IN THE UNITED STATED DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

BX LED LLC,	§	
	§	
Plaintiff,	§	
	§	
v.	§	**Case No. 6:22-cv-00445-ADA-DTG**
	§	
WALMART INC.,	§	**JURY DEMANDED**
	§	
Defendant.	§	

EXPERT DECLARATION OF

John K. Roberts

REGARDING CLAIM CONSTRUCTION

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This declaration is submitted pursuant to Rule 26(a)(2) of the Federal Rules of Civil Procedure.

I. INTRODUCTION

1. My name is John K. Roberts, and I have been retained as an independent technical expert to provide opinions concerning certain claim construction disputes in this litigation.

2. The opinions set forth in this declaration are based on scientific, mathematical, and logical principles, my education, 4.5 decades of experience inventing, patenting and commercializing new products for high-rate production including 3 decades in the LED, LED Lighting and related industries, and finally my analysis of the materials and information referenced below in this declaration.

3. I am being compensated at a rate of $300.00 per hour for time spent plus reimbursement of reasonable expenses incurred during work on this matter. My compensation is not contingent on the outcome of this litigation, nor do I have any personal interest in the outcome of this case.

II. BACKGROUND AND QUALIFICATIONS

4. In this section I have summarized my educational background, career history, and other relevant qualifications. A detailed description of my professional qualifications is outlined in my resume, a copy of which is attached to this declaration.

5. I have nearly fifty (50) years of post-undergraduate professional work experience, starting with the United States Marine Corps (USMC) in 1983 and then including nearly 45 years in industry inventing, patenting and commercializing new products for high-rate production with companies I helped start or grow to success. This includes 3 decades of commercial experience advancing the state of the art in LED chips, LED components, LED lighting systems and LED

based display systems primarily within the semiconductor, automotive, lighting, and flat panel display industries.

6. In May of 1983, I earned a Bachelor of Science degree in Earth and Planetary Sciences from the Massachusetts Institute of Technology (MIT) in Cambridge, Massachusetts. I was simultaneously commissioned as a 2nd Lt with a regular commission in the USMC and commenced active-duty service.

7. In December of 1983, I completed USMC training for commissioned officers at The Basic School (TBS) in Quantico, Virginia. In early 1985 I completed training to become a Naval Aviator at NAS Pensacola and NAS Whiting Field in Florida, was issued my wings and transitioned to fly the UH-1N Iroquois ("Huey") aircraft with the Fleet Marine Force in the 1st Marine Air Wing, MAG 39, at Camp Pendleton, CA. While on active duty with the USMC, I specialized in advanced tactical flying techniques, deployed extensively across the Western USA and Western Pacific, and accumulated approximately 1800 flight hours, mostly in high performance conditions (low altitude, night, shipboard, at sea or all the above). I left active duty with the USMC in 1989 to form a startup company in the automotive industry based on a then patent-pending display technology I had invented and begun commercializing.

8. Since 1989 I have held technical positions in several companies ranging from individual contributor to leadership positions such as Director of Technology, VP of Technology, VP of Engineering, Chief Engineer, Engineering Fellow, and Chief Technology Officer. I remain actively employed full time, presently as Principal Engineering Fellow with a large contractor in the Defense industry working to develop and deploy next generation sensor systems for defense of the United States and allies.

9. I have been inventor or co-inventor on 154 US patents issued over 4.5 decades

assigned to several technically and commercially disruptive companies and resulting in billions of dollars in revenue. These companies became leaders in industries such as the LED and LED Lighting industries by commercializing, producing in high volume and selling products based on these inventions. Innovations protected by these patents include:

a. Some of the earliest high-intensity LED based automotive turn and brake signal systems used in the OEM automotive industry in the early 1990's;

b. Some of the earliest white light emitting LED components, high power LED components and LED based illumination systems used in the automotive industry in the late 1990's and early 2000's;

c. The 1st comprehensive line of AlInGaN based power LED chips and components available in many colors, including lighting class white light emitting power LEDs for the lighting industry starting in the late 2000's; and

d. Numerous additional patented developments widely used within the LED backlighting and LED lighting industries since the early 2010's.

III. MATERIALS CONSIDERED

10. In forming the opinions set forth in this declaration, I have considered and analyzed the following material:

a. U.S. Patent No. 6,869,812 ("the '812 Patent");
b. The prosecution history of the '812 Patent;
c. References cited in the '812 Patent;
d. U.S. Patent No. 7,901,109 ("the '109 Patent");
e. The prosecution history of the '109 Patent;
f. References cited in the '109 Patent;
g. U.S. Patent No. 7,973,465 ("the '465 Patent");
h. The prosecution history of the '465 Patent;
i. References cited in the '465 Patent;
j. U.S. Patent No. 8,203,260 ("the '260 Patent");
k. The prosecution history of the '260 Patent;
l. References cited in the '260 Patent;
m. U.S. Patent No. 8,567,988 ("the '988 Patent");
n. The prosecution history of the '988 Patent;
o. References cited in the '988 Patent;
p. U.S. Patent No. 8,998,433 ("the '433 Patent");
q. The prosecution history of the '433 Patent;

r. References cited in the '433 Patent;
s. U.S. Patent No. 10,966,300 ("the '300 Patent");
t. The prosecution history of the '300 Patent;
u. References cited in the '300 Patent;
v. Plaintiff's Complaint for Patent Infringement;
w. Defendant's Opening Claim Construction Brief and Exhibits, including the Declaration of Dr. Gary Eden; and
x. Extrinsic Evidence cited in this declaration[1].

IV. APPLICABLE LEGAL STANDARDS

11. I am not an attorney, but I have been informed of the following legal standards and principles, which I have used and applied in forming the opinions set forth herein.

A. Claim Construction

12. I understand that deciding if a claim has been infringed directly is a two-step process. Claim construction is the first step in any infringement or validity analysis. Claims are construed in light of their explicit language as informed by their preambles, as well as the patent's specification, figures, and prosecution history.

13. I understand that the specification is the best source for understanding a technical term, to be supplemented, as needed, by the prosecution history. The prosecution history represents key evidence of how the examiner and the inventor construed the patent. I understand that claims should generally be interpreted in a manner consistent with other claims, as well as with the prosecution history. Claim terms in patents sharing a common specification and application should usually be given the same interpretation. I understand that it is not proper to confine a claim to a particular embodiment; the claim language itself is paramount.

14. I understand that extrinsic evidence may also be relevant to claim construction. Such evidence consists of all evidence extrinsic to the patent and its prosecution history, including

[1] Although listed here, the materials footnoted in this declaration were not used to form the basis for my opinions. Rather, they are intended to further demonstrate certain principles I discuss throughout this declaration.

expert and inventor testimony, dictionaries, and learned treatises. I understand that while extrinsic evidence can shed useful light on the relevant art, it is less significant than the intrinsic record in determining the legally operative meaning of claim language.

15. I understand that the prosecution history of a patent can often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention during prosecution, making the claim scope narrower than it would be otherwise. I understand that when the patentee unequivocally and unambiguously disavows a certain meaning to obtain a patent, the doctrine of prosecution history disclaimer narrows the meaning of the claim consistent with the scope of the claim surrendered.

16. I understand that a claim is invalid for indefiniteness only when its language, read in light of the specification and the prosecution history fails to inform, with reasonable certainty, those skilled in the art about the scope of the invention. The definiteness requirement mandates clarity while recognizing that absolute precision is unattainable. I understand that reasonable certainty does not require absolute or mathematical precision. I further understand that general principles of claim construction apply to determining whether a claim is indefinite.

V. LEVEL OF ORDINARY SKILL IN THE ART

17. I have been informed, and I understand, that the disclosure of a patent is to be viewed from the perspective of a person having ordinary skill in the art at the time of the alleged invention i.e., a "POSITA".

18. I have been informed, and I understand, that the prior art references can provide evidence of the level of ordinary skill in the art, and the factors that may be considered in determining this level of skill can include the educational level of the inventors, the types of problems encountered in the art, prior art solutions to those problems, the rapidity with which

innovations are made, the sophistication of the technology, and the educational level of others active in the field.

19. I understand that a POSITA is also expected to be a person of ordinary creativity, not an automaton, and further would have the capability of understanding the scientific and engineering principles applicable to the pertinent art.

20. I understand that the relevant time for the Asserted Patents ranges from May 13, 2003 to October 13, 2011.

21. It is my opinion that a POSITA during the relevant period would have possessed at least:

a. A bachelor's degree or equivalent in a relevant scientific, engineering or mathematical field (e.g. applied physics, physical chemistry, materials science, engineering, applied mathematics, manufacturing engineering or other interdisciplinary science or engineering degree);

b. Three or more years of technical experience in the semiconductor field;

c. At least one year of technical experience designing, commercializing, and manufacturing Light Emitting Diode (LED) chips or alternately LED discrete components, modules or assemblies directly incorporating LED chips;

d. A working knowledge of basic electronic, optical, and thermal principals; and

e. A working knowledge of measurement, process control and dimensional tolerancing principles fundamental to LED production and application.

Under this standard, I am at least a POSITA and was one on the earliest date to which the Asserted Patents claim priority.

22. My education and experience qualify me as at least a POSITA and give me expertise in the fields of LED chips, LED components, LED modules and LED lighting systems including the technologies described and claimed in the Asserted Patents. My close association

with hundreds of inventive and esteemed colleagues over three decades in the LED and LED lighting industries (including many credited as founders of the InGaN LED, power LED and LED Lighting revolution) further give me insight into what a POSITA knows, how a POSITA thinks and how a POSITA would interpret patent claim language such as the language from the Asserted Patents under consideration in this matter.

VI. THE '812 PATENT

A. Background of the '812 Patent

23. I have been asked to consider the construction of a certain claims in the '812 Patent employing the term "approximately", and my opinions regarding the term in dispute are below.

24. The '812 Patent describes a light emitting diode chip, and the method for forming the same, and teaches how to address deficiencies in the prior art. For context, here is an extract from the Brief Summary Of The Invention in the '812 Patent at 4:27-33:

> *"The present invention specifically addresses and alleviates the above mentioned deficiencies associated with the prior art. More particularly, the present invention comprises a light emitting diode chip having a substantially transparent substrate and having an aspect ratio which defines an elongated geometry, so as to provide enhanced efficiency and brightness, and a method for forming the same."*

25. Asserted Claims 1, 2 and 3 include the disputed term in question and claim, in part:

Claim 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.

Claim 2: The device as recited in claim 1, wherein the aspect ratio of the active area is greater than approximately 2 to 1.

Claim 3: The device as recited in claim 1, wherein the aspect ratio of the active area is between approximately 1.5 to 1 and approximately 10 to 1.

such as fashion to have minimal thermal resistance across their interface. Similarly, two articles can become mechanically integrated by virtue of being affixed with an adhesive or other mechanical bond that makes the two members act as one rigid body. The phrase "integrally affixed" thus can refer to a configuration that starts with a separate heat sink and solid state light that that are then made integral from a mechanical and thermal point of view through a number of known bonding measures. These examples of integral affixation embody the concept taught through Fig. 4B and its corresponding discussion.

47. Contrary to Dr. Eden's opinion, the meaning of the phrase "heatsink integrally affixed to the solid state light" was not restricted solely to the embodiment depicted in Fig. 4B. Rather, a POSITA would understand from the specification, claims and prosecution history of the '109 patent that Fig 4B and its corresponding discussion in the specification were exemplary of embodiments that integrally conjoined the heatsink and solid state light either by "integrally forming" the components together or "integrally affixing" the two distinct components such that they are integrated and not simply attached.

VIII. THE '465 PATENT

A. Background of the '465 Patent

48. I have been asked to consider the construction of certain terms in the '465 Patent arising in Claims 1, 2 and 3.

49. The '465 Patent describes various multilayer, phosphor bearing films. Asserted Claims 1, 2, and 3 are shown here:

> Claim 1: An apparatus comprising: a light emitting device; a phosphor bearing film arranged with the light emitting device, the phosphor bearing film comprising phosphor and a silicone carrier; and a cured silicone film on the phosphor bearing film, the cured silicone film being substantially free of phosphor.

Claim 2: The apparatus of claim 1, wherein the phosphor bearing film is 60%-80% phosphor.

Claim 3: The apparatus of claim 1, wherein the phosphor bearing film is at least partially on the light emitting device.

B. Construction of "a phosphor bearing film arranged with the light emitting device" (CL 1)

50. In the context of the patent and art, a POSITA would not find this term indefinite. Rather, a POSITA would understand that this phrase describes that phosphor bearing film as being within the LED component or module being described, and not disembodied and present in an indefinite location in some unrelated part of the system. In addition to being the only interpretation consistent with the patent title, abstract, specification and field of art, this is a common-sense reading of the word "with". It would not be a credible interpretation of the well understood word "with" to assume that it means "remote, detached and away from" unless redefined as such in the specification by the inventor which is not the situation at hand.

51. Thus, the existing claim language clearly establishes for a POSITA that the relative location of phosphor bearing film is not unbounded. I also note that during prosecution, the Patent examiner amended the claims to include the phrase "arranged with" in the claims, and in fact, inserted the phrase as part of an examiner's amendment. *See* Ex. K, Notice of Allowability, (February 18, 2011) at 2. Contrary to Dr. Eden's discussion, it is not clear from the prosecution history that the phrase was inserted "at the patentees" request. *See* Eden Decl. at p. 21. Rather, the prosecution states that the patentee "authorized" the examiner's amendment. *See* Ex. K, Notice of Allowability, (February 18, 2011) at 2.

52. A POSITA would further recognize that, although dependent claim 3 states that the phosphor bearing film is "at least partly on" the light emitting device and this means the independent claim is broader by virtue of claim differentiation, this does not imply that the broader

independent claim requires the phosphor bearing film to be entirely off the light emitting device. The specification states with respect to the multilayer phosphor bearing film that "[v]arious modifications to, and alternative configurations of, the multilayer bearing films presented throughout this disclosure will be readily apparent to those skilled in the art." '465 Patent at 6:50-54. In fact, a number of plausible alternative dispositions for the phosphor bearing film will be readily recognized as being encompassed by "with the light emitting device" but not necessarily "at least partially on the light emitting device". For example, the phosphor bearing film might be arranged adjacent to the light emitting device and thus beyond the scope of the dependent claim yet within the scope of the independent claim.

53. Dr. Eden makes much of the fact that the word "arranged" does not appear in specification and that it is not specifically defined. Eden Decl. at p. 21-22. However, in the context of the claim, and the broader phrase appearing in the claim, a POSITA would understand that the specification does discuss the scope of the invention to include various arrangements of the phosphor bearing film with the respect to the light emitting device. The specification states that "[v]arious elements may be shown in the drawings in a particular orientation. By way of example, the drawings may show one element on 'top' of or 'above; another element . . . It will be understood that the present invention is intended to encompass different orientations of an apparatus in addition to the orientation depicted in the drawing." '465 Patent at 3:13-19. As there is only one drawing, Fig. 3, that demonstrates an orientation of the phosphor with respect to the light emitting device, a POSITA would understand that the patentee's discussion of various "orientations" would correspond to the use of the phrase "arranged with" in the claims such not to restrict the claims to a particular orientation.

54. The term "arranged with" would be recognized by a POSITA to include a number

of possible arrangements such that the functionality of the LED and phosphor arrangement is maintained. Nevertheless, as I stated, at the farthest bounds, the phosphor would clearly not be arranged with the LED if it was not held within the LED assembly proximal to the LED in a fashion so as to receive electromagnetic radiation from the LED, such as if located in a separate part of the assembly facing away from the LED having no functional purpose with respect to the LED. The phrase would be obviously and naturally bounded in that an arrangement of phosphor with the LED must lead to their functional interaction as described in the specification.

C. Construction of "the phosphor bearing film is 60% - 80% phosphor" (CL 2)

55. In my opinion, a POSITA will see this language as a range of proportions in a mixture evaluated in terms of percent by weight. For mixtures of powders and fluids (e.g. phosphor and silicone), the most predictable way to specify % concentration is by weight. Weights are additive and essentially immutable, so the total mass or weight of a mixture of a powder and a liquid after mixing will be equal to the sum of the weights of the liquid and powder separately measured. If a mixture is formed from 6 g of phosphor and 4 g of other materials, then it is said to be 60% phosphor by weight because 6 / (6 + 4) = 0.60. If the mixture is formed from 8 g of phosphor and 2 g of other materials, it is said to be 80% phosphor by weight because 8 / (8 + 2) = 0.60. It should be understood that the term "by weight" is valid within the context of normal terrestrial conditions on the Earth's surface even though the portions of constituents are often specified in terms of mass (grams). The distinction between mass and weight for dimensionless ratios like concentration is not relevant if the force due to gravity is substantially constant as is the case for all situations under consideration.

56. Attempting to use an alternative definition of % concentration by volume can lead to confusing results when mixing dissimilar materials such as powders and liquids because the

resultant volume when mixing specified volumes of such materials may not be equal to their sum. For example, if one pours ¼ cup of water into 1 cup of course sand, the resultant volume will be 1 cup, not 1.25 cups even though the sum of the masses of the sand and water would equal the final mass of the mixture. A similar effect can occur when adding a dry powder such as a phosphor to a liquid such as uncured silicone. Additionally, the volume of a material like phosphor can change significantly with handling or processing. Like snow, it can start out fluffy with a very low density, but it also can be packed into a denser snowball occupying a much smaller volume and yet retaining the same mass and weight. The concentration of a constituent in a mixture characterized in terms of percent by volume might thus require additional definition if one of the materials can be readily packed in a manner that changes its density.

57. The Patentee provides additional justification for interpreting the claimed ranges of concentrations as measures by weight because the examples provided list all the portions of constituents of the example mixture in terms of their mass in grams (abbreviated "g" in the specification). *See* '465 Patent at 5:50-62. Conversely, the Patentee provides no examples in the specification of formulations prepared with portions measured in volume and nowhere does the Patentee otherwise suggest one should measure components of a mixture by volume. Since a POSITA would normally interpret a % concentration for mixtures of dissimilar materials as % by weight to avoid the confusion associated with an interpretation by volume and since the Patentee has solely taught preparation of mixtures using portions evaluated by weight, the only logical interpretation of this claim to a POSITA would be that the specified ranges are meant as percentages by weight.

"Power rail can be defined as the voltage source within the device from which its various functions can draw power."[7]

"A power rail is all or part of a plane layer that is used for some voltage. In virtually all printed circuit boards, some signals, often half of them, have to be routed over the power layers."[8]

"A computer's power supply converts AC power into several DC voltages (typically plus and minus 3.3v, 5v and 12v), each of which is known as a rail. The term comes from the power lines on motherboards. Power must be available throughout a motherboard; hence, voltage lines tend to run in long strips like railroad tracks."[9]

"At the top of the standard cell, there is VDD rail and bottom there is a VSS rail. Both the Power rails are drawn in the Metal-1 layer. In between the VDD rail and VSS rail there are three main regions, a nwell region, a gap of nwell and pwell and pwell region. nwell region is near to the VDD rail and pwell region is near the VSS rail. pMOS transistors are build inside the nwell, so all the pMOS transistors are in the top half of the cell and similarly, all nMOS are in the bottom half of the standard cell."[10]

99. Given that "power rails" is a term so well recognized in electronics and the present art and, given that the Inventors' use of the term within the specification, figures and subject claims is consistent and compatible with the common meaning to POSITAs, it requires no further interpretation in my opinion.

100. I reserve the right to modify and supplement my opinions in the future to respond to new arguments raised and to take into account new information as it becomes available to me.

101. I hereby declare all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true.

Dated: February 17, 2023 John K. Roberts

2/17/2023

[7] Ex. T, https://www.sciencedirect.com/topics/engineering/power-rail
[8] Ex. P, https://resources.altium.com/p/why-power-rails-need-be-low-impedance
[9] Ex. Q, https://www.pcmag.com/encyclopedia/term/rail#:~:text=A%20computer%27s%20power%20supply%20converts%20AC%20power%20into,to%20run%20in%20long%20strips%20like%20railroad%20tracks
[10] Ex. R, https://teamvlsi.com/2020/05/standard-cells-in-asic-design-standard-cells-in-vlsi.html