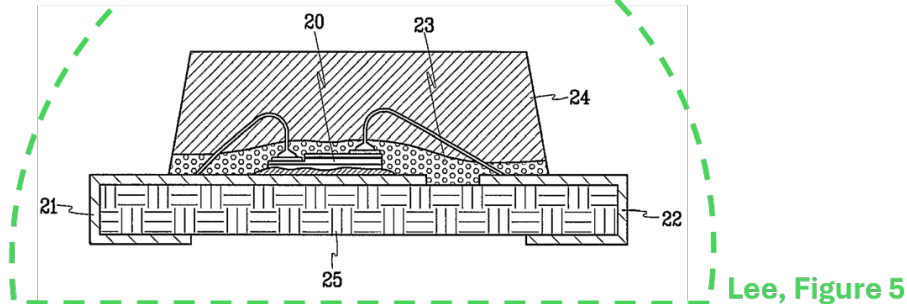
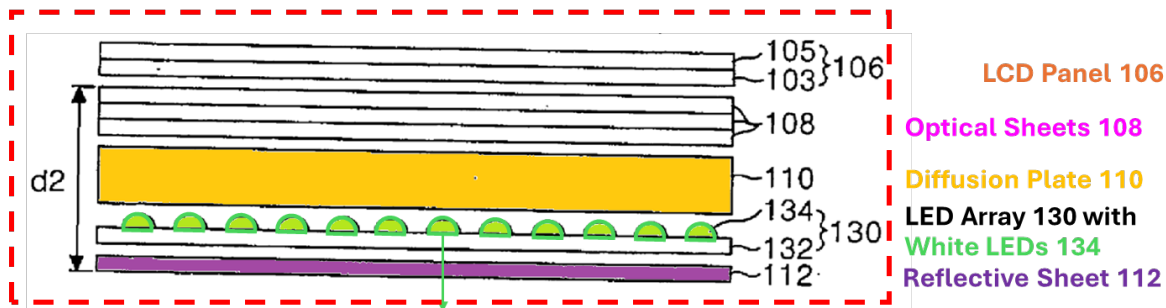


EX1004, Figure 5. EX1002, ¶68.

Since Lee specifically teaches that “white light emitting diodes have been widely used as a backlight for liquid crystal displays (LCD)” (EX1004, 1:22-23) and that Lee’s white LEDs are “appropriate for the backlight of a LCD” (EX1004, 15:22-16:2), a POSITA would have found it obvious to combine Hong with Lee to use Lee’s white LEDs as Hong’s white LEDs, as shown below. EX1002, ¶69.

Hong In Combination With Lee

Hong, Figure 6



EX1003, Figure 6; EX1004, Figure 5. EX1002, ¶69.

i. Reasons To Combine Hong’s Backlight Unit With Lee’s White LED With A Reasonable Expectation Of Success

A POSITA would have been motivated to combine Hong with Lee as described above. Hong explains that each LED in the backlight unit “emits white light” (EX1003, [0054]), but it does not specifically disclose how such white LED is implemented. Accordingly, a POSITA would have been motivated to look for teachings of white LEDs for backlight panels, and would have understood that Lee teaches white LEDs that would be readily incorporated into Hong’s backlight unit for an LCD display. EX1004, 1:22-23, 3:21-4:3. EX1002, ¶¶70-71.

Lee specifically motivates using Lee's white LEDs in Hong's backlight unit. Lee teaches that there are several ways to implement white LEDs for backlight panels. For example, Lee teaches that the white LEDs can be implemented as (1) a blue LED with overlying yellow phosphors or (2) "a package composed of red, green, and blue LEDs." EX1004, 1:22-2:5. Lee, however, explains that those designs have "a color purity problem" and are costly to manufacture. EX1004, 2:5-7 ("However, the phosphor material used for the white LED using the blue LED having the frequency range of 450-470 nm is limited to YAG:Ce, which has a color purity problem."); EX1004, 2:8-12 ("In order to make a white light semiconductor light emitting device using the red, green, and blue LEDs, a variety of substrates such as GaAS, ALGaInP, InGaN, and GaN should be separately prepared, utilizing different semiconductor layers. This causes the manufacturing costs to be increased, while complicating the manufacturing process."). EX1002, ¶¶72-73.

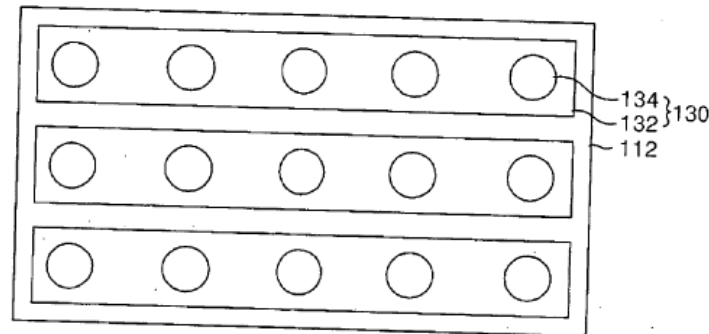
Lee then explains that its inventive white LED—made using a blue LED and overlying green and red phosphors—"is more appropriate for the backlight of a LCD" than the alternative designs because its white LEDs do not suffer from similar issues. EX1004, 15:22-16:2. *See also* EX1004, 17:11-15 ("Particularly, ***by applying green and red phosphors to a single blue LED chip***, the white light is realized, thereby providing ***high quality color purity*** as compared with a prior semiconductor light emitting device having red, green, and blue LED chips, while ***reducing the***

manufacturing costs simply and simplifying manufacturing processes.”).

Accordingly, a POSITA would have been motivated to use Lee’s white LEDs—which include a blue LED with overlying green and red phosphors—in Hong’s backlight unit to obtain predictable results of improving the color purity and reducing manufacturing costs. EX1002, ¶74.

A POSITA would have had a reasonable expectation of success in combining Hong’s backlight unit with Lee’s white LED. **First**, Hong’s backlight unit is compatible with Lee’s white LEDs. Hong teaches that the LED array 130 in the backlight unit includes multiple LEDs 134 that are mounted on a printed circuit board (PCB) 132, as shown in Figure 7 (reproduced below). EX1003, [0054] (“The **PCB 132 supports the LED 134** and controls an emission of the LED 134 by a circuit configured thereon.”). Lee’s white LED, too, is “a **surface mounting type** white light semiconductor light emitting device” (EX1004, 14:10-13) that is surface-mounted on a PCB. Accordingly, a POSITA would have understood that Lee’s white LEDs would readily be used in Hong’s LED array 130 to provide white light to the LCD panel. EX1002, ¶75.

FIG. 7



EX1003, Figure 7. EX1002, ¶75.

Second, the combination would have merely amounted to a simple substitution of known white LEDs (Hong’s white LEDs 134 in the LED array 130 of the backlight unit) for other known white LEDs (Lee’s white LEDs that include blue LEDs with overlying green and red phosphors) to obtain predictable results of providing white light in Hong’s backlight unit. For example, Hong’s backlight unit includes an array of white LEDs to illuminate the LCD panel. EX1003, [0054] (“As shown in FIG. 7, the LED array 130 ... includes a plurality of LED’s 134 ... The LED 134 is a point light source and which emits a *white light*.”); [0059] (“it becomes possible to apply the LED array 130 emitting a *white light*...”), FIG. 7. And Lee teaches a specific implementation of white LEDs that is “appropriate for the

backlight of a LCD.” EX1004, 15:22-16:2. Accordingly, a POSITA would have understood that the combination of Hong’s backlight unit with Lee’s white LEDs would have obtained predictable results of providing white light from Lee’s white LEDs to Hong’s LCD display panel. EX1002, ¶76.

At a minimum, it would have been obvious to try to use Lee’s white LEDs in Hong’s backlight unit. Hong does not explicitly describe how its white LEDs 134 are implemented, and thus, a POSITA would have been motivated to find some exemplary implementations of white LEDs (a design gap) that were known in the art. And Lee expressly teaches multiple predictable solutions of white LEDs: (1) a package that includes red, green, and blue LEDs; (2) a blue LED with overlying yellow phosphors; and (3) a blue LED with overlying green and red phosphors. EX1004, 1:22-2:7, 17:11-15. A POSITA would have had a reasonable expectation of success in using such white LEDs in Hong’s backlight unit because Lee itself teaches that “white light emitting diodes have been widely used as a backlight for liquid crystal displays (LCD).” EX1004, 1:22-23. Indeed, as described above, a POSITA would have had a reasonable expectation of success in using a blue LED with overlying green and red phosphors as the white LED in Hong’s backlight unit. Accordingly, it would have been common sense, and would have been obvious to try, to use a blue LED with overlying green and red phosphors as the white LED in Hong’s backlight unit. EX1002, ¶¶77-79.

3. Claim 1

i. [1Pre] A backlight panel, comprising:

Hong/Lee teaches a “backlight panel.” EX1002, ¶80.

Hong discloses a Liquid Crystal Display (LCD) module that includes an LCD panel and a **backlight unit** (the claimed “**backlight panel**”). EX1003, Title, [0006] (“The liquid crystal display module consists of a liquid crystal display panel ... and a **backlight unit** for irradiating a light on the liquid crystal display panel.”). EX1002, ¶81.

Hong’s “**backlight unit**” is the claimed “**backlight panel**” for two reasons. *First*, the “**backlight unit**” irradiates light onto the LCD panel, just like the “**backlight panel**” of the ’952 Patent. *Compare* EX1001 [’952 Patent], 1:34-36 (“a backlight panel for backlighting a display panel”) *with* EX1003 [Hong], [0006] (“a backlight unit for irradiating light onto the liquid crystal display panel.”). EX1002, ¶¶82-83.

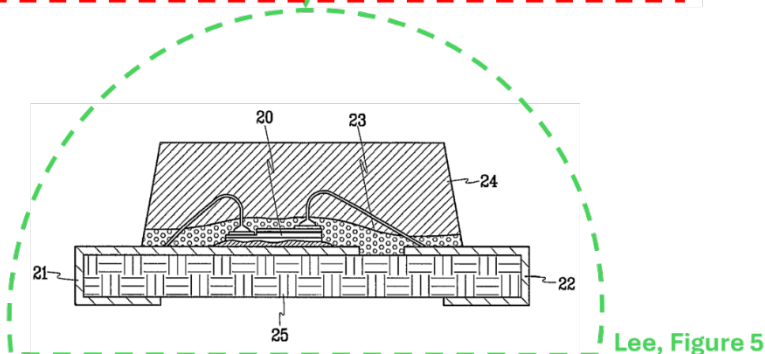
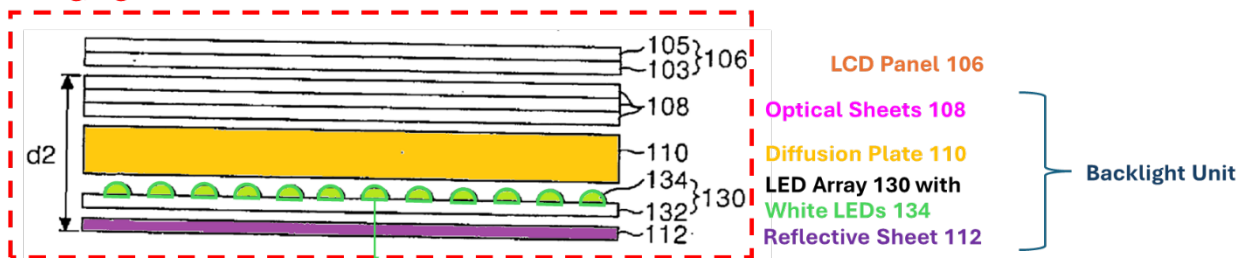
Second, as more fully explained below in Sections X.A.3.ii-X.A.3.iv, X.A.4, X.A.5 [limitations [1A]-[1C], Claims 2, 4], just like the “**backlight panel**” claimed in the ’952 Patent, the “**backlight unit**” includes a **diffusion plate**, **white LEDs**, a **reflective sheet**, **optical sheets**, and an air gap. EX1002, ¶84.

For example, “[t]he **backlight unit** includes a light emitting diode (LED) array 130 [with **white LEDs**] for irradiating a light onto the liquid crystal display panel 106” (EX1003, [0053]) and “a **diffusion plate** 110” (EX1003, [0059] (“The backlight

unit consists of a single diffusion plate 110.”)). The **backlight unit** also includes the reflective sheet 112, the **optical sheets** 108, and the air gap: the “thickness ‘d2’ of the **backlight unit**” depicted in Figure 6 of Hong includes the thickness of the reflective sheet 112, the **optical sheets** 108, and the “gap between the diffusion plate 110 and the LED array 130.” EX1003, [0053], [0059]. Indeed, “a **backlight unit** [] irradiat[es] a light onto the liquid crystal display panel” (EX1003, [0006]), which is the collective function of a diffusion plate, LED array, reflective sheet, optical sheets, and the gap. *See also* EX1003, [0067] (“a **backlight unit** of the liquid crystal display module 200 according to the second embodiment of the present invention includes a light emitting diode (LED) array 230, a **diffusion plate** 210, a **reflective sheet** 212 and a plurality of **optical sheets** 208.”). EX1002, ¶¶85-86.

Hong In Combination With Lee

Hong, Figure 6

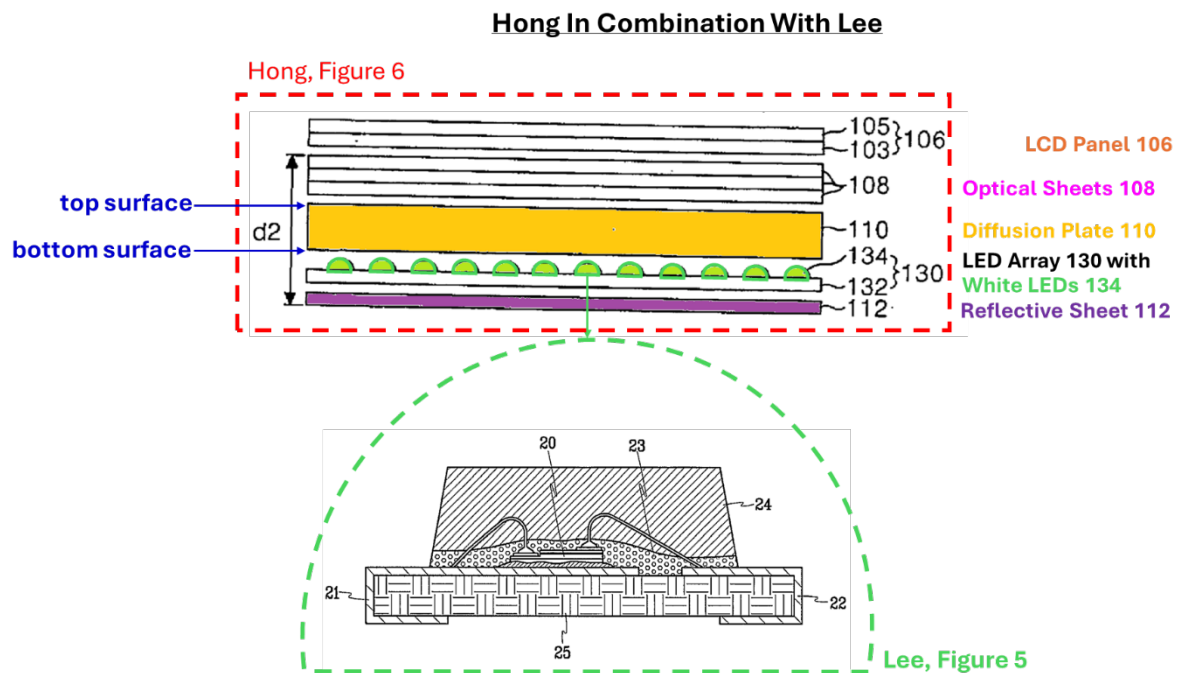


EX1003, Figure 6; EX1004, Figure 5. EX1002, ¶86.

- ii. [1A] a **diffusion plate** comprising a top surface and a bottom surface;

Hong/Lee teaches limitation [1A]. EX1002, ¶87.

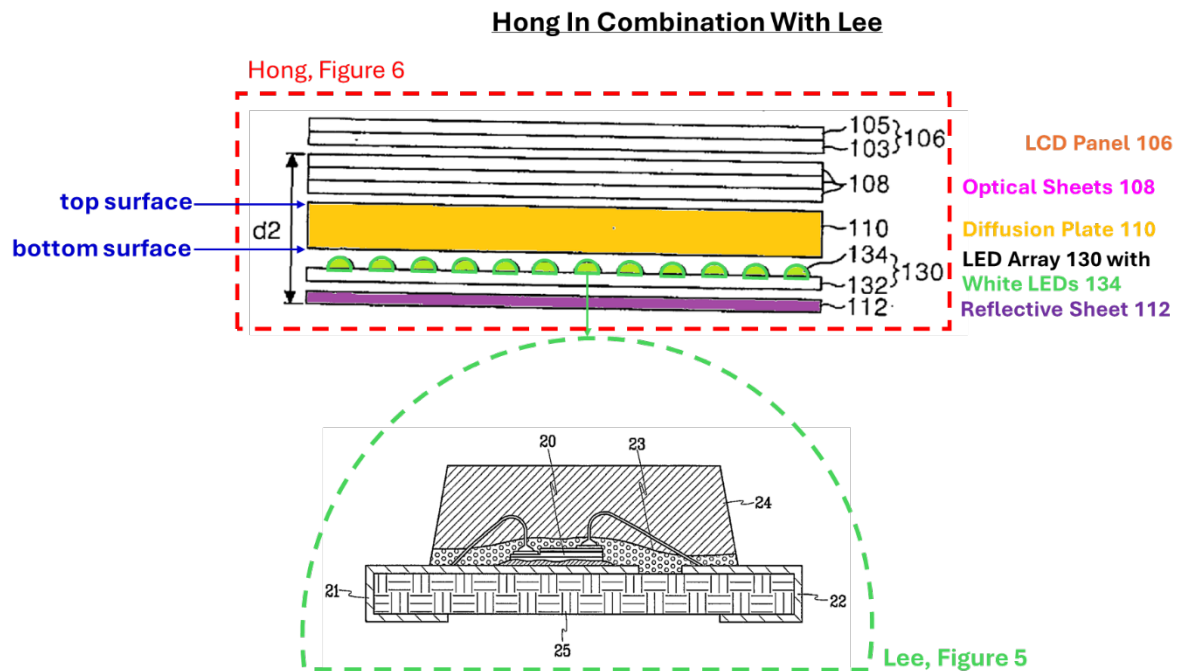
First, the backlight unit in Hong/Lee includes “a **diffusion plate**.” For example, “the backlight unit consists of a single **diffusion plate** 110.” EX1003, [0059]. “The **diffusion plate** 110 diffuses a light input from the LED array 130 to irradiate the light onto the liquid crystal display panel 106.” EX1003, [0053]. EX1002, ¶¶88-89.



EX1003, Figure 6; EX1004, Figure 5. EX1002, ¶89.

Second, the **diffusion plate** has a “top surface and a bottom surface.” As annotated below, the “diffusion plate 110” includes a top surface facing the LCD

panel 106 and a bottom surface facing the LEDs 134 in the LED array 130. EX1002, ¶90.



EX1003, Figure 6; EX1004, Figure 5. EX1002, ¶90.

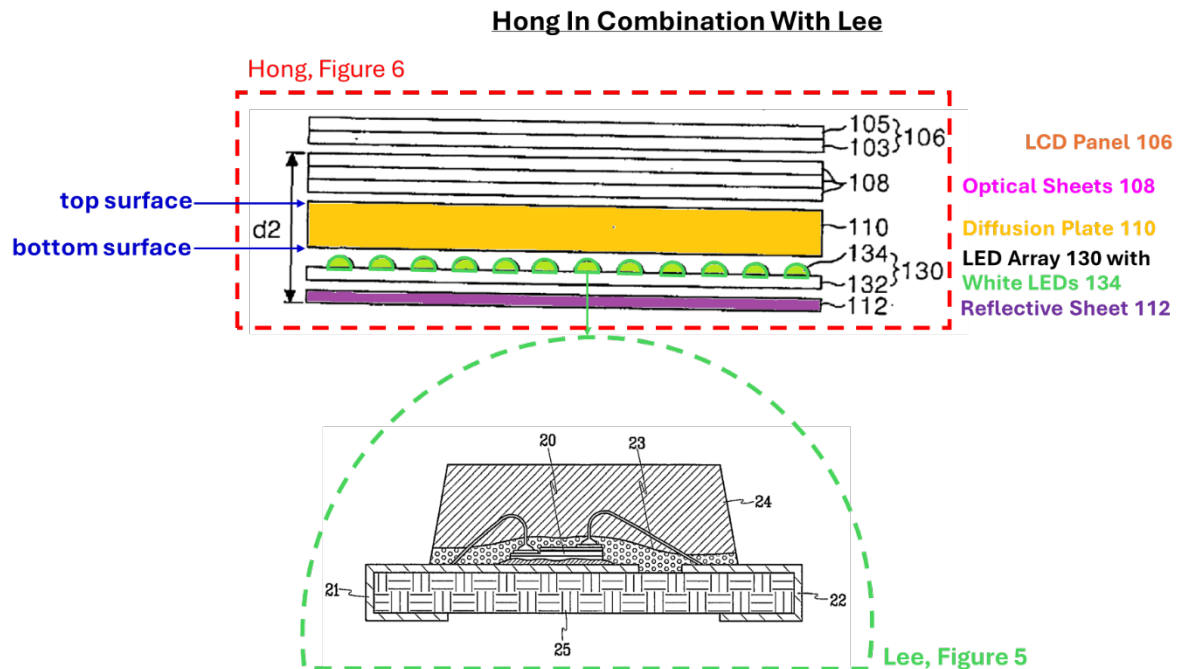
- iii. [1B] a plurality of white light emitting diodes arranged below the bottom surface of the diffusion plate, the white light emitting diodes to emit light directly onto the bottom surface of the diffusion plate;

Hong/Lee teaches limitation [1B]. EX1002, ¶91.

First, the backlight unit in Hong/Lee includes “a plurality of white light emitting diodes.” For example, “[t]he backlight unit includes a light emitting diode (LED) array 130 for irradiating a light onto the liquid crystal display panel 106.” EX1003, [0053]. The LED array 130 includes a plurality of white LEDs 134 (the claimed “plurality of white light emitting diodes”). EX1003, [0054] (“the LED array

130 ... includes a plurality of LED's 134 for generating lights ... The LED 134 is a point light source and which emits *a white light*."); [0059] ("the LED array 130 inherently emits a *white light*"); claim 12 ("generating a white light using a *white light emitting diode*."). EX1002, ¶¶92-93.

Second, the white LEDs 134 in the LED array 130 are "arranged below the bottom surface of the diffusion plate." For example, "the LED array 130[, which includes the white LEDs 134,] is located at the *rear side* of the diffusion plate" (EX1003, [0059]), as shown below. EX1002, ¶94.



EX1003, Figure 6; EX1004, Figure 5. EX1002, ¶94.

Third, the white LEDs 134 "emit light directly onto the bottom surface of the diffusion plate." As shown above, the white LEDs 134 are located "at the rear

side of the **diffusion plate**” (EX1003, [0059]) and “[a] light generated from the **LED 134** is incident onto the **diffusion plate 110**” (EX1003, [0054]). The light from the **LEDs 134** is incident “directly onto” the bottom surface of the **diffusion plate 110** because the **LEDs 134** are directly facing—without any intervening physical structure blocking the light—the bottom surface of the **diffusion plate 110**, and the **LEDs 134** are not coupled to any lenses that redirect the LEDs’ light away from the vertical direction. EX1002, ¶¶95-97.

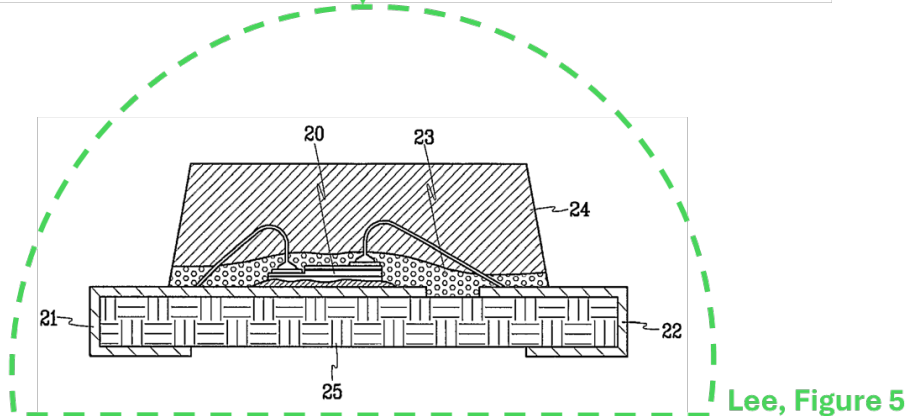
- iv. [1C] a **reflection sheet** arranged below light exit surfaces of the **white light emitting diodes**, the **reflection sheet** to reflect light toward the **diffusion plate**,

Hong/Lee teaches limitation [1C]. EX1002, ¶98.

First, the backlight unit in Hong/Lee includes “a **reflection sheet**.” For example, the backlight unit includes a “**reflective sheet 112**” (the claimed “**reflection sheet**”) that is “disposed at a rear side of the LED array 130.” EX1003, [0053]. Just like the claimed “**reflection sheet**” that “reflects light emitted from the LEDs in an upward direction” (EX1001, 1:60-61), the “**reflective sheet 112**” in Hong reflects the “[l]ight propagated toward the bottom of the LED array 130 ... toward the output face, which is the liquid crystal display panel 106,” as annotated below in pink. EX1003, [0056]. EX1002, ¶¶99-100.

Hong In Combination With Lee

Hong, Figure 6

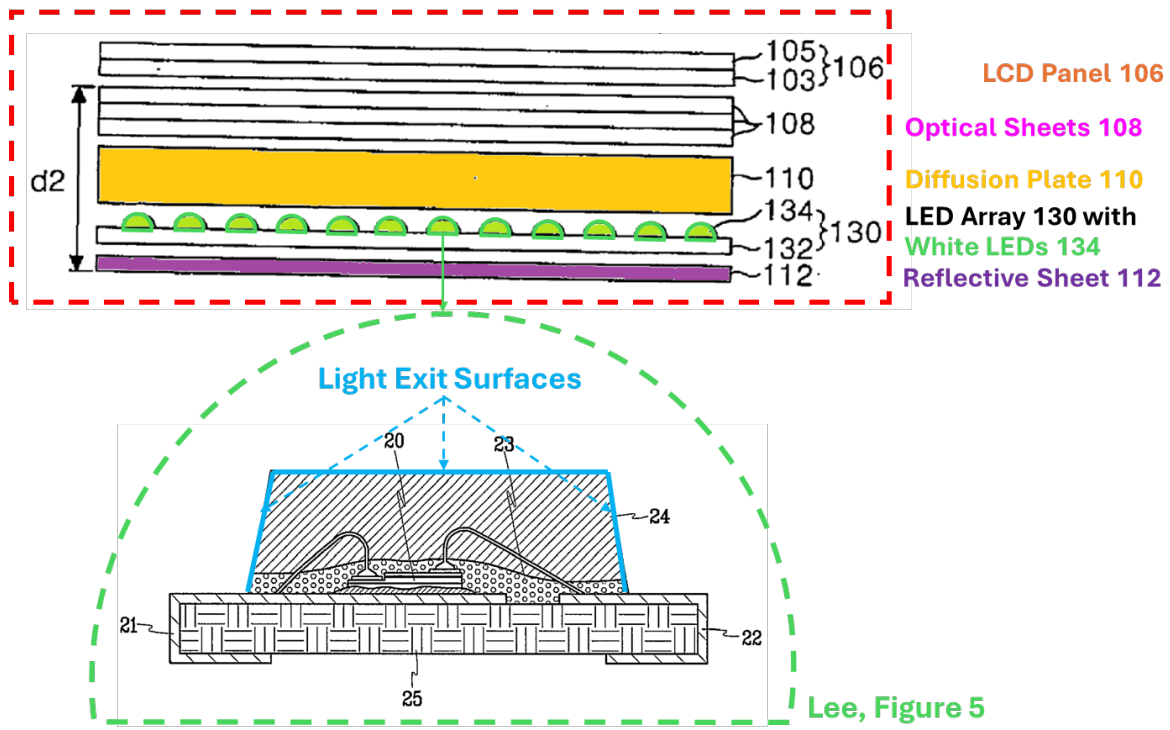


EX1003, Figure 6; EX1004, Figure 5. EX1002, ¶100.

Second, the reflective sheet 112 is “arranged below light exit surfaces of the white light emitting diodes.” For example, the “reflective sheet 112 is disposed at a rear side of the LED array 130” that includes the white LEDs 134. EX1003, [0053], [0056]. Accordingly, in the Hong/Lee combination, the reflective sheet 112 is arranged below the surfaces at which the light exits the white LEDs 134, as annotated below. EX1002, ¶101.

Hong In Combination With Lee

Hong, Figure 6

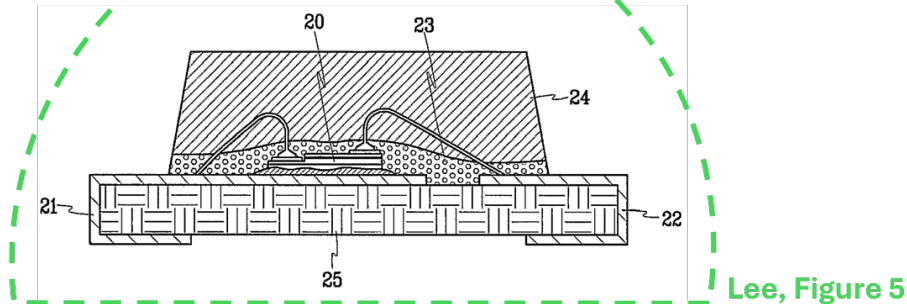
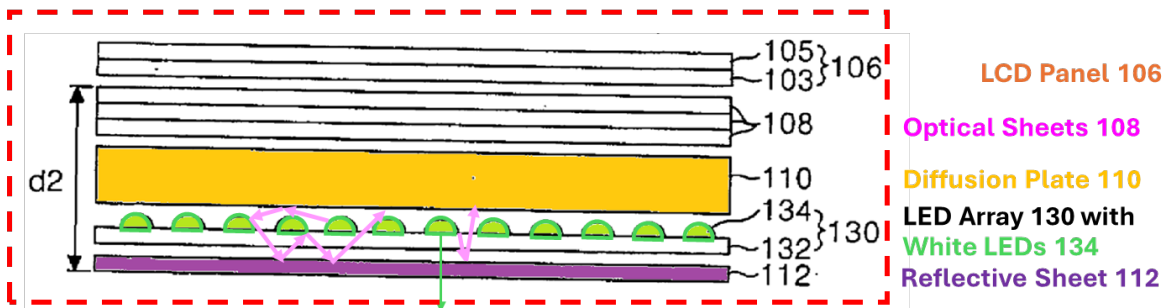


EX1003, Figure 6; EX1004, Figure 5. EX1002, ¶101.

Third, the reflective sheet 112 “reflect[s] light toward the diffusion plate.” The “reflective sheet 112” reflects the “[l]ight propagated toward the bottom of the LED array 130 ... toward the output face, which is the liquid crystal display panel 106,” as annotated in pink below. EX1003, [0056]. Since the diffusion plate 110 is disposed between the LCD panel 106 and the reflective sheet 112, the reflective sheet 112 “reflect[s] light toward the diffusion plate.” EX1002, ¶¶102-103.

Hong In Combination With Lee

Hong, Figure 6



EX1003, Figure 6; EX1004, Figure 5. EX1002, ¶103.

- v. [1D] wherein each **white light emitting diode** comprises a blue light emitting diode chip and a red phosphor and a green phosphor arranged on the blue light emitting diode chip.

Hong/Lee teaches limitation [1D]. EX1002, ¶104.

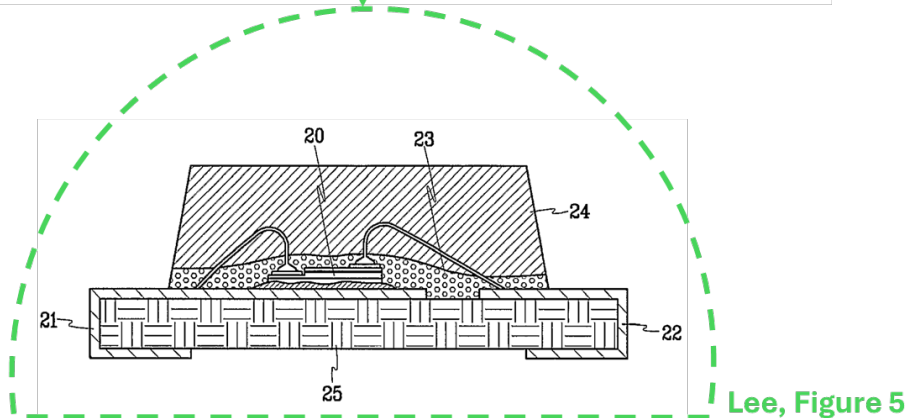
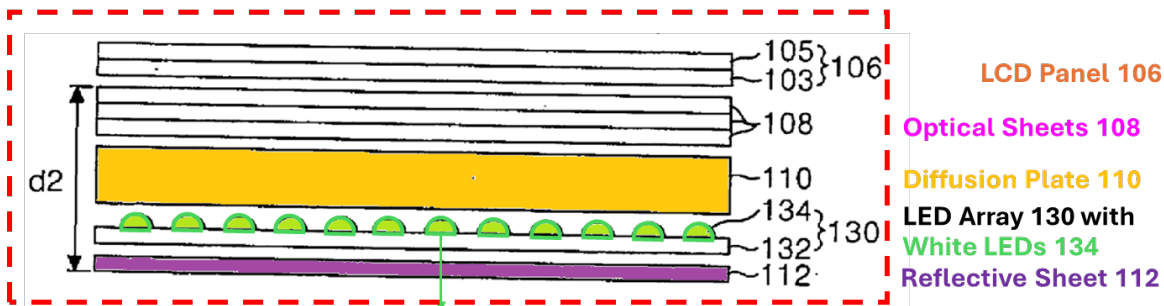
First, Lee teaches that each **white LED** used in Hong/Lee includes “a blue light emitting diode chip.” For example, “[a] white light semiconductor light emitting device of this embodiment comprises an **LED chip 20** ... and an epoxy resin layer 23 containing phosphors. ... The **LED chip 20** may be formed of a **blue LED chip**.” EX1004, 14:10-21. See also EX1004, 3:21-4:3; 15:20-22 (“The

reference light emitted from the blue LED, and the green and red lights emitted by the phosphors absorbing the reference light are mixed to realize the white light.”).

EX1002, ¶105.

Hong In Combination With Lee

Hong, Figure 6

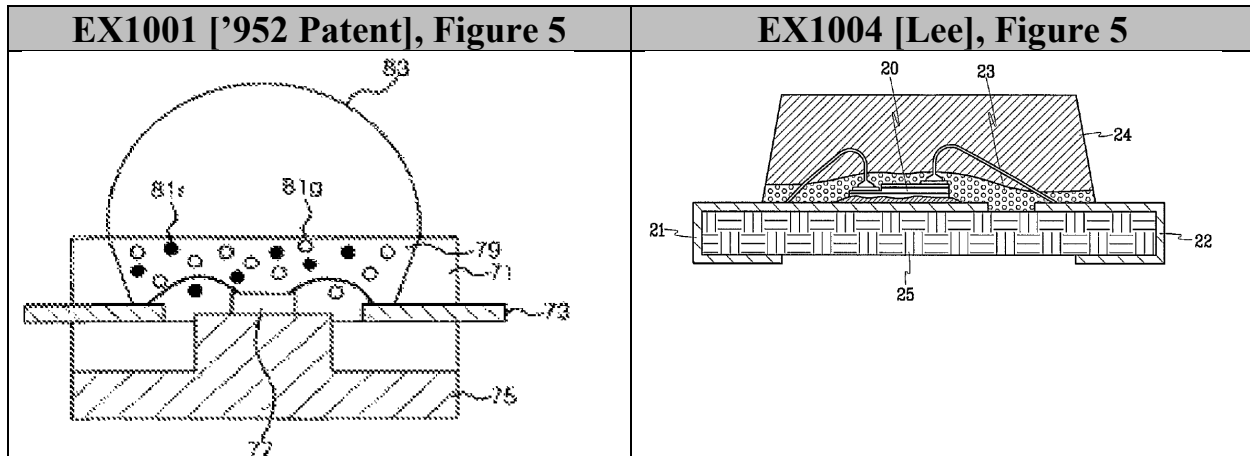


EX1003, Figure 6; EX1004, Figure 5. EX1002, ¶105.

Second, each **white LED** also includes “a red phosphor and a green phosphor.” For example, Lee discloses that “[a] white light semiconductor light emitting device of this embodiment comprises an LED chip 20 ... and an epoxy resin layer 23 containing *phosphors*. ... The phosphors contained in the epoxy mold layer 23

include a barium-silicate-base ***green phosphor*** and a zinc-selenium-base ***red phosphor***.” EX1004, 14:10-19. EX1002, ¶106.

Third, the red phosphor and the green phosphor are “arranged on the blue light emitting diode chip.” As explained above and shown below in Figure 5 of Lee, the red phosphor and the green phosphor are contained in the epoxy resin/mold layer 23. EX1004, 14:17-18, Figure 5. And “[t]he epoxy mold layer 23 is formed ***covering*** the [blue] LED chip 20,” as shown below. EX1004, 14:18-19. Since the red and green phosphors are positioned in the epoxy mold layer 23 covering the blue LED chip 20—just as in the ’952 Patent in which the red and green phosphors are positioned in a molding member covering the blue LED chip—the red and green phosphors are “arranged on” the blue LED chip 20. *See* EX1001, 7:41-50 (“Over the blue LED chip 77 is positioned ***red and green phosphors 81r and 81g*** The red and green phosphors may be ... positioned in a ***molding member 79*** in a state where they are contained therein as shown in this figure. The molding member 79 may be made of an ***epoxy or silicone resin*** and formed into a single layer or multiple layers.”). EX1002, ¶¶107-108.



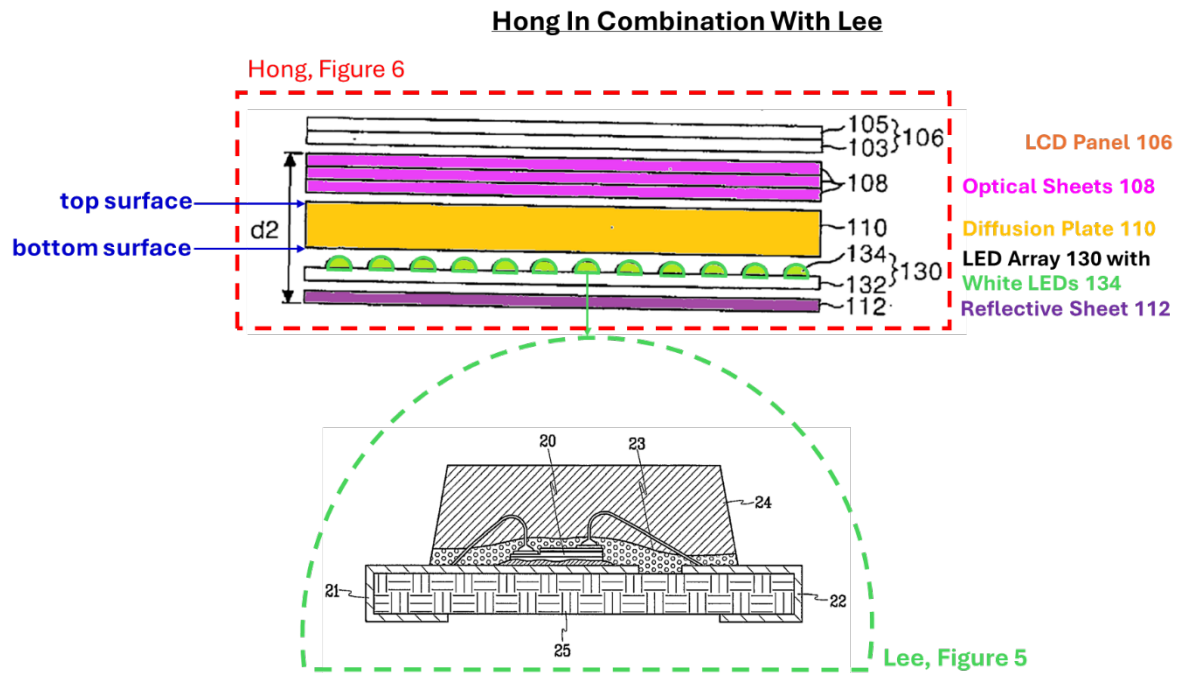
EX1002, ¶¶107-108.

4. Claim 2

- i. The backlight panel of claim 1, further comprising a **brightness enhancement film** and/or a dual brightness enhancement film arranged on the top surface of the **diffusion plate**.

Hong/Lee renders obvious claim 1 for the reasons provided in Section X.A.3 [Ground I, Claim 1]. Hong/Lee also renders obvious claim 2 because Hong teaches the additional limitation of claim 2. EX1002, ¶109.

The backlight unit of Hong/Lee includes at least one “**optical sheet 108**.” EX1003, [0057]; claim 6 (“at least one **optical sheet** arranged on the diffuser.”). The at least one **optical sheet 108** is “arranged on the top surface of the **diffusion plate**,” as shown below. *See also* EX1003, [0057] (“the **optical sheets 108** are *arranged on the diffusion plate 110*.”); claim 6 (“at least one **optical sheet** *arranged on the diffuser*.”). EX1002, ¶¶110-111.



EX1003, Figure 6; EX1004, Figure 5. EX1002, ¶111.

The **optical sheets** 108 are “brightness enhancement” sheets because they are designed to enhance the brightness of the backlight unit. For example, Hong explains that “[l]ight output from the diffusion plate 110 is diffused and has a large viewing angle.” EX1003, [0057]. To address the large viewing angle that would lower the brightness of the backlight unit, the “optical sheets 108 *vertically raises* light output from the diffusion plate 110 to thereby *improve light efficiency*.” EX1003, [0057]. Indeed, the “brightness enhancement film (BEF) 13” in the ’952 Patent works substantially the same way. See EX1001, 2:20-31 (“The BEFs 13 and 15 refract light emitted at a large showing angle from the diffusion plate 11 *into light*

with a small showing angle such that the light can be incident onto the LCD panel 17.”). EX1002, ¶¶112-113.

The **optical sheets** 108, either individually or collectively, form the claimed brightness enhancement “film” because the ’952 Patent itself explains that the “brightness enhancement *film*” may be formed as *one sheet* or *multiple sheets*. EX1001, 2:20-24 (“A brightness enhancement *film (BEF)* 13 such as a prism *sheet* is positioned on a top surface of the diffusion plate 11. *The BEF may be composed of two sheets* which have upward prisms formed in longitudinal and transverse directions, respectively.”) (describing “background art”). Indeed, these **optical sheets** 108 function just like the admittedly-known brightness enhancement film (BEF) 13 described in the “background art” section of the ’952 Patent. EX1001, 2:20-31. EX1002, ¶114.

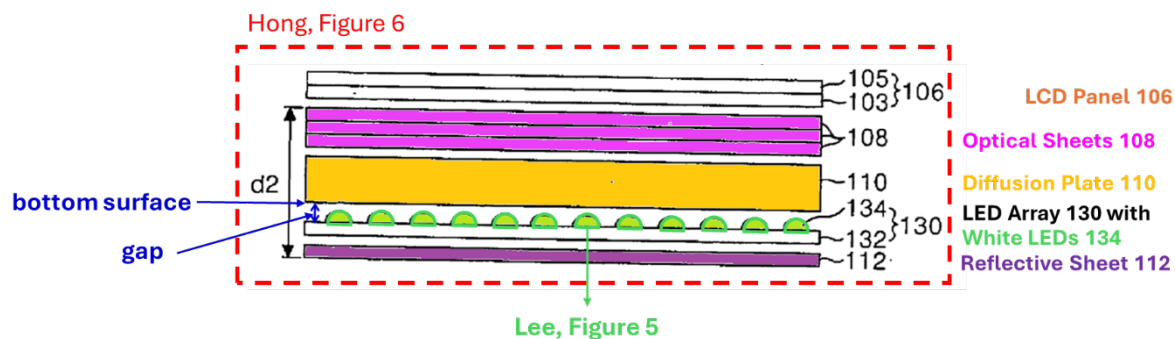
5. Claim 4

- i. **The backlight panel of claim 1, further comprising an air gap arranged between the bottom surface of the diffusion plate and the reflection sheet.**

Hong/Lee renders obvious claim 1 for the reasons provided in Section X.A.3 [Ground I, Claim 1]. Hong/Lee also renders obvious claim 4 because Hong teaches the additional limitation of claim 4. EX1002, ¶115.

First, the backlight unit in Hong/Lee includes a “gap arranged between the bottom surface of the diffusion plate and the reflection sheet.” For example, Hong

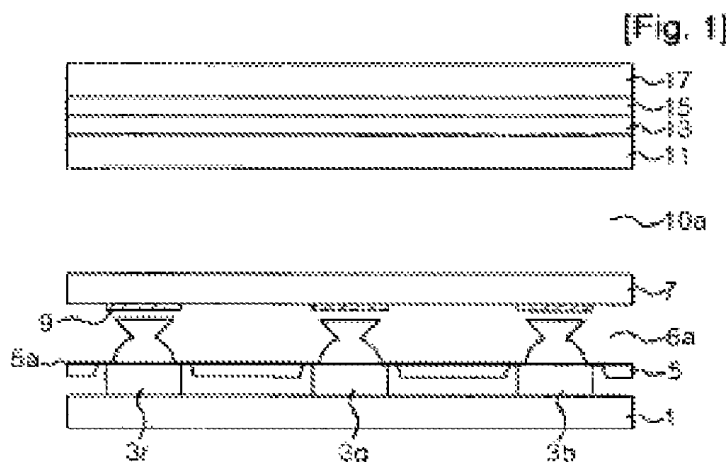
explains that “the LED array 130 is located at the *rear* side of the diffusion plate 110” and that there is “a *gap* between the diffusion plate 110 and the LED array 130.” EX1003, [0059] (“In the liquid crystal display module 100 according to the first embodiment of the present invention, *the LED array 130 is located at the rear side of the diffusion plate 110*. The backlight unit consists of a single diffusion plate 110. Furthermore, it becomes possible to apply the LED array 130 emitting a white light, thereby reducing *a gap between the diffusion plate 110 and the LED array 130*. A thickness of the backlight unit also is reduced in accordance with the reduction of the *gap between the diffusion plate 110 and the LED array 130*.”). That gap between the diffusion plate 110 and the LED array 130 is arranged between the bottom surface of the diffusion plate 110 and the reflection sheet 112, as shown below. EX1002, ¶¶116-117.



EX1003, Figure 6. EX1002, ¶117.

Second, a POSITA would have understood that the “gap between the diffusion plate 110 and the LED array 130” is an *air* gap. A POSITA would have

understood that the “gap between the **diffusion plate 110** and the LED array 130” mixes the light from white LEDs 134 to reduce hot spots of lights corresponding to the LEDs. *See, e.g.,* EX1005, [0032] (“The light emitted from diffuser 33 is **further mixed in mixing chamber 32**, and is then incident on second diffuser 31. Mixing chamber 32 eliminates the appearance of the individual openings in high reflectance material 34 from the brightness profile and **provides uniform light** to diffuser 31.”), Figure 3. And as described in the “background art” section of the ’952 Patent, such gap is commonly formed using air. EX1001, Figure 1 (reproduced below), 2:7-9 (“The light transmission layer 7 and the reflection sheet 5 are spaced apart at a predetermined interval to define a **first gap 6a** which is an **air layer**.”), 2:12-19 (“The diffusion plate and the light transmission layer 7 are spaced apart from each other by a predetermined interval to define a **second gap 10a** which is an **air layer**.”) (describing “background art”). EX1002, ¶¶118-119.



EX1001, Figure 1. EX1002, ¶119.

Indeed, there were benefits to forming that “gap between the **diffusion plate** 110 and the LED array 130” using air. To mix light well, it is desirable to form the gap using a material that is light weight, non-absorbing of light, and has “an index of refraction close to 1.0.” EX1005, [0022] (“The material filling mixing chamber 37 is selected to be *light weight*, to be *non-absorbing of light*, and to have an *index of refraction close to 1.0*.”). One such material is air: air is light-weight, does not absorb light to a significant degree, and has a refractive index that is very close to 1. See EX1017, Table 1. EX1002, ¶¶120-121.

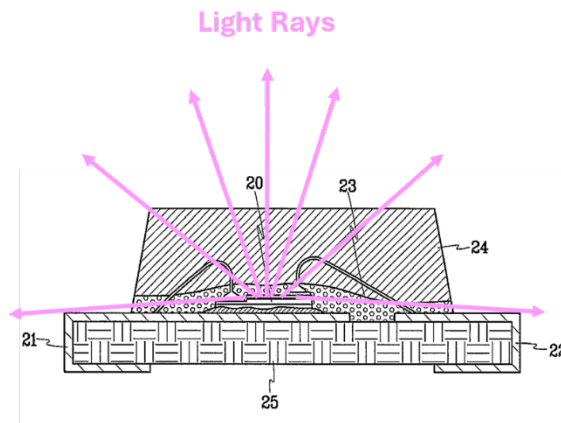
Since air desirably has a refractive index very close to 1 and is cheaper and easier to use to fill the gap, a POSITA would have understood that the “gap between the **diffusion plate** 110 and the LED array 130” is an *air* gap, as it was common in the art before the ’952 Patent. EX1002, ¶122.

6. Claim 5

- i. **[5] The backlight panel of claim 4, wherein light emitted from the white light emitting diodes is mixed together in the air gap before being emitted directly onto the bottom surface of the diffusion plate.**

Hong/Lee renders obvious claim 4 for the reasons provided in Section X.A.5 [Ground I, Claim 4]. Hong/Lee also renders obvious claim 4 because Hong/Lee teaches the additional limitation of claim 5. EX1002, ¶123.

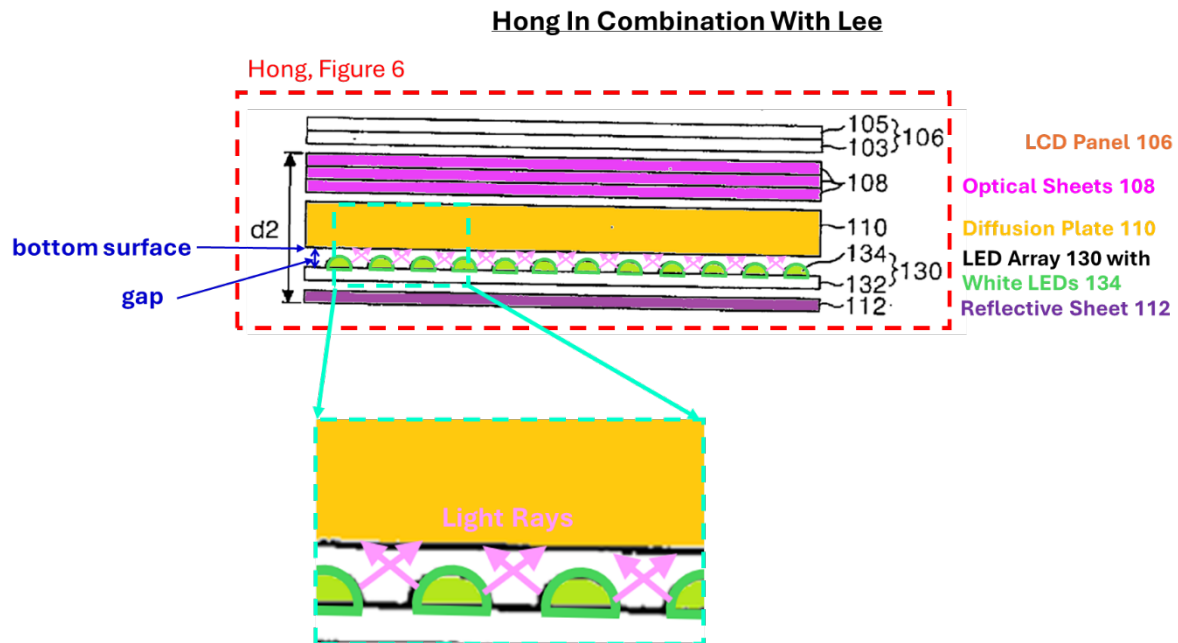
First, in Hong/Lee, the “light emitted from the white light emitting diodes is mixed together in the air gap.” For example, a POSITA would have understood that the flip-chip type LED, such as Lee’s white LED, emits light rays in all directions, as shown below. See EX1016, FIG. 19. EX1002, ¶124.



EX1004, Figure 5. EX1002, ¶124.

Accordingly, a POSITA would have understood that the LEDs in Hong/Lee emit light rays in all directions such that they cross one another within the air gap, as shown below. Thus, Hong/Lee teaches that the “light emitted from the white light emitting diodes is mixed together in the air gap.” Indeed, that is consistent with the well-known function of air gaps in backlight units. See EX1001, 2:16-19 (“Thus, ***the light transmitted through the light transmission layer 7 is again mixed within the second gap 10a*** and the mixed light is then incident onto the diffusion plate 11.”), 2:9-11 (“The first gap is a region where red, green and blue light emitted respectively from the LEDs 3r, 3g and 3b are ***mixed with one another.***”) (describing “background

art”); EX1005, [0022] (“As illustrated in FIG. 4, two rows of LEDs are disposed in a *hollow mixing chamber 37*. ... LEDs 36 may be, for example, red, green, and blue LEDs selected such that when the light emitted by LEDs 36 is *mixed*, it appears white.”). EX1002, ¶125.



EX1003, Figure 6; EX1004, Figure 5. EX1002, ¶125.

Second, in Hong/Lee, the light emitted from the white light emitting diodes is mixed together in the air gap “before being emitted directly onto the bottom surface of the diffusion plate.” As explained in Section X.A.3.iii [limitation [1B]], the **white light emitting diodes** emit light directly onto the bottom surface of the **diffusion plate** 110. But before the light rays hit the **diffusion plate** 110, the light rays are mixed in the air gap, as explained and illustrated above. EX1002, ¶126.

B. Ground II: Hong, Lee, And AAPA Render Obvious Claims 2, 4, And 5.

1. Claim 2

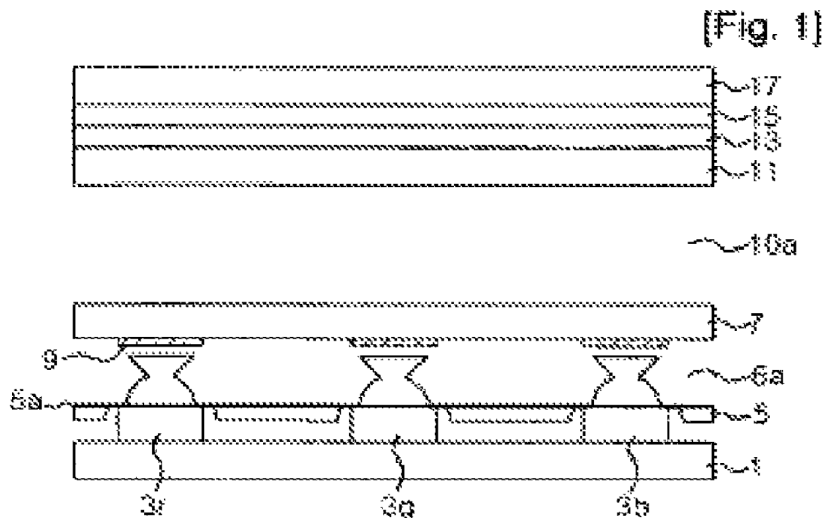
- i. The backlight panel of claim 1, further comprising a brightness enhancement film and/or a dual brightness enhancement film arranged on the top surface of the diffusion plate.**

Hong/Lee renders obvious claim 1 for the reasons provided in Section X.A.3 [Ground I, Claim 1]. As explained in Section X.A.4 [Ground I, Claim 2], Hong/Lee also renders obvious claim 2 because the optical sheets 108 in Hong/Lee are “arranged on” the top surface of the diffusion plate. EX1002, ¶127.

To the extent Hong/Lee is found not to teach the optical sheets 108 “arranged on” the top surface of the diffusion plate because the optical sheets 108 do not physically touch the top surface of the diffusion plate, it would have been obvious to arrange Hong/Lee’s optical sheets to touch the top surface of the diffusion plate as taught by AAPA. EX1002, ¶128.

The “background art” section of the ’952 Patent discloses a “conventional backlight panel” that includes a brightness enhancement film (BEF) 13 and a diffusion plate 11. EX1001, 1:45-47, Figure 1. As illustrated in Figure 1 (reproduced below), the BEF 13 physically touches the top surface of the diffusion plate 11. See EX1001, 2:20-24 (“A brightness enhancement film (BEF) 13 such as a prism sheet is *positioned on a top surface of the diffusion plate 11*. The BEF may

be composed of two *sheets* which have upward prisms formed in longitudinal and transverse directions, respectively.”) (describing “background art”). EX1002, ¶129.



EX1001, Figure 1. EX1002, ¶129.

It would have been obvious to modify Hong/Lee in accordance with AAPA such that the **optical sheets** 108 in Hong/Lee physically touches the top surface of the diffusion plate 110. The modification would have merely amounted to a simple substitution of one known element (the **optical sheets** 108 in Hong/Lee) for another (the BEF 13 in AAPA that physically touches the top surface of the diffusion plate) to obtain predictable results of enhancing the brightness of the backlight unit in Hong/Lee. Indeed, the **optical sheets** 108 in Hong/Lee perform the same function as the BEF 13 in AAPA, and thus, a POSITA would have understood that the physical arrangement of the BEF 13 in AAPA is also readily applicable to the physical arrangement of the **optical sheets** 108 in Hong/Lee. *See* EX1001, 2:27-31 (“The

BEFs 13 and 15 refract light emitted at a large showing angle from the diffusion plate 11 into light with a *small showing angle* such that the light can be incident onto the LCD panel 17. Accordingly, *the luminance of the LCD panel is increased.*”) (describing “background art”); EX1003, [0057] (“The plurality of optical sheets 108 *vertically raises light output* from the diffusion plate 110 to *thereby improve light efficiency.*”). EX1002, ¶130.

2. Claim 4

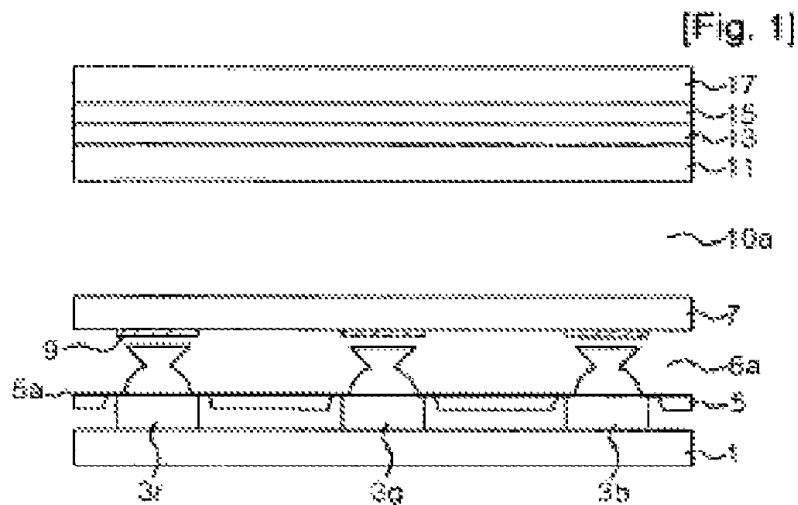
- i. **The backlight panel of claim 1, further comprising an air gap arranged between the bottom surface of the diffusion plate and the reflection sheet.**

Hong/Lee renders obvious claim 1 for the reasons provided in Section X.A.3 [Ground I, Claim 1]. As explained in Section X.A.5 [Ground I, Claim 4], Hong/Lee also renders obvious claim 4 because Hong teaches the additional limitation of claim 4. EX1002, ¶131.

To the extent Hong/Lee is found not to teach an “air gap,” that would have been obvious in view of Hong/Lee and AAPA (“Hong/Lee/AAPA”). EX1002, ¶132.

The background of the ’952 Patent acknowledges that an “air gap” was commonly used in backlight units. For example, the ’952 Patent explains in the background section that a prior art backlight unit includes a gap filled with air to mix the light from LEDs before providing the light to the diffusion plate. *See* EX1001, Figure 1 (reproduced below), 2:7-9 (“The light transmission layer 7 and the

reflection sheet 5 are spaced apart at a predetermined interval to define a **first gap 6a** which is an **air layer**.”), 2:12-19 (“The diffusion plate and the light transmission layer 7 are spaced apart from each other by a predetermined interval to define a **second gap 10a** which is an **air layer**.”) (describing “background art”). Indeed, as explained in Section X.A.5 [Ground I, Claim 4], there were benefits to forming that gap using air. *See* EX1005, [0022]. EX1002, ¶133.



EX1001, Figure 1. EX1002, ¶133.

Based on the teachings of AAPA, it would have been obvious to form the “gap between the **diffusion plate 110** and the LED array 130” in Hong/Lee using air. EX1001, Figure 1, 2:7-19. Hong/Lee already teaches a “gap between the **diffusion plate 110** and the LED array 130.” Unless the gap is vacuumed or is filled with another material, the gap would naturally have air. EX1002, ¶134.

A POSITA would have been particularly motivated to fill that gap using air. As explained in Section X.A.5 [Ground I, Claim 4], to mix light well, it is desirable to form the gap using a material that is light weight, non-absorbing of light, and has “an index of refraction close to 1.0.” EX1005, [0022] (“The material filling mixing chamber 37 is selected to be *light weight*, to be *non-absorbing of light*, and to have an *index of refraction close to 1.0*.”). One such material is air: air is light-weight, does not absorb light to a significant degree, and has a refractive index that is very close to 1. See EX1017, Table 1. Accordingly, a POSITA would have been motivated to make the “gap between the diffusion plate 110 and the LED array 130” as an air gap. EX1002, ¶135.

Using air in the gap would have been obvious because it would have merely amounted to a simple substitution of one known element (the backlight unit with a gap in Hong/Lee) for another (air gap as taught by AAPA) to obtain predictable results of a light-weight, high-brightness backlight unit. Using air in the gap would have been obvious also because it would have merely amounted to using a known technique (using air in the gap between a diffuser and LEDs per AAPA) to improve similar devices (AAPA’s backlight panel with a gap and Hong/Lee’s backlight unit with a gap) in the same way (providing a light-weight, high-brightness backlight unit). EX1002, ¶¶136-137.

A POSITA would have had a reasonable expectation of success with using the air gap in the backlight unit of Hong/Lee because the air gap would not have interfered with or degraded the performance of the backlight unit in Hong/Lee. A POSITA would have understood that components inside the liquid crystal display module—including the diffusion plate, an LED array with white LEDs, a reflection sheet—function properly in the presence of air, as was admittedly known in the art. *See generally* EX1001, Figure 1, 2:7-9, 2:12-13 (describing “background art”); EX1005, [0022], [0026]-[0028]. And if anything, the presence of air in the gap would have improved the performance of the backlight unit. *See, e.g.*, EX1005, [0022] (“[t]he material filling mixing chamber 37 is selected to be light weight, to be non-absorbing of light, and to have an index of refraction close to 1.0.”); [0035] (“Since the mixing chamber is hollow, it is much lighter than a light guide formed from a sheet of plastic, as illustrated in FIG. 2. ... Further, eliminating the plastic light guide of FIG. 2 eliminates losses associated with interfaces between the plastic and adjoining surfaces and absorption in the plastic.”). EX1002, ¶138.

A POSITA would have had a reasonable expectation of success with the air gap in the backlight unit of Hong/Lee also because that would have entailed no specific modification to the backlight unit in Hong/Lee. The combination would have merely entailed ensuring that air is present inside the display module package, which would have entailed no specific modification. EX1002, ¶139.

And given the simplicity with using air (e.g., does not require complex structures to form a vacuum), at a minimum, it would have been common sense and obvious to try air as a material that has an index of refraction close to 1.0. EX1002, ¶140.

3. Claim 5

- i. **[5] The backlight panel of claim 4, wherein light emitted from the white light emitting diodes is mixed together in the air gap before being emitted directly onto the bottom surface of the diffusion plate.**

Hong/Lee/AAPA renders obvious claim 4 for the reasons provided in Section X.B.2 [Ground II, Claim 4]. Hong/Lee/AAPA also renders obvious claim 5 because Hong/Lee/AAPA teaches the additional limitation of claim 5 for the reasons provided above in Section X.A.6 [Ground I, Claim 5]. EX1002, ¶141.

XI. Discretionary Factors Disfavor Denial of Institution

The discretionary factors the Board employs for its institution decisions disfavor denial of institution.

A. Discretionary Denial Under *Advanced Bionics* Is Not Appropriate.

The Board uses a two-pronged test to determine whether it will deny institution under 35 U.S.C. § 325(d): (1) whether the same or substantially the same art or arguments were previously presented to the Office; and (2) if first part is satisfied, whether the Office erred in a manner material to the patentability of

challenged claims. *See Advanced Bionics LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 (precedential).

In this proceeding, the *Advanced Bionics* factors guide against discretionary denial. Neither Hong nor Lee was considered during prosecution of the '952 Patent. And none of the references cited during prosecution showed the configuration of a backlight panel presented in the combinations relying on Hong. Accordingly, the same or substantially the same art or arguments were *not* previously presented to the Office, and the discretionary denial under § 325(d) is not warranted.

B. Discretionary Denial Under *Fintiv* Is Not Appropriate

At the outset, Petitioner filed a motion to transfer the pending case from the Eastern District of Texas to the District of New Jersey, where Samsung Electronics America Inc. resides. *See Sinotechnix LLC v. Samsung Electronics Co. Ltd et al.*, Case No. 2:24-cv-00544, Dkt. No. 53 (EDTX). While Petitioner will inform the Board of the latest developments related to the *Fintiv* factors as they become available, the following analysis is based on the *current* venue in the Eastern District of Texas for the parallel district court litigation.

Based on the current facts, the six *Fintiv* factors guide against discretionary denial. *See Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (precedential).

1. Factor 1: No Evidence Regarding A Stay

Factor 1 is neutral because no motion to stay has been filed.

2. Factor 2: Parallel Proceeding Trial Date

Factor 2 is neutral. Trial in co-pending litigation is scheduled for May 4, 2026. EX1021 [Docket Control Order]. The expected trial date based on the court's median time-to-trial date statistics is also approximately May 2026. *See* EX1012 (showing the median time-to-trial date is approximately 21.9 months from the filing of the case (*i.e.*, July 17, 2024)). Both of these dates are close to the expected final written decision date, which is around July 2026.

However, there is a significant uncertainty over the trial date. Judge Gilstrap has scheduled trials for seven other patent and copyright cases for May 4, 2026. EX1013 [Judge Gilstrap Trial List]. It is at the very least uncertain that the '952 Patent will be tried on May 4, 2026. Hence, this factor is neutral.

As the interim guideline notes, “when other relevant factors weigh against exercising discretion to deny institution or are neutral, the proximity to trial should not alone outweigh all of those other factors.” Memorandum Regarding Interim Procedure for Discretionary Denials⁴, 8 (*citing In re Genentech, Inc.*, 566 F.3d 1338, 1347 (Fed. Cir. 2009)).

⁴ Available online at https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf

3. Factor 3: Investment In Parallel Proceeding

Factor 3 guides against discretionary denial. The co-pending litigation is in its early stages, and the investment in it has been minimal. *See* EX1021. The parties have not exchanged preliminary positions on claim construction, and discovery has not begun. *See PEAG LLC v. Varta Microbattery GmbH*, IPR2020-01214, Paper 8, 17 (Jan. 6, 2021). Invalidity contentions will not be exchanged until February 14, 2025. *See* EX1021, 5. Moreover, Markman hearing is not scheduled until November 7, 2025, and expert discovery is scheduled for completion on January 20, 2026—both of which are after the expected institution decision date of June-July 2025 for this instant IPR. *Id.* Hence, this factor guides against discretionary denial.

4. Factor 4: Overlapping Issues With The Parallel Proceeding

Factor 4 guides against discretionary denial. Petitioner stipulates that if the IPR is instituted, Petitioner will not pursue the same grounds in the district court litigation. *Sand Revolution II LLC v. Continental Intermodal Group – Trucking LLC*, IPR2019-01393, Paper 24 at 7 (June 16, 2020) (Informative). As such, the Grounds presented in the instant IPR will be materially different from the grounds that will be presented in the district court, which guides against discretionary denial.

5. Factor 5: Identity Of Parties

Factor 5 is neutral. Petitioner is the defendant in the litigation. This factor should not be a basis for denying institution.

6. Factor 6: Other Circumstances, Including The Merits

Factor 6 guides against discretionary denial. “[W]here the PTAB determines that the information presented at the institution stage presents a compelling unpatentability challenge, that determination alone demonstrates that the PTAB should not discretionarily deny institution under *Fintiv*.” Memo, 4-5. Here, the evidence of unpatentability is compelling, as evidenced by Grounds laid out above. This factor also guides against discretionary denial.

Accordingly, *Fintiv* factors guide against discretionary denial.

C. General Plastic Factors Favor Institution

The ’952 Patent has not been challenged in any prior IPR petition. Thus, the *General Plastic* factors guide against discretionary denial.

XII. Conclusion

Petitioner respectfully requests that the Board institute *inter partes* review, hold the challenged claims unpatentable, and cancel the challenged claims.

Petition for *Inter Partes* Review of U.S. Patent No. 8,132,952
Claims 1, 2, 4, and 5

Dated: January 6, 2025

Respectfully submitted,

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Petition for *Inter Partes* Review of U.S. Patent No. 8,132,952
Claims 1, 2, 4, and 5

CERTIFICATION UNDER 37 C.F.R. § 42.24(d)

I hereby certify that this Petition for *Inter Partes* Review of U.S. Patent No. 8,132,952 has, excluding the portions exempted under 37 C.F.R. § 42.24(a), 9,578 words as counted by the word-processing system used to prepare this document, in compliance with 37 C.F.R. § 42.24(d).

Dated: January 6, 2025

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CERTIFICATE OF SERVICE

Under 37 C.F.R. §§ 42.6(e) and 42.126, the undersigned certifies that on January 6, 2025, complete copies of the foregoing and any accompanying exhibits were caused to be served by sending them via Federal Express Priority Overnight shipping, which is at least as fast and reliable as U.S. Priority Mail Express, to the correspondence address of record for U.S. Patent No. 8,132,952 as indicated in Patent Center:

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Reston, VA, 20191

Dated: January 6, 2025

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