

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HISENSE USA CORPORATION,
Petitioner,

v.

BRIGHTPLUS VENTURES LLC,
Patent Owner.

IPR2023-01411
Patent 7,872,705 B2

Before STACEY G. WHITE, KEVIN C. TROCK, and JOHN D. HAMANN,
Administrative Patent Judges.

HAMANN, *Administrative Patent Judge.*

PRELIMINARY GUIDANCE
PATENT OWNER'S MOTION TO AMEND
37 C.F.R. § 42.121(e)

I. INTRODUCTION

We instituted trial as to claims 1, 2, 5, 6, 9, 11, 13, 14, 16, 17, 22, 28, 29, and 31–34 of U.S. Patent No. 7,872,705 B2 (“the ’705 patent,” Ex. 1001). Paper 7 (“Inst. Dec.”). After institution, Patent Owner filed a Motion to Amend that is contingent on the patentability of claims 1, 2, 6, 11, 13, 14, 16, 17, 28, 29, 31, 32, 33, and 34. Paper 12 (“Mot.” or “Motion”). Patent Owner’s “contingent request [is] to substitute claims 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, and 48” for particular challenged claims of the ’705 patent. Mot. 3, App. A (Substitute Claims Listing). Petitioner filed an Opposition on October 17, 2024. Paper 17 (“Opp.”).

In the Motion, Patent Owner requested that we provide preliminary guidance concerning the Motion in accordance with 37 C.F.R. § 42.121(a)(1)(ii). Mot. 4, 22; *see* 37 C.F.R. § 42.121(e)(1); *see also Rules Governing Motion to Amend Practice and Procedures in Trial Proceedings under the America Invents Act before the Patent Trial and Appeal Board*, 89 Fed. Reg. 76,421 (Sept. 18, 2024) (“Final Rule”). We have considered Patent Owner’s Motion and Petitioner’s Opposition.

In this Preliminary Guidance, we provide information indicating our initial, preliminary, non-binding views on whether Patent Owner has shown a reasonable likelihood that it has satisfied the statutory and regulatory requirements associated with filing a motion to amend in an *inter partes* review and whether Petitioner establishes a reasonable likelihood that the substitute claims are unpatentable. 37 C.F.R. § 42.121(e)(1), (2); *see also* 35 U.S.C. § 316(d) (statutory requirements for a motion to amend); 37 C.F.R. § 42.121(a)(2), (a)(3), (b) (regulatory requirements and burdens for a motion to amend); *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15 (PTAB Feb. 25, 2019) (precedential) (providing information and

guidance regarding motions to amend). The reasonable likelihood standard this Preliminary Guidance applies is different than the preponderance of the evidence standard applied when ultimately deciding the Motion. *Compare* 37 C.F.R. § 42.121(e)(1) *with* § 42.121(d). Finally, this preliminary guidance is not a “decision” for purposes of rehearing under 37 C.F.R. § 42.71(d). 37 C.F.R. § 42.121(e)(2).

For purposes of this Preliminary Guidance, we focus on the proposed substitute claims, and specifically on the amendments proposed in the Motion. *See* 37 C.F.R. § 42.121(e)(1); Final Rule, 89 Fed. Reg. at 76,425. We do not address the patentability of the originally challenged claims. Moreover, in formulating our preliminary views on the Motion and Opposition, we have not considered the parties’ other substantive papers on the underlying merits of Petitioner’s challenges. We emphasize that the views expressed in this Preliminary Guidance are subject to change upon consideration of the complete record, including any revision to the Motion filed by Patent Owner. Thus, this Preliminary Guidance is not binding on the Board when rendering a final written decision or any other subsequent decision in this proceeding. 37 C.F.R. § 42.121(e)(2); *see Medytox, Inc. v. Galderma S.A.*, 71 F.4th 990, 1000 (Fed. Cir. 2023).

Before providing our preliminary guidance concerning the Motion, we note that Patent Owner’s requested contingencies are that “if claims 1, 2, 32, 33, 17, 34, and 31 are found to be unpatentable, substitute proposed amended claims 35, 36, 37, 38, 39, 40, and 41,” and “if claims 6, 11, 13, 14, 28, 16, and 29 are found to be unpatentable, substitute proposed amended claims 42, 43, 44, 45, 46, 47, and 48.” *See* Mot. 4. Patent Owner’s requests can be read that (i) proposed substitute claims 35, 36, 37, 38, 39, 40, and 41 should replace claims 1, 2, 32, 33, 17, 34, and 31 *only if all claims* 1, 2, 32, 33, 17, 34, and 31 *are found to be unpatentable* and (ii)

proposed substitute claims 42, 43, 44, 45, 46, 47, and 48 should replace claims 6, 11, 13, 14, 28, 16, and 29 *only if all claims 6, 11, 13, 14, 28, 16, and 29 are found to be unpatentable*. Patent Owner should clarify how it contends these contingencies should operate.

We further observe that Patent Owner's proposed substitute claims include some typographical errors and recite some terms lacking antecedent basis, and we advise Patent Owner to correct these issues. For example, we note the following typographical errors in proposed substitute claims 35, 36, and 42. In claim 35, paragraph c) recites "*a* first light entry region" even though "*a* first light entry region" was already introduced at paragraph b), and Patent Owner should clarify whether "*a* first light entry region" in paragraph c) is in fact *the* "first light entry region" introduced in paragraph b). Also in claim 35, paragraph d) recites "*a* second light entry region" even though "*a* second light entry region" was already introduced at paragraph b), and Patent Owner should clarify whether "*a* second light entry region" in paragraph d) is in fact *the* "second light entry region" introduced in paragraph b). Claim 36 includes a typo where it recites "and *the* wherein each transmissive surface is smaller than the viewable surface." Claim 42 includes a typographical error where it recites "*at least one a first* waveguide element and a second waveguide element." We also note the following terms in proposed substitute claims 40 and 41 lacking explicit antecedent basis. Claim 40 recites "*the third* waveguide element" which lacks antecedent basis in claim 40 (or its base claim 35). Claim 41 recites "*the fourth* waveguide element" which lacks antecedent basis in claim 41 (or its base claims 40 and 35).

II. PRELIMINARY GUIDANCE

A. Statutory and Regulatory Requirements

Patent Owner bears the ultimate burden to show that its motion to amend complies with the requirements of 35 U.S.C. § 316(d)(1), (3) and 37 C.F.R. § 42.121(a)(2), (a)(3), (b)(1), and (b)(2). 37 C.F.R. § 42.121(d)(1). For the reasons discussed below, at this stage of the proceeding, and based on the current record, it appears that Patent Owner has not shown a reasonable likelihood that it has satisfied the statutory and regulatory requirements associated with filing a motion to amend with respect to proposed substitute claims 35–48. *See* 37 C.F.R. § 42.121(e)(1).

1. Reasonable Number of Substitute Claims

A motion to amend must propose a reasonable number of substitute claims. 35 U.S.C. § 316(d)(1)(B); 37 C.F.R. § 42.121(a)(3). Patent Owner has shown that it proposes a reasonable number of substitute claims. In particular, Patent Owner proposes no more than 1 substitute claim for each of challenged claims 1, 2, 6, 11, 13, 14, 16, 17, 28, 29, 31, 32, 33, and 34. *See* Mot. 4–5, App. A (Substitute Claims Listing). Petitioner does not argue otherwise. *See generally* Opp.

2. Respond to Ground of Unpatentability

A motion to amend must respond to a ground of unpatentability involved in the proceeding. 37 C.F.R. § 42.121(a)(2)(i). Patent Owner has responded to the grounds of unpatentability involved in this proceeding. *See* Mot. 5–6, 13–21. Proposed substitute claims 35–48 recite new limitations, and new combinations of limitations, that directly respond to the grounds of unpatentability involved in the trial. *See* Mot. 5–6, 13–21, App. A (Substitute Claims Listing). Petitioner does not argue otherwise. *See generally* Opp.

3. *Scope of Amended Claims*

A motion to amend may not enlarge the scope of the claims of the patent. 35 U.S.C. § 316(d)(3); 37 C.F.R. § 42.121(a)(2)(ii).

On the current record, we determine that proposed substitute claims 35–48 seek to enlarge the scope of the claims of the patent, in violation of 35 U.S.C. § 316(d)(3) and 37 C.F.R. § 42.121(a)(2)(ii).

Proposed substitute claims 35–41

Proposed substitute claim 35 replaces original independent claim 1 and adds new limitations. *See* Mot. App. A (Substitute Claims Listing). In particular, proposed substitute independent claim 35 amends original claim 1 to further recite that

- b) at least a first waveguide element and a second waveguide element respectively comprising a first light entry region and a second light entry region;
- c) a first light-emitting source comprising a first plurality of LEDs arranged in a first strip and positioned to emit light into the first waveguide element at a first light entry region;
- d) a second light-emitting source comprising a second plurality of LEDs arranged in a second strip and positioned to emit light into the second waveguide element at a second light entry region.

See id.

Thus, proposed substitute independent claim 35 amends original claim 1 to recite that the LCD system comprises “at least a first waveguide element and a second waveguide element respectively comprising a first light entry region and a second light entry region,” instead of “at least one waveguide element comprising a plurality of light entry regions” (as recited in original claim 1). *See id.* Proposed substitute independent claim 35 also amends original claim 1 to recite that the LCD system comprises “a first light-emitting source comprising a first plurality of LEDs arranged in a first strip and positioned to emit light into the first waveguide

element at a first light entry region” instead of “a first light-emitting source comprising a first plurality of LEDs arranged in a first strip and positioned to emit light into the at least one waveguide element at a first light entry region of the plurality of light entry regions” (as recited in original claim 1), and “a second light-emitting source comprising a second plurality of LEDs arranged in a second strip and positioned to emit light into the second waveguide element at a second light entry region” instead of “a second light-emitting source comprising a second plurality of LEDs arranged in a second strip and positioned to emit light into the at least one waveguide element at a second light entry region of the plurality of light entry regions.” *See id.* In other words, while original claim 1 requires *one* waveguide element comprising *multiple* light entry regions, claim 35 requires *two* waveguide elements each with *its own* light entry region. And while original claim 1 requires *both* light-emitting sources to emit light into *the one* waveguide element, claim 35 requires *each of* the two light-emitting sources to be *associated with (emit light into) one of* the two waveguide elements.

Thus, although proposed substitute claim 35 restricts the waveguide element features to “at least a first waveguide element and a second waveguide element respectively comprising a first light entry region and a second light entry region,” claim 35’s amendment covers where the recited LCD system *does not necessarily include at least one waveguide element comprising a plurality of light entry regions (as required by original claim 1)*. In other words, while original claim 1 requires *one* waveguide element comprising *multiple* light entry regions, claim 35 does not necessarily require at least *one* waveguide element comprising *multiple* light entry regions. For this reason, Patent Owner’s amendment in claim 35 broadens the scope of original challenged claim 1.

Moreover, although proposed substitute claim 35 restricts the two light-emitting sources to an association with (*light emission into*) *different* waveguide elements, claim 35's amendment allows for a scenario that *does not include two light-emitting sources emitting light into one waveguide element (as required by original claim 1)*. For this additional reason, Patent Owner's amendment in claim 35 broadens the scope of original challenged claim 1.

Accordingly, for these reasons, for purposes of this preliminary guidance and based on the current record, proposed substitute claim 35—and proposed substitute dependent claims 36–41 by virtue of their dependency from claim 35—enlarge the scope of the '705 patent claims. Thus, Patent Owner's Motion has enlarged the scope of the claims of the patent.

Proposed substitute claims 42¹–48

Proposed substitute independent ***claim 42*** replaces original dependent claim 6 (which depends from original independent claim 1 via original dependent claim 5) and adds new limitations similar to the limitations added in claim 35.

Proposed substitute claim 42 amends original claim 1 to recite that the LCD system comprises “at least . . . a first waveguide element and a second waveguide

¹ We analyze claim 42 with the typographical errors in paragraphs c) and d) of the claim (as discussed *supra* with respect to the indefiniteness of the claim). In particular, it appears that paragraph c) of claim 42 positively requires “a first light-emitting source comprising a first plurality of LEDs arranged in a first strip and positioned to emit light,” “the first waveguide element [being] positioned to receive light emitted by one or more of the LEDs of the first plurality of LEDs,” and the existence of “a second light entry region of the plurality of light entry regions”; and paragraph d) of claim 42 positively requires “a second light-emitting source comprising a second plurality of LEDs arranged in a second strip and positioned to emit light,” “the second waveguide element [being] positioned to receive light emitted by one or more of the LEDs of the second plurality of LEDs,” and (again) the existence of “a second light entry region of the plurality of light entry regions.” See Mot. App. A (Substitute Claims Listing) (emphasis omitted).

element respectively comprising a first light entry region and a second light entry region,” instead of “at least one waveguide element comprising a plurality of light entry regions” (as recited in original claim 1). *See* Mot. App. A (Substitute Claims Listing)(emphasis omitted). Because claim 42’s amendment allows for a scenario where the recited LCD system *does not necessarily include one waveguide element comprising a plurality of light entry regions (as required by original claim 1)*, Patent Owner’s amendment in claim 42 broadens the scope of original challenged claim 1.

Claim 42 also recites that “the first waveguide element is positioned to receive light emitted by one or more of the LEDs of the first plurality of LEDs [of the first light-emitting source]” and “the second waveguide element is positioned to receive light emitted by one or more of the LEDs of the second plurality of LEDs [of the second light-emitting source].” *See* Mot. App. A (Substitute Claims Listing)(emphasis omitted). In contrast, original claim 1 requires the “first plurality of LEDs [of the first light-emitting source] . . . [to be] positioned to emit light into the at least one waveguide element” and the “second plurality of LEDs [of the second light-emitting source] . . . [to be] positioned to emit light into the at least one waveguide element.” *See id.* Thus, claim 42’s amendment allows for a scenario that *does not include two light-emitting sources (two pluralities of LEDs) emitting light into one waveguide element (as required by original claim 1)*.

Accordingly, for the above reasons, for purposes of this preliminary guidance and based on the current record, proposed substitute claim 42—and

Thus, the limitations required by paragraphs c) and d) of claim 42 are similar to those required by paragraphs c) and d) of proposed substitute claim 35. Moreover, paragraphs a), b) and e) are similar to paragraphs a), b) and e) of claim 35.

proposed substitute dependent claims 43–48 by virtue of their dependency from claim 42—enlarge the scope of the ’705 patent claims.

4. New Matter

A motion to amend may not introduce new subject matter. 35 U.S.C. § 316(d)(3); 37 C.F.R. § 42.121(a)(2)(ii). On this record, Patent Owner appears to have identified adequate written description support for proposed substitute claims 35–48.² *See* Mot. 11–12. Petitioner does not argue otherwise. *See generally* Opp.

Thus, at this stage of the proceeding, on the record before us, Patent Owner has shown a reasonable likelihood that there is adequate written description support in the original disclosure of the ’705 patent for proposed substitute claims 35–48.

B. Unpatentability Arguments by Petitioner

Petitioner bears the ultimate burden to show that any proposed substitute claims are unpatentable. 37 C.F.R. § 42.121(d)(2). For the reasons discussed below, at this stage of the proceeding, and based on the current record,³ Petitioner has shown a reasonable likelihood that proposed substitute claims 35–48 are unpatentable. *See* 37 C.F.R. § 42.121(e)(1).

² Patent Owner identified adequate written description support for a reading of proposed substitute claim 42, but the text of claim 42 may be indefinite. *See* discussion *infra* regarding indefiniteness of claim 42.

³ We express no view on the patentability of original claims 1, 2, 5, 6, 9, 11, 13, 14, 16, 17, 22, 28, 29, and 31–34 in this Preliminary Guidance. Instead, we focus on limitations added to those claims in the Patent Owner’s Motion to Amend.

1. *Indefiniteness*

Claim 42 appears to be indefinite under 35 U.S.C. § 112, paragraph 2.

In particular, Petitioner argues that claim 42 “is indefinite under 35 U.S.C. § 112 and is thus unpatentable” because

the proposed claim language [in claim 42] is riddled with, at best, incomplete clauses, other typographical errors, and instances of lack of antecedent basis. For example, the claim purports to require that each of the “first light-emitting source” and “second light-emitting source” be “positioned to emit light into the at least one [something]”—but fails to identify what that something is. The claim also purports to twice include limitations “at a second light entry region of the plurality of light entry regions”—but fails to articulate what either limitation is.

Opp. 2–3 (alterations in original).

We have reviewed the language of proposed substitute claim 42 and we agree⁴ with Petitioner’s contention that claim 42 is indefinite under 35 U.S.C. § 112, second paragraph. Paragraph c) of proposed substitute claim 42 recites

a first light-emitting source comprising a first plurality of LEDs arranged in a first strip *and positioned to emit light into the at least one* wherein the first waveguide element is positioned to receive light emitted by one or more of the LEDs of the first plurality of LEDs; *at a second light entry region of the plurality of light entry regions.*

Mot. App. A (Substitute Claims Listing) (emphasis added). The phrase “a first light-emitting source . . . positioned to emit light into the at least one” renders the

⁴ We do not agree, however, with Petitioner’s assertion that “‘the plurality of light entry regions[]’ . . . lack antecedent basis in the claim language” of claim 42 (*see* Opp. 3). “[*T*he plurality of light entry regions” recited in paragraphs c) and d) of claim 42 has the required antecedent basis in paragraph b) of the claim, which recites “at least one a first waveguide element and a second waveguide element respectively comprising *a first light entry region and a second light entry region.*” *See* Mot. App. A (claim 42) (emphases added).

claim indefinite because the metes and bounds of this phrase are unclear (as it is unclear into *what* is the recited light emitted). It is also unclear from claim 42 whether the phrase “*at a second light entry region of the plurality of light entry regions*”—separated by a semicolon from the text before it—is to be read in the context of that text (e.g., modifies that text) or not. For example, it is unclear whether claim 42 merely requires that “the first waveguide element is positioned to receive light emitted by one or more of the LEDs of the first plurality of LEDs,” or whether it actually requires that “the first waveguide element is positioned to receive light emitted by one or more of the LEDs of the first plurality of LEDs [] *at a second light entry region of the plurality of light entry regions.*”

Further, paragraph d) of proposed substitute claim 42 recites

a second light-emitting source comprising a second plurality of LEDs arranged in a second strip *and positioned to emit light into the at least one* wherein the second waveguide element is positioned to receive light emitted by one or more of the LEDs of the second plurality of LEDs; *and at a second light entry region of the plurality of light entry regions.*

Mot. App. A (Substitute Claims Listing) (emphasis added). The phrase “a second light-emitting source . . . *and positioned to emit light into the at least one*” renders the claim indefinite because the metes and bounds of this phrase are unclear (as it is unclear into *what* is the recited light emitted). It is also unclear from claim 42 whether the phrase “*and at a second light entry region of the plurality of light entry regions*”—separated by a semicolon from the text before it—is to be read in the context of that text (e.g., modifies that text) or not. For example, it is unclear whether claim 42 merely requires that “the second waveguide element is positioned to receive light emitted by one or more of the LEDs of the second plurality of LEDs,” or whether it actually requires that “the second waveguide element is positioned to receive light emitted by one or more of the LEDs of the

second plurality of LEDs . . . *at a second light entry region of the plurality of light entry regions.*”

Thus, it appears, on this record, that proposed substitute claim 42, and dependent claims 43–48 by virtue of their dependency from claim 42, fail to comply with the definiteness requirement.

We acknowledge that Patent Owner has not yet had the opportunity to address Petitioner’s (and our analysis *supra*) regarding proposed substitute claim 42 failing to comply with the definiteness requirement of 35 U.S.C. § 112, second paragraph. Patent Owner will have the opportunity to do so in its Reply to Petitioner’s Opposition (or in a revised motion to amend) in this proceeding.

2. Obviousness

Petitioner has asserted the following obviousness challenges against the following substitute claims:

- Ground asserting newly cited Zhou (Ex. 1015)⁵ and Fine (Ex. 1007) against proposed substitute claims 35–48;
- Ground asserting Johnson (Ex. 1005), Zhou (Ex. 1015), and Fine (Ex. 1007) as rendering obvious proposed substitute claims 35–48; and
- Ground asserting Suzuki (Ex. 1006), Zhou (Ex. 1015), and Fine (Ex. 1007) as rendering obvious proposed substitute claims 35–48.

Opp. 4–23.

On this record, it appears that Petitioner (or the record) has shown a reasonable likelihood that:

- proposed substitute claims 35–48 are unpatentable as obvious over the combination of Zhou and Fine;

⁵ US 6,650,822 B1, filed July 26, 1999, issued November 18, 2003.

- proposed substitute claims 35–48 are unpatentable as obvious over the combination of Johnson, Zhou, and Fine; and
- proposed substitute claims 35–48 are unpatentable as obvious over the combination of Suzuki, Zhou, and Fine.

Below, we analyze each of Petitioner’s proposed grounds against the proposed substitute claims.

Zhou-Fine Ground

Proposed substitute claims 35, 42,⁶ 36–38, 40, 41, 43–45, 47, and 48

Proposed substitute **claim 35** replaces original independent claim 1 and adds new limitations. *See* Mot. App. A (Substitute Claims Listing). In particular, proposed substitute independent claim 35 amends original claim 1 to further recite that:

- b) at least a first waveguide element and a second waveguide element respectively comprising a first light entry region and a second light entry region;
- c) a first light-emitting source comprising a first plurality of LEDs arranged in a first strip and positioned to emit light into the first waveguide element at a first light entry region;
- d) a second light-emitting source comprising a second plurality of LEDs arranged in a second strip and positioned to emit light into the second waveguide element at a second light entry region.

See id. Proposed substitute independent **claim 42** replaces original dependent claim 6 and adds new limitations similar to the limitations added in claim 35, as discussed above.

Petitioner relies on Zhou to “disclose[] (or, at a minimum, render[] obvious)” an “LCD panel” as recited in paragraph a) of proposed substitute claim

⁶ We analyze claim 42 with the typographical errors and incomplete statements in paragraphs c) and d) of the claim (as discussed *supra* with respect to the indefiniteness of the claim).

35. *See* Opp. 4–6. In particular, Petitioner contends that “Zhou is generally directed to a ‘waveguide optical device’ for ‘flat-panel displays (FPDs),’ such as ‘liquid crystal displays (LCDs),” particularly disclosing a “waveguide panel display” illustrated in Figs. 1 and 2. *Id.* at 5–6 (citing Ex. 1015, 1:20–30, 3:46–49, 6:15–19, 16:30–35, Figs 1–2). Petitioner reasons that

[a] POSITA would have understood that Zhou’s “waveguide optical device” could be utilized as a backlight in an LCD system, for example. Ex. 1014, ¶¶16, 24. Indeed, the use of a waveguide in a backlight assembly for an LCD system was well known in the art prior to the July 29, 2007, filing date on the ’705 Patent. *E.g.*, Ex. 1005, 2:49–3:33; Ex. 1006, [0024]–[0025]; Ex. 1007, 3:41–4:62, 11:46–55. And the display systems disclosed by Zhou include a “display screen 10,” which, in an LCD system, would be an LCD panel. Ex. 1015, 6:9–14, Fig. 1 . . . ; *see* Ex. 1014, ¶25.

Id. at 5.

We have reviewed the disclosure of Zhou, and observe that the disclosure supports Petitioner’s assertions with respect to the claimed “LCD panel.” *See* Ex. 1015, 1:23–33, 4:44–47, 6:15–16, Figs 1–2. Thus, at this stage of the proceeding, Petitioner has sufficiently shown that Zhou teaches or suggests “[a] liquid crystal display (LCD) system comprising: a) a LCD panel,” as recited in proposed substitute claim 35.

Petitioner also relies on Zhou for the claimed “a first waveguide element and a second waveguide element respectively comprising a first light entry region and a second light entry region” recited in paragraph b) of proposed substitute claim 35. *See* Opp. 6–8. In particular, Petitioner references Zhou’s “optical waveguide plate 25 [which] consists of a plurality of waveguide channels consisting of waveguide cores 20 and claddings 21” (*see* Ex. 1015, 6:28–31, Figs. 2, 5A–5C; Opp. 6–7), and contends that “[t]he ‘waveguide cores 20’ are ‘optical devices that confine the propagation directions of light waves,’ and thus satisfy the claimed

‘*first waveguide element*’ and ‘*second waveguide element*,’ respectively” (Opp. 6–7 (emphases added)). Petitioner further contends that “light [is emitted] into each ‘waveguide 20,’ respectively, at a ‘*waveguide end 20c*’—respectively, the claimed ‘*first light entry region*’ of the ‘first waveguide element’ and ‘*second light entry region*’ of the ‘second waveguide element.’” *Id.* at 8 (emphases added) (citing Ex. 1015, 6:32–33, 6:50–53, 16:19–22, Figs. 2, 3, and 13; Ex. 1014 ¶ 32).

We have reviewed the disclosure of Zhou, and find that the disclosure supports Petitioner’s assertions. For example, Zhou provides that

The waveguides used in this invention are optical devices that confine the propagation directions of light waves. The optical waveguide plate 25 consists of a plurality of waveguide channels consisting of waveguide cores 20 and claddings 21, with the refractive index of the waveguide cores 20 higher than that of the claddings 21. Each waveguide core 20 is aligned with one element of the light source 60 array. . . .

. . . .
A light beam 62, emitted from a light source 60, is coupled into a waveguide core 20 through a lens 61 to a waveguide end 20c. Inside the waveguide core 20, the light beam 62a is confined in lateral y and z directions but is allowed to propagate freely along longitudinal x direction until it reaches a location where a light switch 30 is on. . . .

. . . .
A collimated light beam 62 is coupled to a waveguide core 20 through the wedge surface 20c.

Ex. 1015, 6:26–34, 6:51–57, 12:66–13:1, Figs. 2, 3, 9B (emphases added).

Thus, at this stage of the proceeding, Petitioner has sufficiently shown that Zhou teaches or suggests “a first waveguide element and a second waveguide element respectively comprising a first light entry region and a second light entry region,” as recited in proposed substitute claim 35.

Petitioner next relies on Zhou for the claimed “first light-emitting source comprising a first plurality of LEDs arranged in a first strip and positioned to emit

light into the first waveguide element at a first light entry region” and “second light-emitting source comprising a second plurality of LEDs arranged in a second strip and positioned to emit light into the second waveguide element at a second light entry region” recited in paragraphs c) and d) of proposed substitute claim 35. *See* Opp. 6–8. In particular, Petitioner references Zhou’s “light source 60 [which] is constructed as a linear array, in which pluralities of light elements are placed one next to each other. . . . [with] each element of the linear array [being] composed of three sub-elements of red, green and blue (RGB) colors,” as shown for example in Fig. 13A of Zhou—in which “an exemplary LED light source 60 . . . is composed of a linear array of full color LED elements” where “[e]ach element consists of three sub-elements, consisting of red 60*a*, green 60*b*, and blue 60*c* colors, of surface emitting LEDs.” *See* Ex. 1015, 6:19–23, 16:1–5, Figs. 2 and 13A; Opp. 6–8. Petitioner contends that “[a] POSITA would have understood that each of Zhou’s ‘LED elements’ is thus *a strip* of a plurality of ‘surface emitting LEDs,’ including as illustrated in Figure 13 of Zhou, for example,” and “each individual ‘LED element’ []consisting of the three red-green-blue surface emitting LEDs 60*a*, 60*b*, and 60*c*[]—respectively, [teach] the claimed ‘*first light-emitting source comprising a first plurality of LEDs arranged in a first strip*’ and ‘*second light-emitting source comprising a second plurality of LEDs arranged in a second strip*.’” Opp. 7–8 (emphases added) (citing Ex. 1014 ¶ 30).

We have reviewed the disclosure of Zhou, and find that the disclosure supports Petitioner’s assertions. As noted *supra*, Zhou provides that “[e]ach waveguide core 20 is aligned with one element of the light source 60 array” which may include “a linear array of full color LED elements” with “[e]ach element consist[ing] of three sub-elements, consisting of red 60*a*, green 60*b*, and blue 60*c* colors, of surface emitting LEDs” whose light is coupled into the waveguide core

20 to the waveguide end 20c. *See* Ex. 1015, 6:31–33, 6:50–53, 16:1–5, 16:20–23, Fig. 13A (showing a linear array of multiple sets of three LED sub-elements that form a plurality of full color LED elements). And because “the pitch between adjacent LED elements is preferably the same as that between adjacent waveguide cores 20. . . . each LED element, consisting of red-green-blue sub-elements, are aligned with a corresponding waveguide core 20” such that “each waveguide core 20 carries light beams 62 of all three primary colors.” *See id.* at 16:17–23. That is, Zhou teaches that each waveguide core 20 receives light from an LED element that consists of red, green, and blue surface emitting sub-elements (LEDs). *See id.* at 16:1–5, 16:17–23.

Thus, at this stage of the proceeding, Petitioner has sufficiently shown that Zhou teaches or suggests (i) “a first light-emitting source [(one full color LED element of light source 60 as shown in, e.g., Fig. 13A)] comprising a first plurality of LEDs [(three sub-elements, consisting of red 60a, green 60b, and blue 60c colors, of surface emitting LEDs that form that full color LED element)]” that are “arranged in a first strip and positioned to emit light into the first waveguide element [(one of the waveguide cores 20)] at a first light entry region [(waveguide end 20c of that waveguide core 20)],” as recited in paragraph c) of proposed substitute claim 35, and (ii) “a second light-emitting source [(another full color LED element of light source 60 in Fig. 13A)] comprising a second plurality of LEDs [(three sub-elements, consisting of red 60a, green 60b, and blue 60c colors, of surface emitting LEDs that form that full color LED element)]” that are “arranged in a second strip and positioned to emit light into the second waveguide element [(another of the waveguide cores 20)] at a second light entry region [(waveguide end 20c of that waveguide core 20)],” as recited in paragraph d) of proposed substitute claim 35. We also find that Petitioner has sufficiently shown

that Zhou teaches “a common control circuit in electrical communication with at least one of the first plurality of LEDs and the second plurality of LEDs,” as recited in paragraph e) of proposed substitute claim 35. *See* Opp. 8–9 (citing Ex. 1015, 4:13–15, 6:38–7:12, 16:46–48, 16:50–51; Ex. 1014 ¶ 33).

Based on the current record, at this stage of the proceeding, Petitioner has shown a reasonable likelihood that proposed substitute claim 35, and proposed substitute claim 42 (which requires limitations similar to those recited in claim 35), are rendered obvious by Zhou and Fine.

Proposed substitute **claim 36** depends from claim 35 and replaces original dependent claim 2 while adding new limitations directed to “the first and second waveguide elements each have a transmissive surface, and . . . each transmissive surface is smaller than the viewable surface” of the LCD panel. Mot. App. A (Substitute Claims Listing). Proposed substitute **claim 43** depends from claim 42 and replaces original dependent claim 11 while adding new limitations similar to the limitations added in claim 36. *See id.*

Petitioner asserts that the limitations of claims 36 and 43 are “disclosed in (or, at a minimum, rendered obvious by) Zhou” because Zhou’s “display screen 10” of a “panel display set” has a “width W and height H” which forms “the claimed ‘viewable surface,’” the panel display set includes a “plurality” of “waveguide cores 20,” and “as illustrated in Figure 2 of Zhou . . . a POSITA would have understood that the transmissive surface of each ‘waveguide core 20’ is smaller than the viewable surface of the display screen 10.” Opp. 9–10 (citing Ex. 1015, 6:9–14, 6:28–30, 6:50–7:9, Figs. 1–3; Ex. 1014 ¶¶ 25, 28).

Based on the current record, at this stage of the proceeding, Petitioner has shown a reasonable likelihood that proposed substitute claims 36 and 43 are rendered obvious by Zhou (together with Fine) because, as seen in Zhou’s Figs. 2

and 3, each waveguide core 20 has a transmissive surface that transmits light to a viewer, and the transmissive surface of each waveguide core 20 is smaller than the surface of optical waveguide plate 25 that is commensurate with the viewable surface of the panel display. *See* Ex. 1015, 6:15–30, 6:65–7:9 (explaining that when light switch 30 is brought sufficiently close to waveguide core 20, “light beam 62*a* penetrates or tunnels through the gap 34 and enters the light switch 30” and “[a]fter entering the light switch 30, the light beam 62*a* is reflected by an embedded mirror reflector 31, passes back through the waveguide core 20 on its trajectory 62*b* to the front of the display, and then reaches a viewer 90”), Figs. 1–3.

Proposed substitute **claim 37** depends from claim 35 and replaces original dependent claim 32 (which recites that the LCD system is embodied in a television) while adding new limitations directed to “each of the first and second waveguide elements [being] positioned to light a portion of the LCD panel.” Mot. App. A (Substitute Claims Listing) (emphasis omitted). Proposed substitute **claim 38** depends from claim 35 and replaces original dependent claim 33 (which recites that the LCD system is embodied in a computer monitor) while adding new limitations directed to “each of the first and second waveguide elements [being] positioned to light a portion of the LCD panel.” *See id.* Proposed substitute **claim 44** depends from claim 42 and replaces original dependent claim 13 while adding new limitations similar to the limitations added in claim 37. *See id.* Proposed substitute **claim 45** depends from claim 42 and replaces original dependent claim 14 while adding new limitations similar to the limitations added in claim 38. *See id.*

Petitioner asserts that the limitations of claims 37, 38, 44, and 45 are “disclosed in (or, at a minimum, rendered obvious by) Zhou” because “Zhou teaches that ‘flat-panel displays (FPDs),’ such as ‘liquid crystal displays (LCDs),’

may be used in “[c]onventional television (TV) sets and computer monitors,”” and Zhou’s waveguide cores 20 are positioned to light a portion of the panel display. Opp. 10–11 (citing Ex. 1015, 1:20–30, 6:9–7:12, Figs. 1–2; Ex. 1014 ¶¶ 16, 24, 28) (alteration in original).

Based on the current record, at this stage of the proceeding, Petitioner has shown a reasonable likelihood that proposed substitute claims 37, 38, 44, and 45 are rendered obvious by Zhou (together with Fine) because Zhou provides that *waveguide cores 20* of optical waveguide plate 25 form (in cooperation with *light switches 30*) *pixels* displayed on display screen 10 of the panel display—such that waveguide cores 20 “are positioned to light a portion” of the panel display, as required by these claims. *See* Ex. 1015, 6:9–16, 7:5–24.

We acknowledge Patent Owner’s argument that an advantage of the amendments recited in claims 37, 38, 44, and 45 is “that the use of smaller waveguides improves light uniformity, and allows for the *backlight* to use less powerful LEDs, which helps to prevent ‘hot spots’ and overheating in the panel” (*see* Mot. 21 (emphasis added)). However, claims 37, 38, 44, and 45 do not recite or require the waveguide elements to be part of a *backlight*.

Proposed substitute **claim 40** depends from claim 35 and replaces original dependent claim 34 while adding new limitations directed to “a third plurality of LEDs arranged in a third strip and positioned to emit light into [a] third waveguide element at a third light entry region,” and proposed substitute **claim 41** depends from claim 40 and replaces original dependent claim 31 while adding new limitations directed to “a fourth light-emitting source comprising a plurality of LEDs arranged in a fourth strip and positioned to emit light into [a] fourth waveguide element at a fourth light entry region.” *See* Mot. App. A (Substitute Claims Listing) (emphasis omitted). Proposed substitute **claim 47** depends from

claim 42 and replaces original dependent claim 16 while adding new limitations similar to the limitations added in claim 40. *See id.* Proposed substitute **claim 48** depends from claim 47 and replaces original dependent claim 29 while adding new limitations similar to the limitations added in claim 41. *See id.*

Petitioner asserts that the limitations of claims 40, 41, 47, and 48 are “disclosed in, or, alternatively, rendered obvious by, Zhou” because “Zhou discloses a panel display including at least ten different ‘waveguide cores 20,’” and “[e]ach waveguide core 20 is aligned with one element of the light source array 60” with “each individual LED element consist[ing] of three individual ‘surface emitting LEDs’ (60a, 60b, and 60c), as illustrated in Figure 13 of Zhou.” Opp. 14–16 (citing Ex. 1015, 4:45–46, 6:15–53, 16:1–5, 16:19–22, Figs. 1–3, 5A–5C, 13; Ex. 1014 ¶¶ 14, 29–32) (first alteration in original).

Based on the current record, at this stage of the proceeding, Petitioner has shown a reasonable likelihood that proposed substitute claims 40, 41, 47, and 48 are rendered obvious by Zhou (together with Fine) because Zhou provides that *each waveguide core 20* (among more than four cores 20 shown in Fig. 2) is aligned with one element (such as a full color LED element consisting of red-green-blue sub-elements/surface emitting LEDs) of light source 60, with the aligned full color LED element positioned to emit light into its corresponding waveguide core 20 at a light entry region 20c. *See* Ex. 1015, 6:19–24, 6:28–34, 6:51–54, 16:1–5, 16:17–23, Figs. 2–3, 13A.

We acknowledge that Patent Owner has not yet had the opportunity to address Zhou (which Petitioner first made of record in this proceeding in support of its Opposition) and respond to Petitioner’s asserted ground against claims 35–38, 40–45, 47, and 48, based on Zhou and Fine. Patent Owner will have the

opportunity to do so in its Reply to Petitioner’s Opposition (or in a revised motion to amend) in this proceeding.

Proposed substitute claims 39 and 46

Proposed substitute **claim 39** depends from claim 35 and replaces original dependent claim 17 while adding new limitations directed to “the first light-emitting source and the second light-emitting source [being] embedded within a surface of the first and second waveguide, respectively.” Mot. App. A (Substitute Claims Listing) (emphasis omitted). Proposed substitute **claim 46** depends from claim 42 and replaces original dependent claim 28 while adding new limitations similar to the limitations added in claim 39; more particularly, claim 46 adds new limitations directed to “the first plurality of LEDs and the second plurality of LEDs are embedded within a surface of and emit light into the first and second waveguide, respectively.” *See id.* (emphasis omitted).

Petitioner asserts that the limitations of claims 39 and 46 are “disclosed in, or, alternatively, rendered obvious by, Zhou, including in view of Fine.” Opp. 11–12. Petitioner submits that “it would have been obvious to [embed elements of Zhou’s light source 60 into the respective waveguide cores 20 of Zhou] . . . in view of Fine” which describes “LEDs 12 [that] can be ‘embedded in the bulk of waveguide material 14.’” *Id.* at 11–12 (citing Ex. 1007, 11:50–55, 12:16–17, 13:24, 13:66–67, Fig. 2b; Ex. 1015, 16:1–5, Fig. 13; Ex. 1014 ¶¶ 29–30, 34–37). Petitioner contends that an ordinarily skilled artisan “would have been motivated to modify Zhou in view of Fine’s teachings with respect to embedded LEDs within a waveguide element” because

Zhou’s displays seek to improve, *inter alia*, the “light extraction efficiency” of [flat-panel displays (FPDs) including liquid crystal displays (LCDs)]. [Ex. 1015,] 4:33–36.

In relation, Fine is directed to, *inter alia*, improvements to “known LED based backlight devices,” including so as to deliver “superior

properties” with respect to “brightness, intensity and/or color profiles.” Ex. 1007, 4:50–59, 5:2–10. And Fine states that its teachings “can be incorporated in a passive display device,” such as a “liquid crystal display (LCD)” that employs a “backlight assembly.” Ex. 1007, 5:22–23, 3:37–52. Indeed, Fine states that a goal of its invention “to provide substantially uniform illumination,” which Fine notes is “particularly useful when ... incorporated in a backlight unit of a passive display device.” Ex. 1007, 16:31–38.

A POSITA would thus have been motivated to use the improvements described within Fine (*e.g.*, LEDs embedded within waveguide material) to improve the “light extraction efficiency” sought in Zhou. Ex. 1015, 4:33–36; *see also* Ex. 1014, ¶¶36–37. Indeed, Fine expressly teaches that “embedding” LEDs in a waveguide, as taught in Fine, “allows to efficiently collect the emitted light” from the LEDs. Ex. 1007, 13:5–6; *see id.* at 12:6–13:23 (discussing “several advantages for embedding the light source within the waveguide material”). Fine also discloses that a display apparatus according to its invention will “provide substantially uniform illumination” (Ex. 1007, 16:31–38), and Zhou is specifically concerned with achieving improved “uniformity.” Ex. 1015, 3:10–15. A POSITA would thus have recognized that the combination is simply the use of a known solution described in Fine to modify a similar system in Zhou, and for this reason would expect a successful combination. Ex. 1014, ¶37.

Id. at 12–14.

We have reviewed Petitioner’s contentions, as well as Patent Owner’s arguments that “Fine is silent about light emitting sources or LEDs embedded into multiple waveguides” (*see* Mot. 19–20).

At the outset, we note that at this stage we disagree with Petitioner’s contention that the limitations of claims 39 and 46 are “disclosed in . . . Zhou” because “Zhou . . . discloses that, in some embodiments, ‘light source 60’ may be ‘integrated into a light-source module’” (*see* Opp. 11–12 (citing Ex. 1015, 12:61–65)). Zhou’s column 12, lines 61–65 and Fig. 9A disclose that “light source 60, collimating lens 61 and optical prism 63 can be integrated into a light-source module. During display device assembly, the light-source module can be simply

attached to the surface of waveguides in a single step”—which does not teach that the LED elements of light source 60 are actually “embedded within a surface of” waveguide cores 20 (as required by claims 39 and 46).

However, at this stage, we find sufficient Petitioner’s arguments that the combination of Zhou and Fine renders claims 39 and 46 obvious because “[a] POSITA would . . . have been motivated to use the improvements described within Fine (e.g., LEDs embedded within waveguide material) to improve the ‘light extraction efficiency’ sought in Zhou.” *See* Opp. 12–14. As noted by Petitioner, Fine particularly discloses that light emitting sources (12) may be embedded in a waveguide material (14), in the bulk of waveguide material 14 or near surface 18 of waveguide material 14. *See* Ex. 1007, 8:50–62, 11:50–52, 12:66–67, 13:65–14:2, Figs. 1a, 1b, 2a, 2b. Fine also provides that

There are several advantages for embedding the light source within the waveguide material. One advantage is that all the light emitted from the light source eventually arrives at the waveguide material. When the light source is externally coupled to the waveguide material, some of the light scatters at wide angle and does not impinge the waveguide material. Thus, the embedding of light source 12 in waveguide material 14 allows to efficiently collect the emitted light.

Another advantage is the optical coupling between the light source and the waveguide material in particular when the light source is a light emitting diode. . . . when the diode is embedded in waveguide material, there is a direct transition of light from the diode to the waveguide material with higher overall transmission coefficient.

See id. at 12:66–13:19 (emphases added). Based on the disclosure of Fine and in view of testimony from Dr. Pattison (in Ex. 1014), at this stage, we find sufficient Petitioner’s arguments that an ordinarily skilled artisan “would . . . have been motivated to use the improvements described within Fine (e.g., LEDs embedded within waveguide material) to improve the ‘light extraction efficiency’” of the waveguide cores of Zhou. *See* Opp. 12–14.

Thus, based on the current record, at this stage of the proceeding, Petitioner has shown a reasonable likelihood that proposed substitute claims 39 and 46 (requiring LEDs to be embedded within surfaces of waveguide elements) are rendered obvious by Zhou and Fine.

We acknowledge that Patent Owner has not yet had the opportunity to address Zhou (which Petitioner first made of record in this proceeding in support of its Opposition) and Petitioner's discussion of the combination between Zhou and Fine asserted against claims 39 and 46. Patent Owner will have the opportunity to do so in its Reply to Petitioner's Opposition (or in a revised motion to amend) in this proceeding.

Johnson-Zhou-Fine Ground

Proposed substitute claims 35–38, 40–45, 47, and 48

As noted *supra*, proposed substitute claim 35 replaces original independent claim 1 and adds new limitations. *See* Mot. App. A (Substitute Claims Listing). In particular, proposed substitute independent claim 35 amends original claim 1 to recite that the LCD system comprises “at least a first waveguide element and a second waveguide element respectively comprising a first light entry region and a second light entry region,” instead of “at least one waveguide element comprising a plurality of light entry regions” (as recited in original claim 1). *See id.* Proposed substitute independent claim 35 also amends original claim 1 to recite that the LCD system comprises “a first light-emitting source comprising a first plurality of LEDs arranged in a first strip and positioned to emit light into the first waveguide element at a first light entry region” instead of “a first light-emitting source comprising a first plurality of LEDs arranged in a first strip and positioned to emit light into the at least one waveguide element at a first light entry region of the plurality of light entry regions” (as recited in original claim 1), and “a second light-

emitting source comprising a second plurality of LEDs arranged in a second strip and positioned to emit light into the second waveguide element at a second light entry region” instead of “a second light-emitting source comprising a second plurality of LEDs arranged in a second strip and positioned to emit light into the at least one waveguide element at a second light entry region of the plurality of light entry regions.” *See id.* (emphasis omitted). In other words, while original claim 1 requires *one* waveguide element comprising *multiple* light entry regions, claim 35 requires *two* waveguide elements each with *its own* light entry region. And while original claim 1 requires *both* light-emitting sources to emit light into *the one* waveguide element, claim 35 requires *each of* the two light-emitting sources to be *associated with (emit light into) one of* the two waveguide elements.

Petitioner’s original ground against original claim 1 based on Johnson relies on Johnson to teach or suggest *one waveguide element* (Johnson’s waveguide 20) comprising *plural* light entry regions (Johnson’s first major surface 22 and edge surface 28), and *two light-emitting sources* (Johnson’s LED array 16 and LED array 30) each having LEDs (LEDs 18 and LEDs 32, respectively) arranged in strips and *emitting light into the waveguide element* (waveguide 20) at a respective light entry region (edge surface 28 and first major surface 22). *See* Paper 1 (“Pet.”) 17–19 (citing Ex. 1005, Figs. 1–2). In other words, Petitioner’s original ground against original claim 1 identified in Johnson, *one waveguide element* (Johnson’s waveguide 20) comprising *a light entry region* (Johnson’s first major surface 22 and/or edge surface 28), and *one or more light-emitting sources* (Johnson’s LED array 16 and LED array 30) with LEDs arranged in strips *emitting light into the waveguide element* (waveguide 20) at the light entry region. *See id.*; *see also* Opp. 16–17 (reiterating the contentions in Petitioner’s original ground against claim 1, which assert that Johnson teaches, *inter alia*, one waveguide element

having a light entry region, and a light-emitting source comprising a LEDs arranged in a strip and positioned to emit light into the waveguide element at the entry region); Mot. 3, 13–14 (noting Petitioner’s original ground against original claim 1 based on Johnson).

As Patent Owner’s Motion notes, however, “Johnson is silent about multiple waveguide elements or multiple light entry regions corresponding to the multiple waveguide elements,” as required by proposed substitute claim 35. Mot. 13–14. Petitioner’s Opposition, in turn, contends that the combination of Johnson and Zhou renders claim 35 obvious as “it would have been obvious to a POSITA to *implement Johnson’s invention with two or more waveguide 20 elements (with corresponding LED light sources, respectively), including in view of Zhou.*” Opp. 17–18 (emphasis added) (citing Ex. 1014 ¶¶ 40–43). Petitioner explains that an ordinarily skilled artisan would have found it obvious (and been motivated) to employ *multiple arrangements of Johnson’s waveguide 20* (together with the waveguide’s light entry region into which a light-emitting source having LEDs in a strip is positioned to emit light) “in a modular fashion in a large LCD display” because

Johnson claims a backlight for an LCD comprising “a combining element,” which the dependent claims make clear is a “waveguide.” Ex. 1005, 7:7–18, 7:37–38. And Johnson expressly states that, “where the claims recite ‘a’ or ‘a first’ element or the equivalent thereof”—as in the case of the “waveguide”—“such claims should be understood to include incorporation of one or more such elements, neither requiring nor excluding two or more such elements.” *Id.* at 6:57–60.

And a POSITA would have understood, including in view of Zhou, that Johnson’s waveguides 20 could be used in a modular fashion in a large LCD display. Ex. 1014, ¶¶ 40–43. *For example, for an LCD stack 12 four-times as wide as the one exemplified in Figures 1 and 2 of Johnson, a POSITA would recognize that, as an alternative to building and using a waveguide 20 four-times as wide as the one exemplified in Figures 1 and 2 of Johnson, four (4) of the waveguides 20 illustrated in*

Figures 1 and 2 of Johnson—as well as four (4) of the corresponding LED arrays 18, for example—could be arranged linearly, in modular fashion, similar to Zhou’s waveguide cores 20, to achieve the same end. Ex. 1014, ¶43. Indeed, Zhou expressly teaches that its invention—including its plurality of waveguide cores 20—provides for an “inexpensive, simple, energy efficient, high quality” flat-panel display “that can be manufactured in sizes ranging . . . to tens of feet,” including with respect to potentially both “television (TV) sets” and “computer monitors.” Ex. 1015, 3:35–38, 1:20–30; *see id.* at 3:45–49; *see also* Ex. 1014, ¶¶41–42.

A POSITA thus would have recognized that use of multiple waveguide elements (with corresponding light sources) in modular fashion in flat-panel displays, as taught in Zhou, was a known solution in designing and constructing large flat-panel displays (“tens of feet” in size), as described in Zhou, including with respect to the similar LED-based LCD systems described in Johnson, and for this reason would expect a successful combination of Johnson and Zhou on this point. Ex. 1014, ¶42. And in such combination, each of individual waveguides 20 would itself necessarily have a surface smaller than the surface of the entire LCD panel and likewise only light a portion of the larger LCD panel. Ex. 1014, ¶43.

Id. at 17–19 (emphases added).

Based on the disclosures of Johnson and Zhou and in view of testimony from Dr. Pattison (in Ex. 1014), at this stage, we find sufficient Petitioner’s arguments that “it would have been obvious to a POSITA to implement Johnson’s invention with two or more waveguide 20 elements (with corresponding LED light sources, respectively), including in view of Zhou” such that Johnson’s waveguide would be “used in a modular fashion in a large LCD display.” *See* Opp. 17–18. Johnson provides that “where [its] claims recite ‘a’ or ‘a first’ *element* or the equivalent thereof, such claims should be understood to include incorporation of *one or more such elements*, neither requiring nor excluding two or more such elements” (*see* Ex. 1005, 6:57–60 (emphases added)) and also indicates that its *waveguide 20 is such an element* (more particular, a “combining element” by

which “[t]he light from the LED arrays [16 and 30] is combined . . . thereby altering the chromaticity of the light from first LED array 16,” *see id.* at 2:3, 3:25–30, 4:10–11, 4:39–40, Abstr.). Moreover, as discussed *supra* with respect to the Zhou-Fine ground, Zhou teaches that *multiple waveguide elements* may be used in one display device, with each waveguide element having a light entry region into which a light-emitting source composed of LEDs arranged in a strip is positioned to emit light. *See* Ex. 1015, Figs. 1–3.

Thus, based on the current record, at this stage of the proceeding, Petitioner has shown a reasonable likelihood that proposed substitute independent claim 35, proposed substitute independent claim 42 (which appears to require limitations similar to those recited in claim 35), proposed substitute dependent claims 36 and 43 (reciting that the transmissive surfaces of individual waveguide elements are smaller than the viewable surface of the entire LCD panel), proposed substitute dependent claims 37, 38, 44, and 45 (reciting that each of the waveguide elements are positioned to light a portion of the LCD panel), and proposed substitute dependent claims 40, 41, 47, and 48 (reciting third and fourth light-emitting sources or plurality of LEDs that emit light into respective third and fourth waveguide elements at the waveguides’ respective light entry regions), are rendered obvious by Johnson, Zhou, and Fine.

We acknowledge that Patent Owner has not yet had the opportunity to address Zhou (which Petitioner first made of record in this proceeding in support of its Opposition) and Petitioner’s discussion of the combination between Johnson, Zhou, and Fine asserted against claims 35–38, 40–45, 47, and 48. Patent Owner will have the opportunity to do so in its Reply to Petitioner’s Opposition (or in a revised motion to amend) in this proceeding.

Proposed substitute claims 39 and 46

Petitioner contends that the limitations of proposed substitute claims 39 and 46 “are obvious over Johnson and Zhou in further view of Fine” for reasons similar to those discussed *supra* with respect to the Zhou-Fine combination asserted against these claims. *See* Opp. 19–20. For substantially the same reasons discussed *supra* with respect to the Zhou-Fine combination, at this stage we find sufficient Petitioner’s arguments that an ordinarily skilled artisan “would have been motivated to use the improvements described within Fine (LEDs embedded within waveguide material) to improve the Johnson-Zhou system” (*see id.*). Thus, based on the current record, at this stage of the proceeding, Petitioner has shown a reasonable likelihood that proposed substitute claims 39 and 46 are rendered obvious by the combination of Johnson, Zhou, and Fine.

We acknowledge that Patent Owner has not yet had the opportunity to address Zhou (which Petitioner first made of record in this proceeding in support of its Opposition) and Petitioner’s discussion of the combination between Johnson, Zhou, and Fine asserted against claims 39 and 46. Patent Owner will have the opportunity to do so in its Reply to Petitioner’s Opposition (or in a revised motion to amend) in this proceeding.

Suzuki-Zhou-Fine Ground

Proposed substitute claims 35–38, 40–45, 47, and 48

As noted *supra*, proposed substitute claim 35 replaces original independent claim 1 and adds new limitations to the effect that (i) while original claim 1 requires *one* waveguide element comprising *multiple* light entry regions, claim 35 requires *two* waveguide elements each with *its own* light entry region, and (ii) while original claim 1 requires *both* light-emitting sources to emit light into *the one* waveguide element, claim 35 requires *each of* the two light-emitting sources to be

associated with (emit light into) one of the two waveguide elements. See Mot. App. A (Substitute Claims Listing).

Petitioner's original ground against original claim 1 based on Suzuki relies on Suzuki to teach or suggest *one waveguide element* (Suzuki's light guide 11) comprising *plural* light entry regions (Suzuki's light entry surfaces 12), and *two light-emitting sources* (Suzuki's LED light sources 15) each having LEDs (sets of LEDs 7) arranged in strips and *emitting light into the waveguide element* (light guide 11) at a respective light entry region (light entrance surfaces 12). *See Pet. 42–46 (citing Ex. 1006, Figs. 1, 2, 4).* In other words, Petitioner's original ground against original claim 1 identified in Suzuki, *one waveguide element* (Suzuki's light guide 11) comprising *a light entry region* (Suzuki's light entry surface 12), and *one or more light-emitting sources* (Suzuki's LED light sources 15) with LEDs arranged in strips *emitting light into the waveguide element* (light guide 11) at the light entry region. *See id.; see also Opp. 21 (reiterating the contentions in Petitioner's original ground against claim 1, which assert that Suzuki teaches, inter alia, one waveguide element having a light entry region, and a light-emitting source comprising a LEDs arranged in a strip and positioned to emit light into the waveguide element at the entry region); Mot. 3, 14–15 (noting Petitioner's original ground against original claim 1 based on Suzuki).*

Patent Owner' Motion notes, however, “Suzuki is silent about multiple waveguide elements or multiple light entry regions corresponding to the multiple waveguide elements,” as required by proposed substitute claim 35. Mot. 14–15. Petitioner's Opposition, in turn, contends that the combination of Suzuki and Zhou renders claim 35 obvious as “it would have been obvious to a POSITA to *implement Suzuki's invention with two or more 'light guide 11' elements (with corresponding LED light sources, respectively), including in view of Zhou.*”

Opp. 21 (emphasis added) (citing Ex. 1014 ¶¶ 47–50). Petitioner explains that an ordinarily skilled artisan would have found it obvious (and been motivated) to employ *multiple arrangements of Suzuki’s light guide 11*

in a modular fashion in a large LCD display. [Ex. 1014 ¶¶ 47–50]. For example, for an LCD panel 2 four-times as wide as the one exemplified in Figures 1–3 of Suzuki, a POSITA would recognize that, *as an alternative to building and using a light guide 11 four-times as wide as the one exemplified in Figures 1–3 of Suzuki, four (4) of the light guides 11 illustrated in Figures 1–3 of Suzuki—as well as four (4) of the corresponding LED light sources 15—could be arranged linearly, in modular fashion, similar to Zhou’s waveguide cores 20, to achieve the same end.* Ex. 1014, ¶50. Indeed, Zhou expressly teaches that its invention—including its plurality of waveguide cores 20—provides for an “inexpensive, simple, energy efficient, high quality” flat-panel display “that can be manufactured in sizes ranging ... to tens of feet,” including with respect to potentially both “television (TV) sets” and “computer monitors.” Ex. 1015, 3:35–38, 1:20–30; *see id.* at 3:45–49; *see also* Ex. 1014, ¶¶ 48–49.

A POSITA thus would have recognized that use of multiple waveguide elements (with corresponding light sources) in modular fashion in flat-panel displays, as taught in Zhou, was a known solution in designing and constructing large flat-panel displays (“tens of feet” in size), as described in Zhou, including with respect to the similar LED-based LCD systems described in Suzuki, and for this reason would expect a successful combination of Suzuki and Zhou on this point. Ex. 1014, ¶49. And in such combination, each of individual light guides 11 would itself necessarily have a surface smaller than the surface of the entire LCD panel and likewise only light a portion of the larger LCD panel. Ex. 1014, ¶50.

Id. at 21–22 (emphases added).

Based on the disclosures of Suzuki and Zhou and in view of testimony from Dr. Pattison (in Ex. 1014), at this stage we find sufficient Petitioner’s arguments that “it would have been obvious to a POSITA to implement Suzuki’s invention with two or more ‘light guide 11’ elements (with corresponding LED light sources,

respectively), including in view of Zhou” such that Suzuki’s light guide would be “used in a modular fashion in a large LCD display.” *See* Opp. 21–22. As discussed *supra* with respect to the Zhou-Fine ground, Zhou teaches that *multiple waveguide elements* may be used in one device, with each waveguide element having a light entry region into which a light-emitting source composed of LEDs arranged in a strip is positioned to emit light. *See* Ex. 1015, Figs. 1–3.

Thus, based on the current record, at this stage of the proceeding, Petitioner has shown a reasonable likelihood that proposed substitute independent claim 35, proposed substitute independent claim 42 (which appears to require limitations similar to those recited in claim 35), proposed substitute dependent claims 36 and 43 (reciting that the transmissive surfaces of individual waveguide elements are smaller than the viewable surface of the entire LCD panel), proposed substitute dependent claims 37, 38, 44, and 45 (reciting that each of the waveguide elements are positioned to light a portion of the LCD panel), and proposed substitute dependent claims 40, 41, 47, and 48 (reciting third and fourth light-emitting sources or plurality of LEDs that emit light into respective third and fourth waveguide elements at the waveguides’ respective light entry regions), are rendered obvious by Suzuki, Zhou, and Fine.

We acknowledge that Patent Owner has not yet had the opportunity to address Zhou (which Petitioner first made of record in this proceeding in support of its Opposition) and Petitioner’s discussion of the combination between Suzuki, Zhou, and Fine asserted against claims 35–38, 40–45, 47, and 48. Patent Owner will have the opportunity to do so in its Reply to Petitioner’s Opposition (or in a revised motion to amend) in this proceeding.

Proposed substitute claims 39 and 46

Petitioner contends that the limitations of proposed substitute claims 39 and 46 “are obvious over Suzuki and Zhou in further view of Fine” for reasons similar to those discussed *supra* with respect to the Zhou-Fine combination asserted against these claims. *See* Opp. 22–23. For substantially the same reasons discussed *supra* with respect to the Zhou-Fine combination, we are persuaded at this stage by Petitioner’s arguments that an ordinarily skilled artisan “would have been motivated to use the improvements described within Fine (LEDs embedded within waveguide material) to improve the Suzuki-Zhou system” (*see id.*). Thus, based on the current record, at this stage of the proceeding, Petitioner has shown a reasonable likelihood that proposed substitute claims 39 and 46 are rendered obvious by the combination of Suzuki, Zhou, and Fine.

We acknowledge that Patent Owner has not yet had the opportunity to address Zhou (which Petitioner first made of record in this proceeding in support of its Opposition) and Petitioner’s discussion of the combination between Suzuki, Zhou, and Fine asserted against claims 39 and 46. Patent Owner will have the opportunity to do so in its Reply to Petitioner’s Opposition (or in a revised motion to amend) in this proceeding.

III.CONCLUSION

This concludes our Preliminary Guidance. Patent Owner has the option to reply to this Preliminary Guidance *or* to file a revised MTA by DUE DATE 3. 37 C.F.R. § 42.121(e)(3), (f); Paper 9 (Scheduling Order). Patent Owner’s reply or revised MTA may only respond to this Preliminary Guidance or Petitioner’s Opposition and may be accompanied by new evidence (including declarations). 37 C.F.R. § 42.121(e)(3). Petitioner has the option to file a sur-reply responsive to

this Preliminary Guidance, Patent Owner's reply, or Patent Owner's revised MTA but may not present new evidence in any case. 37 C.F.R. § 42.121(e)(3).

Petitioner may also file a reply to the preliminary guidance in the case Patent Owner does not file a reply or revised MTA. 37 C.F.R. § 42.121(e)(4).

In addition, Patent Owner is reminded that amendments of the challenged claims may also be pursued in a separate reissue or reexamination proceeding before, during, or after an AIA trial proceeding, including subsequent to the issuance of the Final Written Decision. We draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

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