United States District Court,
E.D. Texas, Lufkin Division.

BRIDGELUX, INC,
Plaintiff.
v.
CREE, INC,
Defendant.

Civil Action No. 9:06-CV-240

June 3, 2008.

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MEMORANDUM OPINION AND ORDER CONSTRUING CLAIM TERMS OF UNITED STATES PATENT NOS. 6,869,812, 6,614,056 ***AND*** 6,885,036

KEITH F. GIBLIN**, United States Magistrate Judge.**

Plaintiff BridgeLux, Inc. filed suit against Defendant Cree, Inc. claiming infringement of United States Patent Nos. 6,869,812 ("the '812 patent"). Cree filed counterclaims alleging infringement of United States Patent Nos. 6,614,056 ("the '056 patent") and 6,885,036 ("the '036 patent"). All three patents relate to light emitting diodes (LED).

The court conducted a *Markman* hearing on September 26, 2007 to assist the court in interpreting the meaning of the claim terms in dispute. Having carefully considered the patent, the prosecution history, the parties' briefs, and the arguments of counsel, the court now makes the following findings and construes the disputed claim terms. FN1

FN1. The transcript of the hearing contains a number of representations and agreements of the parties and their answers to technical questions from the court, all of which will not be repeated here, but which assisted the court in reaching the conclusions set out in this Order. This Order governs in the event of any conflict between the Order and the court's preliminary analysis at the hearing. The transcript will be cited as

Trans. p. ___ ll. ___.

I. CLAIM CONSTRUCTION STANDARD OF REVIEW

Claim construction is a matter of law. Markman v. Westview Instruments, Inc., 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996) ("*Markman II*"). "The duty of the trial judge is to determine the meaning of the claims at issue, and to instruct the jury accordingly." Exxon Chem. Patents, Inc. v. Lubrizoil Corp., 64 F.3d 1553, 1555 (Fed.Cir.1995) (citations omitted), *cert. denied,* 518 U.S. 1020, 116 S.Ct. 2554, 135 L.Ed.2d 1073 (1996).

" '[T]he claims of the patent define the invention to which the patentee is entitled the right to exclude.' " Phillips v. AWH Corp., 415 F.3d 1303, 1312 (Fed.Cir.2005) (*en banc*) (citation omitted), *cert. denied,* 546 U.S. 1170, 126 S.Ct. 1332, 164 L.Ed.2d 49 (2006). "Because the patentee is required to 'define precisely what his invention is,' it is 'unjust to the public, as well as an evasion of the law, to construe it in a manner different from the plain import of its terms.' " Phillips, 415 F.3d at 1312 (quoting White v. Dunbar, 119 U.S. 47, 52, 7 S.Ct. 72, 30 L.Ed. 303 (1886)).

The words of a claim are generally given their ordinary and customary meaning. Phillips 415 F.3d at 1312. The "ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention." FN2 Id. at 1313. Analyzing "how a person of ordinary skill in the art understands a claim term" is the starting point of a proper claim construction. *Id.*

FN2. Based on the patents and their cited references, the tutorials, and the representations of the parties at the hearing, the court finds that "one of ordinary skill in the art" covered by these four patents is someone with the equivalent of a Ph.D. in materials science, electrical engineering, or applied physicals, or an equivalent field of study, and at least several years of experience with semiconductor growth processes and light-emitting diode design.

A "person of ordinary skill in the art is deemed to read the claim term not only in context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." Phillips, 415 F.3d at 1313. Where a claim term has a particular meaning in the field of art, the court must examine those sources available to the public to show what a person skilled in the art would have understood the disputed claim language to mean. *Id.* at 1414. Those sources "include 'words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art.' " *Id.* (citation omitted).

"[T]he ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words." Phillips, 415 F.3d at 1314. In these instances, a general purpose dictionary may be helpful. *Id.*

However, the Court emphasized the importance of the specification. "[T]he specification 'is always highly relevant to the claim construction analysis. Usually it is dispositive; it is the single best guide to the meaning

of a disputed term.' " Phillips, 415 F.3d at 1315 (quoting Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed.Cir.1996)). A court is authorized to review extrinsic evidence, such as dictionaries, inventor testimony, and learned treaties. Phillips, 415 F.3d at 1317. However, their use should be limited to edification purposes. Id. at 1319.

The intrinsic evidence, that is, the patent specification, and, if in evidence, the prosecution history, may clarify whether the patentee clearly intended a meaning different from the ordinary meaning, or clearly disavowed the ordinary meaning in favor of some special meaning. *See* Markman v. Westview Instruments, Inc., 52 F.3d 967, 979-80 (Fed.Cir.1995); *aff'd,* 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). Claim terms take on their ordinary and accustomed meanings unless the patentee demonstrated "clear intent" to deviate from the ordinary and accustomed meaning of a claim term by redefining the term in the patent specification. Johnson Worldwide Assoc., Inc. v. Zebco Corp., 175 F.3d 985, 990 (Fed.Cir.1999).

The " 'ordinary meaning' of a claim term is its meaning to the ordinary artisan after reading the entire patent." Phillips, 415 F.3d at 1321. However, the patentee may deviate from the plain and ordinary meaning by characterizing the invention in the prosecution history using words or expressions of manifest exclusion or restriction, representing a "clear disavowal" of claim scope. Teleflex, Inc. v. Ficosa N. Am. Corp., 299 F.3d 1313, 1327 (Fed.Cir.2002). It is clear that if the patentee clearly intended to be its own lexicographer, the "inventor's lexicography governs." Phillips, 415 F.3d at 1316.

II. PATENT BACKGROUND AND TECHNOLOGY

The patents-in-suit generally relate to light emitting diodes (LED). An LED consists of a chip of conductive material doped with impurities to create an active layer or region. When current is applied, current flows from the p-type to the n-type layers and injects electrons and holes throughout the active layer, which recombine to emit light. LEDs are built on a substrate, which can be transparent and backed by a reflective layer in order to increase efficiency.

The '812 patent discloses a light emitting diode chip having a substantially transparent substrate and an elongated geometry, so as to provide enhanced efficiency and brightness. The active region of the substrate has an aspect ratio which is greater than approximately 1.5 to 1. The '056 and '036 patents relate to LEDs with improved current spreading structures that provide enhanced current injection into the LED's active layer, thus improving its power and luminous flux. The improved structures comprise of conductive fingers that form cooperating conductive paths that ensure that current spreads from the p-type and n-type contacts into the fingers and uniformly spread through the oppositely doped layers.

III. CLAIM CONSTRUCTION OF THE '812 PATENTFN3

FN3. The agreed definitions are set out in a separate order.

BridgeLux asserts independent Claims 1 and Claim 17 and dependent Claims 2-12 and 18-32 against Cree. Claims 1 and 11 contain most of the disputed terms and read as follows, with the disputed terms in bold:

1. A light emitting diode chip comprising:

a substantially **transparent substrate;**

an **active region formed upon** the **substrate;** and

wherein an aspect ratio of the active area is greater than approximately 1.5 to 1.

11. The device as recited in claim 1, further comprising:

an upper LED layer and a lower LED layer cooperating to define the **active region;**

an upper **contact finger** formed upon the upper LED layer;

a lower **contact finger** formed upon the lower LED layer; and

a reflector disposed intermediate the **active region** and the lower **contact finger,** the reflector being configured to reflect light directed from the **active region** toward the lower **contact finger** away from the lower **contact finger** so as to enhance a brightness of the light emitting diode chip.

1. "Active region." Used in '812 Patent, Claims 1, 10, 11, 12, 17 and 36.

BridgeLux proposes, "a region in an LED where injected electrons and holes recombine to generate photons in the LED when current is applied." Cree suggests that this term means "a region in a light emitting diode capable of generating light when current is applied."

The skilled artisan would know, and the parties agreed, that the active region can be layers, multiple layers or a single p-n junction. Tr. at 29; Cree's Br. at p. 5 [Doc. # 113, p. 8 of 32]. The parties also agree that where electrons and holes recombine, photons are generated and light is emitted. Tr. at 29.

The main point of contention is whether the "active region" "would be understood to apply to the region *capable* of light generation or whether it applies only to the portion of the region capable of light generation that *actually* generates light when current is applied to an LED." Cree's Br. at 9 [Doc. # 113, p. 12 of 32]. Put simply, the question is if the active region exists even when no current is applied, or if the bounds of the active region can be determined only after current is applied.

The claim language clearly states that the active region is "formed upon the substrate." '812 patent, col. 12, ll. 12. In other words, the active region exists when it is "formed." When no current is applied to the diode, all of the holes are filled in the p-n junction, so there is a neutral charge. At that point, no photons are emitted. So BridgeLux's suggestion to define the "active region" as a region that appears only when photons are emitted or only when current is applied is unsupported by the claim language, which defines an "active region" as a region that is defined when "formed."

BridgeLux argues that "the region in a light-emitting diode capable of generating light when current is applied is not necessarily the intended active region for the design of the device." Tr. at 36. BridgeLux states that the active region may expand beyond the original epitaxial layer that was grown and intended to be the active layer. Tr. at 34.

Nothing in the patents hints that the active region can only be defined by measuring its bounds after current is applied or that one must take into account problems such as current crowding. In fact, dependent Claim 6 discusses an alternative embodiment, wherein the active region is configured to operate "at between

approximately 3.0 volts and approximately 3.5 volts and between approximately 60 milliamps and approximately 90 milliamps." Col. 12, l. 25-30. Such a limitation suggests that the "active region" in Claim 1 is not also limited to existence only when a current is applied.

The specification of the '812 patent further resolves the issue. In the Detailed Description of the Preferred Embodiments, it describes that "the present invention comprises a method for ... forming at least one active region upon the substrate." '812 Patent, Col. 6, ll. 40-44. An upper LED layer and a lower LED layer "cooperate to define the active region." '812 Patent, Col. 7, ll. 31-35. Thus, the active region is formed and defined by the materials it is surrounded by and comprised of, not by the region that actually generates light when current is applied. Of course, it is certainly possible that the intended active region is where injected electrons and holes recombine to generate photons in the LED. The court simply cannot find that one skilled in the art would understand the "active region" to exclude areas capable but not actually generating photons when current is applied. The court will define this term as follows:

"Active region" means: "A region in a light emitting diode that is capable of emitting light (*i.e.* emitting photons as electrons and holes recombine) when current is applied."

2. "Contact finger." Used in '812 Patent, Claims 11 and 12.

BridgeLux proposes that this term should mean "elongated structure made of conductive material that facilitates current spreading in the LED and includes an electrical contact where the device is connected to the outside world." Cree suggests: "A finger-like projection of conductive material." The primary dispute involves whether the finger includes an electrical contact or bond pad as part of its structure.

The parties agree that "contact" has a particular meaning in the context of these patents and that one of ordinary skill in the art would define it as "a portion of an LED where current is applied from an external source, and for distributing current from the external source to the layers of the LED." Tr. at 82. The parties further agree that a bond pad is ordinarily understood to be electrical contacts for connecting a device to an electrical source. BridgeLux's Opening Brief [Doc. # 97 at 10].

Contact fingers are shown in Figures 2 and 4 of the '812 patent. The specification describes the contact fingers as objects which extend from the bond pads. *See* '812 patent, col. 9, ll. 52-61 ("a P contact finger **46** extending from the P bond pad **44,** and a **N** contact finger **47** extending from the N bond pad **45 .**") If the fingers *extend from* the bond pads, then it would be structurally separate from the bond pads. Bridgelux does not point to, and the court cannot find, any written description that describes the contact fingers to *include* bond pads. In fact, Figures 5, 6 and 8 consistently label the contact fingers differently from bond pads.

Bridgelux argues that the specification at '812 patent, col. 2, ll. 56-60 describe contact fingers that provide electrical contact distribution. It provides:

sufficient electrical contact distribution needs to be provided so as to ensure that substantially all of the lateral current is evenly distributed. In actual practice, an interdigital finger pattern is used, such as the one shown in FIG. 2. '812 patent, col. 2, ll. 56-60.

This describes the purpose of the interdigital finger pattern but it does not limit the invention so that only contact fingers can be used to accomplish sufficient electrical contact distribution. Instead, it leaves open the possibility that contact fingers, in combination with bond pads, will be evenly distribute all of the lateral

current.

Cree's suggestion of describing a "contact finger" as a "finger-like projection" is not redundant. Accordingly, the court will define the term as follows:

"Contact finger" means: "finger-like projection made of conductive material that facilitates current spreading in the LED."

3. "Formed upon." Used in '812 Patent, Claims 1, 7, 11, 12, 17 and 36.

BridgeLux contends that "formed upon" means "deposited, etched, attached, or otherwise prepared or fabricated upon." Cree argues that "formed upon" should mean "created directly or indirectly on." The parties agree that "upon" must mean both "directly or indirectly on." Tr. at 101.

Looking first at the claim language, it is clear that nothing in the claims suggests an element to be "attached" on another element whenever it is "formed upon" that element. The claims recite:

-> "an active region *formed upon* the substrate" '812 patent, claims 1, 17 and 36;

-> "one light emitting diode device is *formed upon* the substrate" '812 patent, claim 7;

-> "an upper contact finger *formed upon* the upper LED layer; a lower contact finger *formed upon* the lower LED layer" '812 patent, claims 11;

-> "a reflector *formed upon* the active region." '812 patent, claims 12.

Turning to the specification, the patent clearly states that "an array of elongated active areas may be *etched* onto a single substrate." '812 patent, col. 7, ll. 18-20. The inventor also described a reflective coating that could be "formed upon one sidewall." '812 patent, col. 5, ll. 1-4. The reflective coating is further described as "formed upon the epitaxial layers." '812 patent, col. 9, ll. 62-63. Accordingly, the reflective coating in this instance may be deposited onto the sidewall or epitaxial layers but would not necessarily be "created" upon it. In fact, Cree admits that "reflectors in the LED business and in all of the semiconductor business are deposited by some technique." Tr. at 103.

The court will define this term as follows:

"Formed upon" means: "etched, deposited or created directly or indirectly upon."

4. "Package." Used in '812 Patent, Claims 17, 18, 19, 20, 32, 33, 34, 35 and 36.

BridgeLux argues that this term should be construed to mean "the assembly of elements that houses one or more LED chips, and provides an interface between the LED chip(s) and a power source to the LED chip(s), and also provides optics elements for the purpose of directing the light generated by the LED chip." Cree states that it should mean "a structure used to house light emitting diode(s)." There is no dispute that a "package" is at least used to house light emitting diodes.

The question is whether a "package" includes optical elements. Independent claim 17 claims a package but

the claim is silent regarding whether the "package" contains optical elements. However, dependent claim 18 claims the LED lamp disclosed in independent claim 17 wherein the "package" comprises four reflective sides and a reflective bottom. '812 patent, col. 13, l. 62-col. 14, l. 3. This language may indicate that optical elements are not necessarily part of a "package".

Further, the specifications provide that in one aspect, "the present invention comprises a high power light emitting diode lamp comprising a package and at least one light emitting diode chip disposed within the package. The package *preferably* comprises four reflective sides and a reflective bottom." '812 patent, col. 7, ll. 65-col. 8, ll. 2 (emphasis added). It is apparent that in the specification, the inventor did not specifically define the term "package" to include reflective elements. The inventor only included the reflective elements in the preferred embodiments of his invention. In fact, Fig. 7 shows an LED "package" which is disposed behind a focusing optical coating or reflector. There is no indication that the "package" itself in this embodiment contains reflective elements. Therefore, this court holds that the definition of the term "package" should be given its ordinary meaning and not be limited by the inclusion of reflective elements.

BridgeLux does not point to, and the court cannot find, any claim language or language from the specification adding the limitation that a "package" must include an interface between the LED chip and the power source to the LED chip. The court does not find any justification for describing "package" to include an interface with the power source.

The court defines this term as follows:

"Package" means: "a structure used to house one or more light emitting diodes."

5. "Substrate." Used in '812 patent, Claims 1, 7, 8, 9, 17 and 36.

BridgeLux argues that "substrate" should be construed to mean "the base layer, or other surface, upon which something is deposited, etched, attached or otherwise prepared or fabricated. A substrate also provides physical support." Cree states that "substrate" should be construed to mean "the base material upon which the layers of the light emitting diode are formed."

The dispute surrounding this term primarily involves whether re-urges the same arguments made for "formed upon," namely whether a layer must be "epitaxially grown" on a substrate in all instances of the '812 patent. Given that the manner in which the court has construed "formed upon," it would be redundant and confusing the construe substrate using BridgeLux's proposed construction.

The claims of the '812 make it clear that the active region is formed upon the substrate. Also, a light emitting diode device can be formed upon the substrate. BridgeLux points to a dictionary definition defining "substrate" as a structure that provides physical support. BridgeLux's dictionary argument is eclipsed by the '812 patent's specification, which has no requirement that a "substrate" must "provide physical support." As noted above, "intrinsic evidence is the most significant source of the legally operative meaning of disputed claim language." Vitronics, 90 F.3d at 1583.

BridgeLux states that the flip chip submount design described in '812 patent, col. 3, ll. 26-42, mounts the chip upside down so that the layers are attached rather than grown. BridgeLux argues that any construction of "substrate" should encompass attaching an active layer to the submount. Although there is no express disclaimer of the flip chip design, the patentee does distinguish submounts from substrates. There is no

evidence that one of ordinary skill in the art would attach layers onto the substrate.

The court defines this term as follows:

"Substrate" means: "the base material upon which the layers of the light emitting diode are formed."

6. "Transparent." Used in Claims 1, 17 and 36.

BridgeLux argues that "transparent" should be construed to mean "no significant obstruction or absorption of electromagnetic radiation in the particular wavelength (or wavelengths) of interest." Cree proposes that "transparent" should mean "allowing light to pass through."

The claim language of the '812 patent does not provide guidance as to how much light can pass through material in order to be "transparent." Similarly, the specification only discusses the present invention as having a "substantially transparent substrate" ('812 patent, col. 4, l. 30; col. 6, l. 37; col. 6, l. 43; col. 7, l. 50; col. 7, l. 54), "transparent sapphire substrate" (col. 9, l. 9; col. 9, l. 16, col. 9, l. 21) or a "transparent insulator" (col.7, l.45) but does not describe any particular wavelength of interest.

In support of its construction, BridgeLux points to language in several pieces of prior art cited in the prosecution history, namely U.S. Patent Nos. 5,796,771 ("transparent to the pump light"); 6,455,340 ("the substrate is transparent to the wavelength of light emitted or absorbed"); 6,570,190 ("optically transparent for wavelengths >555 nm.")

Claim constructions are "simply a way of elaborating the normally terse claim language in order to understand and explain, but not to change, the scope of the claims." Embrex, Inc. v. Service Engineering Corp., 216 F.3d 1343, 1347 (Fed.Cir.2000). Although claim constructions should elaborate on the meaning of claim terms, they ought not become elaborate; after all, their purpose is to guide the jury in applying the elements of a claimed invention to specific aspects of an accused device. Hence, there is a heavy presumption that the terms used in claims "mean what they say and have ordinary meaning that would be attributed to those words by persons skilled in the relevant art." SuperGuide Corp. v. DirecTV Enterprises, Inc., 358 F.3d 870, 874-75 (Fed.Cir.2004).

To the extent that BridgeLux contends that "transparent" must encompass semi-transparent, translucent, and/or opaque materials, it is correct. However, the term does not need to be defined within certain wavelengths. Both parties agree that the '812 patent is directed towards white light. Tr. at 155, 160. The parties also agree that white light is created with the combination of blue, green and red LEDs combined with a yellow phosphor-coated structure. Tr. at 53-54, 59. With respect to white light, it generates light across the full spectrum so no particular wavelength is of interest. '812 patent, col. 1, ll. 52-65. Accordingly, the court will define "transparent" in a manner that is detailed enough to assist the jury in understanding the claims but not so complex that the jury is left more confused than it would be without any guidance. The court defines this term as follows:

"Transparent" means: "allowing light to pass through almost undisturbed, such that one can see through it clearly."

7. "Wherein the active region comprises AlInGaN." Used in Claim 10.

BridgeLux contends that this term means "that the active region includes compound(s) in the family of AlInGaN compounds (which are members of the Group III-V family), as would be understood by those skilled in the art. Commonly denoted as: $Al_xIn_yGa_{1-x-y}N$ where 0<=x<=1, 0<=y<=1 and x+y<= 1." At the hearing, BridgeLux stated that its non-mathematical construction would be: "that the active region comprises a material composed of nitrogen and one or more elements from a set that includes aluminum, gallium and indium." Cree proposes: "active region must contain at least the material AlInGaN."

It is undisputed that the chemical formula AlInGaN represents "aluminum indium gallium nitride." The primary dispute is whether the term AlInGaN covers a compound without aluminum, gallium, or indium.

Claim 9 states, "The device as recited in claim **1,** wherein the substrate comprises a material selected from the group comprising: ... GaN; AlN; and AlGaN." Claim 10 recites: "The device as recited in claim **1,** wherein the active region comprises AlInGaN." When discussing AlInGaN, the specification provides:

Preferably, the substrate comprises a material selected from the group comprising ... AlN, and AlGaN. Preferably, the active region comprises AlInGaN. However, as those skilled in the art will appreciate, other materials for the substrate and/or the active area are likewise suitable. '812 patent, col. 7, ll. 25-30.

Since the index of refraction of sapphire (n=1.7) is lower than that of AlInGaN (n=2.5), sapphire provides a good index matching between the AlInGaN LED and the media (n=1.5 for most epoxy). '812 patent, col. 3, l. 29-31.

It is clear that where the patentee wanted to describe gallium nitride, aluminum nitride and aluminum gallium nitride, he or she would use the symbols GaN, AlN and AlGaN. Moreover, the specification describes different indexes of refraction associated with different compounds. If AlInGaN describes a family of compounds, then the patentee would not have discussed any particular index of refraction specifically related to AlInGaN. Therefore, it is redundant and improper to include gallium nitride, aluminum nitride, and aluminum gallium nitride compounds within the definition of AlInGaN.

The court defines this term as follows:

"Wherein the active region comprises AlInGaN" means: "that the active region must contain at least the material AlInGaN."

IV. CLAIM CONSTRUCTION OF THE '036 AND '056 PATENTSFN4

FN4. The agreed definitions are set out in a separate order entered contemporaneously with this one.

Claims 1 of the '036 patent contains the disputed terms and reads as follows, with the disputed terms in bold:

A scalable light emitting diode (LED) with enhanced current spreading structures, comprising:

an LED core **having:**

an epitaxially grown p-type layer;

an epitaxially grown n-type layer;

an epitaxially grown **active layer** between said p-type and n-type layers;

a first **spreader layer adjacent** to said LED core;

at least one groove through said LED core, to said first **spreader layer;**

at first contact **having** at least one first **conductive finger on** said first **spreader layer** within said at least one groove such that current flows from said first contact, into said at least one first **conductive finger,** into said first **spreader layer,** and into said LED core;

a second contact **having** at least one second **conductive finger on** said LED core opposite said first **spreader layer** such that current flows from said second layer into said at least one said finger and into said LED core.

1. "Active layer." Used in '056 patent, claim 10; '036 patent, claim 1.

Cree proposes "a layer of material in a light emitting diode capable of generating light when current is applied." BridgeLux initially argued that this term means "a functional layer in an LED where injected electron and holes recombine to generate photons in the LED; synonymous with 'active region' (used interchangeably)." BridgeLux subsequently changed its construction to "a region in an LED wherein injected electrons and holes recombine to generate photons when current is applied." The parties agree that the arguments related to this term overlap with the arguments made for "active region" in the '812 patent. Tr. at 183.

For the reasons stated above, the active layer exists even when no current is applied. In the '056 patent, col. 1, ll. 57-60, the specification states, "the current will not migrate to the entire active layer ..." Without current, photons cannot be generated, so BridgeLux's argument that electron-hole recombination must occur in the entire active layer is inaccurate. Moreover, in the claim language and in '056 patent, col. 1, ll. 19-22, the patent states that an active layer is sandwiched between two oppositely doped layers, one being p-type and the other being n-type. Accordingly, it describes "active layer" as a physical layer of material rather than a "functional layer" that requires measurement after photons are emitted.

The court defines this term as follows:

"Active layer" means: "A layer in a light emitting diode that is capable of emitting light (*i.e.* emitting photons as electrons and holes recombine) when current is applied."

2. "Adjacent." Used in '056 patent, claims 1 and 3; '036 patent, claim 1.

Cree proposes that "adjacent" means "near or next to." BridgeLux proposes the following constructions related to "adjacent:"

"Adjacent" means "may or may not require contact but always requires absence of anything of the same kind in between."

"Adjacent conductive fingers" means "must be in close proximity to each other, and there can be no conductive finger lying between two adjacent fingers."

"Adjacent layers" means "contiguous layers within the LED structure, having a common endpoint or border."

Claim 1 of the '056 patent claims an LED including "two or more adjacent layers doped with impurities." In the '056 patent, col. 2, ll. 39-42, where describing U.S. Patent No. 5,652,434 to Nakamura, et al., the specification describes "an LED structure on the insulating substrate, with the n-type layer adjacent to the substrate and the p-type layer on the epitaxial layer surface." The term is also used in the '056 patent, col. 3, ll. 36-40 ("The spreader layer is more conductive than the LED core layer adjacent to it."). The parties agree that there may be layers in between any two "adjacent" layers. Tr. at 191, 234. However, each individual layers can be as thin as .2 microns. '056 patent, col. 5, ll. 16-18. The distance between the spreader fingers can be from 5-500 microns. '056 patent, col. 6, ll. 15-17.

Figure 1 depicts the perspective view of a standard sized LED with the new current spreading structure. The figure illustrates that an active layer **14** can be sandwiched between the "adjacent" doped layers. As noted by Cree, the ' 056 patent also states that the Nakamura LED structure has an n-type layer "adjacent" to the substrate when they were actually separated by a buffer layer. '056 patent, col. 2, ll. 42-44. Further, there is no evidence that the inventor expressly limited the ordinary meaning of "adjacent" to include a limitation that it requires "the absence of anything of the same kind in between".

BridgeLux also argues that separate constructions are needed to capture the difference between laterally adjacent as used for fingers and vertically adjacent as used for layers in an LED. Tr. at 234. The Federal Circuit has held that "a claim term should be construed consistently with its appearance in other places in the same claim or in other claims of the same patent." Rexnord Corp. v. Laitram Corp., 274 F.3d 1336, 1342 (Fed.Cir.2002). "Varied use of a disputed term in the written description demonstrates the breadth of the term rather than providing a limited definition." Johnson Worldwide Assocs., Inc. v. Zebco Corp., 175 F.3d 985, 991 (Fed.Cir.1999). Accordingly, the court declines to use separate constructions in different contexts. There is no credible evidence that the term "adjacent" has a specialized meaning to those skilled in the art.

The court defines this term as follows:

"**Adjacent**" means: "near or next to."

3. "Conductive Finger." Used in '056 patent, claims 1, 2, 3, 4, 5, 6, 10; '036 patent, claims 1, 4, 5, 6, 9, 11, 12 and 13.

Cree proposes "a finger-like projection of conductive material." BridgeLux argues that this term means "an elongated current spreading electrode made of essentially straight portions and without having any portions of significant curvature." The primary dispute is whether the fingers must consist of "essentially straight portions."

The Figures in the '056 and '036 patents show rectangular, bent, zigzag, radial and branched conductive fingers. *See* '056 patent, figures 1, 2, 4, 6, 7, 8, 9, 11. The specification states that the conductive fingers can be "curved." '056 patent, col. 9, ll. 3-5 ("An alternative embodiment to this concept can use *curved fingers*

to produce a zig-zag pattern with rounded corners instead of right angles.") (emphasis added). In fact, the specification states that "[t]he conductive fingers can have many different shapes and patterns." '056 patent, col. 10, ll. 62-64.

BridgeLux argues that the patentees expressly disclaimed curved fingers when distinguishing their invention from U.S. Patent No. 5,696,389 to Ishikawa, et al. The inventors explained:

To distinguish the invention from Ishikawa, claim 22 and 31 [i.e. issued claims 1 and 10] have been amended to reflect a current spreading arrangement disclosed in the embodiments of the present application, but not disclosed or taught by Ishikawa. The embodiments do not have one electrode surrounding the other, but instead are arranged so that the first contact and its fingers are in grooves that begin at a first edge of the LED and extend toward the opposite edge.

BridgeLux also points to an affidavit filed December 3, 2002 during prosecution of the '056 patent:

Part of the focus of the research was how to improve current injection ... one of the approaches discovered was to include elongated fingers as part of the LED contacts.

Where the question is whether statements made in prosecution of a patent limits the scope of a term, a patentee is bound by a disavowal only when it constitutes clear and unmistakable surrender of the subject matter at issue. *See* Cordis v. Medtronic Ave, Inc., 511 F.3d 1157, 1177 (Fed.Cir.2008). In order to constitute binding surrender of claim scope, the statements in question must be such that "a competitor would reasonably believe that the applicant had surrendered the relevant subject matter." Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1457 (Fed.Cir.1998).

Here, the inventors' statements simply do not come close to being a clear and unmistakable surrender of curved finger. The inventors described an improved method is to use elongated fingers in grooves that begin at a first edge of the LED and extend toward the opposite edge. There is no mention of curvature or, for that matter, straight segments. As such, there is no clear disavowal of curved fingers.

The second issue is whether the construction of "conductive finger" should include the descriptive term "elongated". Claim 1 of the '056 patent claims "elongated first conductive finger" and "elongated second conductive finger" while claim 10 claims "first conductive finger" and "second conductive finger." Therefore, the inventor chose the term "elongated" to describe fingers in some instances but not in others. Further, in the '036 patent, claim 1 claims "conductive finger" while claims 11 and 12 claim conductive fingers forming an elongated conductive path".

Therefore, the court defines this term as follows:

"Conductive finger" means: finger-like projection made of conductive material that facilitates current spreading in the LED.

4. "Having." Used in '056 patent, claims 1 and 10; '036 patent, claim 1.

Cree proposes "including but not limited to." BridgeLux suggests "consisting of only." The issue is whether "having" is an open transition phrase or a closed transition phrase.

The Federal Circuit has stated that the phrase "having" "must be interpreted in light of the specification to determine whether open or closed language is intended." Manual of Patent Examining Procedure s. 2111.03 (8th Ed. Rev.2006).

Claim 1 of the '036 patent defines the "LED core" has "having" an epitaxially grown p-type layer, an epitaxially grown n-type layer and an epitaxially grown active layer. *See also* '056 patent, claim 10. There is no evidence suggesting that an "LED core" includes any other element. The patent also claims a "contact having at least one [ ] conductive finger ...." This implies a closed interpretation because if "having" were intended to be open ended, the qualifier "at least" would be redundant. Along the same lines, the fact that the inventors used the open term "comprising" within the same claims means that they intended "having" to be a closed transitional term." *See* Enzo Biochem, Inc., et al. v. Applera Corp., et al., 2006 WL 2927500 (D.Conn.2006) at *8-9.

The court defines this term as follows:

"Having" means "consisting of only."

5. "On." Used in '056 patent, claims 1, 10; '036 patent, claims 1, 4 and 9.

Cree suggests that this term should mean "positioned directly or indirectly above." BridgeLux argues that the proper construction is "in direct contact with."

The word "on" is repeatedly used in the specification to describe the positioning of a contact above and supported by a layer. *See* '056 patent, col. 3, ll. 24-32; col. 4, ll. 43-46; col. 5, ll. 43-49; col. 7, ll. 2-6, 37-41; col. 8, ll. 32-34, 47-53, 60-65; col. 9, ll. 24-31, 38-42; col. 10, ll. 10-11. None of the references specify whether direct contact is needed between the contact and the layer. However, the specification also states that certain material must be grown on or deposited on another material. *See* '056 patent, col. 2, ll. 5-10; col. 2, ll. 44-54; col. 3, ll. 43-46; col. 5. ll. 33-37; col. 5, ll. 51-54. Naturally, in order to grow or deposit a layer on a substrate, it must necessarily be in contact with each other.

However, Cree is correct that the inventor did use the term "on" in specific instances where there was indirect contact. The inventor explains that LED devices generally include an n-type layer grown "on" a conductive substrate, with a LED active region and a p-type layer grown on the n-type layer. '056 patent, col. 2, ll. 1-7. Cree correctly notes that the p-type layer is "on" the n-type layer even though the active region is between the p-type layer and n-type layer. In referring to Fig. 3, the inventor states that layers **11, 14, 15, 16** can be fabricated "on" the substrate. In this figure, only layer **11** is in direct contact with the substrate. Further, it appears that the specification uses the term "directly on" when it direct contact is mandated. *See* '056 patent, col. 10, ll. 34-37 ("a contact is deposited directly on the conductive substrate opposite the epitaxial layers.).

The court defines this term as follows:

"On" means: "positioned directly or indirectly above."

6. "Spreader layer." Used in '036 patent, claims 1, 2, 3, 7, 9 and 10.

Cree contends that this term should mean "a layer that spreads current." BridgeLux argues that the proper

construction is "a layer intended to spread current laterally, and is separate from the layers in the LED core." The dispute is whether the spreader layer is intended to spread current "laterally."

The specification of the '036 patent states: "The current spreads throughout the first spreader 11." '036 patent, col. 5, ll. 56-59. In fact, BridgeLux does not dispute that the current can spread out through length, breadth and height. Tr. at 237. BridgeLux simply argues that it is "an added burden" to discuss all dimensions of the current spreading layer.

Cree argues that there is no reason to state that the "spreader layer" is "separate from the layers in the LED core" because the spreader layer can be both adjacent or on the LED core. *See* '036 patent, clam 1("first spreader layer *adjacent to* said LED core.") Pointing out that a layer is adjacent or on the LED core only lends support to BridgeLux's argument that it is separate from the LED core. A layer cannot be adjacent or on an object if it is already a part of the object.

The court defines this term as follows:

"Spreader layer" means: "a layer that spreads current throughout, and is separate from the layers in the LED core."

7. "Substrate." Used in '036 patent, claims 7 and 8.

Cree states that "substrate" should be construed to mean "the base material upon which the layers of the light emitting diode are formed." BridgeLux argues that "substrate" should be construed to mean "the base layer, or other surface, upon which something is deposited, etched, attached or otherwise prepared or fabricated. A substrate also provides physical support."

For the same reasons discussed above, the court defines this term as follows:

"Substrate" means: "the base material upon which the layers of the light emitting diode are formed."

8. "Transparent." Used in '036 patent, claim 10.

Cree proposes that "transparent" should mean "allowing light to pass through." BridgeLux argues that "transparent" should be construed to mean "no significant obstruction or absorption of electromagnetic radiation in the particular wavelength (or wavelengths) of interest."

For the same reasons discussed above, the court defines this term as follows:

"Transparent" means: "allowing light to pass through almost undisturbed, such that one can see through it clearly."

Other Claim Terms

BridgeLux asserts that "layer," "elongated," "extending from," "extending toward," "generally parallel," "current spreading structures," "interdigitated," "interdigitated between," and "scalable" require construction by the court.

Although every word used in a claim has a meaning, not every word requires a construction. *See* United States Surgical Corp. v. Ethicon, Inc., 103 F.3d 1554, 1568 (Fed.Cir.1997). Only two of the phrases would potentially be unfamiliar or confusing to the jury: "current spreading structures" and "scalable." These two phrases occur exclusively in the preambles. "Preambles describing the use of an invention generally do not limit the claims because the patentability of apparatus or composition claims depends on the claimed structure, not on the use or purpose of that structure." Catalina Mktg. Intl., Inc. v. Coolsavings.com, Inc., 289 F.3d 801, 808 (Fed.Cir.2002).

Here, it is clear from the claim language and specification that these preamble phrases are not claim limitations. The patentee did not rely on this phrase to define his invention, nor is the phrase essential to understand limitations or terms in the body of the claim. The court declines to construe these terms.

V. CONCLUSION

The jury shall be instructed in accordance with the court's interpretations of the disputed claim terms in the '812, '056, and '036 patents.

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