



**IN THE UNITED STATES DISTRICT COURT  
FOR THE WESTERN DISTRICT OF TEXAS  
WACO DIVISION**

LED WAFER SOLUTIONS LLC,

Plaintiff,

v.

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

Defendants,

and

SEOUL SEMICONDUCTOR CO., LTD.,

Intervenor-Defendant.

Civil Action No. 6:21-cv-00292-ADA

**JURY TRIAL DEMANDED**

**DEFENDANTS' OPENING CLAIM CONSTRUCTION BRIEF**

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## **REGULATIONS**

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## I. INTRODUCTION

Plaintiff LED Wafer Solutions LLC alleges that Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively, “Samsung”) infringe four patents<sup>1</sup> directed to LED structures and methods for forming LED structures. *See* D.I. 1, ¶ 15. Samsung and Intervenor-Defendant Seoul Semiconductor Co., Ltd. (collectively, “Defendants”) propose constructions rooted in the claims, specifications, and prosecution histories of the Patents-in-Suit. In contrast, Plaintiff’s proposed constructions depart from proper claim construction principles in myriad ways—in some cases limiting terms to preferred embodiments, and in others attempting to unwind the applicant’s representations to the Patent Office to obtain the patents. Accordingly, Defendants respectfully request that this Court adopt Defendants’ constructions.<sup>2</sup>

## II. “OPTICALLY DEFINABLE MATERIAL”

| Claim Term  | Defendants’ Construction   | Plaintiff’s Construction  |
|---|----------------------------|---|
| “optically definable material” (’137 patent, claim 1; ’405 patent, claim 1) | Plain and ordinary meaning | “a material within or adjacent to the optically permissive layer that changes an optical characteristic of emitted light” |

The meaning of “optically definable material” is evident from the claims in which the term appears. In particular, each claim recites the characteristics of the “optically definable material”:

- ’137 patent, claim 1: “an *optically definable material* proximal to or within said optically permissive layer that *affects an optical characteristic of emitted light passing therethrough*”
- ’405 patent, claim 1: “optically permissive layer comprising an optically definable material containing quantum dots and/or phosphor, said *optically definable material adapted to change the frequency of at least some of emitted light passing therethrough*”<sup>3</sup>

Because the surrounding claim language clearly defines the term (and specifies the location of the

<sup>1</sup> The “Patents-in-Suit” are U.S. Patent Nos. 8,941,137 (the “’137 patent”); 8,952,405 (the “’405 patent”); 9,502,612 (the “’612 patent”); and 9,786,822 (the “’822 patent”). D.I. 1, Exs. A-D.

<sup>2</sup> Appendix A identifies which party proposed each term for construction.

<sup>3</sup> All emphasis, highlighting, color, and annotations added unless otherwise stated.

optically definable material relative to other components), no further construction is necessary.

The Court should reject Plaintiff's construction for three reasons. **First**, Plaintiff's construction is a repetitive and imprecise paraphrase of claim 1 of the '137 patent. Inserting Plaintiff's construction (underlined) into that claim effectively repeats the same limitation twice with ambiguously different language: "a material within or **adjacent to** the optically permissive layer that **changes** an optical characteristic of emitted light **proximal to** or within said optically permissive layer that **affects** an optical characteristic of emitted light passing therethrough."

**Second**, Plaintiff's construction—which is the same for both claims—impermissibly broadens claim 1 of the '405 patent. In particular, that claim requires the “optically definable material” to “**change the frequency** of at least some of emitted light.” '405 patent, claim 1. Plaintiff's construction omits that requirement and instead requires only that the optically definable material changes some “optical characteristic” of the emitted light.

**Third**, Plaintiff's construction improperly broadens claim 1 of the '405 patent by permitting the optically definable material to be “adjacent to”—and presumably separate from—the optically permissive layer. The claim, however, requires the optically permissive layer to “**compris[e]** an optically definable material.” '405 patent, claim 1. Because the “optically permissive layer compris[es]” the “optically definable material,” the optically definable material is within—not “adjacent to”—the optically permissive layer. *See, e.g., MACON Tech. Sols. Holdings, Inc. v. Infineon Techs. AG*, No. 2:16-cv-02859, 2018 WL 2213431, at \*18 (C.D. Cal. May 9, 2018) (“layer **comprises** a gallium nitride alloy” requires that the gallium nitride alloy be “present somewhere **in** the layer”).

Indeed, the applicant amended the claim during prosecution by replacing “**proximal to** or within” with “comprising”:



optically permissive layer comprising an optically definable material containing quantum dots and/or phosphor proximal to or within said optically permissive layer, said optically definable material adapted to that change[[s]] the frequency

Ex. A, Sept. 22, 2014 Response at 3. Plaintiff's construction attempts to unwind that amendment and permit the optically definable material to be "*adjacent to*" rather than *within* the optically permissive layer. Accordingly, the Court should reject Plaintiff's construction.

### III. "COVERING AT LEAST A PORTION OF THE ABOVE COMPONENTS"

| Claim Term   | Defendants' Construction  | Plaintiff's Construction  |
|--|---|---|
| "covering at least a portion of the above components" ('137 patent, claim 1) | "covering at least a portion of each of the semiconductor LED, the conducting support layer, the optically permissive layer, and the optically definable material"      | "covering at least a portion of at least one of the semiconductor LED, the conducting support layer, optically permissive layer, and optically definable material to protect the LED from degrading properties (e.g. moisture)" |
| "covering at least a portion of the above components" ('405 patent, claim 1) | "covering at least a portion of each of the semiconductor LED, the electrically conducting metallization layer, the sapphire layer, and the optically permissive layer" |   |

The parties agree that these terms require construction, but the parties' constructions fundamentally differ in three respects. **First**, Defendants' construction properly identifies the complete list of "the above components" recited earlier in each claim; whereas Plaintiff's construction arbitrarily omits some of those "above components." **Second**, the parties dispute whether the claimed "cover substrate" (recited earlier in the limitation) must cover a portion of *each* (i.e., all) of the aforementioned components (as Defendants propose) or merely a portion of only *one* of those components (as Plaintiff asserts). **Third**, the parties dispute whether the claimed cover substrate must "protect the LED from degrading properties (e.g. moisture)" (as Plaintiff asserts). The claims, specification, and prosecution history support Defendants' construction.

#### A. Defendants' construction properly lists all of "the above components."

The terms' use of "the above components" refers to the components of the claimed light

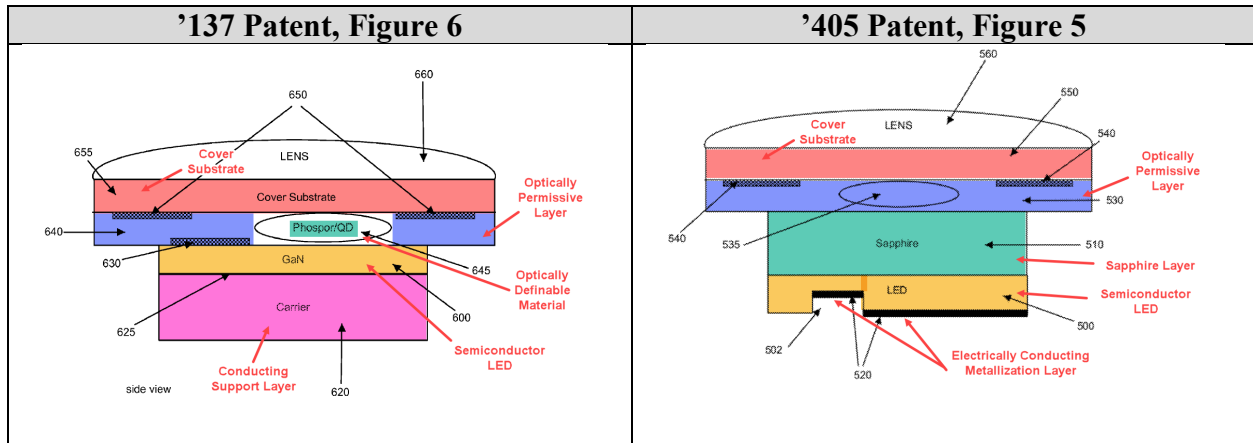
emitting device recited earlier in each claim; although, the earlier-recited components differ between the two claims. In claim 1 of the '137 patent, the “above components” are “a semiconductor LED,” “a conducting support layer,” “an optically permissive layer,” and “an optically definable material.” '137 patent, claim 1. Both parties’ constructions list those components. In claim 1 of the '405 patent, however, the “above components” are “a semiconductor LED,” “*an electrically conducting metallization layer*,” “*a sapphire layer*,” and “an optically permissive layer.” '405 patent, claim 1. Defendants’ construction properly reflects that distinction by including all recited components, whereas Plaintiff’s construction for claim 1 of the '405 patent incorrectly omits the “electrically conducting metallization layer” and the “sapphire layer.”

**B. The claimed “cover substrate” must cover a portion of *each* of the earlier-recited components—not just “one” of those components.**

The claims and specifications support Defendants’ construction for two reasons. *First*, claim 1 of each of the '137 and '405 patents recites a “cover substrate covering at least a portion of the above components.” '137 patent, claim 1; '405 patent, claim 1. The reference to “*the*” above components refers to *each* of those components. *See, e.g., Harris Corp. v. Fed. Exp. Corp.*, 502 F. App’x 957, 963, 965 (Fed. Cir. 2013) (construing “transmitting *the* . . . data” as “transmitting *all* the . . . data”) (“[A]lthough the claim does not expressly require that ‘all’ of the accumulated data must be transmitted, it similarly lacks any indication that some subset of the accumulated data should be transmitted, and if so what that subset should be.”); *see also Kruse Tech. P’ship v. Volkswagen AG*, 544 F. App’x 943, 950 (Fed. Cir. 2013) (“The subject is introduced with the definite article (*‘the’*), indicating a particular combustion. . . . ‘[T]he combustion . . . is a substantially isothermal process,’ does not indicate that only a portion of the combustion is isothermal; instead, it indicates that the *entire* combustion is isothermal.”).

*Second*, the specifications support Defendants’ construction because in every figure that

shows a “cover substrate,” the cover substrate covers at least a portion of *each* of the components listed in Defendants’ constructions. An exemplary figure from each patent is shown below:



See also ’137 patent, Figs. 8-18; ’405 patent, Figs. 7-12. The specifications never discuss or show the cover substrate covering only *one* of, or a subset of, the “above components.”

In contrast, Plaintiff’s construction improperly broadens the claims by requiring only that a portion of “at least *one* of the” components be covered rather than a portion of *each*. Indeed, Plaintiff’s construction—which requires the cover substrate to cover as few as *one* of “the above components”—is internally inconsistent because it would encompass a “cover substrate” that does *not* cover *any* portion of the “semiconductor LED.” Yet Plaintiff at the same time asserts in its construction that the purpose of the “covering” limitation is “to protect *the LED* from degrading properties (e.g. moisture).” If the “semiconductor LED” is *not* one of the components that must be covered—as Plaintiff’s overly broad construction permits—the semiconductor LED would not be protected by the cover substrate.

**C. Plaintiff’s additional requirement that the cover substrate must “protect the LED from degrading properties (e.g. moisture)” is not supported.**

Plaintiff’s construction improperly adds an alleged purpose or intent of the claimed “cover substrate.” See *United Servs. Auto. Ass’n v. PNC Bank N.A.*, No. 2:20-cv-00319-JRG, 2021 WL 5451020, at \*19 (E.D. Tex. Nov. 22, 2021) (“PNC’s proposal of introducing a ‘goal’ into the

construction is unclear, lacks sufficient support in the intrinsic record, and would tend to confuse rather than clarify the scope of the claims.”); *Innovative Display Techs. LLC, et al. v. Hyundai Motor Co., et al.*, No. 2:14-cv-201-JRG, 2015 WL 2090651, at \*27 (E.D. Tex. May 4, 2015) (“Defendants have failed to demonstrate that design intent is a necessary or appropriate claim limitation here.”).

Neither the claims nor the specifications of either patent provides any support for Plaintiff’s injection of a purpose or intent into the claim term. Indeed, the specifications describe the “cover substrate” as “provid[ing] structure presence and mechanical coupling”—*not* as “protect[ing] the LED from degrading properties” such as “moisture.” ’137 patent, 5:12-14; ’405 patent, 5:27-29.

The only references to adding a cover substrate “for the added benefit of sealing the device for protection from moisture” were made by the *examiner* during prosecution—*not by the applicant*. Ex. B (Mar. 27, 2013 Non-Final Rejection) at 6; *see also* Ex. C (Nov. 22, 2013 Non-Final Rejection) at 5; Ex. D (July 16, 2014 Final Rejection) at 4; *see* Ex. E (May 21, 2014 Non-Final Rejection) at 22. The applicant did not acknowledge, amend the claims in response to, or otherwise respond to those comments by the examiner. Accordingly, the examiner’s statements cannot narrow the claims. *See 3M Innovative Props. Co. v. Avery Dennison Corp.*, 350 F.3d 1365, 1373-74 (Fed. Cir. 2003); *Dealertrack, Inc. v. Huber*, 674 F.3d 1315, 1322 (Fed. Cir. 2012).

#### IV. “SAID SHAPED EDGE CONFIGURED TO REFLECT LIGHT GENERATED BY SAID LIGHT EMITTING DEVICE OUTWARDLY THEREFROM”

| Claim Term  | Defendants’ Construction                | Plaintiff’s Construction   |
|---|---|----------------------------|
| “said shaped edge configured to reflect light generated by said light emitting device outwardly therefrom” (’137 patent, claim 4; ’405 patent, claim 4) | “therefrom” refers to the “shaped edge” | Plain and ordinary meaning |

This term is internally inconsistent because it requires light to be “reflect[ed] . . . outwardly” from a “shaped edge,” but light cannot be “reflected” outward from a medium, it can

only be reflected internally. During the meet and confer process, it appeared likely that Plaintiff would contend the outward requirement refers to the device as a whole. Plaintiff, however, refused to confirm its position. Defendants, therefore, write briefly to address that potential argument.

Reflection refers to one of two well-known results that occur when light strikes an interface between two mediums having different indices of refraction: (1) the light can propagate forward from a first medium into a second in a process known as refraction; or (2) the light can remain within the first medium in a process known as reflection. *See* Ex. M (*Modern Dictionary of Electronics* 634 (7th ed. 1999)); Ex. Q (*Wiley Electrical and Electronics Engineering Dictionary* 647 (2004)); Ex. P (*Webster's Unabridged Dictionary* 1620); Ex. O (*Concise Oxford American Dictionary* 748 (2006)); Ex. I (Hecht *Optics* 79-93 (2d ed. 1987)); Ex. R (*Geometric, Physical, and Visual Optics* 6-7, 267-68 (2d ed. 2002)). The full phrase recites two structures: a “shaped edge” and a “light emitting device.” ’137 patent, claim 4; ’405 patent, claim 4. The former reflects light, *i.e.*, changing its direction of propagation. The latter emits light, but without any limitation on its direction of propagation. Accordingly, “outwardly therefrom” is an unambiguous reference to reflection occurring at the “shaped edge.”

Moreover, interpreting the claim to refer to light moving **outwardly** from a “light **emitting** device” would render that language redundant—**emitted** light necessarily moves **outward**. That interpretation, therefore, would improperly render the disputed language superfluous. *See St. Jude Med., LLC v. Snyders Heart Valve LLC*, 977 F.3d 1232, 1240-41 (Fed. Cir. 2020).

**V. “A REQUIRED POSITION OF SAID DEVICE WITH RESPECT TO SAID OPTICALLY PERMISSIVE [FLAT] COVER SUBSTRATE”**

| Claim Term  | Defendants’ Construction | Plaintiff’s Construction   |
|---|--------------------------|--|
| “a required position of said device with respect to said optically permissive [flat] cover substrate” (’137 patent, | Indefinite               | “align the light emitting device with an optically permissive cover substrate to protect one or more components of the light |

|                                |                  |
|--------------------------------|------------------|
| claim 6; '405 patent, claim 7) | emitting device” |
|--------------------------------|------------------|

Claim 6 of the '137 patent and claim 7 of the '405 patent recite limitations regarding a position of the light emitting device relative to the cover substrate. Those claims are indefinite for two independent reasons. **First**, they are indefinite because the claims and the corresponding patent specifications “fail to inform, with reasonable certainty, those skilled in the art about the scope” of what constitutes a **required** position. *See Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014). **Second**, they are indefinite because they nonsensically recite a position of a device relative to a component **of** that device.

**A. The claims are indefinite because the claims and specifications fail to inform with reasonable certainty what constitutes a “required position.”**

**First**, the claims do not specify what constitutes a “required position.” Thus, they do not provide any guidance regarding the scope of those terms. *See, e.g., Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1371 (Fed. Cir. 2014) (invalidating claims where the claim language provided no objective boundaries for the recited phrase).

**Second**, the specifications do not disclose how to determine whether the light emitting device is in a “required” position relative to the cover substrate. The phrase “required position” does not even appear in the specifications. *See* '137 patent; '405 patent. The patents thus fail to provide a POSITA any guidance regarding what a “required” position means in the context of these claims. *See Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 789 F.3d 1335, 1344-45 (Fed. Cir. 2015).

Plaintiff appears to recognize the claims’ ambiguity and seeks to replace “required position” with a requirement that the light emitting device is “align[ed]” with the cover substrate. But Plaintiff’s construction is just as ambiguous as the already indefinite claim language because it fails to specify **how** the light emitting device is to be aligned with the cover substrate. For example, is the device “align[ed]” with the cover substrate if merely one edge of the overall light

emitting device is stacked vertically on top of one edge of the cover substrate? Is the device “align[ed]” with the cover substrate only if all edges of the light emitting device are stacked vertically on top of corresponding edges of the cover substrate? Is the device “align[ed]” with the cover substrate if their centers are stacked vertically on top of each other? Plaintiff’s construction is just as indefinite as the as-written claims. And as discussed in the following section, it does not even make sense for the light emitting device to be aligned with the cover substrate because the cover substrate is a component *of* the light emitting device.

**B. The claims are further indefinite because they nonsensically recite a position of a device relative to a component *of* that device.**

Plaintiff agrees that “said device” refers to the “light emitting device” of each patent’s claim 1. *See* Plaintiff’s construction. Thus, there is no dispute that the “light emitting device” is the claimed apparatus that *comprises* the claimed “cover substrate.” *See* ’137 patent, claim 1; ’405 patent, claim 1. These claims therefore require that the “light emitting device” be positioned with respect to a component of that device—a nonsensical concept. In contrast, claim 11 of the ’137 patent and claim 17 of the ’405 patent, for example, refer to the position of the *semiconductor LED* relative to the cover substrate. In those claims it would be possible to compare the position of one component of the device—the semiconductor LED—relative to another component of the device—the cover substrate. But it is nonsensical to relate the position of *the device* to a component of that device.

**C. Plaintiff’s construction injects an unsupported purpose into the claims.**

As explained above, Plaintiff’s construction—replacing “required position” with “align[ed]”—does not save the claims. But Plaintiff’s construction is also incorrect because it improperly injects an unsupported purpose into the claims: “to protect one or more components of the light emitting device.” The ’137 and ’405 patents do not describe positioning the cover

substrate to protect components of the device (as Plaintiff’s construction requires). Instead, they only describe the cover substrate as “provid[ing] structural presence and mechanical coupling for elements of the LED device.” ’137 patent at 5:14-15; ’405 patent at 5:27-29.

**VI. “LIFTING OFF SAID SUBSTRATE FROM SAID LED; FORMING A METAL PAD ON THE NEWLY EXPOSED LED SURFACE”**

| <b>Claim Term</b>  | <b>Defendants’ Construction</b>   | <b>Plaintiff’s Construction</b>   |
|--|---|---|
| “lifting off said substrate from said LED; forming a metal pad on the newly exposed LED surface”<br>(’137 patent, claim 9) | “newly exposed LED surface” means the LED surface exposed by “lifting off said substrate from said LED.”<br><br>Step 9[d] (“lifting off said substrate from said LED”) must precede step 9[e] (“forming a metal pad on the newly exposed LED surface”). | Plain and ordinary meaning<br><br>In the alternative, “separating LED from substrate and forming a metal pad on newly exposed surface.” |

**A. Defendants’ construction reflects the logical reading of the claim and is supported by the specification.**

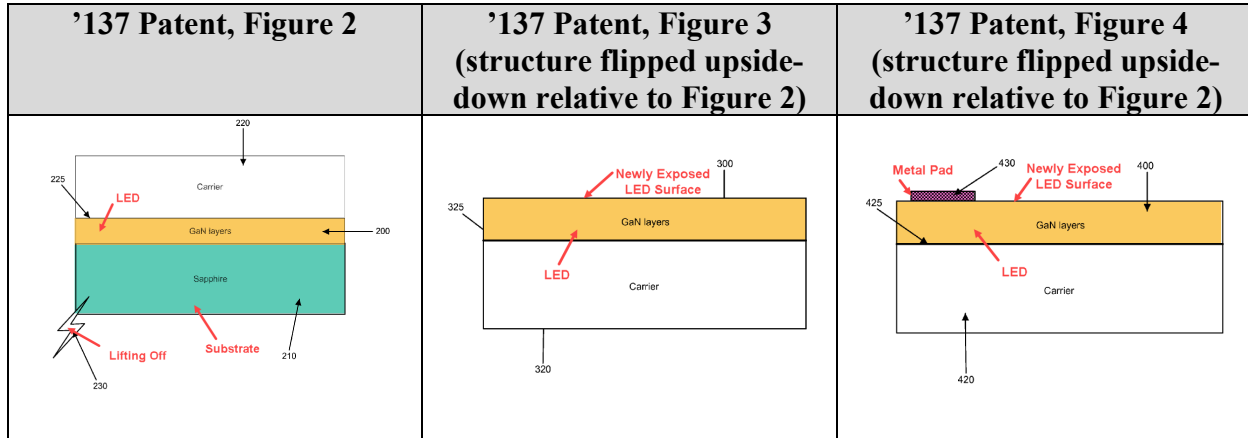
This term should be construed because “the newly exposed LED surface” lacks antecedent basis; and absent proper construction, the term is indefinite. *In re Downing*, 754 F. App’x 988, 996 (Fed. Cir. 2018) (“A claim is indefinite when it contains words or phrases where the meaning is unclear, which may be the result of the lack of an antecedent basis.”).

Defendants’ proposed construction reflects the only logical reading of the claim: “the newly exposed LED surface” refers to the LED surface that has been exposed by the previous step of “lifting off said substrate from the LED.” *See id.*; *see also Intellectual Ventures II LLC v. BITCO Gen. Ins. Corp.*, No. 6:15-cv-59, 2016 WL 125594, at \*16 (E.D. Tex. Jan. 11, 2016) (holding that “centralized access point of *the particular user*” was not indefinite for lack of antecedent basis because “[i]n context of the entire claim . . . [t]he ‘particular’ user is merely one of the ‘one or more potential users’ [as recited earlier in the claim]”).

The specification also supports Defendants’ construction because it consistently describes “forming a metal pad” on the surface of the LED that is exposed by “lifting off” the substrate from



the LED. For example, with reference to Figures 2-4 (shown below), the specification explains that “[l]aser liftoff is applied . . . to cause separation of LED GaN layer 200 from underlying sapphire layer 210. The resulting structure after the step of laser liftoff is shown in FIG. 3. . . . FIG. 4 illustrates a device similar to that of FIG. 3 with a metal pad 430 deposited on a portion of the GaN layers 400 of the device.” ’137 patent at 3:66-4:12; *see also id.*, Figs. 2-4:



**B. Steps 9[d] and 9[e] must be performed in the order specified by Defendants’ construction.**

The parties dispute whether steps 9[d] and 9[e] must occur in order (as Defendants propose) or can occur in any order (as Plaintiff apparently asserts). The claims and specification confirm Defendants’ construction. “[A] claim ‘requires an ordering of steps when the claim language, as a matter of logic or grammar, requires that the steps be performed in the order written, or the specification directly or implicitly requires’ an order of steps.” *Mformation Techs., Inc. v. Research in Motion Ltd.*, 764 F.3d 1392, 1398-99 (Fed. Cir. 2014) (citation omitted); *see also Kaneka Corp. v. Xiamen Kingdomway Grp.*, 790 F.3d 1298, 1306 (Fed. Cir. 2015) (construing claims to require order where “the language of a claimed step refers to the completed results of the prior step”).

Step 9[e] physically requires an antecedent structure—“the newly exposed LED surface”—that is not created before step 9[d] occurs. In other words, “the newly exposed LED surface” is

created by “lifting off said substrate” from the LED in step 9[d], as explained above. ’137 patent, claim 9; *see also id.* at 3:66-4:12; Figs. 2-4. “Lifting off” (from step 9[d]) must occur before “forming a metal pad” (from step 9[e])—otherwise there would be no “newly exposed surface” on which to form the metal pad. Accordingly, step 9[d] must necessarily precede step 9[e].

**C. Plaintiff’s alternate construction improperly equates “lifting off” with “separating.”**

Plaintiff’s alternate construction is also wrong because it improperly equates “*lifting off* said substrate from said LED” with “*separating* LED from substrate.” But the patent makes clear that “lifting off” does not refer merely to separation—indeed, the only example the specification provides is “laser liftoff.” ’137 patent at 3:66-4:6 (“*Laser liftoff is applied* (represented by 230) to cause separation of LED GaN layer 200 from underlying sapphire layer 210. The resulting structure *after the step of laser liftoff* is shown in FIG. 3.”). “Laser liftoff” is a term of art defined as “the method of separating the sapphire substrate from GaN LED . . . by irradiation of high energy laser to the interface between sapphire and GaN, causing decomposition of GaN to liquid gallium and gaseous nitrogen.” Ex. F at 1. “Lifting off” is therefore not equivalent to mere “separation,” as Plaintiff suggests, but rather refers to a specific method of doing so.<sup>4</sup>

**VII. “METALLIZATION LAYER” TERMS**

| Claim Term  | Defendants’ Construction   | Plaintiff’s Construction   |
|---|--|----------------------------|
| “an electrically conducting metallization layer in direct contact with at least a portion of each of a positively-doped surface and said negatively-doped surface of said semiconductor LED” (’405 patent, claim 1) | “the same electrically conducting metallization layer in direct contact with at least a portion of each of a positively-doped surface and said negatively-doped surface of said semiconductor LED” | Plain and ordinary meaning |

<sup>4</sup> Plaintiff’s construction is also grammatically incorrect because it removes the definite article “the” from “newly exposed surface.” *See* Plaintiff’s construction (“forming a metal pad *on newly* exposed surface”). Plaintiff also inexplicably removes “LED” from “newly exposed *LED* surface,” introducing further ambiguity as to whether the “newly exposed surface” is a surface of the LED (which the original claim language makes clear) or a surface of the lifted-off substrate.

|   |  |                            |
|---|--|----------------------------|
| “depositing a metallization layer on a positively-doped surface of said positively-doped layer and said negatively-doped surface of said negatively-doped layer to provide electrical contact with said positively-doped layer and said negatively-doped layer of said LED” (’405 patent, claim 12) | “depositing the same metallization layer on a positively-doped surface of said positively-doped layer and said negatively-doped surface of said negatively-doped layer to provide electrical contact with said positively-doped layer and said negatively-doped layer of said LED” | Plain and ordinary meaning |
|---|--|----------------------------|

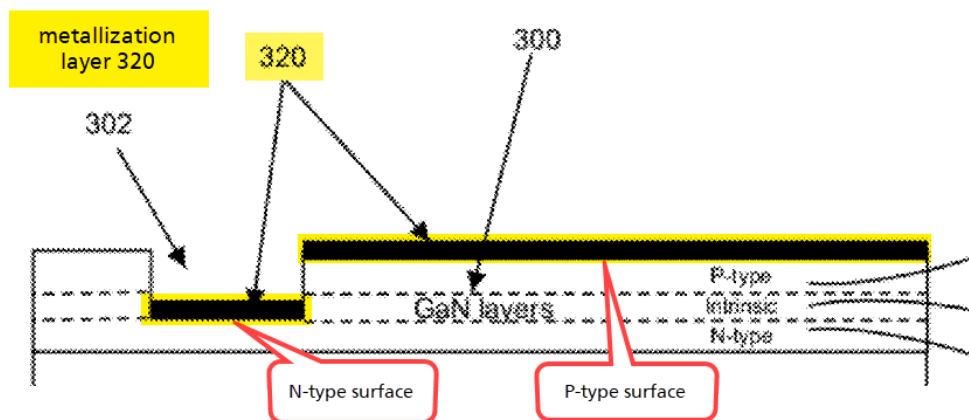
Claims 1 and 12 of the ’405 patent require a “metallization layer” that, among other things, directly contacts (claim 1) / is deposited on (claim 12) *both* the positively-doped surface and the negatively-doped surface of the claimed “LED.” ’405 patent, claims 1, 12. The parties dispute whether the metallization layer that directly contacts (or is deposited on) the positively- and negatively-doped surfaces has to be *the same* (as Defendants propose) or can be different (as Plaintiff asserts). In other words, the dispute centers on whether the material(s) that form the metallization layer that directly contacts (or is deposited on) the positively-doped surface, on the one hand, and the material(s) that form the metallization layer that directly contacts (or is deposited on) the negatively-doped surface, on the other hand, must be the same material(s) (as Defendants propose) or can consist of different material(s) (as Plaintiff asserts). The claim language, specification, and—critically—the prosecution history, confirm that the material(s) of the metallization layer must be *the same* at both surfaces.

**A. The claims, specification, and prosecution history confirm Defendants’ constructions.**

*First*, the claims confirm that the same metallization layer directly contacts (or is deposited on) both recited surfaces of the claimed LED. Claim 1 states that the metallization layer is “in direct contact with at least a portion of *each of*” the positively- and negatively-doped surfaces. ’405 patent, claim 1. For a particular layer to directly contact “each of” two surfaces, that same layer must contact both surfaces. Claim 1 does not recite, for example, a first metallization layer

in direct contact with one surface, and a second metallization layer in direct contact with the other surface. Similarly, method claim 12 recites “depositing a metallization layer on a positively-doped surface . . . *and* [a] negatively-doped surface” in the same step. ’405 patent, claim 12. Claim 12 does not recite depositing a first metallization layer on one surface and depositing a second metallization layer on the other surface.

**Second**, the specification supports Defendants’ construction. In particular, the specification consistently shows that the *same* metallization layer contacts both surfaces of the LED. *See* ’405 patent at 4:15-19. For example, Figure 3 (shown below) labels the “metallization layer” with the same reference numeral—320—at both points of contact with the LED:

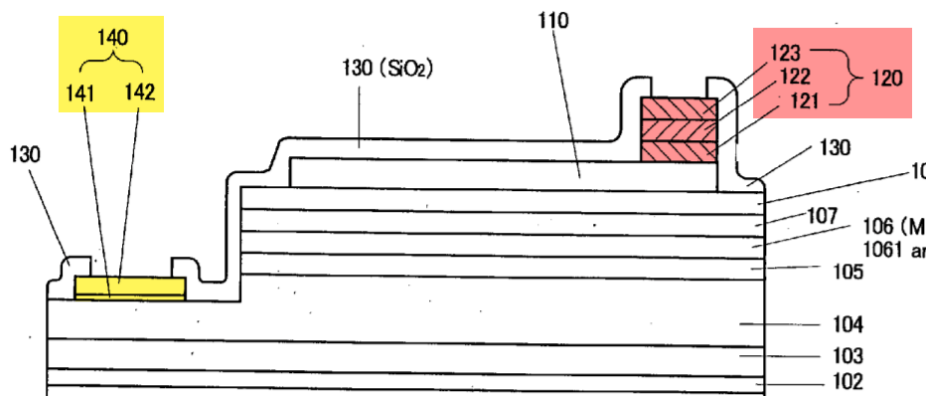


’405 patent, Fig. 3. And the specification explains that this metallization layer is the result of “applying *a* suitable metallic layer 320” to those surfaces of the LED. *Id.* at 3:64-67. Indeed, *every* figure of the ’405 patent identifies the metallization layer with the same reference numeral at both points of contact with the LED surfaces. *See, e.g.,* ’405 patent, Fig. 10, 6:63-64 (“metallization layer 1020”); *id.*, Figs. 5, 7, 8, 9, 11. Where the figures use the same reference numeral, each labelled item is presumed to be the same component. *See* 37 C.F.R. § 1.84(p)(4) (“[T]he same reference character must never be used to designate different parts.”).

**Third**, the prosecution history provides a textbook example of prosecution disclaimer that confirms that the claimed “metallization layer” must be the same at both points of contact with the

positively- and negatively-doped surfaces of the LED. In particular, the applicant expressly argued that the claimed “metallization layer” was not satisfied by a prior art reference that disclosed *different* materials in contact with the positively- and negatively-doped surfaces of the LED.

Specifically, the examiner rejected claims 1 and 9<sup>5</sup> in view of U.S. Patent Application Publication No. 2006/0073692 (Ex. G) (“Yoshida”) in combination with other references. Ex. E (May 21, 2014 Rejection) at 5. The examiner determined that the “metallization layer” of the pending claims was satisfied by Yoshida’s “n- and p-side electrodes . . . (140, 120).” *Id.* at 6. Figure 1 of Yoshida below shows n-electrode 140 (in yellow) and p-electrode 120 (in pink):



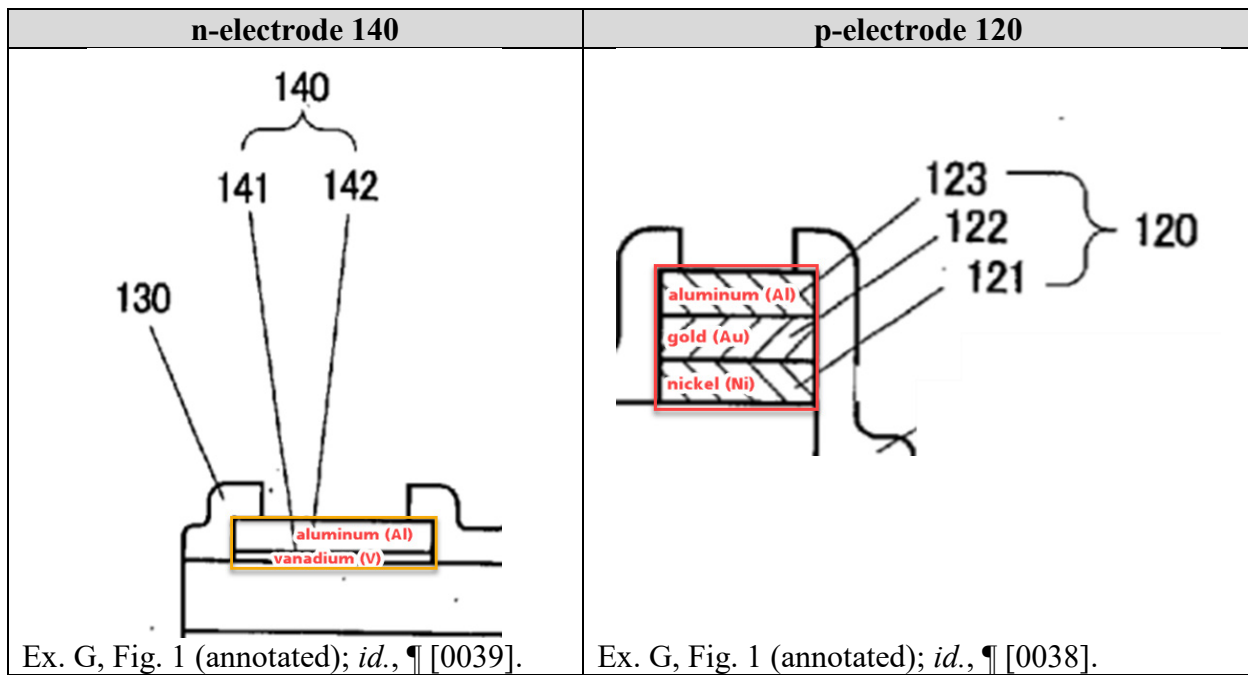
Ex. G, Fig. 1 (highlighted to show the two electrodes).

In response, the applicant first amended claims 1 and 9 to insert new limitations for the metallization layer. In particular, the applicant amended claim 1 to recite that the claimed metallization layer must be “in direct contact with at least a portion of each of a positively-doped surface and said negatively-doped surface” of the semiconductor LED. Ex. A (Sept. 22, 2014 Amendment and Response) at 3 (underlining in original). Similarly, the applicant amended claim 9 to require “depositing a . . . metallization layer on a positively-doped surface . . . and said negatively-doped surface.” *Id.* at 6 (underlining in original).

<sup>5</sup> Then-pending claim 9 ultimately issued as claim 12 of the '405 patent. Ex. H at 3.

Next, the applicant distinguished the metallization layer “recited in claim 1 as amended” from Yoshida. Ex. A at 12. Critically, the applicant argued that because Yoshida’s “electrode 120 and electrode 140 are *comprised of different materials*,” “they are *not the same layer*” and, accordingly, cannot satisfy the claimed “metallization layer.” *Id.* (citing Yoshida, ¶¶ [0038]-[0039]).

More specifically, in Yoshida’s structure, the n-electrode 140 consists of aluminum and vanadium. Ex. G, ¶ [0039]. And the p-electrode 120 consists of aluminum, gold, and nickel. Ex. G, ¶ [0038]. Figure 1 of Yoshida shows those electrodes:



As shown above, both electrodes in Yoshida contain aluminum but the materials do not completely overlap. Based on that distinction, the applicant argued that Yoshida’s electrodes did not satisfy claim 1’s “metallization layer” because, even though Yoshida’s electrodes share one metal in common, they do not have complete identity: “[T]he electrode 120 and electrode 140 are *comprised of different materials* and, therefore, *they are not the same layer*.” *See* Ex. A (Sept. 22, 2014 Amendment and Response) at 12. The applicant similarly argued that amended claim 9,

which issued as claim 12, was patentable for at least the same reasons. *See id.* at 13.<sup>6</sup>

Thus, the claims, specification, and—in particular—the applicant’s disclaimer during prosecution confirm that the claimed “metallization layer” must be the *same layer* (*i.e.*, consists of the same material(s)) at both points where it contacts the positively- and negatively-doped surfaces of the LED.

**B. Plaintiff cannot rely on purported “plain meaning” to overcome the applicant’s prosecution disclaimer.**

Plaintiff proposes plain meaning but ostensibly disagrees that the claims require that the same metallization layer contacts both the positively- and the negatively-doped surfaces of the LED. But Plaintiff cannot now interpret the claims differently to reclaim what it surrendered during prosecution. *See SpeedTrack, Inc. v. Amazon.com*, 998 F.3d 1373, 1380 (Fed. Cir. 2021) (rejecting patentee’s interpretation that “leads to the paradoxical result that the claims” would cover precisely what the prior art reference had); *Graham v. John Deere Co.*, 383 U.S. 1, 33 (1966) (“[C]laims that have been narrowed in order to obtain the issuance of a patent by distinguishing the prior art cannot be sustained to cover that which was previously by limitation eliminated from the patent.”). Accordingly, the proper construction cannot permit the claims to encompass a metallization layer that consists of *different* material(s) at the points of contact with the positively- and negatively-doped surfaces of the claimed LED.

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<sup>6</sup> To the extent that Plaintiff argues that the applicant’s statements should not result in prosecution history disclaimer because the applicant distinguished the prior art in other ways, that argument fails. A separate disclaimer results from *each* argument an applicant makes to obtain patentability during prosecution. *Southwall Techs., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1583 (Fed. Cir. 1995) (internal citations omitted) (“[A]ny argument made regarding the need to distinguish the prior art . . . create[s] a *separate estoppel, regardless of other distinctions made.*”); *see also PODS, Inc. v. Porta Stor, Inc.*, 484 F.3d 1359, 1367-68 (Fed. Cir. 2007) (holding that each argument distinguishing the prior art constituted a separate estoppel regardless of whether it was actually the distinction that led to allowance because the standard is whether a competitor would reasonably have believed that the applicant surrendered that subject matter).

**VIII. “WHEREIN SAID INTRINSIC LAYER IS BETWEEN SAID POSITIVELY-DOPE LAYER AND A FIRST SURFACE OF SAID LED IS IN DIRECT CONTACT WITH A SAPPHIRE LAYER”**

| Claim Term  | Defendants’ Construction | Plaintiff’s Construction   |
|---|--------------------------|----------------------------|
| “wherein said intrinsic layer is between said positively-doped layer and a first surface of said LED is in direct contact with a sapphire layer”<br>(’405 patent, claim 12) | Indefinite               | Plain and ordinary meaning |

This term is nonsensical. Specifically, this term begins by stating that the “intrinsic layer is *between* *said positively-doped layer*,” but then fails to specify the other thing that the “intrinsic layer” is “between.” Rather than completing the description to identify the other thing that the intrinsic layer is “between,” the claim proceeds to recite an entirely different element—that “a first surface of said LED is in direct contact with a sapphire layer.” ’405 patent, claim 12. Proper use of the term “between” requires that the “intrinsic layer is between said positively-doped layer” *and* something else. But the claim fails to say what that is.

In other claims, the patentee properly used the term “between” to refer to a component that is *between* one component *and another component*. For example, claim 1 recites “wherein said intrinsic region is *between* said positively-doped region *and said negatively-doped region*.” ’405 patent, claim 1. The same is true of the specification. *See, e.g., id.* at 4:20-22 (“contact *between* an electrical connection *and the N-type layer*”); 6:67 (“*between* the metal *and metal pads*”). But in claim 12 of the ’405 patent, the second phrase is missing. The Court cannot rewrite the claim to correct this error. *See Allen Eng’g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1349 (Fed. Cir. 2002) (“It is not our function to rewrite claims to preserve their validity. . . . Moreover, it is of no moment that the contradiction is obvious: semantic indefiniteness of claims ‘is not rendered unobjectionable merely because it *could* have been corrected.’”) (quoting *In re Hammack*, 427 F.2d 1384, 1388 n.5 (C.C.P.A. 1970)). Accordingly, because the claim does not make sense as



written, it is indefinite. *T-Rex Prop. AB v. Regal Entm't Grp.*, No. 6:16-cv-927-JDK-KNM, 2019 WL 4935264, at \*4 (E.D. Tex. Mar. 5, 2019).

#### IX. ORDERING OF STEPS 12[c], [e]-[g]

| Claim Steps  | Defendants' Construction   | Plaintiff's Construction  |
|--|--|---------------------------|
| 12[c]: “depositing a metallization layer . . .”<br>12[e]: “depositing a passivation layer in direct contact with said metallization layer . . .”<br>12[f]: “defining a first contact hole in said passivation layer to expose a first portion of an upper metal surface of said metallization layer disposed on said negatively-doped surface wherein said passivation layer is in direct contact with a second portion of said upper metal surface of said metallization layer disposed on said negatively-doped surface;”<br>12[g]: “defining a second contact hole in said passivation layer to expose a first portion of a lower metal surface of said metallization layer disposed on said positively-doped surface wherein said passivation layer is in direct contact with a second portion of said lower metal surface of said metallization layer disposed on said positively-doped surface”<br>('405 patent, claim 12) | step 12[c] must precede step 12[e];<br>step 12[e] must precede step 12[f]; and<br>step 12[e] must precede step 12[g] | No construction necessary |

Claim 12 of the '405 patent is a method claim directed to “making a light emitting device.” '405 patent, claim 12. The parties dispute whether steps 12[c] and [e]-[g] must occur in a particular order (as Defendants propose) or can occur in any order (as Plaintiff apparently asserts). The claim language and specification confirm that these steps must occur in the order recited in Defendants' construction. *See Mformation*, 764 F.3d at 1398-99.

**First**, the claim language requires Defendants' ordering because subsequent steps of the claimed method require antecedent structures that the earlier steps create. This scenario frequently arises in semiconductor cases. *See Loral Fairchild Corp. v. Sony Corp.*, 181 F.3d 1313, 1321 (Fed. Cir. 1999) (requiring that “forming a first insulation layer” be performed before “forming

implanted barrier regions . . . aligned with the vertical edges of the insulation layer” because “the insulation layer must already be in place in order to align . . . with it”). Where the language of a later step “refers to the completed results of the prior step,” the claim’s plain meaning requires ordering the steps accordingly. *Kaneka*, 790 F.3d at 1306.

Step 12[e] requires “depositing a passivation layer *in direct contact with*” four previously recited layers/components: (1) “*said metallization layer*”; (2) “said sapphire layer”; (3) “a surface of said optically permissive layer”; and (4) “said LED.” Each of those four layers/components are created in previous steps of the claim. ’405 patent at 10:5-7. The “said metallization layer” that the passivation layer of step 12[e] is “deposit[ed] . . . in direct contact with” refers back to the “metallization layer” deposited in previous step 12[c]. If there was no preexisting metallization layer at the time step 12[e] is performed, it would not be physically possible to satisfy step 12[e], because the passivation layer could not be “deposit[ed] in direct contact with said metallization layer,” which as yet would not exist. Therefore, step 12[c] must precede step 12[e].

Steps 12[f] and 12[g] recite “*defining* a [first/second] contact hole *in said passivation layer* to *expose* a first portion of [an upper/a lower] surface *of said metallization layer* . . . .” ’405 patent, claim 12. This language strictly imposes ordering: it is not physically possible to (1) “defin[e]” holes in a passivation layer that does not yet exist or (2) “to *expose*” a metallization layer that has not yet been deposited. The only way for the claim to be physically operable is if the metallization layer and passivation layer are deposited before a contact hole can be “defin[ed]” in the passivation layer “to expose” a portion of the metallization layer. Thus, the claim language compels all three of Defendants’ proposed ordering requirements: step 12[c] must precede step 12[e]; and step 12[e] must precede each of steps 12[f]-[g].<sup>7</sup>

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<sup>7</sup> By the transitive property, step 12[c], which creates the metallization layer, must also precede steps 12[f] and 12[g].

**Second**, the specification supports Defendants’ construction. The ’405 patent illustrates the claimed method through the sequence of Figures 3 and 5-10. In Figure 3, “a metallization layer 320 is applied to at least a portion of the surface of the GaN layer” (the LED). ’405 patent at 4:15-29, Fig. 3. That structure continues through Figures 5-7. *See id.* at 4:65-5:1 (noting that Figure 5 includes the same layers as in previous figures); *id.* at 5:44-46 (same for Figure 6); *id.* at 6:1-2, 6:11-12 (same for Figure 7). In Figure 8, “a passivation layer 870 has been applied to surround certain portions of the device around . . . metallization layer 820.” *Id.* at 6:14-16, Fig. 8. That description confirms that step 12[e] (“depositing a passivation layer”) occurs after step 12[c] (“depositing a metallization layer”). Next, in Figure 10, “contact holes are drilled . . . through the passivation layer until reaching the metal pad” (*i.e.*, a surface of a metallization layer). *Id.* at 6:47-50, Fig. 10. Drilling holes through the passivation layer can only be done after there is already a passivation layer in place—thus, each step of defining a (first/second) contact hole (steps 12[f] and 12[g]) must occur **after** depositing the passivation layer (step 12[e]).

Defendants’ construction thus reflects the correct and necessary order of the claimed method steps and, accordingly, should be adopted.

#### **X. “THERMALLY CONDUCTIVE LAYER”**

| <b>Claim Term</b>  | <b>Defendants’ Construction</b> | <b>Plaintiff’s Construction</b>   |
|--|---------------------------------|---|
| “thermally conductive layer”<br>(’612 patent, claims 1, 9) | Plain and ordinary meaning      | “a layer of metal or an organic material with a physical property of high thermal conductivity” |

A “thermally conductive layer” refers to a layer that conducts heat. *See Red Arrow Prods. Co. LLC v. Resource Transforms Int’l, Ltd.*, No. SA-03-CA-751, 2008 WL 5088648, at \*11 (W.D. Tex. Oct. 20, 2008) (“The language is clear and understandable to lay jurors. The Court declines to construe this language to include additional limitations.”). Nothing in the claims, specification, or prosecution history warrants deviation from that plain and ordinary meaning.

Plaintiff's construction is wrong for two reasons. **First**, Plaintiff's construction improperly narrows the term to a layer of "metal" or "organic material" based on an embodiment: "In another **aspect**, the thermally conductive layer comprises metal or an organic material with a physical property of high thermal conductivity." '612 patent at 4:11-14. A patent's reference to an "aspect" refers to an embodiment and does not warrant limiting the term to that embodiment. *Moore U.S.A., Inc. v. Standard Register Co.*, 229 F.3d 1091, 1111 (Fed. Cir. 2000) (stating that "one aspect of the present invention" in patent specification refers to "only the preferred embodiment"); *FenF, LLC v. SmartThingz, Inc.*, 601 F. App'x 950, 953 (Fed. Cir. 2015) ("[T]he phrase here appears to refer to separate embodiments . . . . For example, in the Summary of the Invention section, the specification describes thirty discrete aspects of the present invention."). Moreover, Plaintiff's construction improperly excludes embodiments of a thermally conductive layer that are **inorganic** and **non-metal**. See '612 patent at 10:43-44 (describing "a thermally conductive layer such as **SiN**").

**Second**, Plaintiff's construction introduces a subjective term of degree ("**high** thermal conductivity") that would render the term indefinite for the reasons discussed in Section XII below with respect to claim 4 (which recites "has the property of high thermal conductivity"). And even if the Court finds that claim 4 is not indefinite, Plaintiff's construction improperly equates "thermally conductive" with the "property of high thermal conductivity." Although independent claim 1 recites a "**thermally conductive** layer," dependent claims 4 and 10 recite materials with the "property of **high thermal conductivity**." '612 patent, claims 1, 4, 10 (unasserted). Plaintiff's construction would thus render superfluous the requirements of claims 4 and 10 that the thermally conductive layer of claim 1 further has the "property of high thermal conductivity." See *Digital-Vending Servs. Int'l, LLC v. Univ. of Phoenix, Inc.*, 672 F.3d 1270, 1274-75 (Fed. Cir. 2012).

## XI. “RELIEF”

| Claim Term                      | Defendants’ Construction | Plaintiff’s Construction    |
|---------------------------------|--------------------------|-----------------------------|
| “relief” (’612 patent, claim 1) | “hole”                   | “thermally conducting hole” |

The parties agree that this term requires construction. Each party proposed a construction other than “plain meaning” because the term “relief” is not a readily understood term of art.

The parties also agree that the claim term “relief” refers to a “hole.” The parties dispute whether the claimed “relief” is limited to one particular type of hole—a “thermally conducting hole” (as Plaintiff asserts). The claims and specification confirm that the term is not so limited.

### A. Defendants’ construction is supported by the claims and specification.

*First*, the plain language of the claims confirms that the claimed “relief” is a “hole.” Claim 1 recites that “the carrier wafer and the thermally conductive layer *define a relief to expose* at least a portion of the second LED surface.” ’612 patent, claim 1. Prior limitations of claim 1 make clear that the claimed “carrier wafer” and “thermally conductive layer” are “disposed *on* the second LED surface.” *Id.* (the “thermally conductive layer” is “disposed on the second LED surface of the semiconductor LED” and the “carrier wafer” is “disposed on the thermally conductive layer”). Therefore, in order to “expose . . . the second LED surface,” the claimed “relief” must be a “hole” defined through the carrier wafer and thermally conductive layer.

*Second*, the specification supports Defendants’ construction. The specification states that “[t]here are *two types of geometrical reliefs* . . . . The *first type* is a via (*hole*). . . . The *second type* of geometrical relief is a thermally conducting *hole* . . . .” ’612 patent at 9:4-19. Both types of reliefs are holes, and Defendants’ construction encompasses the commonality between them. *See, e.g., id.* at 9:8-14, 9:18-23, Fig. 5 (showing both “types of . . . reliefs” as holes etched through various layers); *see also id.* at 10:19-24 (describing process that “will result in *holes* both for the thermal via as well as electrical vias”); *id.* at 11:12-14 (“Electrical and thermal contact *holes* are

drilled through the passivation layer until reaching the metal pad.”). Accordingly, the Court should adopt Defendants’ construction, which comports to the meaning of “relief” used throughout the specification. *See Trs. of Columbia Univ. v. Symantec Corp.*, 811 F.3d 1359, 1363-64 (Fed. Cir. 2016); *Vitrionics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996).

**B. Plaintiff’s construction improperly narrows the term.**

Plaintiff’s overly narrow construction is not supported by the claims or specification. **First**, the claims do not require the “relief” to be “thermally conducting.” The patentee knew how to claim features that are “thermally conducting” (e.g., the “thermally conducting layer” of claim 1), yet chose not to do so here. *See, e.g., Acumed LLC v. Stryker Corp.*, 483 F.3d 800, 807 (Fed. Cir. 2007) (“The intrinsic evidence of the specification therefore suggests that the patentees knew how to restrict their claim coverage . . . . They could have used the word ‘perpendicular,’ as they did in discussing their preferred embodiment. Instead, they chose a different term that implies a broader scope.”); *Intellectual Ventures I LLC v. T-Mobile USA, Inc.*, 902 F.3d 1372, 1379 (Fed. Cir. 2018) (“This shows that the patentee knew how to restrict the resource allocator to using information obtained from layer 7. If the patentee had intended to similarly restrict the resource allocator in claim 1, it could have done so using the language of claim 19, but did not.”).

**Second**, as discussed above, the specification makes clear that a “thermally conducting hole” is only one of “**two types** of geometrical reliefs.” ’612 patent at 9:4-19. Plaintiff’s construction improperly limits the claimed “relief” to a single embodiment, and would exclude the other “type[] of . . . relief[]” the specification describes: the “via (hole).” *Id.*; *see also Johnson Worldwide Assocs., Inc. v. Zebco Corp.*, 175 F.3d 985, 991 (Fed. Cir. 1999). The Federal Circuit “has repeatedly cautioned against limiting claims to a preferred embodiment,” and the Court should decline to do so here. *Comaper Corp. v. Antec, Inc.*, 596 F.3d 1343, 1348 (Fed. Cir. 2010); *see also Lone Star Silicon Innovations LLC v. Iancu*, 813 F. App’x 512, 519 (Fed. Cir. 2020).

**XII. “HAS THE PROPERTY OF HIGH THERMAL CONDUCTIVITY”**

| <b>Claim Term</b>  | <b>Defendants’ Construction</b> | <b>Plaintiff’s Construction</b> |
|--|---------------------------------|---------------------------------|
| “has the property of high thermal conductivity” (’612 patent, claim 4) | Indefinite                      | Plain and ordinary meaning      |

Dependent claim 4 of the ’612 patent recites “an adhesive material which has the property of **high** thermal conductivity.” ’612 patent, claim 4. Neither the claims nor the specification provides objective boundaries on what level of thermal conductivity qualifies as “**high**.”

**First**, the claims do not specify what level of thermal conductivity qualifies as “high.” Accordingly, the claims do not provide any guidance regarding the scope of the claim.

**Second**, the specification fails to specify what level of thermal conductivity qualifies as “high.” The specification provides only two exemplary thermal conductivity values. In a first example, the specification states that “3 W/mK or more is sufficient” for “suitable performance.” ’612 patent at 7:38-40. In a second example, the specification merely states in one embodiment that the “thermal conductance of the adhesion layer 41 is above 1 W/mK.” *Id.* at 9:46-49. But neither of those exemplary values specifies what level of thermal conductivity qualifies (or does not qualify) as “high.” *See Interval Licensing*, 766 F.3d at 1370-71 (holding that terms of degree are indefinite unless they “provide[] enough certainty to one of skill in the art when read in the context of the invention. . . . [I]t is not enough . . . to identify ‘*some standard*’ for measuring the scope of the phrase.” (citations omitted)). Thus, neither of the two exemplary values of thermal conductivity provides any guidance as to what would be considered “**high** thermal conductivity,” as compared with **moderate** or **low** thermal conductivity, or, indeed, as compared with simply thermal conductivity. *See Adv. Display Techs. of Tex., LLC v. AU Optronics Corp.*, No. 6:11-cv-011, 2012 WL 2872121, at \*12 (E.D. Tex. July 12, 2012) (holding the claim term “highly modulated surface” indefinite because the patent “fails to provide a standard for measuring the

difference between a mere modulated surface and a *highly* modulated surface” (emphasis in original)); *Jaguar Land Rover Ltd. v. Bentley Motors Ltd.*, No. 2:18-cv-320, 2020 WL 7010227, at \*16 (E.D. Va. Oct. 14, 2020) (holding the term “relatively high” indefinite because despite “three examples in . . . the specification” that “describe different levels of wheel slip,” the patent “does not provide any objective bounds around what qualifies as a ‘relatively high’ degree of wheel slip, or whether the degree of wheel slip can become so high that it no longer qualifies as ‘relatively high’”).

*Third*, the phrase “high thermal conductivity” did not have a well-understood meaning to a POSITA at the time of the alleged invention. To the contrary, contemporaneous references variously refer to similar ranges of thermal conductivity as “high,” “relatively high,” “moderate,” and even “low.” For example, one technical article defined a range from 170-240 W/mK as “high thermal conductivity.” Ex. J at 890. But another classified a much smaller value—16 W/mK—as “*relatively high* thermal conductivity.” Ex. K at 1. And yet another group of researchers classified values within a range (0.9-290 W/mK) that encompasses the values listed in the aforementioned references as “*low-to-moderate* thermal conductivit[y]”; and those researchers only identified a range that is considerably higher (300-1800 W/mK) than the values listed in the aforementioned references as “*high* thermal conductivit[y].” Ex. L at 182. Given those inconsistent descriptions of “high thermal conductivity,” the term does not have a well-understood meaning in the art, and a POSITA would need further guidance from the intrinsic record. Because the claims and the specification lack such guidance, this claim term is indefinite.

### XIII. “CARRIER LAYER”

| Claim Term                                | Defendants’ Construction   | Plaintiff’s Construction   |
|---|----------------------------|--|
| “carrier layer”<br>(’822 patent, claim 1) | Plain and ordinary meaning | “a thermally and electrically conductive layer coupled to the LED” |



**A. “Carrier layer” should be afforded its plain and ordinary meaning.**

The term “carrier layer” should be afforded its plain and ordinary meaning. *See, e.g.*, Ex. M (*Modern Dictionary of Electronics* 99 (7th ed. 1999)) (defining “carrier” as “holder for electronic parts and devices that facilitates handling during processing, production, imprinting, or testing operations and protects such parts under transport”); Ex. N (*Merriam-Webster’s Collegiate Dictionary* 189 (11th ed. 2009)) (defining “carrier” as “one that carries,” and “carry” as “to sustain the weight or burden of”); Ex. O (*Concise Oxford American Dictionary* 135 (2006)) (defining “carrier” as “a person or thing that carries, holds, or conveys something,” and “carry” as “support the weight of”); Ex. P (*Webster’s Unabridged Dictionary* 319) (defining “carrier” as “a person or thing that carries,” and “carry” as “to bear the weight, burden, etc. of; sustain”).

The ’822 patent uses the term “carrier” consistent with that plain meaning. For example, the specification explains that other components are mounted on the carrier and each figure shows the carrier layer providing structural support for other layers and components during the fabrication process. *See* ’822 patent at 1:56-67 (“Conventional LED packaging includes silicon (Si) or Ceramic based carrier substrates. The LEDs can be mounted on the carrier . . . .”); *id.*, Figs. 2-4, 6, 8-18 (each showing carrier layer supporting other layers and components that are formed during processing). Neither the claims nor the specification use the term in a contrary manner.

**B. Plaintiff’s construction improperly reads out the term “carrier” and renders other claim language superfluous.**

Plaintiff’s construction is wrong for two reasons. *First*, Plaintiff’s construction essentially replaces the term “carrier” with the phrase “thermally and electrically conductive.” Although in certain embodiments the specification states that the carrier layer is thermally and electrically conductive, those are just possible features of a carrier layer. The specification does not *equate* “carrier” with “thermally and electrically conductive,” and, accordingly, it is improper to *replace*

“carrier” with “thermally and electrically conductive” as Plaintiff proposes. See ’822 patent at 3:64-67 (“a *thermally and electrically conductive carrier* layer 220”); 2:33-38 (“a light emitting device . . . disposed on *conductive carrier* layer”). In other words, a carrier layer *can* be thermally and/or electrically conductive, but those additional features are not imposed by the term “carrier” itself.

**Second**, Plaintiff’s addition of the phrase “coupled to the LED” is at best superfluous and at worst ambiguous. The phrase “coupled to the LED” does not define what a “carrier layer” is. Instead, it presumably describes the carrier layer’s position relative to the “LED.” But the claim already states that the “carrier layer” is “*proximal to a second surface of said semiconductor LED.*” ’822 patent, claim 1. Thus, at best, the phrase “coupled to the LED” is superfluous because the claim already recites the position of the carrier layer. *Digital-Vending*, 672 F.3d at 1274-75. At worst, Plaintiff’s reference to “the LED” is ambiguous because it is unclear whether Plaintiff’s construction refers to the claimed “light emitting device” (in the preamble) or the “semiconductor LED.” Accordingly, Plaintiff’s construction should be rejected.

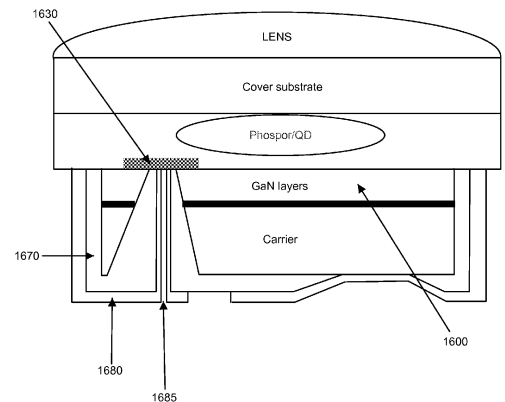
#### XIV. “ELECTRICAL CONTACT IN ELECTRICAL COMMUNICATION WITH SAID FIRST SURFACE OF SAID SEMICONDUCTOR LED”

| Claim Term  | Defendants’ Construction  | Plaintiff’s Construction   |
|---|---|----------------------------|
| “electrical contact in electrical communication with said first surface of said semiconductor LED” (’822 patent, claim 1) | “electrical contact that is in a conduction path with the first surface of the semiconductor LED” | Plain and ordinary meaning |

The primary dispute between the parties is whether a “plain and ordinary meaning” exists for the phrase “in electrical communication” as used in the context of claim 1 of the ’822 patent. That phrase appears nowhere in the specification of the ’822 patent. In general, the term “communication” refers to the exchange of some form of information. That ordinary usage has no relevance to the disputed claim term here. In other words, the usage of “in electrical

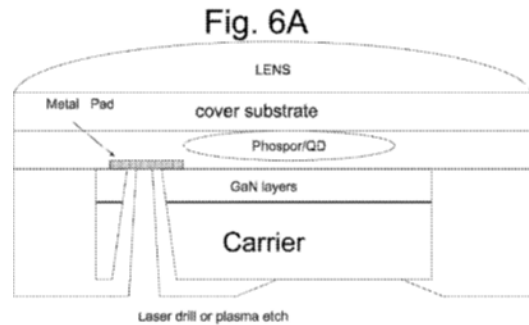
communication” appears to be an idiosyncratic usage or coined term specific to this patent. *See 3M Innovative Properties*, 725 F.3d at 1321. This, therefore, is not a situation where resort to the specification indicates an impermissible narrowing of a broader “ordinary meaning,” but instead, a permissible search for the meaning of an unconventional usage. *See id.* That search is rendered difficult by the fact that neither the term “communication” nor any version thereof is used in the specification of the ’822 patent. The substantive question, therefore, is directed to the nature of the relationship (in electrical terms) between the “electrical contact” and the “first surface” of the semiconductor LED.

The clearest textual description of an “electrical contact” occurring to the first surface of the semiconductor LED is presented with reference to Figure 16, where layer 1680 provides a conduction path to metal pad 1630 on the back surface of GaN layer 1600. ’822 patent, Fig. 16 (shown at right). Here, the back surface is the recited “first surface of said semiconductor LED.” *See also id.* Figs. 4, 6, 7, 10, 14, 15 (showing the similar metal pad 430, 630, 730, 1030, 1430, and 1530, respectively). The specification thus confirms that the claimed “electrical contact in electrical communication with said first surface of said semiconductor LED” is an “electrical contact that is in a conduction path with the first surface of the semiconductor LED.”



In addition, when identifying the written description support for the “electrical contact in electrical communication with . . . first surface of said semiconductor LED” during prosecution, the applicants pointed to Figure 6A of provisional application 61/449,686 (“the ’686 Provisional”). *See Ex. S*, Feb. 17, 2017 Response at 7. The response also reproduced the version of the figure in

the '686 Provisional (shown at right). *Id.* at 8. This arrangement can be understood based on the description of the '686 Provisional, which explains “Thus an improved LED . . . is provided using vertical diodes with a conductive layer LED carrier. Vias



through the carrier and LED active layer, route the top pad electrical connections to the LED backside.” *See* Ex. T ('686 Provisional) at 4. The focus here (and throughout the provisional) is providing an electrical contact that routes electrical current to the upper side of the LED.

## **XV. CONCLUSION**

For the foregoing reasons, Defendants respectfully request that this Court adopt Defendants’ proposed constructions.

Dated: December 22, 2021

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## **APPENDIX A**

### **Plaintiff's Proposed Terms for Construction**

1. “optically definable material” (’137 patent, claim 1; ’405 patent, claim 1)
2. “thermally conductive layer” (’612 patent, claims 1, 9)
3. “carrier layer” (’822 patent, claim 1)

### **Samsung's Proposed Terms for Construction**

1. “a required position of said device with respect to said optically permissive [flat] cover substrate” (’137 patent, claim 6; ’405 patent, claim 7)
2. “lifting off said substrate from said LED; forming a metal pad on the newly exposed LED surface” (’137 patent, claim 9)
3. “an electrically conducting metallization layer in direct contact with at least a portion of each of a positively-doped surface and said negatively-doped surface of said semiconductor LED” (’405 patent, claim 1) /  
“depositing a metallization layer on a positively-doped surface of said positively-doped layer and said negatively-doped surface of said negatively-doped layer to provide electrical contact with said positively-doped layer and said negatively-doped layer of said LED” (’405 patent, claim 12)
4. “wherein said intrinsic layer is between said positively-doped layer and a first surface of said LED is in direct contact with a sapphire layer” (’405 patent, claim 12)
5. Ordering of steps 12[c], [e]-[g] (’405 patent, claim 12)
6. “relief” (’612 patent, claim 1)
7. “has the property of high thermal conductivity” (’612 patent, claim 4)

### **Seoul Semiconductor's Proposed Terms for Construction**

1. “covering at least a portion of the above components” (’137 patent, claim 1; ’405 patent, claim 1)
2. “said shaped edge configured to reflect light generated by said light emitting device outwardly therefrom” (’137 patent, claim 4; ’405 patent, claim 4)
3. “electrical contact in electrical communication with said first surface of said semiconductor LED” (’822 patent, claim 1)

**CERTIFICATE OF SERVICE**

I hereby certify that on this 22nd day of December, 2021, a copy of the foregoing document was served on all counsel of record via email as follows:

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